ACCT 200  SURVEY OF ACCOUNTING  4
Survey of financial and managerial accounting concepts for the non-business major. Students learn about financial statements for merchandising, manufacturing, and service companies. Topics include: accounting cycle, budgeting, standard cost, contribution margins, cost-volume-profit analysis, and decision making.
REQUIREMENTS: No credit granted for majors within the accounting or business degree programs.

ACCT 207  ACCOUNTING I  3
REQUIREMENTS: Not open to freshmen.

ACCT 208  ACCOUNTING II  3
Introduction to managerial accounting. Topics: manufacturing accounting, cost-volume-profit analysis, job-order accounting, budgeting, standard costs and variance analysis, contribution approach to decision analysis, absorption and variable costing.
REQUIREMENTS: Not open to freshmen. Requires a grade of C- or better in ACCT207.

ACCT 302  ACCOUNTING INFORMATION SYSTEMS  3
Accounting information and its place within an organization's overall management information system. Emphasis on information and document flow, internal control, data organization, and design, development, and audit of computer-based accounting systems. Includes some computer work.
REQUIREMENTS: ACCT208, MSYS160 or CISC101. RESTRICTIONS: Requires sophomore status.

ACCT 315  INTERMEDIATE ACCOUNTING I  3
In-depth coverage of financial accounting. Topics include: environment and conceptual framework of financial accounting; review of the accounting process; preparation of financial statements; recognition and measurement of current assets, property, plant and equipment and current liabilities.
REQUIREMENTS: ACCT207, ACCT208. RESTRICTIONS: Requires sophomore status.

ACCT 316  INTERMEDIATE ACCOUNTING II  3
Continuation of ACCT315. Topics include: recognition and measurement of investments, long-term liabilities and stockholders' equity; dilutive securities and earning per share calculations; revenue recognition; accounting for income taxes, pensions and leases; accounting changes and error analysis; financial reporting and changing prices; preparation of the statement of cash flows; and disclosure requirements in financial reporting.
REQUIREMENTS: ACCT207, ACCT315. RESTRICTIONS: Requires junior status and a grade of C- or better in ACCT315.

ACCT 327  Cost Accounting  3
Process, job order and standard costing; variable and absorption costing; budgeting, decentralized, and transfer pricing; and cost analysis for managerial applications.
REQUIREMENTS: ACCT208. RESTRICTIONS: Requires sophomore status.

ACCT 350  BUSINESS LAW I  3
Formation, use and performance of contracts, including both Common Law and the Uniform Commercial Code (Article 2, Sales). Other topics covered include product liability, negotiable instruments and accountants' legal liability.
REQUIREMENTS: Requires junior status.

ACCT 351  BUSINESS LAW II  3
Covers variety of areas of law, including agency, partnerships, corporations, unfair competition, debtor-creditor relationships, bankruptcy, secured transactions, real and personal property, wills and trusts.
REQUIREMENTS: ACCT350. RESTRICTIONS: Requires junior status.

ACCT 352  LAW AND SOCIAL ISSUES IN BUSINESS  3
REQUIREMENTS: Not open to accounting majors. Requires junior status.

ACCT 363  SERVICE LEARNING AND EARNED INCOME TAX CREDIT  1-3
Requires 8-12 hours of training in tax preparation for people with incomes low enough to qualify for the EITC (Earned Income Tax Credit). In addition, at least 34 hours of service preparing returns for this type of taxpayer is expected.

ACCT 364  ACCOUNTING IN PRACTICE  1-3
Requires at least 120 hours of an accounting-related internship with verification by the hiring company. Term paper relating the real-world duties and experiences of the internship to principles learned in traditional accounting courses also required.
REQUIREMENTS: ACCT315, ACCT327. RESTRICTIONS: Requires permission of instructor.

ACCT 366  INDEPENDENT STUDY  1-6

ACCT 395  SEMINAR: INTERNATIONAL ACCOUNTING  3
Seminar on selected topics in international accounting. Combines lectures and visits to local organizations.
REQUIREMENTS: ACCT207. RESTRICTIONS: Taught abroad.

ACCT 410  THEORY OF EXTERNAL REPORTING  3
Covers the traditional model of accounting for information users external to the firm as well as modern descriptive research. Examines institutional environment and impact of the organization on development of accounting theory and practice.
REQUIREMENTS: ACCT 316. RESTRICTIONS: Accounting junior or senior status.

ACCT 413  INCOME TAX ACCOUNTING  3
Analysis of recent revenue acts; use of federal law and regulations to determine tax liability.
REQUIREMENTS: ACCT315. RESTRICTIONS: Requires junior status and a grade of C or better in ACCT315.

ACCT 414  ADVANCED FEDERAL INCOME TAXATION  3
Introduction to tax research and corporate and partnership tax laws. Introduces research tools useful for analyzing tax issues. Student uses acquired skills to explore corporate and partnership taxation concepts.
REQUIREMENTS: ACCT413.

ACCT 415  ADVANCED ACCOUNTING  3
Introduction to branch accounting, consolidations, partnerships, fund accounting for state and local governments, and accounting for international transactions. Other relevant topics may also be covered.
REQUIREMENTS: ACCT316. RESTRICTIONS: Requires senior status and a grade of C minus or better in ACCT316.

ACCT 417  AUDITING  3
Introduction to standards and procedures underlying contemporary auditing. Topics include ethics, legal liability, internal control, audit evidence, audit reports, statistical sampling, the audit of computerized systems, operational auditing, other engagements and services.
REQUIREMENTS: ACCT316. RESTRICTIONS: Requires senior status and a grade of C or better in ACCT316.

ACCT 418  ESTATE PLANNING  3
Focuses on the efficient conservation and transfer of wealth. Studies the legal, tax, financial, and non-financial aspects of this financial planning process, covering topics such as trusts, wills, probate, advance directives, gift planning, wealth transfers, and related taxes.
REQUIREMENTS: ACCT 350 or ACCT 352.

ACCT 425  STRATEGIC INFORMATION SYSTEMS AND ACCOUNTING  3
Explores the role of accounting and information systems in accomplishing the strategic goals of the corporation. Students exposed to accounting information from large data bases, enterprise-wide computing environments and cases and projects related to strategic problem solving across functional areas of business.
REQUIREMENTS: ACCT302 and ACCT316. RESTRICTIONS: Accounting majors only.

ACCT 466  INDEPENDENT STUDY  1-6

ACCT 483  INTRODUCTION TO INTERNATIONAL ACCOUNTING  3
Describes the functions of international accounting; foreign currency transactions, financial statement translation, inflation, auditing and taxation. Current issues are covered as appropriate.
REQUIREMENTS: ACCT207.

ACCT 516  SEMINAR-INTERMEDIATE TOPICS  3
Provides a foundation for knowledge as professional accountants in intermediate financial accounting topics under US GAAP. Material included goes beyond the basics for analyzing and recording advanced accounting transactions.

ACCT 614  ADVANCED FEDERAL INCOME TAXATION  3
Introduces master's student to techniques and tools of technical tax research. Using these developing skills, student begins exploration of the corporate and partnership taxation areas.
REQUIREMENTS: ACCT413 or comparable undergraduate accounting course.

ACCT 800  FINANCIAL REPORTING AND ANALYSIS  3
Surveys concepts underlying financial accounting and external reporting. Provides an understanding of accounting methods, standards, and terminology so that students can interpret and evaluate financial statements. Students are encouraged to participate in class and group discussions involving contemporary investment issues and decisions.
REQUIREMENTS: Not open to M.S. in Accounting students.
ACCT 801 MANAGEMENT ACCOUNTING AND CONTROL 3
Examines the use and impact of accounting information on decision making and strategic choice and on the role of information in organization control.
PREREQ: ACCT800 or equivalent and FINC850.

ACCT 804 DATABASE DESIGN, NETWORKS AND IMPLEMENTATION 3
Covers the design and implementation of enterprise databases in a business environment. Special consideration will be placed on issues related to systems in a networked setting, including current topics related to the management and implementation of databases in such systems.
RESTRICTIONS: Open to business and accounting graduate students only.

ACCT 805 CURRENT ISSUES IN MANAGEMENT INFORMATION SYSTEMS 3
Addresses current information technology challenges facing today’s corporate management. Although content will constantly change to reflect current technology and emerging issues, topics include: ethics, management of the impact of new information systems on corporate environments, implementation issues, and changing systems in a global environment.
RESTRICTIONS: Open to business and accounting graduate students only.

ACCT 806 SYSTEMS ANALYSIS, DESIGN AND IMPLEMENTATION 3
Explores the management, organizational and technical challenges of developing systems. Analyzes business processes within a data-driven development methodology. Students will elicit requirements, weigh alternatives and design and implement solutions. Data, process and object modeling will be covered.
PREREQ: ACCT804 RESTRICTIONS: Open to Master Students in Information Systems & Technology Management, Accounting, and MBA majors with a concentration in Information Technology.

ACCT 810 THEORY OF EXTERNAL REPORTING 3
Study of contemporary models of accounting for information users external to the firm. Includes an examination of the institutional environment and the impact of the institutions on the development of accounting theory and practices.
PREREQ: ACCT316

ACCT 811 ADVANCED MANAGEMENT ACCOUNTING 3
Examination of concepts and rationale underlying managerial accounting methods; Advanced topics in decision analysis, standard costing and performance measurement.
PREREQ: ACCT327

ACCT 812 CORPORATE TAX PLANNING AND DECISION MAKING 3
Topics include gross income; business deductions and credits; taxable entities; special limitations on business and passive activity losses; compensation planning; tax factors in the acquisition; use of the disposition of fixed assets; nontaxable transaction; and family tax planning.
RESTRICTIONS: Not open to students with prior tax courses.

ACCT 817 INFORMATION TECHNOLOGIES AUDIT 3
Analysis of current and prospective developments in professional auditing. Topics include auditing computerized systems and the use of statistical sampling by the auditor.
PREREQ: ACCT417

ACCT 820 FINANCIAL STATEMENT ANALYSIS 3
Examines contemporary aspects of financial statement analysis such as the supply and demand for accounting information, statistical properties of accounting numbers and the impact of information on securities prices.
PREREQ: ACCT800 or ACCT316.

ACCT 840 CONTEMPORARY ISSUES IN ACCOUNTING 3
Selected problems of current interest to the accounting profession.
PREREQ: ACCT316 and ACCT327 RESTRICTIONS: Requires permission of instructor.

ACCT 857 PRIVATE EQUITY & VENTURE FINANCE 3
Understanding of economic role of private equity and venture capital, the structure of the industry, and the forces that shape its development. Develop analytical deal-structuring techniques, interact with private equity professionals, and learn about unique risks of private equity investing. Crosslisted with FINC857. PREREQ: ACCT800 and FINC850 or equivalent.

ACCT 868 RESEARCH 1-6

ACCT 883 INTERNATIONAL ACCOUNTING 3
Describes functions of international accounting: foreign currency transactions, financial statement translation, inflation, auditing, and taxation. Comparative approach is stressed. Current issues are covered as appropriate.
PREREQ: ACCT800 or ACCT316.

AFSC 110 FOUNDATIONS OF THE UNITED STATES AIR FORCE I 1
Survey course which briefly covers topics relating to the Air Force and defense. Focuses on the structure and missions of Air Force organizations, officership and professionalism. Introduction into the use of communication skills.

AFSC 111 FOUNDATIONS OF THE UNITED STATES AIR FORCE II 1
Continuation of AFSC110. Survey course which briefly covers topics relating to the Air Force and defense. Focuses on the structure and missions of Air Force organizations, officership and professionalism. Introduction into the use of communication skills.

AFSC 150 INITIAL MILITARY TRAINING I 0 PF
This course (to be taken in conjunction with AFSC 110 and AFSC 111 respectively) is a weekly laboratory that touches on the topics of Air Force customs and courtesies, health and physical fitness, and drill and ceremonies.
COREQ: AFSC110. RESTRICTIONS: Open to freshmen and sophomores.

AFSC 151 INITIAL MILITARY TRAINING II 0 PF
Continuation of AFSC150. Provides instruction on the ROTC program and an overview to Air Force skills and life.
COREQ: AFSC111 RESTRICTIONS: Open to freshmen and sophomores.

AFSC 210 EVOLUTION OF UNITED STATES AIR AND SPACE POWER I 1
Survey course focused on the beginnings of manned flight and the development of aerospace power in the United States, including the employment of air power in WWII, Vietnam, Korea, and the Gulf War and the peaceful employment of U.S. air power in civic actions, scientific missions and support of space exploration.

AFSC 211 EVOLUTION OF UNITED STATES AIR AND SPACE POWER II 1
Continuation of AFSC210. Survey course focused on the beginnings of manned flight and the development of aerospace power in the United States, including the employment of air power in WWII, Vietnam, Korea, the Gulf War and the peaceful employment of U.S. air power in civic actions, scientific missions and support of space exploration.

AFSC 250 FIELD TRAINING PREPARATION I 0 PF
This course (to be taken in conjunction with AFSC 210 and AFSC 211 respectively) provides you with the opportunity to demonstrate fundamental management skills and prepares you for Field Training.
RESTRICTIONS: Open to sophomores and juniors. Required for all cadets planning to attend field training in the next year.

AFSC 251 FIELD TRAINING PREPARATION II 0 PF
This course (to be taken in conjunction with AFSC 210 and AFSC 211 respectively) provides you with the opportunity to demonstrate fundamental management skills and prepares you for Field Training.
RESTRICTIONS: Open to sophomores and juniors. Required for all cadets planning to attend field training in the next year.

AFSC 310 LEADERSHIP STUDIES I 3
This course is a study in the anatomy of leadership, the need for quality and management leadership, the role of discipline in leadership situations and the variables affecting leadership. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts. Deal with actual problems and complete projects associated with planning and managing the Leadership Laboratory.
RESTRICTIONS: Students must complete Air Force Field Training the summer prior to enrolling in AFSC310. This training is an initial component of the coursework contained in the class.

AFSC 311 LEADERSHIP STUDIES II 3
Continuation of AFSC 310. This course is a study in the anatomy of leadership, the need for quality and management leadership, the role of discipline in leadership situations and the variables affecting leadership. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts. Deal with actual problems and complete projects associated with planning and managing the Leadership Laboratory.

AFSC 350 INTERMEDIATE CADET LEADER TRAINING I 0 PF
This course (taken in conjunction with AFSC 310 and AFSC 311 respectively) provides you the opportunity to develop your fundamental management skills while planning and conducting cadet activities.
COREQ: AFSC310. RESTRICTIONS: Restricted to those cadets who have completed Field Training.
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

**AGED 448**  **STUDENT TEACHING SEMINAR**  3
Provides support to undergraduates during their student teaching experience. Covers various aspects of professional development, portfolio development, and classroom management.
COREQ: EDUC400.

**AGED 466**  **INDEPENDENT STUDY**  1-6

**AGED 480**  **METHODS OF TEACHING AGRICULTURE AND TECHNOLOGY EDUCATION I**  3
Teaching methods, treatment of aims, materials, unit organization, evaluation and teaching techniques. Participation in career and technical student organization activities required.
PREREQ: Students must show evidence of passing Praxis I. RESTRICTIONS: School practicum of 12 hours required.

**AGED 481**  **METHODS OF TEACHING AGRICULTURE AND TECHNOLOGY EDUCATION II**  3
Methods of teaching and organization in supervised career and technical programs, applied technical skills and adult education and community activities. Participation in career and technical student organization activities required.

**AGED 600**  **INTERNSHIP IN TEACHING**  9
Fourteen week teaching internship experience in 7th-12th grade schools under the guidance and supervision of a cooperating teacher in the classroom and a University of Delaware supervisor.
PREREQ: Must show evidence of passing Praxis I.

**AGED 625**  **AGRICULTURAL LEADERSHIP: TOOLS AND TECHNIQUES**  3
Topics include leadership theories, team work, facilitation, internet research, problem solving and facilitating team activities focused on the agricultural industries and professions.

**AGED 626**  **GLOBAL LEADERSHIP PERSPECTIVES IN AGRICULTURE**  3
Designed to help people in agriculture organizational environments, today and in the future, learn leadership skills which are effective with individuals from different cultures and are based in several locations and time zones.

**AGED 630**  **WORKING WITH ADVISORY COUNCILS**  3
Organize, manage, and follow-up advisory council meetings. Skill development includes working with small groups, strategic planning, conflict management, and communication.

**AGED 648**  **STUDENT TEACHING SEMINAR**  3
Provides support to graduates during their student teaching experience. Covers various aspects of professional development, portfolio development and classroom management.
PREREQ: Completion of at least 21 graduate credits toward master's degree and evidence of passing Praxis II content area as required by the State of Delaware.
COREQ: AGED600.

**AGED 666**  **SPECIAL PROBLEM**  1-12

**AGED 680**  **METHODS OF TEACHING AGRICULTURE AND TECHNICAL EDUCATION I**  3
Teaching methods, treatment of aims, materials, unit organization, evaluation and teaching techniques. Participation in career and technical student organization activities required.
PREREQ: Students must show evidence of passing Praxis I. RESTRICTIONS: School practicum of 12 hours required.

**AGED 681**  **METHODS OF TEACHING AGRICULTURE AND TECHNOLOGY EDUCATION II**  3
Methods of teaching and organization in supervised career and technical programs; applied technical skills and adult education and community activities. Participation in student career and technical activities required.

---

**AGRI 164**  **PRACTICAL TEAMWORK EXPERIENCE**  1-3
Examines roles of leaders, strategies for working in teams, and principles of event planning. The final project is the planning and execution of Ag Day, a college-wide community event.
RESTRICTIONS: Limited to majors in the College of Agriculture and Natural Resources.
AGRI 165  MASTERING THE FRESHMAN YEAR  1 PF
Focusses on academic services, career exploration and preparation, campus resources, and practical skills that are helpful in mastering the freshman year. RESTRICTIONS: Limited to freshmen in the College of Agriculture and Natural Resources.

AGRI 211  LITERATURE OF THE AGRICULTURAL AND LIFE SCIENCES  1
Promotes familiarity with arrangement of the card catalog, guides to literature, indexes to periodical literature, abstracting services, bibliographic form, and scientific papers and reports. Aids students in scientific writing and reporting. RESTRICTIONS: Not open to freshmen.

AGRI 212  ORAL COMMUNICATION IN AGRICULTURE AND NATURAL RESOURCES  3
Introduces basic communication principles and provides a series of experiences designed to develop skills needed for oral presentations and other forms of public and interpersonal communication.
RESTRICTIONS: Open to majors only.

AGRI 399  TEACHING ASSISTANT  1-4 PF
Practical teaching experience. Students participate and assist in instruction of an undergraduate course.
PREREQ: Must have taken the course for which assisting, or have equivalent experience. RESTRICTIONS: An overall GPA of 2.5 or better is required. Maximum of 4 credits may count toward graduation.

ANIMAL AND FOOD SCIENCES

ANFS 100  ANIMALS AND HUMAN CULTURE  3
Animals have important roles in human society and their significance varies across diverse cultural settings. Explore human-animal interactions on issues related to food and fiber production, welfare, conservation, research, work and service, natural and man-made disasters, zoonotic disease, and human health.

ANFS 101  ANIMALS, SCIENCE AND SOCIETY  3
An introduction to the understanding of how domestic food animals function -- genetics, nutrition, reproductive physiology, behavior and animal health. The course begins with a dialogue about the human-animal bond and the role of animals in society, and ends with the discussion of how agricultural animals are managed to produce safe and healthy food.
RESTRICTIONS: ANFS111 mandatory for majors, optional for nonmajors. Offered in Fall only.

ANFS 102  FOOD FOR THOUGHT  3
Overview of our foods today including how the composition, safety, processing, and chemistry influence our choices and overall production of food. The effects of social influences and marketing of foods will be discussed as these are important consideration for individuals and food companies.

ANFS 111  ANIMAL AND FOOD SCIENCE LABORATORY  1
Laboratory providing the opportunity to handle animals and to become familiar with common management practices associated with the production of animals and food.
COREQ: ANFS101. RESTRICTIONS: Corequisite mandatory for majors, optional for nonmajors. Offered in Fall only.

ANFS 140  FUNCTIONAL ANATOMY OF DOMESTIC ANIMALS  4
Identification of relationship between form and function in domestic farm animals. Comparative examination of body systems in order to better understand the various management practices employed in animal agriculture. Serves as prerequisite for advanced departmental courses.
RESTRICTIONS: Offered in Spring only.

ANFS 159  TOPICS IN FOOD SCIENCE  1
Introduction to the area of food science and technology. Topics include product development, current food controversies, fundamental issues in food processing, food safety and food manufacturing. Primarily taught using a problem-based learning format.

ANFS 165  FRESHMAN FIRST YEAR EXPERIENCE  1
Provides practical skills that foster academic and social competencies necessary for success in college. Focuses on academic services, campus resources, career exploration and preparation.
RESTRICTIONS: Limited to freshmen majors.

ANFS 166  SPECIAL PROBLEM  1-3
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

ANFS 206  FARM TO TABLE  3
How does food get from the farm to your table? Explore traditional agriculture and contemporary food production models like Community Supported Agriculture (CSA), community gardens and the local food movement. Learn about new crops and dietary strategies that can be incorporated into the way people eat today. Examine cultural influences on food production and consumption patterns, and biocultural aspects of nutrition. Students will complete several projects that include interviews, research, food shopping excursions, film critiques and menu planning. Students will volunteer at the Delaware Food Bank and/or Gardens for the Community.
Crosslisted with PLSC206.

ANFS 220  INTRODUCTION TO EQUINE SCIENCE  3
An overview of equine science which focuses on the unique equine biology, function and husbandry of the horse.

ANFS 230  FOODBORNE DISEASES: INVESTIGATING OUTBREAKS  3
An introduction to basic epidemiology and a critical review of contemporary food- and water-borne outbreaks. Presents current issues in light of developments related to food safety and public health. Emphasis on emerging pathogens, virulence factors, epidemiological techniques, rapid detection methods, and quantitative risk assessment.

ANFS 241  INTRODUCTION TO EQUINE NUTRITION  3
Principles of nutrition applied to the feeding management of horses. Focus on the nutritional requirements of horses for growth, reproduction and work. Discussion of the advantages and disadvantages of common feedstuffs for horses, formulating equine diets, and addressing nutritional requirements in real-life situations.
PREREQ: ANFS101.

ANFS 251  ANIMAL NUTRITION  4
Comparative study of digestive anatomy, the nutrients, their metabolism and physiological function in domestic food animals. Emphasis on effects of nutrition on productivity, health and well-being of animals. Includes laboratory/discussion section on animal feeds and feed ingredients.
PREREQ: ANFS101.

ANFS 261  PRINCIPLES OF PET NUTRITION  3
A broad overview of the principles of nutrition as they are applied to pets and companion animals.

ANFS 265  PERSPECTIVES IN CAREER AND PROFESSIONAL DEVELOPMENT  1
Emphasis on career discovery and development in the area of animal and food science. Preparation for professional schools including veterinary and graduate programs. Explore current and future trends in fields of animal science, food science and technology, research, teaching, and animal agriculture.

ANFS 266  SPECIAL PROBLEM  1-3
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

ANFS 270  BIOTECHNOLOGY: SCIENCE AND SOCIOECONOMIC ISSUES  3
Introduction to agricultural biotechnology and socio-economic issues. Introduces genetic engineering and the basic scientific theory and the applications of biotechnology in agriculture production and research. Presents issues surrounding biotechnology-risk and technology assessment, animal rights, public and private research interface, media and environmental perspectives, consumer acceptance, regulation and economic development.
May be crosslisted with APEC270, PLSC270.

ANFS 300  PRINCIPLES OF ANIMAL AND PLANT GENETICS  3
Introduction to the theory and application of genetics as related to the improvement of plants and animals. May be crosslisted with ENWC300, PLSC300. PREREQ: PLSC101 or BISC207 or BISC208.

ANFS 305  FOOD SCIENCE  3
Composition, structure and functional properties of food and the fundamentals of commercial food processing. Discussion and video demonstrations of various food processing and preservation methods and the effects of ingredient manipulation.

ANFS 310  ANIMAL AND PLANT GENETICS LABORATORY  1
Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems.
May be crosslisted with ENWC310, PLSC310. COREQ: ANFS300.
ANFS 315 FOOD SAFETY FROM FARM TO FORK 3
Examines safety issues in major food production systems in plants and animals (dairy, beef, swine, poultry, seafood). Study of government regulation, the use of antimicrobials and pesticide residues. Explores the consumer's perception of biotechnology, organic farming, and post-harvest handling of agricultural commodities. PREREQ: BISC207 or equivalent. RESTRICTIONS: Offered in Spring semester.

ANFS 324 EQUINE DISEASE AND LAMENESS 3
A study of infectious and non-infectious diseases common to the horse. Principles of pathophysiology, manifestation, prevention, and control of disease will be emphasized. Approximately one third of course content will include types, cause, prevention, and management of musculoskeletal disease (lameness) in the horse.

ANFS 332 INTRODUCTION TO ANIMAL DISEASES 3
Develop an appreciation for the nature and mechanisms of disease conditions and processes in agricultural and domestic animal species through an understanding of basic immunology, microbiology and virology. PREREQ: ANFS140.

ANFS 350 ANIMAL BEHAVIOR 3
Introduction to domestic and companion animal behavior, in relation to animal management, production, and welfare. Lectures cover animal behavior and its basis, including genetic, physiological and environmental factors, as well as different types of behavior, including communication, feeding, social, parental, and others. PREREQ: ANFS101 OR BISC208. RESTRICTIONS: Offered Fall of odd-numbered years.

ANFS 366 INDEPENDENT STUDY 1-6
RESTRICTIONS: Contract must have department chair signature. Independent Study to involve library or lab research.

ANFS 390 HONORS COLLOQUIUM 3
First year interdisciplinary honors seminar. May be team-taught, specific topics vary.

ANFS 399 TEACHING ASSISTANT 1-2 PF
Practical teaching experience. Students participate and assist in instruction of an undergraduate course. RESTRICTIONS: A GPA of 2.75 (3.0 in major) is required. Students must have taken the course or have equivalent experience.

ANFS 402 FORAGE RESOURCE MANAGEMENT 3
Exploration of the various grasses, legumes, and forbs that have a potential as forage crops. Discussions will cover characteristics of each species that make it suited for a particular type of forage use. Cultural practices for successful plantings, maintenance, harvest and storage and preservation will be covered. Crosslisted with PLS1C44.

ANFS 404 DAIRY PRODUCTION 4
A study of nutrition, reproduction, physiology, health, and management as they relate to modern dairy production. PREREQ: ANFS301. RESTRICTIONS: Offered in Spring of odd-numbered years. Laboratory requires some out of class time for hands-on experience in animal production facilities.

ANFS 409 FOOD PROCESSING 4
Covers the rationale and history of food processing; organizing unit operations; the maintenance of food quality including food palatability and nutritive value; separation technology including initial operations, size reduction, mixing, filtration, centrifugation and crystallization; and preservation methods including fresh food storage, low temperature and high temperature methods.

ANFS 411 FOOD SCIENCE CAPSTONE 4
A capstone course for seniors to complete food science learning experience by participating in a food product development team that simulates the real-world operation and requires integrated knowledge in areas of general food science, food chemistry, food analysis, food microbiology and food processing. PREREQ: ANFS428, ANFS429, ANFS409 and ANFS439.

ANFS 415 DEVELOPMENTAL BIOLOGY 3
Explore mechanisms underlying development. Topics: gamete interactions, establishment of body plans, cell signaling and tissue interactions, morphogenetic pattern formation, developmental regulation of gene expression, molecular control of tissue specification and diversification, and the evolutionary comparison of developmental processes. Diseases resulting from developmental defects will be discussed. Crosslisted with BISC415. PREREQ: BISC207 and BISC208.

ANFS 417 BEEF CATTLE AND SHEEP PRODUCTION 4
Principles of modern beef cattle and sheep production; nutrition, reproduction, housing, health and management. PREREQ: ANFS101 and ANFS251. RESTRICTIONS: Laboratory requires some out-of-class time for hands-on experience in animal production.

ANFS 418 SWINE PRODUCTION 4
Principles of modern swine production: nutrition, reproduction, housing, health and management. PREREQ: ANFS101 and ANFS251. RESTRICTIONS: Laboratory requires some out-of-class time for hands-on experience in animal production. Offered in Spring of even-numbered years.

ANFS 419 TOPICS IN INTERNATIONAL ANIMAL AGRICULTURE 3-4
Instruction in animal production taught as part of a study abroad course. Topics vary with program location and focus. PREREQ: ANFS101.

ANFS 420 EQUINE REPRODUCTIVE MANAGEMENT 4
Provides in-depth study of the anatomy, endocrinology, physiology, behavior, and management of the mare, stallion, and foal. Laboratory provides opportunity to care for a pregnant mare, to be present at foaling, and care for newborn foal. PREREQ: ANFS101 and ANFS220 or permission of instructor.

ANFS 421 POULTRY PRODUCTION 3
Application of the fundamental principles of incubation, feeding, brooding, growing, disease control, processing and marketing as applied to broilers, heavy breeders and commercial egg producers. PREREQ: ANFS101 and ANFS140 or permission of instructor. RESTRICTIONS: In order to obtain DLE credit student must also successfully complete ANFS422 (Poultry Production, 3 credit). Requires additional hands-on experience outside of class.

ANFS 422 POULTRY PRODUCTION LABORATORY 1
Fundamental principles of incubation, feeding, brooding, growing, disease control, processing and marketing as applied to broilers, heavy breeders and commercial egg producers. Requires additional hands-on experience outside of class. PREREQ: ANFS101 and ANFS140 or permission of instructor. RESTRICTIONS: In order to obtain DLE credit student must also successfully complete ANFS421 (Poultry Production, 3 credit).

ANFS 424 NONRUMINANT NUTRITION 3
Advanced comparative study of digestion, absorption and metabolism of nutrients in terms of the needs of nonruminant animals. Application of principles to swine, poultry and equine nutrition. PREREQ: ANFS253, CHEM214. RESTRICTIONS: Offered in Spring of odd-numbered years.

ANFS 426 EQUINE MANAGEMENT 4
Application of scientific principles of nutrition, health care, behavior, reproduction, and farm management to the discipline of horse management. Laboratory provides hands-on experience. Intended for students interested in the horse industry. ANFS 220 or previous equine experience is recommended. Laboratory may require some out of class time for hands-on experience.

ANFS 428 FOOD CHEMISTRY 4
Composition of food materials, reaction mechanisms leading to deterioration; and interaction of food components to form desirable and undesirable products, pigments, characterization of food polymers. Effect of physical and chemical factors on the structure and functionality of food. PREREQ: CHEM214 or CHEM527.

ANFS 429 FOOD ANALYSIS 4
Theory and practice of food analysis. Determine the chemical composition and characteristics of food. Introduction to instrumentation; spectroscopy, chromatography, electrophoresis, enzyme analysis and titration. Critically examine food analytical methods and data from journal articles including official AOAC and AACC methods and prepare scientific reports and presentations including a scientific poster. PREREQ: CHEM214 or CHEM527, and CHEM220.

ANFS 432 DISEASE PATHOGENESIS IN ANIMALS 3
An introduction to host (immunological/physiological/genetic) and environmental (viruses/toxins/nutrition/temperature/other) factors which contribute to disease pathogenesis in animals. Encompasses microbial infections, allergic responses, autoimmunity, malignancy, organ-specific syndromes, the stress response, and aging. PREREQ: BISC208 or ANFS332.

ANFS 435 ANIMAL VIROLOGY 3
Lecture-based introduction to virus functional characterization; including, classification methods, replication strategies and pathogen-host interactions. Content stresses current methods in diagnosis and analysis of viruses associated with important animal diseases. PREREQ: BISC300.
ANFS 436 IMMUNOLOGY OF DOMESTIC ANIMALS 3
Comparative study of the immune response of domestic animals including dog, cat, horse, pig, chicken and others. General topics include ontogeny of the immune system, reproductive immunity, neonatal immunity, immunodeficiencies and autoimmunity.
PREREQ: ANFS332 and BISC207. RESTRICTIONS: Offered in Fall of even-numbered years.

ANFS 439 FOOD MICROBIOLOGY 4
The role and significance of microorganisms in foods with particular reference to food spoilage, preservation, fermentation, sanitation and poisoning. Current methodology used in the microbiological examination of foodstuffs.
PREREQ: BISC300.

ANFS 440 COMPARATIVE HISTOPATHOLOGY 4
Comparative Histopathology explores the light and electron microscopic structure of normal and diseased cells, tissues, and organ systems. Lectures will emphasize normal tissue and organ architecture, while correlating structure to function in health and disease. Associated laboratories will focus on tissue and lesion identification with an introduction to fundamental pathologic processes encountered in living tissues.
PREREQ: BISC208 or by permission of instructor. RESTRICTIONS: ANFS140 (Functional Anatomy) or equivalent anatomy course is highly recommended.

ANFS 441 REPRODUCTIVE PHYSIOLOGY OF DOMESTIC ANIMALS 3
Emphasis on physiological and reproductive function in males and females, comparative aspects of reproductive function and opportunity for enhancing production through newer management practices. Discussion and laboratory involve both classic and current state of knowledge in mammalian and avian reproduction.
PREREQ: ANFS140. BISC306 strongly recommended.

ANFS 442 LACTATIONAL PHYSIOLOGY 3
Physiology and metabolism of lactation are evaluated at the cellular, tissue, organ, and whole animal levels. Emphasis areas include nutrient biochemistry, endocrinology, the nervous system, and mammary gland structural response to stage of reproduction. Examples primarily come from commercial dairy species, rodents, and humans.
PREREQ: ANFS140.

ANFS 443 FOOD ENGINEERING TECHNOLOGY 4
Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations. May be crosslisted with BREG445. PREREQ: PHYS201. RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

ANFS 445 COMPARATIVE PHYSIOLOGY OF DOMESTIC ANIMALS 3
Provides with an in-depth knowledge of the physical, biological and chemical principles that underlie life processes at all levels of organization: molecular, cellular, organ, system and the whole organism.
PREREQ: ANFS140, CHEM527 or CHEM214. COREQ: PHYS201 or PHYS202.
RESTRICTIONS: Required for PVAB major. Successful completion of this course will prepare students for professional careers in animal agriculture or for more advanced courses in physiology, cell biology, endocrinology and systems biology offered in veterinary, medical a

ANFS 449 FOOD BIOTECHNOLOGY 4
Traditional food biotechnology and biotechnology based on genetic engineering are explored through in-depth study of current examples. Technical, economic and social aspects of biotechnology are researched and analyzed through individual and group assignments and lectures. Field trips provide a view of local biotechnology enterprises.

ANFS 450 APPLIED BIOMEDICAL COMMUNICATION 3
Applied Biomedical Communication explores methodology, technique, and ethical issues fundamental to written, oral, and visual communications in the biological and medical sciences through lecture, active learning experiences and an immersive course project. Class sessions will focus on scientific method and reasoning, hypothesis development and testing, source documentation and citation, format and types of biomedical communications, the peer review process, and related ethical issues.
PREREQ: ENGL110. RESTRICTIONS: Must have greater than 60 credits to have this course fulfill second writing requirement.

ANFS 454 RUMINANT NUTRITION 3
Practical and applied aspects of ruminant nutrition with an emphasis on dairy. Topics include basic nutrient requirements and nutrition management aspects for different age and production classes of dairy cattle.
PREREQ: ANFS251, CHEM214 or CHEM527 or CHEM641.

ANFS 464 ANIMAL AND FOOD SCIENCE EXPERIENCE 1-3 PF
Opportunity to gain work experience in a field related to the animal or food sciences and to explore potential occupational areas. A minimum of 40 hours of technical activities is required per credit hour. May be repeated twice for 6 credits.
RESTRICTIONS: Signed contract and permission of the department chairperson.

ANFS 466 INDEPENDENT STUDY 1-6
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

ANFS 468 RESEARCH 1-3
Supervised, faculty-monitored, experience in research in the fields of animal science or food science. Students must keep a log of activities, submit regular reports and submit a final report.
RESTRICTIONS: Requires contract form to be completed and approved by department chairperson or designate prior to registering. One credit requires a minimum of 40 hours of research.

ANFS 470 PRINCIPLES OF MOLECULAR GENETICS 3
Fundamentals of nucleic acid biochemistry (replication, repair and recombination) and bacterial genetics are studied to provide the background needed for detailed study of selected topics in animal and plant molecular biology.
PREREQ: ANFS330 or permission of instructor.

ANFS 512 CONNECTIONS IN FOOD SCIENCE 2 PF
Investigate modern food culture through seminars, lectures, and problem-based learning; exploring topics critical to feeding the world including: food production methods, flavor trends, product development, and contemporary issues of safety, security and quality.

ANFS 602 FORAGE RESOURCE MANAGEMENT 3
Exploration of the various grasses, legumes, and forbs that have potential as forage crops. Discussions will cover characteristics of each species that make it suited for a particular type of forage use. Cultural practices for successful plantings, maintenance, harvest and storage will be covered. Crosslisted with PLSC641.

ANFS 609 FOOD PROCESSING 4
Rationale and history of food processing; organizing unit operations; maintenance of food quality including food palatability and nutritive value; separation technology including initial operations, size reduction and screening, mixing, filtration, centrifugation and crystallization; and preservation methods including fresh food storage, low temperature and high temperature methods.

ANFS 611 FOOD SCIENCE CAPSTONE 4
Capstone course for graduate students to advance food science training by participating in a food product development team that simulates real-world operation and requires integrated knowledge in areas of general food science, food chemistry, food analysis, food microbiology and food processing.

ANFS 615 DEVELOPMENTAL BIOLOGY 3
Explore mechanisms underlying development. Topics: gamete interactions, establishment of body plans, cell signaling and tissue interactions, morphogenetic pattern formation, developmental regulation of gene expression, molecular control of tissue specification and diversification, and the evolutionary comparison of developmental processes. Diseases resulting from developmental defects will be discussed.
Crosslisted with BISC615. PREREQ: BISC401 and BISC403. RESTRICTIONS: Requires instructor approval.

ANFS 628 FOOD CHEMISTRY 4
Composition of food materials, reaction mechanisms leading to deterioration; interaction of food components to form desirable and undesirable products, pigments, characterization of food polymers. Effect of physical and chemical factors on the structure and functionality of food.

ANFS 629 FOOD ANALYSIS 4
Theory and practice of food analysis. Determine the chemical composition and characteristics of food. Introduction to spectroscopy, chromatography, electrophoresis, enzyme analysis and titration. Examine food analytical methods and data from journal articles including official AOAC and AAAC methods. Prepare scientific reports and presentations including a scientific poster.

ANFS 633 POULTRY PATHOLOGY 3
Study of poultry diseases with emphasis on their causes, prevention, treatment and control.
PREREQ: ANFS332, ANFS431 and ANFS635.
ANFS 635 ANIMAL VIROLOGY 3
Introduction to virus functional characterization; including classification methods, replication strategies and pathogen-host interactions. Stress methods in the diagnosis and analysis of viruses associated with important animal diseases. PREREQ: BISC300.

ANFS 636 IMMUNOLOGY OF DOMESTIC ANIMALS 3
Comparative study of the immune response of domestic animals including dog, cat, horse, pig, chicken and others. General topics include otogeny of the immune system, reproductive immunity, neonatal immunity, immunodeficiencies and autoimmunity. PREREQ: ANFS332 and BISC207. RESTRICTIONS: Offered in Fall of even-numbered years.

ANFS 637 AVIAN IMMUNOLOGY 3
Advanced study of the avian immune system covering cellular and humoral immune responses; autoimmunity; neuroendocrine-immune interactions; nutritional effects on the immune system; and immunogenetics. RESTRICTIONS: Offered in Spring of even-numbered years.

ANFS 639 FOOD MICROBIOLOGY 4
The role and significance of microorganisms in foods with particular reference to food spoilage, preservation, fermentation, sanitation and poisoning. Current methodology used in the microbiological examination of foodstuffs. PREREQ: BISC300.

ANFS 640 COMPARATIVE HISTOPATHOLOGY 4
Comparative Histopathology explores the light and electron microscopic structure of normal and diseased cells, tissues, and organ systems. Lectures will emphasize normal tissue and organ architecture, while correlating structure to function in health and disease. Associated laboratories will focus on tissue and lesion identification with an introduction to fundamental pathologic processes encountered in living tissues. PREREQ: BISC 208 or by permission of instructor. RESTRICTIONS: ANFS 140 (Functional Anatomy) or equivalent course is highly recommended.

ANFS 642 LACTATIONAL PHYSIOLOGY 3
Fundamentals of physiology and lactation involved in initiation, maintenance and cessation of lactation. Neuroendocrine control of lactation, nutrient absorption and processing by mammary gland and control of milk composition. Covers mammals of commercial dairy importance as well as rodents, horses and humans. PREREQ: ANFS 140 or permission of instructor.

ANFS 643 FOOD ENGINEERING TECHNOLOGY 4
Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations. PREREQ: MATH222 and PHYS201. RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

ANFS 644 BIOINFORMATICS 3
Examines computer applications to biological sciences with emphasis placed upon genomics and proteomics applications. No computer programming experience required.

ANFS 649 FOOD BIOTECHNOLOGY 4
Traditional food biotechnology and biotechnology based on genetic engineering are explored through in-depth study of current examples. Technical, economic and social aspects of biotechnology are researched and analyzed through individual and group assignments and lectures. Field trips provide a view of local biotechnology enterprises.

ANFS 650 APPLIED BIOMEDICAL COMMUNICATION 3
Applied Biomedical Communication explores methodology, technique, and ethical issues fundamental to written, oral, and visual communications in the biological and medical sciences through lecture, active learning experiences and an immersive course project. Class sessions will focus on scientific method and reasoning, hypothesis development and testing, source documentation and citation, format and types of biomedical communications, the peer review process, and related ethical issues. PREREQ: ENGL110.

ANFS 654 ADVANCED RUMINANT NUTRITION 3
Emphasis of metabolic aspects of ruminant microbiology and intermediary metabolism. Discussions on methods to partition nutrients at the tissue level and methods to alter rumen fermentation. May be crosslisted with NTDT654. PREREQ: Undergraduate or graduate courses in nutrition, microbiology, biochemistry, ANFS544 or equivalents. ANFS540 or ANFS417 recommended.

ANFS 665 SEMINAR 1-3
ANFS 668 RESEARCH 1-6

ANFS 670 PRINCIPLES OF MOLECULAR GENETICS 3
Fundamentals of nucleic acid biochemistry (replication, repair, and recombination) and bacterial genetics provide the background needed for detailed study of selected topics in animal and plant molecular biology. PREREQ: ANFS330 or permission of instructor.

ANFS 671 PARADIGMS IN CELL SIGNALING 3
Overview of important signaling paradigms in animal and plant cells. Primarily literature based, with class discussion and presentations. Topics include direct cell-cell interactions, cell-matrix interactions and various ligand-receptor signaling paradigms. May be crosslisted with PLSC671. RESTRICTIONS: Familiarity with Genetics, Molecular and Cell Biology.

ANFS 865 SEMINAR 1
ANFS 868 RESEARCH 1-9

ANFS 869 MASTER’S THESIS 1-6

ANFS 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. May be crosslisted with PLSC874. RESTRICTIONS: Requires permission of instructor.

ANFS 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.

ANFS 969 DOCTORAL DISSERTATION 1-12 PF

ANTH 101 INTRODUCTION TO SOCIAL AND CULTURAL ANTHROPOLOGY 3
Major ideas and areas of study in social and cultural anthropology. Use of ethnographic data and film to illustrate the anthropologist’s view of societies in their sociocultural and ecological dimensions.

ANTH 102 INTRODUCTION TO BIOLOGICAL ANTHROPOLOGY 3
Genetic basis for human evolution; emergence of racial differences and ongoing human evolution, nonhuman primates and fossil evidence for human evolution. RESTRICTIONS: Neither anthropology major nor degree credit will be granted for ANTH102 if ANTH104 is taken.

ANTH 103 INTRODUCTION TO PREHISTORIC ARCHAEOLOGY 3
Fundamental concepts and research procedures of archaeology. History of archaeology, methods of fieldwork and artifact analysis, and theories of human behavior in archaeological research. RESTRICTIONS: Neither anthropology major or degree credit will be granted for ANTH103 if ANTH104 is taken.

ANTH 104 INTRODUCTION TO ARCHAEOLOGY AND BIOLOGICAL ANTHROPOLOGY 3
Fossil and archaeological record of human biological and cultural evolution. Emphasis on how archaeological and biological anthropological research are conducted, and how their treatment of data distinguish them as scientific disciplines. RESTRICTIONS: Neither anthropology major nor degree credit for ANTH102 or ANTH103 will be granted if ANTH104 is taken.

ANTH 105 INTRODUCTION TO HISTORICAL ARCHAEOLOGY 3
Introduces principal ideas, approaches, and research methods in historical archaeology. Presented through a comparative case study of the emergence of the modern world.

ANTH 106 INTRODUCTION TO ANTHROPOLOGY OF HEALTH 3
Introduces biocultural anthropological approaches to health. It covers topics ranging from evolutionary perspectives on health, ethnomedical systems, disease vs. illness, alternative medicine, placebo and nocebo, diet and nutrition, growth and development, reproductive health, aging, infections and chronic disease, stress, mental health, social determinants and health disparities. May be crosslisted with BHAN106.
ANTH 200  INTRODUCTION TO THE HISTORY OF ANTHROPOLOGICAL THEORY 3
Provides a foundation in anthropological theory and insights into the relationship between theory, method and social context. Examines the history of anthropology as an academic discipline and intellectual enterprise.

ANTH 201  VISUALIZING HUMANITY: ETHNOGRAPHIC FILM 3
Examines visual cultural representations, meanings and interpretations in the medium of ethnographic film. Introduces ethnographic filmmaking history and critical theory. Primarily encompasses regional subjects and cultural practices including those developed in Austronesia, Africa, North and South America, and South Asia.

ANTH 202  HUMAN EVOLUTION AND THE FOSSIL RECORD 3
A survey of the human fossil record from the origin of the human species to the establishment of agriculture. Includes evolutionary theory, anatomical interpretation and reconstruction of early social behavior. May be crosslisted with CGS202.

ANTH 205  ANTHROPOLOGY AND HUMAN NATURE 3
Archaeological, biological and cultural anthropology organized around the theme of human nature. May be crosslisted with CGS205.

ANTH 206  FARM TO TABLE 3
How does food get from the farm to your table? Explore traditional agriculture and contemporary food production models like Community Supported Agriculture (CSA), community gardens and the local food movement. Learn about new crops and dietary strategies that can be incorporated into the way people eat today. Examine cultural influences on food production and consumption patterns, and biocultural aspects of nutrition. Students will complete several projects that include interviews, research, food shopping excursions, film critiques and menu planning. Students will volunteer at the Delaware Food Bank and/or Gardens for the Community. Crosslisted with PLSC206.

ANTH 210  PEOPLES AND CULTURES OF SOUTHEAST ASIA 3
Introduction to diverse cultural, societal and ecological systems of Indonesia, Malaysia, Thailand, Vietnam, Singapore and the Philippines. Focuses on theoretical and ethnographic issues in culture, history and contemporary life of modern Southeast Asia.

ANTH 211  PEOPLES AND CULTURES OF EAST ASIA 3
Introduction to diverse cultural, societal and ecological systems of China, Japan, Korea and Taiwan as well as Overseas Chinese. Focuses on theoretical and ethnographic issues in culture, history and contemporary life of modern East Asia.

ANTH 212  PEOPLES AND CULTURES OF THE MUSLIM WORLD 3
Focusing on cultural and social dimensions of the Islamic experience, uses anthropological case studies and theory to survey the Muslim world and to understand ways in which Islam is practiced, experienced and represented in Muslim societies from the Middle East, sub-Saharan Africa, South and Southeast Asia and the West. Examines interaction between the shared Islamic identity and distinctive local expressions of Muslim faith and life. Investigates ways in which Western scholars have interpreted Islamic societies and cultures.

ANTH 216  INTRODUCTION TO MATERIAL CULTURE STUDIES 3
Introduces students to material culture studies, broadly defined as study of all things people make and all the ways people have altered the physical world. Explores the approaches, concepts, and methods of numerous disciplines that investigate material culture. May be crosslisted with HIST216, MCG216.

ANTH 218  SOLVING ARCHAEOLOGICAL MYSTERIES 3
A consideration of how archaeologists use the scientific method to answer questions about ancient societies. Case studies introduce the research questions, theories, and methods that guide the collection, analysis, and interpretation of prehistoric remains. Students also experience doing hands-on research.

ANTH 222  TECHNOLOGY AND CULTURE 3
Primitive and preindustrial technologies. Theoretical issues of innovation, diffusion and adaptation. The relationship between technology and other aspects of culture.

ANTH 223  FOOD, GENDER AND CULTURE 3
Explores how preparing, eating, and thinking about food demonstrates culturally determined gender and power relations in different societies. Using cross-cultural and interdisciplinary perspectives, explores various understandings of issues such as nutrition, eating disorders, body images, and gender differences around food. May be crosslisted with WOMS223.

ANTH 225  PEASANT SOCIETIES 3
Comparative study of peasant communities in European, Asian, African and Latin American societies, including case studies of family life, religion and forms of social control and relationships to the ruling classes.

ANTH 227  AMERICAN CULTURE 3
Concepts and methods of cultural anthropology in contemporary America. The culture concept, American social structure, language, values and beliefs.

ANTH 228  PEOPLES AND CULTURES OF THE SOUTHWEST 3
Cultures, institutions and ethnic groups of southwestern United States. Analysis of both prehistoric and historic cultures, continuity and change.

ANTH 229  INDIANS OF NORTH AMERICA 3
An introductory comparative study of Native American cultures as they existed prior to their disruption by European contact. Uses the culture area approach.

ANTH 230  PEOPLES OF THE WORLD 3
Anthropological studies of societies and culture areas throughout the world to illustrate their characteristics and anthropological issues.

ANTH 232  THE ANTHROPOLOGY OF GLOBAL YOUTH 3
Joins American and International students in mutual learning about cultural differences and similarities as young, privileged, and connected citizens of today's globalized world. Structured to engage students in shared, face-to-face cultural explorations in which they teach each other about their culture and their lives. The goal is to generate and establish deeper cross-cultural understanding and to build confident interactions between them.

ANTH 235  ANTHROPOLOGY OF FOOD 3
Explores relationship between food and culture in the past and in the contemporary world. Topics include the economic, political and symbolic dimensions of food, effects of dietary changes on health, role of globalization, and causes of hunger and famine.

ANTH 236  ANTHROPOLOGY OF SPORT 3
Examines sports from a cross-cultural perspective. The unifying theme is how sports interact with and reflect other aspects of culture, such as economics, politics, religion, identity, gender, and change. These inter-relationships are examined in case studies drawn from traditional and contemporary cultures.

ANTH 239  ARTS AND CRAFTS OF NATIVE NORTH AMERICA 3
Anthropological analysis of indigenous technologies, arts, and crafts of native peoples of North America, including textiles, stoneworking, and ceramics.

ANTH 245  CONTEMPORARY NORTH AMERICAN CULTURE ISSUES 3
An overview of cultural identity issues for Native Americans in the contemporary United States, including how Native Americans view their own cultures and society, perspectives they bring to the Euro-American and native encounters and to persistent denials of their distinctiveness in modern American society.

ANTH 251  INTRODUCTION TO ETHNIC ARTS 3
General survey of the ethnoarts from Africa, the Americas and the Pacific, including sculpture, painting, decoration and their interrelationships with oral literature, music, dance, games and ritual.

ANTH 255  APPLIED ANTHROPOLOGY 3
Anthropology applied to practical problems, including community development, directed change, agrarian reform and urban dislocation, particularly in Third World countries.

ANTH 265  HIGH CIVILIZATIONS OF THE AMERICAS 3
The origin and development of pre-Columbian civilizations in the Gulf Coast lowlands, Central Mexico, Yucatan peninsula and Andean area.

ANTH 269  EARLY CIVILIZATIONS OF THE OLD WORLD 3
Early civilization in Southeast Asia, the Near East, Egypt, China and India.
ANTH 270  ANTHROPOLOGY COLLOQUIUM  1 PF
Talks by individuals trained in anthropology who work in many different contexts: academic, government, business, museum, etc. Shows the full range of what people trained in anthropology do and how anthropology shaped and informed their view of the world and of their work.

ANTH 275  DELAWARE PREHISTORIC ARCHAEOLOGY  3
Overview of the prehistoric lifeways of Delaware. Considers the relationships between people and their environments on the Delmarva Peninsula from the first inhabitants at the end of the Ice Age to the arrival of the European colonists.

ANTH 300  PRIMATOLOGY  3
Survey of the nonhuman primates, including their taxonomy and biological characteristics, and the study of their behavior and how it relates to human behavior.

ANTH 302  MEDICAL ANTHROPOLOGY  3
This course introduces the field of Medical Anthropology. It examines the interaction of biology and culture as it affects health and medical systems and focuses on: 1) cross cultural comparisons; 2) notion of adaptation in biocultural evolution; 3) understanding and appreciation of "exotic" ethnomedical systems; 4) critical cultural analysis of Biomedicine; 5) understanding issues of stigma, disability and the social process of health and illness; and 6) application of the concept of culture to practical problems in health delivery in a multicultural society. May be crosslisted with BHA302.

ANTH 304  CULTURE, HEALTH & ENVIRONMENT  3
Human health and environmental health are intimately connected. Human behavior influences the health of the environment, which in turn influences human health. This course provides a biocultural perspective on culture, health, and environment, and their interactions. We will cover relationships between: 1) health and biodiversity, climate change, water, toxins, and energy; and 2) relationships between health and food, agriculture and dietary environment. May be crosslisted with BHA304.

ANTH 305  THE EVOLUTION OF HUMAN SEX ROLES AND REPRODUCTION  3
Survey of the evolution of human reproduction and sex differences. Evidence derived from the human fossil record, living non-human primates, modern biological differences between human males and females and cross-cultural comparisons of reproductive behavior and sex roles. May be crosslisted with WOMS305.

ANTH 306  HUMAN VARIATION AND ADAPTATION  3
Concerned with the nature of human biological variation in modern populations around the world including the evolutionary forces that shape us both physically and psychologically and the interaction of that biology with our adaptation as a cultural species.

ANTH 307  NUTRITIONAL ANTHROPOLOGY  3
Nutritional Anthropology takes an explicit biocultural approach to nutrition, examining the interaction of biology and culture as they affect food systems, customs, practices and nutrition. Specific foci of the course include: evolutionary and comparative perspectives (biological baseline, agriculture, contemporary food systems); why we eat what we eat (materialist, symbolic explanations for foodways); adaptation of food to people and people to food; foods as medicines; under- and over-nutrition in contemporary world; child and infant feeding, hunger; solutions to diet-related problems. May be crosslisted with BHA307.

ANTH 310  ASIAN WOMEN’S LIVES  3
Using examples from China, Japan, Southeast Asia, South Asia, and the Middle East, examines how lives of Asian women have been constructed by cultural, historical, and international forces and seeks to understand and challenge culturally pervasive stereotypes that define their lives. May be crosslisted with WOMS310.

ANTH 311  ANTHROPOLOGY OF TOURISM  3
Views tourism as an international industry, a cultural practice and a phenomenon of globalization. Examines such topics as tourism and modernity, sexual and romantic tourism, ecotourism and environmental tourism, tourism and "authenticity". May be crosslisted with WOMS315.

ANTH 312  ASIAN WOMEN IN THE GLOBALIZED WORKPLACE  3
Focuses on relationship between work, gender, and social, cultural, and economic transformations associated with globalization in East and Southeast Asia. May be crosslisted with WOMS312.

ANTH 316  ISLAM AND GENDER  3
Uses anthropological case studies and historical material to comprehend ideals, practices, and themes of gender and gender relations in Islam. Introduces representations of Islamic belief in doctrinal, historical, and contemporary contexts. May be crosslisted with WOMS316.

ANTH 318  TRIBAL LIFeways  3
Examines the nature of tribal societies as they exist and have existed in the past, communities of a few hundred to a few thousand people linked by kinship, language and culture in a flexible political structure different from stereotype of tribal chiefs and warriors. Topics include evolutionary theories and archeological record of tribal development, institutional characteristics of tribal cultures, variability among tribal peoples, and contemporary views of concept of "tribe".

ANTH 320  PREHISTORY OF NORTH AMERICA  3
Major cultural and social developments of prehistoric humans in North America, from the entrance of the Paleolithic to the arrival of the Europeans in the 16th century.

ANTH 321  PREHISTORIC HUMAN ECOLOGY  3
Uses archaeological evidence to examine human-environmental interactions during the prehistoric period. It considers how past peoples adapted to their environments with two subsistence strategies, hunting/gathering and farming. Addresses two topics that are relevant to our own time, the impacts that ancient societies had on their environments and how they were affected by climate change.

ANTH 323  PREHISTORY OF SOUTH AMERICA  3
Survey of archaeological complexes and chronology, including lower Central America from western Costa Rica to Panama, and South America from the tropical forests to the Andean highlands. Major topics include the domestication of plants and animals and the rise of civilization.

ANTH 324  OLD WORLD ARCHAEOLOGY  3
Survey of world prehistory, excluding the Americans, from the earliest evidence of human activity until the rise of civilizations with particular emphasis on technological, economic and social change.

ANTH 325  PEOPLES OF EUROPE  3
Cultures and subcultures of Europe, with special attention to the rural sectors and their historical development.

ANTH 326  ANTHROPOLOGY OF AFRICAN DIASPORA  3
Focus on the historical, geographical, and cultural specificities of cultures in the African diaspora: slavery and responses to slavery (rebellions and revolutions); the 'big thinkers' of the African Diaspora, cultural manifestations (music and religion); discourses of whiteness, and ways to remember the Motherland. May be crosslisted with BAM326.

ANTH 328  MAYAN ART AND ARCHITECTURE  3
Introduction to the civilization of the Maya as evident in the Yucatan Peninsula. Incorporates visits to relevant archeological zones. Examines the geographical framework that shaped the development of Mayan culture, political and economic organizations, art, architecture, ideology and history. Crosslisted with ARTH338. RESTRICTIONS: Offered abroad only.

ANTH 329  THE ARCHAEOLOGY OF AGRICULTURE  3
Survey of the worldwide transitions from hunting and gathering adaptations to agricultural lifeways. Examines archaeological evidence of these transitions and theories of their causes and consequences using broad anthropological and interdisciplinary perspectives.

ANTH 330  DEVELOPMENT AND UNDERDEVELOPMENT  3
Anthropological perspectives of sociocultural change in Africa, Asia and Latin America: Emphasis on the economic and political relationships established between these areas and industrial societies.

ANTH 333  PEOPLES OF AFRICA  3
Social institutions and cultural traditions of Africa; political, economic, legal and kinship systems, and modes of thought. May be crosslisted with BAM333.
ANTH 334  PEOPLES AND CULTURES OF ARGENTINA  
The origins and formation of the cultural, social, economic and political characteristics of Argentina. The historical construction of an Argentinian national identity provides students with an opportunity to understand one example of the sources and forces of historical change in ideas, beliefs, institutions, and cultures.

ANTH 337  SOUTH AMERICAN INDIANS  
Types of Indian cultures in contemporary South America. Cultural traditions and social institutions of Indian communities, especially the tribes of the tropical forest.

ANTH 338  ARTS AND CRAFTS OF NATIVE SOUTH AMERICA  
Arts and crafts technological processes invented by or available to tribal societies of South America. Artistic and technical achievements in ceramic and textile.

ANTH 341  ISSUES, METHODS ARCHAEOLOGICAL RSCH  
This course provides students with hands-on training in the fundamentals of archaeological research and its conduct in the real world. Topics covered focus on methods used to organize the collection and study of various kinds of archaeological data as they pertain to the research questions archaeologists hope to answer. Specific topics include: archaeological research design, quantitative analysis and issues in archaeological sampling, analysis of lithic and ceramic artifacts, paleoenvironmental reconstructions and geoarchaeology, the development and testing of quantitative predictive models, and the application of these methods in cultural resource management.

ANTH 342  ISSUES IN AMERICAN CULTURE: ARCHAEOLOGICAL PERSPECTIVES  
Archaeological perspectives on issues of concern in contemporary American culture, including the environment, multiculturalism, war, gender, technology and production, and class.

ANTH 344  ANTHROPOLOGY OF CLOTHES  
Study of clothes in cross-cultural perspective. Uses anthropological perspective to examine varying standards of beauty worldwide and impact and reflection of clothes on other aspects of culture (e.g., economics, politics, gender, religion). Causes and consequences of changing styles of dress through the topic of globalization.

ANTH 351  RACE AND ETHNICITY IN LATIN AMERICA  
Explores the multiple, complex and historically changing meanings of race and ethnicity in Latin America, and the consequences of discrimination towards specific groups. Regions covered are the Caribbean, Mexico and Central America, and the Andean, Atlantic and Southern Cone regions of South America. May be crosslisted with BAMS31.

ANTH 356  ANTHROPOLOGY OF CHILDHOOD  
Many aspects of childhood that seem inevitable or natural are, in fact, shaped by culture and not rooted in our biology. Examine childhood from biological and cultural perspectives, examining how humans compare to nonhuman primates and how humans vary today and through time.

ANTH 360  AMERICAN ANABAPTISTS: AMISH, MENNONITE AND BRETHREN CULTURES  
Examines the origins, development, and current status of Amish, Mennonite and Brethren communities in the United States. Special emphasis placed on the varied methods these groups have used to establish and maintain a visible and distinctive identity separate from mainstream American culture. The merchandizing and consumption of their separate identity through tourism is also discussed.

ANTH 363  WOMEN IN CROSS-CULTURAL PERSPECTIVE  
Social realities of women within the cultures of Asia, Africa and Latin American societies. How institutions such as motherhood, the family, sexuality and work structure women’s lives within the dominant social ideologies. Crosslisted with WOM363.

ANTH 366  INDEPENDENT STUDY  
1-6

ANTH 370  CULTURE OF FOOD PRODUCTION AND ECONOMIC DEVELOPMENT  
Social and cultural dynamics of food production, distribution and consumption throughout the developing world, examined in the context of concepts and policies of development.

ANTH 372  CULTURE AND COLONIALISM  
This course examines the cultural and historical contexts of European colonialism in Africa, Asia, and the Americas from an anthropological perspective. It compares the relationships between the colonized and the colonizers during the 19th and early 20th centuries and uses ethnographic, historical, and literary texts.

ANTH 375  PEOPLES AND CULTURES OF MODERN LATIN AMERICA  
Contemporary cultures and societies of Latin America, with emphasis on historical perspective. Rural and urban populations, the elite, the military, the church, students and workers.

ANTH 379  HISTORICAL ARCHAEOLOGY OF THE EASTERN UNITED STATES  
Surveys the substantive contributions of historical archaeology to the study of the cultural history of eastern North America beginning with the period of initial European contact. May be crosslisted with HIST379.

ANTH 381  VISIONS OF NATIVE AMERICANS  
Critically examines the visual images of Native Americans that have been created in films, photography, commercial art and media and analyzes how those images function in Euroamerican culture.

ANTH 382  ANTHROPOLOGY AND BUSINESS  
How culture affects business and capitalism in societies worldwide and how modern capitalistic life affects culture. Looks at diverse work cultures from direct-sales organizations to dot-coms, street-vendor businesses to megacorporations, as well as working women and the working poor in different cultures.

ANTH 383  GLOBALIZATION IN EVERYDAY LIFE  
Overview of how globalization impacts everyday life in the United States and in other cultures around the world. Uses anthropological perspective to examine aspects of everyday life with which students have personal experience, such as clothes, sports, music, cell phones.

ANTH 390  COLLOQUIUM  
REQUIREMENTS: Requires a GPA of 3.0 or higher.

ANTH 401  THE IDEA OF RACE  
The idea of race in historical and anthropological perspective. The interpretation of racial differences in 18th and 19th century Europe and America and an examination of modern approaches to the question of human variability. REQUIREMENTS: Requires permission of instructor.

ANTH 404  HUMAN OSTEOLOGY  
The identification of the human skeleton, including complex and fragmentary materials. Basic bone growth, bone pathology, paleopathology and forensic identification. REQUIREMENTS: Requires permission of instructor.

ANTH 424  INTRODUCTION TO ARCHAEOLOGICAL FIELD METHODS  
Excavation at selected sites; laboratory work and field trips to museum sites.

ANTH 457  SURVEY OF AFRICAN ART  
Major African art styles, their interrelationships, the context of usage and the meanings of African artworks. May be crosslisted with ARTH457.

ANTH 463  HISTORICAL ARCHAEOLOGY AND THE PUBLIC  
Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation. May be crosslisted with HIST463, MSST463.

ANTH 466  INDEPENDENT STUDY  
1-6

ANTH 475  THE TEACHING OF ANTHROPOLOGY  
Emphasis on the structure and coherence of the discipline - identifying central questions and assembling relevant data - as seen from the perspective of an anthropologist offering an introductory-level survey course. PREREQ: 15 hours of anthropology. REQUIREMENTS: Requires permission of instructor teaching the introductory course. Tutorial and primarily for majors.

ANTH 486  TUTORIAL IN SOCIAL AND CULTURAL ANTHROPOLOGY  
History, theory and method in the field of social and cultural anthropology. REQUIREMENTS: Open to majors only. Requires permission of instructor.
### Applied Economics and Statistics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APEC 100</td>
<td>Sustainable Development</td>
<td>3</td>
</tr>
<tr>
<td>APEC 107</td>
<td>Snack Science</td>
<td>4</td>
</tr>
<tr>
<td>APEC 110</td>
<td>Introduction to Food and Agribusiness Industry</td>
<td>1</td>
</tr>
<tr>
<td>APEC 135</td>
<td>Introduction to Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>APEC 150</td>
<td>Economics of Agriculture and Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>APEC 165</td>
<td>The FREC First Year Experience</td>
<td>1 PF</td>
</tr>
</tbody>
</table>

### APEC 100 Sustainable Development
Surveys pressing issues in the management of natural resources, environmental protection, and international development. Requires critical evaluation of these issues by applying basic policy analysis, considering the ethical dimensions of policy, and drawing on economic indicators of environmental quality and human health.

**RESTRICTIONS:** Students with majors in the College of Agricultural and Natural Resources cannot use this course to satisfy College Breadth requirements in their major.

### APEC 107 Snack Science
An overview of topics from introductory biology, chemistry, and physics focusing on their applications to food and cooking. Emphasis will be placed on the use of the scientific method as a critical thinking tool through the use of laboratory experiments and problem based learning.

Crosslisted with SCN107.

### APEC 110 Introduction to Food and Agribusiness Industry
Introduction to the food and agribusiness industry. The economic structure and importance of the industry is discussed.

### APEC 135 Introduction to Data Analysis
Introduction to computer systems, with an emphasis on microcomputer systems, and their use to process and analyze data.

**RESTRICTIONS:** Students with majors in the College of Agricultural and Natural Resources cannot use this course to satisfy College Breadth requirements in their major.

### APEC 150 Economics of Agriculture and Natural Resources
Introduction to economic and management principles and their applications to agriculture, including agribusiness, natural resources and the environment.

### APEC 165 The FREC First Year Experience
Provides practical skills and information necessary for success in college and professional career. Focuses on academic services, campus resources and career opportunities.

**RESTRICTIONS:** Freshmen only.
APEC 399  TEACHING ASSISTANT  1-2  PF
Practical teaching experience. Students participate and assist in the instruction of an undergraduate course.
Restrictions: A GPA of 2.75 (3.00 in major) is required. Students must have taken the course.

APEC 400  INTRODUCTION TO OPERATIONS RESEARCH  3
Introduction to the methodologies of operations research with particular focus on their application in areas such as agriculture, environmental systems, health care, manufacturing and transportation. Case studies and applied problem solving are emphasized.
Prerequisites: MATH241 and MATH242

APEC 404  FOOD AND FIBER MARKETING  3
System approach to food and fiber marketing analysis: consumer, retail, processor, wholesale and farm level. Domestic and foreign demand and supply and analysis, pricing, marketing costs, food safety, market power and its sources. Physical distribution, and structure of the food and fiber marketing system.

APEC 406  AGRICULTURAL AND NATURAL RESOURCE POLICY  3
Agricultural and natural resource policy formation, effects of policy on resource allocation and economics of alternative programs. Analysis of effects of various programs on producers, consumers and taxpayers, especially contemporary issues and market failures.
Prerequisites: APEC150 or ECON115.

APEC 408  STATISTICAL RESEARCH METHODS  3
An introductory statistics course for advanced undergraduate and graduate students with applications for life sciences, business, health, engineering, and the social sciences. The course managing and describing data; the normal, t, F and chi squared distributions; the logic of inference; inferential statistics for one and two sample problems; analysis of table data; analysis of variance; and multiple regression. The course is taught using statistical software. Crosslisted with STAT408.

APEC 409  SURVEYS AND ECONOMIC EXPERIMENTS  3
Research methods for the social sciences from surveys to lab and field experiments with a focus on consumer behavior and resource management issues. Emphasis on designing, conducting and reporting results from research and learning to critically read results from other studies. Data issues and data analysis and modeling techniques will be discussed including graphical methods, inference, and multiple regression.
Prerequisites: STAT 200 or equivalent.

APEC 410  INTERNATIONAL AGRICULTURAL TRADE AND MARKETING  3
The global economy and role of government and other institutions in setting agricultural trade policy. Trade theories and theoretical foundations of the economics of international agricultural trade. Current issues and analytical methods of international agricultural trade.
Prerequisites: APEC150 or ECON115.

APEC 412  STRATEGIC MARKETING COMPETITION  1-3
Strategic marketing of a new food or fiber product/service. Development of a marketing plan and communicating the plan effectively in local and national competition.
Restrictions: Requires permission of instructor.

APEC 420  AGRICULTURE IN ECONOMIC DEVELOPMENT  3
Process of increasing agricultural productivity and food supply in developing nations. Rural resource adjustment problems at various stages of industrialization. Role of foreign trade in development process.
Prerequisites: APEC150 or ECON 151.

APEC 424  RESOURCE ECONOMICS  3
Theoretical allocation of exhaustible and renewable resources over time, concepts of social welfare and depletion, and review of market failures and contemporary resource management issues.
Prerequisites: APEC150 or Restrictions: Credit cannot be received for both APEC324 and APEC424.

APEC 427  AGRIBUSINESS FINANCIAL MANAGEMENT  3
Study of the principles and tools of finance to identify and solve agribusiness financial management problems through the application of quantitative analytical methods and problem solving techniques.
Prerequisites: APEC201 or ACCT207, and a statistics course

APEC 429  COMMUNITY ECONOMIC DEVELOPMENT  3
Community economic development in the United States; application of economic principles regarding industrial location, land use, environmental protection, and economic growth and public service provision; and economic development policies.
Prerequisites: APEC150 or ECON 151.

APEC 430  ESTABLISHING AND MANAGING A FOOD AND AGRIBUSINESS ENTERPRISE  3
Analysis of the necessary factors to consider in initiating a Food and Agribusiness enterprise. Including strategic marketing concepts, competitive, communication, site, and financial strategies, management structure and legal forms of small businesses, etc. Involves case studies and writing a business plan.

APEC 444  ECONOMICS OF ENVIRONMENTAL MANAGEMENT  3
Review of benefit-cost analysis and welfare theory; techniques for evaluating environmental amenities; the evolution of environmental legislation; and review of case studies of environmental conflicts.
May be crosslisted with ECON444. Prerequisites: One of ECON251, ECON300 or ECON301. Restrictions: Credit cannot be received for both APEC343 and APEC444.

APEC 450  TOPICS IN ENVIRONMENTAL LAW  3
Overview of the legal process and environmental laws in order to understand policy issues and learn analysis processes in the environmental field.
May be crosslisted with LIS 450.

APEC 464  INTERNSHIP  1-3
Practical experience acquired by working with corporate and government institutions. Internship sponsor, performance evaluation, and written reports are required.
Restrictions: A maximum of three credits may be applied to the B.S. in Agriculture with a major in Food and Agribusiness Management.

APEC 465  SEMINAR  1
Oral and written reports in the subdisciplines of food and resource economics.

APEC 466  INDEPENDENT STUDY  1-6

APEC 471  FUTURES AND OPTIONS MARKETS  3
Analysis of futures and options markets of agricultural and nonagricultural commodities. Trading and hedging theory and techniques, cash and futures price relationships. Students trade commodities via a satellite information system. May be crosslisted with ECON 471. Prerequisites: One of APEC404, ECON251, ECON300 or ECON301.

APEC 480  GEOGRAPHIC INFORMATION SYSTEMS IN NATURAL RESOURCE MANAGEMENT  4
Introductory hands-on training in geographic information systems for environmental and natural resource management.

APEC 601  SURVEY OPERATIONS RESEARCH I  3
Covers various deterministic mathematical programming methods (LP, integer dynamic), network models and basic inventory models.
Prerequisites: Requirements permission of instructor.

APEC 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.
Prerequisites: STAT601

APEC 603  SIMULATION MODELING AND ANALYSIS  3
Instructors from hard sciences and social sciences introduce real-world Operations Research case studies based on their expertise. Students implement proposed solution methodologies using a variety of available computer software packages.
Prerequisites: APEC601 or permission of instructor.

APEC 609  SURVEYS AND ECONOMIC EXPERIMENTS  3
Research methods for the social sciences from surveys to lab and field experiments with a focus on consumer behavior and resource management issues. Emphasis on designing, conducting and reporting results from research and learning to critically read results from other studies. Data issues and data analysis and modeling techniques will be discussed including graphical methods, inference, and multiple regression.
Prerequisites: STAT200 or equivalent.

APEC 611  REGIONAL WATERSHED MANAGEMENT  3
Reviews the practical applications of watershed planning as a tool to manage land, water and ecosystem resources. Explores public policies and practices of watershed planning by examining case studies. Uses a multidisciplinary approach involving the fields of geography, environmental science, geology, public policy, land planning, geographic information systems (GIS) and engineering.
Crosslisted with UAPP611.

APEC 615  ADVANCED PRICES AND STATISTICS  3
Statistical tools used in agricultural economics research and operations research. Introduction to econometric specifications, estimation and interpretation.
APEC 650  URBAN TRANSPORTATION SYSTEMS  3
Design and operation of urban transportation systems, characteristics of public transportation modes, vehicle design, right-of-way types and terminal facilities. Application of operations research techniques to analysis of scheduling, network optimization, capacity and evaluation of alternatives. Crosslisted with CIE650.

APEC 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.

APEC 682  SPATIAL ANALYSIS OF NATURAL RESOURCES  3
Advanced hands-on training in geographic information systems and spatial statistics for environmental and natural resource management.

APEC 690  OPERATIONS RESEARCH SEMINAR  0 PF
Seminars to be given by faculty and by visiting academia, industry and government persons. Graduate students provide topical insights in significant methods and results of current research in operations research.

APEC 801  APPLIED DEMAND AND MARKETING ANALYSIS  3
Deals with research techniques and procedures in applied economics with focus on empirical applications of economic theory and econometric tools in consumer demand and marketing analysis.

APEC 802  OPERATIONS RESEARCH APPLICATIONS  3
Applications of models and principles of basic interest to the theory and practice of operations research. Classic models of inventory and queueing theories, maintenance and replacement of equipment and government planning. Contemporary models from research literature of energy management, urban planning, artificial intelligence and flexible manufacturing systems. COREQ: MATH529, STAT601 or MATH630

APEC 806  RESEARCH TECHNIQUES AND PROCEDURES  3
Planning research projects with emphasis on methods of collecting and analyzing data, and the presentation of results. A problems course. PREREQ: APEC608.

APEC 807  MATH PROGRAMMING WITH ECONOMIC APPLS  3
The development application of optimization models and methods such as linear, integer, nonlinear, and special programming. Applications to both firm and sector-level economic issues with emphasis on agricultural, environmental and resource economic applications. PREREQ: APEC601 or permission of Instructor.

APEC 810  INTERNATIONAL AGRICULTURAL TRADE SPECIAL TOPICS  3
The global economy and role of government and other institutions in setting agricultural trade policy. Theoretical and empirical foundations of international agricultural trade and investment. Current issues and econometric methods of international agricultural trade.

APEC 826  ISSUES IN DOMESTIC AND FOREIGN RURAL DEVELOPMENT  3
Rural economic development in the United States and in developing countries; growth vs development issues, government policies, analytical techniques - export basis, shift share, input-output, growth and development models; empirical analysis and case studies.

APEC 827  ADVANCED PRODUCTION ECONOMICS  3
Specification, identification and estimation of dual models for use in the evaluation, hypothesis testing and control of firm-level technological and production problems. May be crosslisted with ECON827. PREREQ: ECON801 and an econometrics/statistics course RESTRICTIONS: Requires permission of instructor.

APEC 834  SEMINAR IN RESOURCE ECONOMICS  3
Quantitative analyses of natural resource markets, resource depletion and the design of optimal management strategies.

APEC 868  RESEARCH  1-9

APEC 869  MASTER’S THESIS  1-6

APEC 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.

APEC 969  DOCTORAL DISSERTATION  1-12 PF

ARAB 105  ARABIC I - ELEMENTARY  4
Introduction to the Arabic language and development of speaking, listening, reading and writing skills through the use of basic texts.

ARAB 106  ARABIC II - ELEMENTARY/INTERMEDIATE  4
Completion of basic Arabic. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: ARAB105 RESTRICTIONS: Two to three years of high school Arabic acceptable in lieu of ARAB105.

ARAB 107  ARABIC III - INTERMEDIATE  4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: ARAB106 RESTRICTIONS: Four years of high school Arabic acceptable in lieu of ARAB106. Satisfies Arts and Sciences foreign language requirement.

ARAB 200  ADVANCED INTERMEDIATE ARABIC  3
A continuation of ARAB107. Emphasis is on reading and viewing authentic materials from Arab media, in order to improve reading, writing and listening skills and to increase knowledge of Arab culture. PREREQ: ARAB107

ARAB 201  ARABIC GRAMMAR AND COMPOSITION  3
Focuses on increasing knowledge of Arabic Grammatical system and improving writing skills. Emphasis is on grammar. PREREQ: ARAB107

ARAB 205  ARABIC CONVERSATION  3
Focuses on improving oral communication skills through discussion of various topics related to modern, social and cultural life in the Arab World. It includes grammar review and writing practice. PREREQ: ARAB200

ARAB 206  CULTURE THROUGH CONVERSATION  3
Taught abroad and focuses on contemporary Arab life discussing aspects of modern Arab culture. PREREQ: ARAB107 or equivalent. RESTRICTIONS: Requires permission of instructor.

ARAB 208  CONTEMPORARY NORTH AFRICA  3
Survey of contemporary North African civilization. Incorporates geography, history, society, economy and politics, with an emphasis on Tunisia. Emphasis on Tunisia’s cultural fluidity through Islamic, French Colonial, and post-Independence Governments. Taught in English. RESTRICTIONS: Does not satisfy the foreign language requirement.

ARAB 366  INDEPENDENT STUDY  1-6

ARSC 166  SPECIAL PROBLEM  1-3

ARSC 266  SPECIAL PROBLEM  1-3

ARSC 293  HONORS FORUM  1-12
Topics vary. RESTRICTIONS: May be repeated for credit when topics vary.

ARSC 295  ARTS FORUM  1-12
Attendance at, and critical appreciation of, performing arts events and visual arts events. RESTRICTIONS: May be repeated for credit when topics vary.

ARSC 296  FORUM: MULTICULTURAL  1-12
Recent topics include Passing the Torch: An Interdisciplinary Look at a World Poised for Change; Living in History; Representations of Race, Class and Gender in the Media; Sexual Identity in Contemporary Culture. RESTRICTIONS: May be repeated for credit when topics vary.
ARSC 297 PASSPORT TO THE ARTS 1-3
Provide students with an overview of the arts at UD and the opportunity to discover the ways in which the arts can inform and contribute to a variety of disciplines. Additionally, students will be expected to attend UD visual and performing arts events on campus for maximum exposure to the rich cultural life available to them as students.
REstrictions: May be repeated for credit if topics vary.

ARSC 300 ISSUES IN GLOBAL STUDIES 1
Lecture series devoted to the discussion of global issues.

ARSC 316 PEER TUTORING/ADVANCED COMPOSITION 3
Trains a selected group of upper-division students in writing techniques by applying recent composition theories to students' own writing. Explores and evaluates fundamental theories of teaching writing. May be crosslisted with ENGL316.

ARSC 320 RESEARCH IN AREA STUDIES 1 PF
Lecture series in which faculty from all area studies programs and disciplines present their research on a given topic.

ARSC 366 INDEPENDENT STUDY 1-6

ARSC 390 HONORS COLLOQUIUM 3
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

ARSC 392 HONORS COLLOQUIUM: MULTICULTURAL 3
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

ARSC 466 INDEPENDENT STUDY 1-6

ARSC 480 ISSUES IN HEALTHCARE FOR CHILDREN AND FAMILIES 3
Students accepted into the Medical Scholars Program are required to perform 1 of 3 designated practica within a structured medical community setting. This practica involves a unique one-on-one interaction with a physician mentor, usually at Christiana Hospital. Students are required to work a minimum of 135 hours within the field of pediatrics and/or family practice. A weekly seminar required with the faculty coordinator and medical mentor.
Restrictions: BALS MSP majors only and junior status or above with permission of instructor.

ARSC 482 ISSUES IN PUBLIC HEALTHCARE - ECONOMICS 3
Students accepted into the Medical Scholars Program are required to perform 2 of 3 designated practica options within a structured medical community setting. This practica involves a unique one-on-one interaction with a physician mentor, usually at Christiana Hospital. Students are required to work a minimum of 135 hours within a Public Health related field. A weekly seminar is required with the faculty coordinator and medical mentor.
Restrictions: BALS MSP majors only and junior status or above.

ARSC 866 SPECIAL PROBLEM 1-12

ARSC 869 MASTER'S THESIS 1-6

ART

ART 110 DRAWING I 3
What do we see versus what we think we see? Perceptual drawing as a language and means of communication for artists and designers. Projects in and development of technical skills through basic drawing media explore drawing in its various forms: process/investigation, proposal, document, and artifact.
Coreq: ART111 and ART116. Restrictions: Open to majors only.

ART 111 DESIGN I 3
Introduction to the dynamic shaping of surface and space for expressive communication. Concentration on visual and temporal vocabulary of the artist and designer with an emphasis on organizational principles relative to art elements. Students represent, rank and rethink originality of designs and ideas.
Coreq: ART110 and ART116 Restrictions: Open to majors only.

ART 112 DRAWING II 3
Emphasizes drawing as the expressive communication of experience and ideas with increasing attention on the conceptual rather than perceptual. Progressive understanding of materials and mixed media with a broader development of critical vocabulary.
Prereq: ART110. Coreq: ART113 and ART117. Restrictions: Open to majors only.

ART 113 DESIGN II 3
Artists and designers apply the vocabulary of Design I to projects of increasing complexity. Communicating in representational, abstract and non-objective formats, students give multi-sensory form to original concepts using 2D and 3D media.
Coreq: ART112 and ART117.

ART 116 INTRODUCTION TO DIGITAL MEDIA 3
Introduction to digital media as an investigative and creative tool in art and design. Students are exposed to digital photography, image and text creation and manipulation, and the Internet through software-based projects. Working in groups, students create collaborative web or time-based projects.
Coreq: ART110 and ART111. Restrictions: Open to Majors only.

ART 117 RESEARCH STUDIO: PRACTICE AND PRODUCT 3
Problem solving for the artist and designer through projects that are media independent. Discussion of creative strategies for idea generation, research, critical analysis, and communication. Exploration and discovery toward the establishment of productive studio practice. Projects include both individual and collaborative investigations.
Coreq: ART112 and ART113. Restrictions: Open to majors only.

ART 118 FOUNDATIONS COLLOQUIUM 1 PF
A forum introducing projects and fundamental principles of art and design. Explore opportunities for department majors and undergraduate research. Contemporary visiting artists and faculty presentations engage students in critical thinking and writing. Instruction on utilizing campus and online resources to achieve foundational goals.
Coreq: ART110 or ART112 or ART113 or ART116 or ART117. Restrictions: Art majors only.

ART 129 DESIGN FOR NON-MAJORS 3
Introduction to art and design principles within creative problem solving assignments using 2-dimensional and 3-dimensional media. Design organization criteria, technical craftsmanship, and artistic objectives interconnect to support production of original expressive statements.
Restrictions: Open to nonmajors and nonminors only.

ART 133 DRAWING FOR NON-MAJORS 3
Projects involving black-and-white and color studies in a variety of media, including charcoal, pencil, ink, and pastels.
Restrictions: Open to nonmajors and nonminors only.

ART 180 PHOTOGRAPHIC APPROACHES 3
Introduces the basics of photography as a way to communicate ideas emphasizing content, composition, and technique. Examines contemporary artists and historic movements through research, gallery visits and lectures. Using a digital camera and visual editing software students create, edit and critique images.
Restrictions: Open to non-majors and non-minors only.

ART 200 INTRODUCTION TO VIDEO GAME DESIGN 3
Students will learn game theory, animation, and design. Intended for students from across the university, no experience with making art or knowledge of computer programming is required. Students will work individually and in groups to design and develop working video games.

ART 202 TYPOGRAPHY I 3
Introduction to fundamentals of typography and the study of letterforms: history of the modern alphabet, type classification, effects of printing technology (i.e. letterpress) on typography, drawing letterforms, constructing letterforms, designing a page with type.
Restrictions: Open to VC-BFA Majors only.

ART 203 TYPOGRAPHY II 3
Further development in use of typography for communication: grid systems, effects of context on legibility and readability, type in sequence (i.e. books, animation, interactivity), typographic systems and modernist grid compositions in publications, use of computer as tool for typographic projects, introduction to design theory (i.e. semiotics) as it applies to typography.
Prereq: C- or better in ART202 AND ART206. Restrictions: Open to VC-BFA Majors only.
ART 204 MEDIA/DESIGN/CULTURE 3
Current and historical media processes and their impact on art, design and culture. Image making and manipulation, video, audio, interactivity, and connectivity. Viewing fine art and design projects, the historical aspects of design and digital media, basic media theory, and universal principles of software and digital media. Projects include writing, creating visual media, and making presentations. Unfamiliar media experienced firsthand through exhibitions, screenings, lectures, online exploration and consumer media devices.

ART 205 CORE INTERACTIVE MEDIA 3
Introduction to interactive media and concepts of interaction design. Students learn the basics of coding and programming languages that are fundamental to human-computer interaction and strategies for understanding users and prototyping designed experiences with media.

ART 206 FORM AND COMMUNICATION I 3
Students create images by hand to use for graphic design communication, learning techniques and processes that communicate concepts. These processes and techniques are applied by using illustrative and representative imagery to communicate ideas in graphic design systems.
PREREQ: Open to VC-BFA Majors Only.

ART 207 FORM AND COMMUNICATION II 3
Development of image-making techniques and processes with the intention to communicate: graphic translation and representation, digital and analog processes, semiotics, design systems. Utilization of design fundamentals for composition and communication of visual form.
PREREQ: C- or better in ART202 AND ART206. RESTRICTIONS: Open to VC-BFA Majors Only.

ART 208 CORE TYPOGRAPHY 3
Fundamentals of typography and the study of letterforms, history of the modern alphabet, type classification, effects of printing technology on typography, drawing letterforms, constructing letterforms, designing a page with type.
RESTRICTIONS: ART-BAAS.

ART 209 CORE DESIGN 3
Dynamic shaping of surface and space for expressive communication with an emphasis on organizational principles in representational, abstract and non-objective formats. Students gain multi-sensory form to original concepts.
RESTRICTIONS: ART-BAAS.

ART 215 SEEING AND BEING 3
Focuses on how people see, process and respond to visual information embedded in the world, from immediate personal environments to the larger places in which we live. Visual impact and social action are explored within contexts of change. Design thinking and innovation processes are highlighted.

ART 218 CORE COLLOQUIUM 1 PF
A forum introducing projects and fundamental principles of art and design. Explore opportunities for department majors and undergraduate research. Contemporary visiting artists and faculty presentations engage students in critical thinking and writing. Instruction on utilizing campus and online resources to achieve core curriculum goals.
RESTRICTIONS: ART-BAAS.

ART 230 FIGURE DRAWING 3
Drawing the human figure with emphasis on structure, proportion, and volume. Various dry media explored.
PREREQ: ART112

ART 231 INTRODUCTION TO PAINTING 3
An exploration of beginning oil painting methods and material through traditional and conceptual painting ideas, providing the student with a foundation for discovering their unique potential for self-expression.

ART 233 DRAWING AS STUDY 3
Develop both a technical and conceptual understanding of the methods behind the drawing process. Analyze the systems involved in transferring the three-dimensional world to a two-dimensional surface. Discussions about light and shadow, surface texture, perspective, and, in particular, linear structure, as well as the various ways these conditions reveal themselves visually. The prior concepts will be used as the foundation on which to build more advanced understanding of how drawing might be used to investigate the physical world, and what might differentiate it from other ways of recording. Repeatable for 6 credits.
RESTRICTIONS: May be repeated for six credits.

ART 235 CORE DRAWING 3
What do we see versus what we think we see? Perceptual drawing as a language and means of communication for artists and designers. Projects in and development of technical skills through basic drawing media explore drawing in its various forms: process/investigation, proposal, document, and artifact.
RESTRICTIONS: For ART-BAAS Majors only.

ART 236 CORE PAINTING 3
A study of color theory and formal design elements through the use of beginning oil painting methods and materials, exploring traditional and conceptual painting ideas, provides a foundation for discovery of self-expression.
RESTRICTIONS: ART-BAAS.

ART 243 INTRODUCTION TO PRINTMAKING 3
Introduction to a variety of print techniques including digital, silkscreen, etching, and woodcut, and for developing multiple and one of a kind images.

ART 245 CORE PRINTMAKING 3
An introductory printmaking course designed specifically for Art majors. Projects are designed to allow students to demonstrate an understanding of the multiple facets of printmaking. Hands on experience in screen-printing, monotype, intaglio, relief and screen printmaking will be covered. Course has a consumable fee.
RESTRICTIONS: ART-BAAS. This course has a consumable fee.

ART 246 SCREENPRINTING 3
Introduction to basic water-based screenprinting including drawing fluid, crayon resist, and photo emulsion techniques.

ART 250 INTRODUCTION TO SCULPTURE 3
Introduction to a wide variety of construction techniques and tools to create sculpture working in metal and wood including welding and woodshop equipment.

ART 255 CORE SCULPTURE 3
Introduction to the fundamental issues to creating sculpture including processes, content and spatial relationships. Introduced to welding, casting and woodworking techniques through a variety of materials and equipment.
RESTRICTIONS: ART-BAAS. This course has a consumable fee.

ART 265 CORE 3-D MODELING 3
Introduction to using software to create 3D models and computer animations. Students will be given a comprehensive introduction to the various components including modeling, animating, rendering and lighting.
RESTRICTIONS: ART-BAAS.

ART 280 INTRODUCTION TO PHOTO AND VIDEO 3
Introduction to digital photography, video, and sound art. Explore lens-based and time-based uses of the camera and computer. Investigate collaborative methodologies and critical study of media culture and relationships to digital technology in an image-saturated society.

ART 281 DARKROOM PHOTOGRAPHY 3
Explores the concepts and tools of black & white photography while studying photographic movements such as conceptual photography, portraiture, landscape, social documentary, and the manipulated image. Includes analog camera, flash, and darkroom techniques.

ART 284 CORE PHOTOGRAPHY 3
Explores the tools, movements and critical concepts of analog and digital photography as well as basic lighting techniques through a series of interlocking lectures, exercises and visual problems. Course has a consumable fee.
RESTRICTIONS: ART-BAAS. Course has a consumable fee.

ART 285 CORE MOVING IMAGES 3
Introduction to digital video, animation, and sound recording. Explore time-based uses of the camera and computer through hands-on projects. Explores cultural and historical fascination with time, motion, and light through screenings, lectures, and readings. Course has a consumable fee.
RESTRICTIONS: ART-BAAS. Course has a consumable fee.

ART 289 DOCUMENTARY PHOTOGRAPHY 3
Introduces critical issues and practices in documentary photography and video. Explores the influence of social documentarians. Examines the relationship of word and image, the role of photo editors and the development of the photo-essay through discussion and studio experience.

ART 290 INTRODUCTION TO CERAMICS 3
Introduction to the tools, processes and aesthetics of ceramics.
ART 295  CORE CERAMICS  3
First-year majors are introduced to both the fundamentals of working with clay, and the fundamentals of an artistic practice. What does it mean to think with and through a material? Process and engaged investigation will be emphasized, with strong encouragement for experimentation and creativity. Course has a consumable fee.
RESTRICTIONS: ART-BAAS. Course has a consumable fee.

ART 300  EXPERIMENTAL TYPOGRAPHY  3
Exploration of advanced typography in multiple media and for multiple purposes related to visual communications, including on-and-off-screen media, (i.e. motion graphics, illustration, graphic design, typeface design and publication design). PREREQ: ART203 or ART243. RESTRICTIONS: Open to BFA and Art Majors Only.

ART 301  DESIGN STUDIO  3
Designed to emulate a professional design studio practice. Students develop skills in collaboration, client relations, production and advanced media applications in conjunction with a refined development of personal creative process and awareness of cultural contexts. PREREQ: C- or better in ART302 and ART303 or ART308. RESTRICTIONS: Open to VC-BFA Majors only.

ART 302  TYPOGRAPHY METHODS  3
Development in use of typography for communication: grid systems, effects of context on legibility and readability, type in sequence, typographic systems and modernist grid compositions in publications, use of computer as tool for typographic projects, introduction to design theory as it applies to typography. RESTRICTIONS: VC-BFA.

ART 303  DESIGN METHODS  3
Development of image-making techniques and processes with the intention to communicate: graphic translation and representation, digital and analog processes, semiotics, design systems. Utilization of design fundamentals for composition and communication of visual form. RESTRICTIONS: For VC-BFA Majors only.

ART 307  INTERACTION DESIGN  3
Focusing on the development of meaningful interactions between technology and people, specifically through screen-based interfaces, (computer screens, tablets, smart phones, etc.), students develop skills in planning and producing engaging user experiences, (information architecture, prototyping, user interface designs and production), with special attention to conceptualizing innovative uses of new technology and critical evaluation of one’s work. Skills in html, css and Adobe Photoshop are required. RESTRICTIONS: Art Majors and Interactive Media minors only.

ART 308  TYPE AND IMAGE  3
Combining typographic and image-making techniques and processes for communication design. Students use materials and media in an advanced, refined way and develop personal methods for expressing a point of view and communicating ideas. PREREQ: C- or better in all of the following: ART202, ART203, ART206 and ART207. RESTRICTIONS: Open to VC-BFA Majors Only.

ART 309  BOOK ARTS  3
Exploration of book arts as a complete object that integrates content and form through narratives and/or sequential picture planes. Emphasis on elements of design and the principles of book planning and production.

ART 310  PHOTOGRAPHIC DESIGN  3
Explores photographic imagery in communication design and to understand the creative relationship between image and design. Students develop conceptual and technical skills emphasizing both studio and location assignments for graphic and advertising design projects including editorial, print advertising, posters, collateral materials, books and packaging. RESTRICTIONS: BFA or permission of instructor. May be repeated for six credits.

ART 312  ILLUSTRATION METHODS  3
Introduction to illustration methods through color mediums such as watercolor, gouache, acrylic, oils, and dry color media. Emphasis is on various approaches to illustrated visual imagery in editorial, book, institutional and advertising contexts. RESTRICTIONS: BFA or permission of instructor. May be repeated for six credits.

ART 315  ISSUES IN CONTEMPORARY ART  3
Examination of current issues of content and form; developments in technology; and social, political and cultural issues affecting contemporary visual art and artists. RESTRICTIONS: Completion of 60 credit hours.

ART 317  PRINTMAKING STRATEGIES  3
Different print techniques (screenprint, lithography, relief, etc.) will be explored and exploited for their ability to generate large editions in different formats including zines, books and large-scale print/installations. PREREQ: ART243 or ART245. RESTRICTIONS: Course has a course fee. May be repeated for six credits.

ART 318  APPLIED DESIGN VISITS  3
To gain a global awareness of the applied design field students will visit, discuss and review design-related organizations (i.e. advertising agencies, design studios, interactive/Web design studios, photographers, illustrators, commercial directors, magazines, and design museums) through a series of assigned projects. COREQ: ART319

ART 319  APPLIED DESIGN TOPICS  3
Students undertake assigned independent research projects relating to applied design topics and projects (i.e. advertising, graphic and design, typography, applied photography, etc.) resulting in visual and written presentations. COREQ: ART318 RESTRICTIONS: Requires permission of instructor.

ART 322  ADVERTISING DESIGN METHODS  3
Introduces basic tools and techniques of modern advertising along with an overview of industry history and practices. Students create advertising strategies and use a variety of media to communicate ideas effectively. Assignments include semester-long and weekly assignments to build strategy, copywriting, and art direction skills. RESTRICTIONS: VC-BFA or permission of instructor. May be repeated for six credits.

ART 324  THE ART OF SOCIAL CHANGE  3
20th Century international liberation artists’ works are examined from interdisciplinary perspectives. Students will observe and write about art works using behavioral science methods. Interaction with contemporary social change artists and one visual project are part of the course. May be crosslisted with BAMS324.

ART 326  EXPERIMENTAL ANIMATION  3
Explores experimental techniques in animation through hands-on projects. Addresses fundamental problems such as timing, rhythm, and sound. Explores cultural and historical fascination with animating the inanimate through screenings, lectures, and readings. Includes a variety of formats: traditional, digital, and/or electronic. PREREQ: ART280 or ART284 or ART285 or ART289 or ART385.

ART 327  EXPANDED PRINTMAKING  3
Exploration of a variety of printmaking techniques including digital, silkscreen etching and woodcut for developing multiple and one of a kind images. Students will be introduced to the contemporary issues and conversations associated with Printmaking as an art form. PREREQ: ART243 or ART245. RESTRICTIONS: Course has a consumable fee. May be repeated for six credits.

ART 331  INTERMEDIATE PAINTING  3
Identifying and exploring ideas through the development of critical awareness of contemporary painting issues and structures. Emphasis on directed conceptual problems and a variety of materials. PREREQ: ART231 or ART236.

ART 334  FIGURE PAINTING  3
Evolving conceptual and technical solutions to depicting the human figure in oil. Emphasis is on creating a representational and expressive finished product. PREREQ: ART230 and ART231 or ART236. RESTRICTIONS: May be repeated for six credits.

ART 335  DRAWING APPROACHES  3
Exploration of drawing using various media. A range of conceptual ideas including representational and abstract concepts. PREREQ: ART112 or ART129 or ART235. RESTRICTIONS: Open to Art Majors and Art Minors only.

ART 341  ETCHING  3
Introduction to etching and intaglio printing processes including drypoint, line etching, soft ground, liftground, aquatint techniques and non-toxic photo etching. RESTRICTIONS: Open to majors and minors.

ART 343  LITHOGRAPHY  3
Introduction to lithographic process, its history and contemporary practice. Emphasizes independent research on both drawn and photographic litho techniques. PREREQ: ART243.

ART 344  DIGITAL PRINTMAKING  3
ART 346 LETTERPRESS PRINTING 3
Explores the process and product of printing through various media, technology and conceptual approaches. Focuses on text and image relationships by integrating letterpress, woodcut, linoleum blocks, and digital systems. Exploration of processes and results in creation of an edition conceptually centered around individual interests.
PREREQ: ART243 or ART207. RESTRICTIONS: ART JR/SR Majors Only. May be repeated for up to six credits.

ART 350 SCULPTURE PROCESSES 3
Explores construction techniques and tools to create sculpture, introducing more advanced techniques and information. Pursue individual goals, selecting materials and types of artistic expressions that best suit each individual and creative situation.
PREREQ: ART250.

ART 366 INDEPENDENT STUDY 1-6

ART 370 SPECIAL TOPICS 3
Thematically based studio course following faculty research interests. Repeatable for 9 credits. Requires Instructor permission.
RESTRICTIONS: Requires instructor permission. May be repeated for nine credits.

ART 382 ALTERNATIVE PHOTOGRAPHIC PROCESSES 3
Investigates a variety of historical, analogous and digital processes to create unique images exploring 18th - 20th century photographic processes and alternatives. Empasizes concepts of light-sensitive imaging and investigations of classic and current materials augmenting traditional darkroom photographic processes.
PREREQ: ART280 or ART281 or ART284 or ART285 or ART289 or ART344.

ART 384 PHOTOGRAPHIC STRATEGIES 3
Expanded exploration of historic and contemporory photographic practice, critical theory and movements. Develop an advanced body of work through selective image processing, printing and portfolio development.
PREREQ: ART280 or ART284 or ART285 or ART289. RESTRICTIONS: Course has a consumable fee. May be repeated for six credits.

ART 385 VIDEO ART 3
Digital video animation, and time-based installation are contextualized within a tradition of fine art while exploring conceptual, experimental, narrative and documentary methodologies. Investigate lens media through readings, screenings, critiques, and hands-on creation of single and multi ‐ channel video at an intermediate level.
PREREQ: ART280 or ART284 or ART285 or ART289. RESTRICTIONS: May be repeated for six credits.

ART 386 LIGHTING STUDIO 3
Investigation of light as subject and technique. Hands ‐ on practice for students with interest in film/video, fine ‐ art and applied photography. Explore a variety of lighting problems, concepts, and techniques through a series of interlocking workshops, exercises, and visual projects.
PREREQ: ART207 or ART280 or ART281 or ART284 or ART285 or ART289.

ART 390 CERAMICS ‐ WHEEL THROWING & Firing 3
Learn the fundamentals of wheel ‐ throwing with emphasis on imaginative potentials inherent in this technique. Learn basic clay and glaze ‐ mixing chemistry and how to fire electric and gas kilns. Encouraged to experiment in this course.
PREREQ: ART290 or ART295. RESTRICTIONS: Open to non ‐ majors. May be repeated for six credits.

ART 391 CERAMICS A TIME BASED APPROACH 3
Make clay come alive through a combination of claymaking, time ‐ lapse, kiln ‐ based, and site ‐ specific techniques. Projects may explore material and contextual transformations as well as abstract and narrative possibilities.
PREREQ: ART290 or ART295.

ART 393 EXPANDED CERAMIC PROCESSES 3
Students will explore and research ceramic materials, structures, and transformations in a rich variety of building, glazing, and firing techniques. Focus on material experimentation in group projects and individual investigations. Students will be introduced to contemporary issues/sessions/associations associated with Ceramics as an art form. Course has a consumable fee. Repeatable for 9 credits.
PREREQ: ART290 or ART295 or by permission of Instructor. RESTRICTIONS: Course has a consumable fee. May be repeated for nine credits.

ART 400 VISUAL COMMUNICATIONS PRACTICUM 3
Designed to introduce Visual Communications BFA seniors to various aspects of a career in visual communications. Faculty and visiting artists and designers are invited to present topics to the class in lecture and discussion formats. Develop an awareness of diverse creative practices.
PREREQ: C or better in ART301 AND ART308. RESTRICTIONS: Open to VC ‐ BFA Majors Only.

ART 401 PORTFOLIO PREPARATION 3
Produce a portfolio accurately and effectively showing media proficiencies and ability to communicate ideas and point of view. Develop an awareness of how work and individual strengths relate to the current culture, society and creative business environments, informed by knowledge of contemporary and historical visual communications.
PREREQ: C ‐ or better in ART402 and ART409 or ART400. RESTRICTIONS: VC ‐ BFA.

ART 402 EXPERIMENTAL TYPOGRAPHY 3
Exploration of advanced typography in multiple media and for multiple purposes related to visual communications, including on ‐ and ‐ off ‐ screen media, (i.e. motion graphics, illustration, graphic design, typeface design and publication design).
PREREQ: C ‐ or better in ART301. RESTRICTIONS: VC ‐ BFA.

ART 403 DEGREE PROJECT 3
Independent project within Visual Communications disciplines that serves as an in ‐ depth inquiry into a subject of the student's choice, and directly relates to their intended career pathway. Projects are vetted and reviewed by a committee of faculty who serve as advisors.
PREREQ: C ‐ or better in ART402 and ART409. RESTRICTIONS: VC ‐ BFA.

ART 406 ARTIST'S MACHINE 3
Exploration of artist ‐ constructed machines (i.e. micro ‐ electronics, robotics, kinetic sculpture and interactive installation) as media for artistic expression. Balance of theory and practice with specific emphasis on making of electronic objects and positioning these in various contexts. No prior knowledge of electronics required. May be crosslisted with ART408.

ART 407 TOPICS IN ART & TECHNOLOGY 3
Production of large ‐ scale interactive media projects incorporating text, image, video and sound. Topics include theoretical and advanced technical components within a workshop format. Aesthetics, innovation, and cultural awareness are emphasized in creating interactive projects.
PREREQ: ART307 or ART385 or ART326. RESTRICTIONS: Art majors and Interactive Media minors only.

ART 408 INTERNSHIP 3
Students have a hands ‐ on professional experience in their field of choice in consultation with Faculty Advisors and interact with professionals in a creative working environment. The internship requires a minimum number of hours in a studio, gallery, design, advertising or related organization.
RESTRICTIONS: Junior and Senior BFA Art majors only. May be repeated for up to six credits. Requires permission of Instructor.

ART 409 DESIGN CONTEXTS 3
Collaborative approach to large ‐ scale design projects that take advantage of students’ individual skills and unique points of view. Projects are designed to emulate a small creative studio.
PREREQ: C or better in ART301. RESTRICTIONS: VC ‐ BFA.

ART 416 JUNIOR SEMINAR 3
Explores issues relevant to advancing studio practice and developing a cohesive body of work for BFA exhibitions. Examines implications of pursuing a future in a fine arts studio discipline.
RESTRICTIONS: Open to BA ‐ Art and BFA ‐ FA juniors only.

ART 417 BFA EXHIBITION 0 PF
The concluding exhibition required of all Bachelor of Fine Arts candidates and usually held during the final semester of undergraduate study.
RESTRICTIONS: BFA seniors only.

ART 419 SENIOR STUDIO 3
Students work independently to develop a body of art for BFA exhibition and portfolio. The approach is interdisciplinary and students are encouraged to experiment with a variety of media and collaborate with other artists; critique and discussion emphasize concept and content.
PREREQ: ART416 RESTRICTIONS: Art Majors only.

ART 432 PAINTING STUDIO 3
Provides atmosphere of support for a maturing studio practice. Emphasis on evolving a painting or material awareness in the pursuit of a more personal artistic direction and style.
PREREQ: ART331 or ART334. RESTRICTIONS: May be repeated up to nine credit hours.

ART 440 PRINTMAKING STUDIO 3
Emphasizes color printing and integration of advanced printmaking methods and materials. Traditional printmaking techniques and ideas are expanded, experimentation promoted, and new technologies explored. Focuses on individual research through exploring one or more processes.
PREREQ: ART243 and ART343, or ART245, or ART246, or ART341. RESTRICTIONS: Art Majors only.
ART 450  SCULPTURE STUDIO  3  Provides for development of a cohesive body of work based on personal thoughts and artistic ideals. Self-directed in collaboration with the instructor. Strong emphasis on individual concerns and interest working three-dimensionally.  PREREQ: ART350  RESTRICTIONS: May be repeated up to 9 credits.

ART 466  INDEPENDENT STUDY  1-6  RESTRICTIONS:

ART 470  SPECIAL TOPICS  3  Thematically based studio course following faculty research interests. Repeatable for 9 credits. Requires permission of instructor.  RESTRICTIONS: Requires permission of Instructor. May be repeatable for nine credits.

ART 481  PHOTO AND VIDEO STUDIO  3  Develop independent work through various stages of production culminating in a completed photo, video, web, or interactive work. Discuss criticism, techniques and contemporary research on multimedia at an advanced level. Projects may include experimental techniques, multichannel or gallery-based installation, animation, narrative, and/or documentary approaches.  PREREQ: ART307 or ART310 or ART326 or ART384 or ART385 or ART386.

ART 490  CERAMICS STUDIO  3  Curriculum is self-directed in collaboration with the instructor with a strong emphasis on individuality, articulation, and communication. Students will maintain an individual studio practice, participate in written and oral group discussions.  PREREQ: ART290 or ART295 and either ART390 or ART391 or ART393.  RESTRICTIONS: May be repeated twice for nine credits.

ART 600  GRADUATE CRITIQUE  3  Multidisciplinary graduate critique class in which students share and discuss creative work.  RESTRICTIONS: To be repeated up to twelve credit hours.

ART 670  SPECIAL TOPICS  3  Thematically based studio course following faculty research interests. Repeatable for 9 credits. Requires permission of instructor.  RESTRICTIONS: Requires permission of instructor. May be repeated for nine credits.

ART 677  CRITICAL ISSUES SEMINAR  3  Introduces foundational language and ideas used to talk about qualities of works of art and the creative process. Emphasis on development of language that helps individuals to respond to each other’s work during group critiques, and to elevate the level of discourse within personal practice. Prepares students to develop their supporting paper during the second year.

ART 678  RESEARCH SEMINAR  3  Introduction to graduate study focusing on developing research strategies as an integral component of studio practice. Includes critical reading and writing. Emphasis on students’ identifying directions within their own work.  RESTRICTIONS: Requires permission of instructor.

ART 679  GRADUATE STUDIO  3-9  Independent studio practice under the guidance and supervision of graduate advisors.

ART 698  MFA EXHIBITION  3  Selection, presentation and installation of art work in an exhibition space.  RESTRICTIONS: Approval of the student’s individual graduate committee.

ART 699  MFA SUPPORTING PAPER  3  Development of a written and photographic document in support of issues and concerns characterizing personal artistic development experienced during graduate study.  RESTRICTIONS: Approval of the student’s individual graduate committee.

ART 701  ART CONSERVATION FRESHMAN SEMINAR  1  PF  Introduction to the field through exposure to Winterthur Museum, Library and Garden and current art conservation projects. Professional interaction fosters academic and social competencies while explaining education, research, and career opportunities.

ARTC 210  SCIENCE OF COLOR PHENOMENA  4  Introduction to basic physical and chemical principles which describe nature of light and the phenomena of color. Targeted for non-science majors who seek a descriptive understanding of scientific principles underlying formation of color phenomena found in nature and works of art. May be crosslisted with CHEM210, SCEN210.  PREREQ: High school chemistry and algebra.

ARTC 301  CARE AND PRESERVATION OF CULTURAL PROPERTY I  3  Examines philosophy, ethics, and practice of material culture preservation and the issues pertaining to collections management of cultural property. Typical deterioration characteristics and preventive conservation alternatives will be presented and discussed.

ARTC 302  CARE AND PRESERVATION OF CULTURAL PROPERTY II  3  This undergraduate course will serve as an introduction to the practice of conservation, specifically conservation documentation. The class will provide students with a basic knowledge of conservation terminology, conservation literature and research resources, methods of conservation documentation, and prepare students for conservation internships.  PREREQ: ARTC301

ARTC 390  ART AND FORENSICS: PAINTING  3  The class will introduce the materials and techniques used by Western easel painters from the early Renaissance through the early 20th century and explore how science and analytical methods can answer questions relating to the materials, methods, age, attribution and authenticity of paintings and artwork.

ARTC 464  PRESERVATION INTERNSHIP  3-6

ARTC 466  INDEPENDENT STUDY  1-6

ARTC 480  STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST  3  Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research. May be crosslisted with ARTS480.  RESTRICTIONS: Requires permission of instructor.

ARTC 485  COLOR MIXING AND MATCHING  3  Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and the manufacture of paint studied. Major topics include color interaction and the Munsell system of color description.  RESTRICTIONS: Requires permission of instructor.

ARTC 488  STUDIO MATERIALS AND TECHNIQUES OF PAINTING I  3  Major masters and the materials, tools, supports and techniques of architectural painting and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research. May be crosslisted with ARTS488.  RESTRICTIONS: Requires permission of instructor.

ARTC 489  STUDIO MATERIALS AND TECHNIQUES OF PAINTING II  3  Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to present. Major topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research. May be crosslisted with ARTS489.  RESTRICTIONS: Requires permission of instructor.

ARTC 490  STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I  3  Major masters and materials, tools and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research. May be crosslisted with ARTS490.  RESTRICTIONS: Requires permission of instructor.

ARTC 495  PRESERVATION CAPSTONE  3  Summarize and synthesize the previous three years of a student’s undergraduate career in Material Culture Preservation major. Faculty complete the undergraduate experience and prepare students for their next step (job market or graduate school). Career advisement and assessment of learning using exams, the creation of portfolios, oral presentations of internship or research experiences.
ARTC 615  PROPERTIES AND STRUCTURE OF ART MATERIALS I  3
Relationship between structure of materials and their physical, mechanical and chemical behavior. Emphasis on art materials such as metals, ceramics, glasses, geological materials, polymeric materials, textiles, coatings, cellulose products, pigments, dyestuffs, etc. Also, mechanics of change due to heat, time, radiation and environment.
REstrictions: Full-time fellowship students only.

ARTC 616  CONSERVATION RESEARCH METHODS  3
Introduction to the principles and methodology of scientific research in conservation. Emphasis on topics such as experimental design, data analysis, preparation of research proposals, authenticity and technical studies, accelerated aging, and simple analytical methods.
PREREQ: ARTCG15  RESTRICTIONS: Full-time fellowship students only.

ARTC 617  ANALYSIS OF PAINTED SURFACES  3
Introduction to the analysis and technology of painted and varnished surfaces using reflected, visible and ultraviolet light microscopy techniques. Lectures and lab work include a review of traditional coating materials, color measurement and matching, and analysis and interpretation of cast cross-sections of paint and varnish stratigraphies.

ARTC 618  CONSERVATION CLEANING METHODS  3
Introduction to techniques for controlled removal of overpaints, varnishes, and grime from paintings and decorative and architectural objects. Cross-section microscopy techniques are used. Lectures and lab work include discussion of solvent and water-based cleaning systems, use of enzymes and chelating agents, and mixing and testing of customized cleaning materials.

ARTC 650  SEMINAR IN ART CONSERVATION  1
Oral reports on current work in the fields of art conservation, art history, ethics, philosophy and museum science.
PREREQ: ARTCG55  RESTRICTIONS: Full-time fellowship students only.

ARTC 654  EXAMINATION AND TREATMENT OF ART OBJECTS I  1-3
Application of scientific and art historical techniques to the examination, treatment and preservation of works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archeological objects, under the supervision of conservation faculty.
REstrictions: Full-time fellowship students only.

ARTC 655  EXAMINATION AND TREATMENT OF ART OBJECTS II  1-3
Application of scientific and art historical techniques to the examination, treatment and preservation of works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archeological objects under the supervision of conservation faculty.
PREREQ: ARTCG54  RESTRICTIONS: Full-time fellowship students only.

ARTC 658  TOPICS IN ADVANCED APPRENTICESHIP AND RESEARCH IN CONSERVATION I  6
Discussion, demonstration, practice and research relating to the examination, analysis, treatment, and collections care of cultural property including works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archeological materials. Course requirements may be fulfilled by work in cooperative institutions outside the Winterthur Museum.
PREREQ: ARTCG54 and ARTCG55  RESTRICTIONS: Full-time fellowship students only.

ARTC 659  TOPICS: ADVANCED APPRENTICESHIP AND RESEARCH IN ART CONSERVATION II  6
Discussion, demonstration, practice, and research relating to the examination, analysis, treatment, and collections care of cultural property including works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archeological materials. Course requirements may be fulfilled by work in institutions outside the Winterthur Museum.
PREREQ: ARTCG55 and ARTCG58  RESTRICTIONS: Full-time fellowship students only.

ARTC 660  INDEPENDENT STUDY  1-12

ARTC 670  CHEMICAL AND PHYSICAL TECHNIQUES USED IN THE EXAMINATION OF ART MATERIALS I  3
Classroom discussion and laboratory application of chemical and physical techniques that art conservators perform to identify and characterize organic art materials.
REstrictions: Full-time fellowship students only.

ARTC 671  CHEMICAL AND PHYSICAL TECHNIQUES USED IN THE EXAMINATION OF ART MATERIALS II  3
Classroom discussion and laboratory application of chemical and physical techniques that art conservators perform to identify and characterize metals, glass, ceramics, and natural and synthetic polymers. Basic structure, composition and deterioration mechanics of such materials.
PREREQ: ARTCG670  RESTRICTIONS: Full-time fellowship students only.

ARTC 672  CHEMICAL AND PHYSICAL TECHNIQUES USED IN THE EXAMINATION OF ART MATERIALS III  3
Classroom discussion and laboratory application of more sophisticated analytical and physical techniques used by the scientist to characterize materials. Application of these techniques to art materials and treatment-related problems stressed.
PREREQ: ARTCG670 and ARTCG671  RESTRICTIONS: Full-time fellowship students only.

ARTC 673  CHEMICAL AND PHYSICAL TECHNIQUES USED IN THE EXAMINATION OF ART MATERIALS IV  3
Independent research project focusing on the analytical and physical techniques used by the scientist to characterize art materials.
PREREQ: ARTCG670, ARTCG671 and ARTCG672  RESTRICTIONS: Full-time fellowship students only.

ARTC 688  STUDIO MATERIALS AND TECHNIQUES OF PAINTING I  3
Major masters and materials, tools, supports and techniques of architectural and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.
May be crosslisted with ARTGH688. RESTRICTIONS: Requires permission of instructor.

ARTC 689  STUDIO MATERIALS AND TECHNIQUES OF PAINTING II  3
Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Topics include development of canvass, brushes, oil paint, mediums, varnishes, solvents and complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.
May be crosslisted with ARTGH689. RESTRICTIONS: Requires permission of instructor.

ARTC 690  STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I  3
Major masters and materials, tools, and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.
May be crosslisted with ARTGH690. RESTRICTIONS: Requires permission of instructor.

ARTC 870  INTERNSHIP IN CONSERVATION  1-9
A third year of study at an accredited institution working with a master conservator in the student's field of interest.
REstrictions: Full-time fellowship students only. May be repeated for up to eighteen credits when topics vary.

ARTH 101  VISUAL CULTURE  3
Explores the ways we make, perceive and experience images and artifacts. Students will hone their skills in seeing, analyzing historical models and critically engaging in discussions of visual art and material cultures in selected eras and civilizations around the world.

ARTH 150  MONUMENTS AND METHODS IN THE HISTORY OF ART  3
Painting, sculpture and architecture studied as artistic and cultural expressions of their times. Emphasis on selected major artists, monuments and methods of analysis.
ARTH 151 MYTH, RELIGION AND ART 3
An introduction to the study of mythological and religious images, types, attributes and symbols on a comparative basis from many ages throughout the world. Includes representations of deities, heroes and heroines, as well as images with supernatural powers and satirical images.

ARTH 153 INTRODUCTION TO ART HISTORY: PYRAMIDS TO CATHEDRALS 3
Survey of art and architecture from the ancient world through the Middle Ages studied in historical and cultural contexts. Topics include: Egyptian pyramids, ancient Greek and Roman monuments, and medieval manuscripts and cathedrals.

ARTH 154 INTRODUCTION TO ART HISTORY: RENAISSANCE TO MODERN 3
Art and architecture from 1300 to the present studied in historical and cultural context. Topics include art and illusion, the altarpiece, portraiture, the nude, print culture, the changing image of the artist, photography, Impressionism, art and politics, Pop Art, and performance.

ARTH 156 ROMEO: FROM CAESAR TO FELLINI 3
Investigates Rome from antiquity to the twentieth century focusing on art and architecture, culture, architecture, film, literature, urban planning, law, social history, religion, and politics.

ARTH 158 RULERS’ IMAGES: ANTIQUITY TO THE PRESENT 3
Detailed study of selected rulers from Alexander the Great to African Presidents, as presented in both visual and textual sources. Analyze widely differing historical rulers and sources. Explore methods of analysis and interpretive strategies applicable to the images of modern rulers.

ARTH 162 HISTORY OF ARCHITECTURE 3
Survey of major buildings and settlement patterns as cultural expressions, ranging from antiquity to the present day. Lectures contextualize architectural and urban achievements in social, economic, political, religious and technological terms.

ARTH 163 ARCHITECTURE IN GLOBAL CONTEXTS 3
Concepts of architecture, with case studies drawn from various world regions ranging from prehistoric times to present. Understanding the role of architecture in human society and how it has shaped human history. Study of physical and cultural dimensions of architecture in different parts of the world and learn how to place their varieties in global contexts.

ARTH 166 SPECIAL PROBLEM 1-3

ARTH 198 STUDIES IN WORLD ART AND ARCHITECTURE 3
Monuments and artworks of the world, studied in a comparative and/or cross-cultural perspective. Topics highlight global cultural diversity in the history of art and architecture.

ARTH 199 TOPICS IN ART HISTORY 3
An introduction to great artists and their masterpieces. Topics change with each time of offering. Specific topics may focus on a crucial moment in history, or on a particular theme explored throughout the ages.

ARTH 202 BIBLICAL AND CLASSICAL LITERATURE 3
Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts. Crosslisted with ENGL202. PREREQ: ENGL110.

ARTH 203 ART OF THE BLACK AND AFRICAN DIASPORA 3
Through the art and architecture of the Atlantic and Indian oceans, introduces the art of African Heritage peoples after the early 15th century and indicates what connects them (and what separates them) in terms of subject matter, style, representational mode and critique.

ARTH 204 ARCHITECTURE AND POWER IN AFRICA 3
Explores architecture in Africa as a representation both of political power and social/religious complexity. Architecture’s relationship to art forms a component of course content. Always regionally focused, lecture vary by semester among these five zones: West Africa and the Maghreb, the Sahel (West Africa and East Africa), East Africa and the Nile Valley, Southern Africa, and Central Africa. May be crosslisted with BAM5203.

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

ARTH 206 INTRODUCTION TO ART AND ARCHITECTURE IN AFRICA 3
Explores the art history of the African continent from before Antiquity to the twenty first century, surveying a diversity of media including rock art, sculpture, painting and photography. Traverses the vastness of Africa’s ethnic, historical and climatic richness thematized in terms of African comologies, divinatory practices, histories of state formation, concepts of ancestry, colonialism, slavery, sensuality, revolution, and performance.

ARTH 207 ART OF ANCIENT EGYPT AND THE NEAR EAST 3
Survey of the art and architecture of ancient Egypt and Near East. Emphasis on the role of art in religious, political, and social contexts.

ARTH 208 GREEK AND ROMAN ART 3
Introduction to the art and architecture of ancient Greece and Italy. Emphasis on the meanings of art in political, religious, and social contexts in the cities of Athens, Rome, and Pompeii. Topics include the ancient Olympic Games, funerary monuments, and everyday life.

ARTH 209 EARLY MEDIEVAL ART: 200-1000 AD 3
Painting, sculpture and architecture in Europe and the Near East. Surveys the earliest Christian art as well as Byzantine, Early Islamic, Anglo-Saxon and Carolingian art.

ARTH 210 LATER MEDIEVAL ART: 1000-1400 AD 3
Painting, sculpture and architecture of the Christian world, treating later Byzantine, Romanesque and Gothic artistic traditions in their historical and cultural contexts. Development of a distinctively European art and society.

ARTH 213 ART OF THE NORTHERN RENAISSANCE 3
Covers late medieval devotional images to the art of the early modern cities (1400-1570), especially in the Netherlands and Germany. Special emphasis on Jan van Eyck, Rogier van der Weyden, Albrecht Durer and Pieter Bruegel.

ARTH 217 RENAISSANCE ART IN A GLOBAL PERSPECTIVE: THE 1400s 3
Surveys the main artistic developments and cross-cultural exchanges in 15th-century European art and architecture. Topics include: the Search for Antiquity; Naturalism and Illusion; Guilds and Workshops; Humanism and the Arts; Public and Private Devotions; Courtly Magnificence; The Peripatetic Artist; Looking East.

ARTH 218 RENAISSANCE ART IN A GLOBAL PERSPECTIVE: THE 1500s 3
Surveys the main artistic developments and cross-cultural exchanges in 16th-century European art. Topics include: the Splendors of Rome; the Crisis of the Image; Imitation and Competition; New Artistic Genres; The Genius of the Artist; Courtly Collectors; the Age of Discovery.

ARTH 219 ART OF THE ITALIAN RENAISSANCE 3
Surveys major artists in Italy from the fourteenth to sixteenth century and all of the major arts including painting, sculpture, and architecture. Special emphasis on Giotto, Donatello, Mantegna, Leonardo, Michelangelo, Raphael and Titian. Paintings and sculptures discussed in relation to techniques, styles, and their historical contexts.

ARTH 220 ITALIAN RENAISSANCE ARCHITECTURE 3
Italian architecture and art from the fourteenth to sixteenth centuries. Emphasis on the art of the Italian Renaissance. Topics include: the development of the Italian city-state; the role of the patron and the artist; the influence of the Italian Renaissance on art and architecture.

ARTH 222 BAROQUE ART 3
Seventeenth-century European painting, sculpture and architecture in its social-historical context. Emphasis on such major artists as Caravaggio, Bernini, Rubens, Rembrandt, Vermeer, Poussin and Velasquez. Discussion of the range of genre, still-life and landscape painting, as well as the role of patronage.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTH 225</td>
<td>EIGHTEENTH CENTURY ART</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 227</td>
<td>MODERN ART: THE 19TH CENTURY</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 228</td>
<td>MODERN ART SINCE 1900</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 229</td>
<td>CONTEMPORARY ART</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 230</td>
<td>AMERICAN ART: 1607-1865</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 231</td>
<td>AMERICAN ART: 1865-PRESENT</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 232</td>
<td>ART OF LATIN AMERICA</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 233</td>
<td>ART AND ARCHITECTURE IN CHINA</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 236</td>
<td>ARTS OF THE ISLAMIC WORLD</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 237</td>
<td>ART OF TIBET</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 238</td>
<td>ISLAMIC ARCH OF AFRICA/CAIRO TO TIMBUKTU</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 239</td>
<td>ART AND ARCHITECTURE OF EUROPE</td>
<td>3-12</td>
</tr>
<tr>
<td>ARTH 242</td>
<td>WOMAN AS IMAGE AND IMAGEMAKER</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 243</td>
<td>AMERICAN DECORATIVE ARTS, 1700-1900</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 244</td>
<td>AMERICAN ARCHITECTURE</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 245</td>
<td>THE AMERICAN HOME</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 248</td>
<td>AFRICAN AMERICAN ART</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 249</td>
<td>ART AND ARCHITECTURE IN CONTEXT</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 250</td>
<td>RULERS' IMAGES FROM AUGUSTUS TO GEORGE WASHINGTON</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 298</td>
<td>GLOBAL MODERNISM</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 299</td>
<td>MODERN ARCHITECTURE</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 301</td>
<td>RESEARCH AND METHODOLOGY IN ART HISTORY</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 302</td>
<td>PRINTS AND SOCIETY</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 303</td>
<td>ART OF THE IBERIAN WORLD, 1400-1800</td>
<td>3</td>
</tr>
</tbody>
</table>

University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

RESTRICTIONS: Offered only in conjunction with a study abroad program. May be repeated for credit three times when topics vary.
ARTh 304 Northern Baroque Art: The Age of Rubens, Rembrandt and Vermeer
3
Painting, printmaking and art theory in 17th-century Holland and Flanders in social and historical context. Examines the rise of landscape, genre and portraiture, the nature of Dutch realism, the social role of the artist, art and theater, and the impact of religion on art.

ARTh 305 Italian Baroque Art: Metaphor and Marvel
3
Painting, sculpture and architecture from the time of Caravaggio and the Carracci to Borromini and Cortona. Examines topics such as the Counter-Reformation and its impact on the arts, the rise of naturalism and illusionism, the design process and the function of drawings, theatricality and rhetoric.

ARTh 307 Monet to Picasso: Art in France 1860-1910
3
Art and visual culture in France 1860-1910. Topics include impressionism, symbolism, the avant-garde, women artists, public art, bohemia, and exhibitions, colonialism, primitivism, mass culture, photography, and early cinema. Artists include Manet, Monet, Cezanne, Morisot, Seurat, Van Gogh, Gauguin, Vuillard, Bonnard, Rodin, Matisse, and Picasso.

ARTh 310 The Role of the Artist in Society
3
Explores changing ideas of the artist from medieval craftsmen to Renaissance courtiers to Romantic genius and modern revolutionaries. Topics include self-portraiture, notions of artistic temperament and genius, women artists and artists' changing relations with their clients.

ARTh 311 Women, Society and the Arts
3
Focuses on the role of women in art and society throughout the ages. Interdisciplinary and feminist readings emphasize a variety of approaches. Topics may vary. Examples: Women in Antiquity, Renaissance Women, etc. May be crosslisted with WomS311. RESTRICTIONS: May be repeated for credit once when topics vary.

ARTh 314 Seminar: Shops and Shopping
3
Historical overview of the spaces and practices of shopping in Europe and North America.

ARTh 318 History of Photography
3
History and aesthetics of photography from its beginnings to the present. Emphasis on photography as artistic expression, the importance of technology and photography in relation to the other arts and social history.

ARTh 319 Photography in the United States
3
Explores the cultural and scientific histories of photography in the United States beginning with introduction of daguerreotype in 1839. Topics include photography and portraiture, Civil War, western exploration, Pictorialism, and early modernism. Emphasizes study and identification of original photographic materials through introduction to historic photographic processes and materials, such as the ambrotype, tintype, stereograph, and Pictorialist techniques of negative and print manipulation.

ARTh 321 Great Cities of the World
3
Focus on a single city over time or in a specific historical moment. Looks at art, architecture and/or material culture. Topics may vary. Examples: Nineteenth Century Paris; Ancient Pompeii; Florence under the Medici; Mexico City c. 1521.

ARTh 322 Introduction to Historic Preservation
3
Examines a specific research issue within historic preservation including hypothesis construction, design of research methodology and evaluation of results.

ARTh 325 Sculpture in the United States
3
History of sculpture in the U.S. from the 18th century to the present. Lectures and discussion explore sculptural techniques and production; styles, iconographies, and functions; and cultural issues such as space, iconism, and memory.

ARTh 334 Cairo: Architecture and Revolution
3
Course explores the history of Cairo from its founding to the present, paying attention especially to the nature and form of urban space in relation to architecture, as the background to and index of massive social change through time.

ARTh 338 Mayan Art and Architecture
3
Introduction to the civilization of the Maya as evident in the Yucatan Peninsula. Incorporates visits to relevant archeological zones. Examines the geographical framework that shaped the development of Mayan culture, political and economic organizations, art, architecture, ideology and history. May be crosslisted with ANTH328. RESTRICTIONS: Offered abroad only.

ARTh 366 Independent Study
1-6

ARTh 399 Topics in Art History
3
Detailed investigation in a lecture rather than a seminar format of varying topics, e.g., St. Denis and Problems of 12th Century Art.

ARTh 402 Undergraduate Seminar in the History of Art
1-4
Emphasis on art historical reading and research. Student oral reports. Recent seminar topics include Art and Religion in Latin America; Caravaggio; Art of the African Diaspora; Renaissance Rome. RESTRICTIONS: For undergraduates only. May be repeated for credit when topics vary.

ARTh 403 History, Philosophy, Functions and Future of Museums
3
Introduction to philosophy, purposes, structure, historical development and future of museums, and botanical and zoological gardens. Examines functions of collection, conservation, research, exhibition/interpretation, and social/cultural services; museum field growth. Crosslisted with MssT403.

ARTh 405 Seminar in Greek and Roman Art
3
The art and architecture of antiquity from the origins of Greek civilization to the fall of Rome. Recent topics include Art in the Everyday Life of Ancient Romans, Hellenistic Greek Sculpture, Late Roman Portraiture and Roman Architecture. RESTRICTIONS: May be repeated for credit when topics vary.

ARTh 406 Seminar in Medieval Art
3-12
The art of Europe from the fall of Rome to the late Gothic period. Recent topics include The Court of Charlemagne, Early Irish and Anglo-Saxon Art, and Saint Denis and the Origins of Gothic Architecture. PREREQ: ARTH209 or ARTH210. RESTRICTIONS: May be repeated for credit when topics vary.

ARTh 408 Artist's Machine
3
Exploration of artist-constructed machines (i.e. micro-electronics, robotics, kinetic sculptures, and interactive installation) as media for artistic expression. Balance of theory and practice with specific emphasis on making of electronic objects and positioning these in various contexts. No prior knowledge of electronics required. Crosslisted with ART 406.

ARTh 413 Seminar in Renaissance Art & Architecture
3
Renaissance art from 1300 to 1600. Recent topics include The Renaissance Villa and Art in the Age of Exploration. RESTRICTIONS: May be repeated for credit when topics vary.

ARTh 414 Seminar in Italian Renaissance Architecture
3
Italian architecture from 1300 to 1600. Recent topics include Renaissance Villas and Gardens, Brunelleschi and Alberti, Roman Architecture in the Age of Michelangelo and Palladio. PREREQ: ARTH220. RESTRICTIONS: May be repeated for credit when topics vary.

ARTh 415 Seminar in Italian Baroque Art
3-12
Painting, sculpture and architecture in Italy in the 17th century. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Poetics and Imagery, Caravaggio. RESTRICTIONS: May be repeated for credit when topics vary.

ARTh 417 Seminar in Northern Baroque Art
3-12
RESTRICTIONS: May be repeated for credit when topics vary.

ARTh 419 Seminar in Art of the Iberian World, 1400-1800
3
Explore the arts of the Iberian Peninsula and the Spanish and Portuguese colonies from 1400-1800. Topics vary. Seminars may focus on particular artists, or on broader historical and/or methodological issues dealing with artistic production, reception, and circulation within the Spanish empire. RESTRICTIONS: May be repeated for credit once when topics vary.

ARTh 420 Seminar in African Art
3
Studies recent scholarship on art and architecture in Africa, focusing on specific subjects such as Modern and Contemporary art, sculpture before 1500, global views and uses of African art and art institutions in Africa. RESTRICTIONS: Not open to freshmen.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTH 421</td>
<td>Seminar in Nineteenth Century Art</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 422</td>
<td>Folk and Outsider Art</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 423</td>
<td>Seminar in Modern Art Since 1900</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 424</td>
<td>Seminar in Film</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 425</td>
<td>Silent Cinema</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 427</td>
<td>Seminar in the History of Photography</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 429</td>
<td>Seminar in Modern Architecture</td>
<td>3-12</td>
</tr>
<tr>
<td>ARTH 431</td>
<td>Seminar in American Architecture</td>
<td>3-12</td>
</tr>
<tr>
<td>ARTH 435</td>
<td>Seminar in American Art</td>
<td>3-12</td>
</tr>
<tr>
<td>ARTH 440</td>
<td>Seminar in Latin American Art</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 445</td>
<td>Seminar in East Asian Art and Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 456</td>
<td>Seminar in Contemporary Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 457</td>
<td>Survey of African Art</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 464</td>
<td>Internship in Art History</td>
<td>1-3</td>
</tr>
<tr>
<td>ARTH 480</td>
<td>Studio in the Materials and Techniques of Drawing in the West</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 488</td>
<td>Studio in Materials and Techniques of Painting I</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 489</td>
<td>Studio in Materials and Techniques of Painting II</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 490</td>
<td>Studio in Materials and Techniques of Printmaking</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 509</td>
<td>Topics in Art History</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 601</td>
<td>Theories and Practices of Art Historical Interpretation</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 605</td>
<td>Studies in Greek and Roman Art</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 606</td>
<td>Studies in Medieval Art</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 613</td>
<td>Studies in Renaissance Art &amp; Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARTH 614</td>
<td>Studies in Italian Renaissance Architecture</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: RESTRICTIONS: May be repeated for credit when topics vary.
ARTH 616 Studies in Italian Baroque Art 3
Italian art in the 17th century. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Poetics and Imagery, Caravaggio.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 617 Studies in Northern Baroque Art 3
Seventeenth century art in northern Europe. Recent topics include Vermeer and Dutch Genre Painting; Art and Money; 17th Century Netherlands; and Prints in the Age of Rembrandt.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 619 Studies in Art of the Iberian World, 1400-1800 3
The arts of the Iberian Peninsula and the Spanish and Portuguese colonies from 1400-1800. Topics vary. Seminars may focus on particular artists, or on broader historical and/or methodological issues dealing with artistic production, reception, and circulation within the Spanish and Portuguese empires.
RESTRICTIONS: May be repeated for credit once when topics vary.

ARTH 620 Seminar in African Art 3
Topics vary from pre-Dagamari art (pre-European 'discovery') to 20th-century painting and contemporary African cinema and may include representations of Africa in Enlightenment art and philosophy, reviews of the literature on the arts of Fulani peoples and its related archive of documentary film.

ARTH 621 Studies in Nineteenth Century Art 3
History and theory of art 1789-1900.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 622 Research Topics in Historic Preservation 3
Seminar addresses a specific research issue 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. Crosslisted with UAPP636.

ARTH 623 Studies in Modern Art Since 1900 3
Aspects of the history, aesthetics and theories of Modern art from 1900 to the present. Topics may include the Avant-Garde, Abstract Art, Art and Politics, High vs. Low Art, and Folk and Outsider Art.
RESTRICTIONS: May be repeated for credit three times when topics vary.

ARTH 624 Studies in Film 3
Aspects of the history and aesthetics of film since the invention of synchronized sound. Topics change with each time of offering. Topics may include Classic Hollywood Film, Gender and Film, Film Noir, Independent Film, Global Cinema.
RESTRICTIONS: May be repeated for credit three times when topics vary.

ARTH 625 Silent Cinema 3
Examination of the invention, emergence, and development of silent cinema in Europe, the former USSR, and the United States. Includes study of significant films and filmmakers; the social, cultural and artistic contexts; and the critical literature.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 626 Studies in Modern Art and Theory 3
Studies in Modern Art, exploring diverse themes, media, theoretical and interdisciplinary perspectives. Possible topics include Art and Nationalism; Classicism and Modernity; Allegory; Regimes of Visuality; Modern Art and Literature; Modern Portraiture; Freud, Psychoanalysis, and Colonialism.

ARTH 627 Studies in the History of Photography 3
Aspects of the history and aesthetics of photography. Topics change with each time of offering. Topics may include Photography and Art, Documentary Photography, Photography and Criticism, Photography and Race, and Vernacular Photography.
RESTRICTIONS: May be repeated for credit three times when topics vary.

ARTH 628 Theory and Practice of Historical Preservation Planning 3
Examines the historic preservation planning process, the theory supporting this process and contemporary practices. Case studies used to demonstrate the integration of theory and practice. Crosslisted with UAPP629.

ARTH 629 Studies in Modern Architecture 3
Architecture in Europe and/or America from 1750 to the present. Recent topics include the Architecture of Neoclassicism and Sullivan, Wright and the Prairie School.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 630 Historiography of Material Culture 3
Landmark works and recent theoretical approaches to the understanding and interpretation of the man-made environment. Readings draw from a variety of disciplinary frameworks including art history, anthropology, historical archeology, cultural geography, sociology and history.
Crosslisted with HIST605. RESTRICTIONS: Requires permission of instructor.

Architecture in the American Colonies from the anonymous buildings of the 17th century to the designs of Thomas Jefferson and B.H. Latrobe in the early 19th century.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 633 Studies in Nineteenth Century American Architecture 3
The Greek, Gothic, Egyptian and Oriental Revivals; High Victorian Style and its culmination in the Age of Elegance; and Late Nineteenth Century American Architecture.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 635 American Art to 1865 3
Topics change with each offering. Recent topics include Visual Culture in Antebellum America, Common Ground: Dialectics of High and Low in 19th Century American Visual Arts.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 636 Studies in American Art: 1875-Present 3
Painting, sculpture and related media from Eakins to the present. Recent topics include Eakins and American Modernism, and American Painting and Sculpture after World War II.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 640 Seminar in Latin American Art 3
The arts of Latin America from pre-Hispanic times to the 21st century. Recent topics include Art and Conquest in the New World, and Life and Afterlife of pre-Hispanic Artifacts.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 654 Vernacular Architecture 3
Study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship.
Crosslisted with UAPP654.

ARTH 656 Studies in Contemporary Architecture 3
Contemporary architecture from around the world. Topics include Contemporary Architecture, Cross-cultural Dialogues, Transnational Practices. Discover theories of postcolonialism and postmodernism to discuss aesthetic forms and concepts in the most recent architectural design projects.

ARTH 657 Survey of African Art 3
Major African art styles, their interrelationships, the context of usage and the meanings of African artworks.
Crosslisted with ANTH657.

ARTH 664 Internship in Art History 3
Receive on-the-job experience and explore potential occupational areas at an art museum or other art-related venue, under joint supervision of the Department of Art History and sponsoring organization(s). Completion of journal of activities and/or final academic project or paper.
RESTRICTIONS: Requires approval of Director of Graduate Studies before registering the course. Does not count as a 600-level ARTH seminar and does not fulfill an area/distribution requirement.

ARTH 685 Cultural Theory and Criticism 3
Topical introduction to one or more cultural theories, providing a survey of scholarship on such varied topics as semiotics, deconstructionism, feminism, material culture, race, ethnicity studies, postcolonial and global studies, and problems of representation and signification in literary and non-literary texts.
Crosslisted with ENGL685. RESTRICTIONS: May be repeated once for credit when topics vary.

ARTH 688 Studio Materials and Techniques of Painting I 3
Major masters and materials, tools, supports and techniques of architectural and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.
Crosslisted with ARTC688. RESTRICTIONS: Requires permission of instructor.
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisites</th>
<th>Crosslisted with</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTH 689</td>
<td>Studio Materials and Techniques of Painting II</td>
<td>3</td>
<td>Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationships between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.</td>
<td>Requires permission of instructor.</td>
<td>ARCT689</td>
</tr>
<tr>
<td>ARTH 690</td>
<td>Studio in the Materials and Techniques of Printmaking I3</td>
<td>3</td>
<td>Major masters and materials, tools, and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.</td>
<td>Requires permission of instructor.</td>
<td>ARCT690</td>
</tr>
<tr>
<td>ARTH 851</td>
<td>Seminar in Art Historical Pedagogy</td>
<td>3 PF</td>
<td>Discussion of all aspects of teaching in the field of art history (lectures, discussions, materials, examinations, grading), especially in the context of the teaching of a large introductory survey course.</td>
<td>RESTRICTIONS: Open only to teaching assistants in ARTH153 or ARTH154. May be taken for credit only once.</td>
<td></td>
</tr>
<tr>
<td>ARTH 886</td>
<td>Reading and Research</td>
<td>1-9 PF</td>
<td>Readings and conferences on an approved subject under faculty direction.</td>
<td>Requires permission of Department Chair. Open to Art History Ph.D. students only.</td>
<td></td>
</tr>
<tr>
<td>ARTH 889</td>
<td>Master's Thesis</td>
<td>1-6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARTH 890</td>
<td>Master's Paper</td>
<td>3</td>
<td>Research and writing of Master's Paper.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARTH 964</td>
<td>Pre-Candidacy Study</td>
<td>3-12 PF</td>
<td>Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required coursework.</td>
<td>RESTRICTIONS: Not open to students who have been admitted to candidacy.</td>
<td></td>
</tr>
<tr>
<td>ARTH 969</td>
<td>Doctoral Dissertation</td>
<td>1-12 PF</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BLACK AMERICAN STUDIES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisites</th>
<th>Crosslisted with</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAMS 107</td>
<td>History of Rock</td>
<td>3</td>
<td>The study of various styles of rock music. Introduction to folk, country, blues, and jazz as predecessors to rock. Intended for the non-music major. No music reading skills required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 110</td>
<td>Introduction to Black American Studies</td>
<td>3</td>
<td>Assesses the status of Black America in the modern technological order through an examination of the major spheres of institutional life, including employment, education politics, criminal justice and the military.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 134</td>
<td>History of Africa</td>
<td>3</td>
<td>Introduces major themes from the earliest times to 1914. Introduces major themes in African history: pre-colonial African political, social and economic institutions; diversity in African political organizations; slave trade and colonialism.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 166</td>
<td>Special Problem</td>
<td>1-3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 203</td>
<td>Architecture and Power in Africa</td>
<td>3</td>
<td>Explores architecture in Africa as a representation both of political power and social/religious complexity. Architecture’s relationship to art forms a component of course content. Always regionally focused, lecture vary by semester among these five zones: West Africa and the Maghreb, the Sahel (West Africa and East Africa), East Africa and the Nile Valley, Southern Africa, and Central Africa.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 204</td>
<td>Urban Communities</td>
<td>3</td>
<td>Urbanization, rural-urban social differences and the organization of urban communities by race, class, ethnicity and stage in the life cycle.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 205</td>
<td>Contemporary African American Issues</td>
<td>3</td>
<td>The impact of important issues involving African American people in contemporary American society. Critical theoretical analyses of trends that affect programs of the Black community writ large.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 206</td>
<td>Survey of African American Culture</td>
<td>3</td>
<td>Historic and contemporary aspects of African American culture. A multi-faceted approach utilizing resources from music, literature, history, folklore, religion and sociology.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 207</td>
<td>History of Jazz</td>
<td>3</td>
<td>Chronological study of the style changes in jazz from the late 19th century to the present. Emphasis on the sociological, economic and technological influences of the period and on the principal personalities who have been primarily responsible for change.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 215</td>
<td>Race in Society</td>
<td>3</td>
<td>Examination of the social construction of race and its importance in institutions and social identity. History of race in the United States, including access to rights and privileges and how groups worked for racial equality, 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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 220</td>
<td>The Civil Rights Movement</td>
<td>3-4</td>
<td>This course examines African American struggles for freedom, equality, and citizenship from the 1940s to the present.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 293</td>
<td>Special Topics in BAMS</td>
<td>1</td>
<td>Topics vary.</td>
<td>Requires permission of credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>BAMS 296</td>
<td>Honors Forum</td>
<td>1</td>
<td>See ARSC296 for course description.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 298</td>
<td>Research on Race, Ethnicity and Culture</td>
<td>1 PF</td>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 304</td>
<td>African American History to the Civil War</td>
<td>3</td>
<td>The history of African American life and culture to the Civil War. May be crosslisted with HIST325.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 305</td>
<td>Race, Image, in Media/Culture</td>
<td>3</td>
<td>Study how images shape and reflect attitudes toward race and ethnicity in culture. Visual materials include film, photography, television, and popular illustrations. May be crosslisted with HIST305.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 306</td>
<td>African America History since the Civil War</td>
<td>3</td>
<td>Provides an overview of the major themes, issues, and debates in African American History from the Civil War to the contemporary era. Through readings, lectures, discussions film, the course will address: the process of emancipation, Reconstruction, Jim Crow segregation and racial violence, black cultural production, the modern black freedom struggles, and black life in the 21st century.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 307</td>
<td>Black Thought and Philosophy</td>
<td>3</td>
<td>Readings and discussions of Black philosophies, ideologies and concepts as reflected in the thought of significant Black figures. Crosslisted with PHIL307.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 308</td>
<td>Delaware Black History</td>
<td>3</td>
<td>Survey course in Delaware Black history. The Black American in Delaware from colonial times to recent developments. PREREQ: HIST205.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 309</td>
<td>Political Culture by Country</td>
<td>3</td>
<td>Introduction to the political and civic cultures underpinning and supporting different political systems. Topics may vary depending on host country. Crosslisted with POSC309. RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be taken twice for credit when countries vary.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAMS 313</td>
<td>African American Literature I</td>
<td>3</td>
<td>Literature by African American writers from the eighteenth century to the Harlem Renaissance. Crosslisted with ENGL344. PREREQ: ENGL110</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BAMS 322 RACE AND POLITICS 3 Provides an insight and understanding of race as an intrinsic part of the political process in the United States. Role of race in United States politics is explored primarily through the political experiences of black Americans and how the political system has responded. Crosslisted with POSC322.

BAMS 324 THE ART OF SOCIAL CHANGE 3 20th Century international liberation artists' works are examined from interdisciplinary perspectives. Students will observe and write about art works using behavioral science methods. Interaction with contemporary social change artists and one visual project are part of the course. Crosslisted with ART 324.

BAMS 326 ANTHROPOLOGY OF AFRICAN DIASPORA 3 Focus on the historical, geographical, and cultural specificities of cultures in the African diaspora. Addresses the following main topics: history and geography of the African diaspora; slavery and responses to slavery (rebellions and revolutions); the 'big thinkers' of the African Diaspora, cultural manifestations (music and religion); discourses of whiteness, and ways to remember the Motherland. Crosslisted with ANTH326.

BAMS 327 RACE, GENDER, SCIENCE 3 Critically examines a number of metaphysical, epistemological, and ethical issues related to science of race, gender, and sexual orientation. Topics may include (a) evolution of sex and gender, (b) gender and cognition, (c) biological basis, or lack thereof, of sexual orientation/preference (d) evolutionary, cognitive, historical, and political origins of race thinking, (d) relationship between everyday conceptions of race and gender as compared with scientific conceptions of race and gender, (e) ethical issues raised by human kind classification schemes. Crosslisted with PHIL327.

BAMS 330 RHETORIC OF BLACK AMERICA 3 Rhetoric of Black Americans from early orators to contemporary figures. Oral interpretation and analysis of methods and techniques. PREREQ: Introductory class in communication.

BAMS 331 HISTORY OF CARIBBEAN I 3 Examines major themes in Caribbean history from the pre-Columbian period to the end of slavery in 1838. Discussion of the demographic and ecological consequences of European contact, sugar and slavery, the evolution of Creole cultures and slave resistance. Crosslisted with HIST331.

BAMS 332 HISTORY OF CARIBBEAN II 3 Examines the period from 1838 to the present. Includes a discussion of the social and economic adjustments to emancipation, the making of plural societies with the importation of Asian laborers, American imperialism and political and social movements of the twentieth century. Crosslisted with HIST332.

BAMS 333 PEOPLES OF AFRICA 3 Social institutions and cultural traditions of Africa; political, economic, legal and kinship systems, and modes of thought. Crosslisted with ANTH333.

BAMS 334 AFRICAN AMERICAN WOMEN'S HISTORY 3 Explores the diversity of African American women's lives and development of women, work, and culture from the colonial era through the late 20th century. Examines the social, political, religious and economic factors affecting change and transformation in the lives of African American women. Provides a broad introduction to the interdisciplinary field of African American and Women's Studies. Crosslisted with HIST334.

BAMS 335 EXPERIENTIAL EDUCATION 3 Field experience combined with a seminar emphasizing professional issues in human services, including portfolio development and career planning. Students should arrange for a 50 hour field placement prior to first week of class (see instructor). Crosslisted with HDFS334. RESTRICTIONS: HMSV majors only or permission of instructor.

BAMS 336 AMERICAN SLAVERY 3 In this class we will examine the institution of slavery from 1619 through the Civil War. This course has a number of goals, one of which is to examine the peculiar institution over space and time within colonial and antebellum America. Crosslisted with HIST335.

BAMS 345 AFRICAN AMERICAN LITERATURE II 3 Literature by African American writers from the Harlem Renaissance to the present. Crosslisted with ENGL345. PREREQ: ENGL110

BAMS 347 STUDIES IN AMERICAN LITERATURE 3 Special topics, ranging from the beginnings to contemporary American literature; may include studies in a single author or authors (e.g., the detective stories of Poe) or period and genre studies (e.g., the Harlem Renaissance or the humor of the old southwest). Variable content. Crosslisted with ENGL347. RESTRICTIONS: May be taken up to three times when topics vary.

BAMS 350 RACE AND WORK IN THE UNITED STATES 3 Examines how race affects work-related experiences and opportunities of black workers in the United States. Explores ways in which race, class, gender and other systems of social organization operate to determine access to resources, how resource access is managed and restricted, and to what extent workers are able to achieve economic and occupational mobility. Also looks at cultural and social capital formation and their impact on Black workers' employment outcomes.

BAMS 351 RACE AND ETHNICITY IN LATIN AMERICA 3 Explores the multiple, complex and historically changing meanings of race and ethnicity in Latin America, and the consequences of discrimination towards specific groups. Regions covered are the Caribbean, Mexico and Central America, and the Andean, Atlantic and Southern Cone regions of South America. Crosslisted with ANTH351.

BAMS 352 BLACK FEMINIST THEORY 3 Explores black women and their struggles to define and re-define themselves in the US, from slavery to the modern era. Examines the historical evolution of black feminist theory starting with slave narratives and ends with contemporary readings. May be crosslisted with WOMS362.

BAMS 355 INEQUALITY, CRIME AND JUSTICE 3 Introduction to challenges in addressing crime in multicultural, multiethnic, class-stratified society. This context serves as backdrop for inquiry into crime causation, operations of the criminal justice system, and experiences of relevant actors. Crosslisted with CRJU355.

BAMS 356 STUDIES IN MODERN/CONTEMPORARY LITERATURE 3 Study of selected topics in 20th century British, American and world literature, e.g., the contemporary epic novel, post-colonial writing and politics. Crosslisted with ENGL356. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

BAMS 361 RACIAL INEQUALITY 3 A detailed examination of racial inequality, including the social construction of race, the nature of oppression and advantage, government policies and resistance strategies. There will be attention to the status of men and women and social class diversity within racial-ethnic communities. Crosslisted with SOC361. PREREQ: SOC201

BAMS 363 HISTORY OF BLACKS IN THE AMERICAN WEST 3 Examines the history of people of African descent in the western region of the United States from the Spanish colonial era to the present. Focus on contributions of men and women who shaped history of the region, of black America, and of the entire nation. May be crosslisted with HIST333. PREREQ: Because one of the requirements for this course is a research paper, ENGL110 or previous experience with writing research papers with the use of citations is desired. Students should also have taken introductory courses in either American History

BAMS 364 THE AFRICAN DIASPORA IN INDIAN COUNTRY 3 Interdisciplinary exploration of the interactions between African Americans and Native Americans in the Americas (with a specific focus on the U.S.) from the colonial era to the present. Themes explored will be Transatlantic slavery and early Black-Indian continental contacts; American Indians as slaves and slave owners; the Black-Indian experience in the Jim Crow South and frontier West; Afro-Indian people and the politics of mixed-race identity, and contemporary African American and Native American relations in the U.S.

BAMS 369 SLAVE NARRATIVES IN THE AFRICAN DIASPORA 3 Examine the institution of slavery in the Americas through the perspective of the slaves who endured it. Letters, speeches, interviews and first person narratives will be examined within the historical context of eighteenth and nineteenth century slave society. The goal of the course is (1) to gain a deeper understanding of the slave experience from the slave’s point of view, 2) to explore the historical dimensions of slave testimony and examine its use as historical evidence, and 3) to understand the gendered, regional, period and spatial nuances of the slave experience. May be crosslisted with HIST320.
BAMS 373  PSYCHOSOCIAL ELEMENTS OF HIP-HOP IN THE BLACK COMMUNITY 3
Critical look at evolution of Hip-Hop music and culture in the Black community. Focuses on how "street" elements of the Black community organized a socio-political and economic movement through their music.

BAMS 381  UNDERSTANDING BLACK MEN IN THE STREETS AND IN PRISON 3
Examines development of a street identity in Black men in the community and criminal justice system, particularly as a result of inadequate economic and educational opportunity.

BAMS 382  STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH 3
Consideration of multiculturalism as it pertains to American culture or literature in English from Africa and other non-European societies. Variable in historical range, geography, and genre. Crosslisted with ENGL382. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

BAMS 391  RESEARCH METHODS IN BLACK AMERICAN STUDIES 1-4
Develops methodology-based skills allowing for systematic thought and conduct of research on Black Americans in the African Diaspora.

BAMS 392  BRAZIL IN THE MODERN WORLD 3
Focuses on the social and political history of Brazil over five hundred years, from first indigenous contact with Europeans through independence, formation of the Republic, modernization and contemporary issues facing the country. Ends by examining Brazil's changing place on the global stage. Crosslisted with HIST392.

BAMS 395  PAN AFRICANISM 3
Traces the rise, development and varied expressions of the drive towards the liberation and unity of black people on the continent (Africa) and in the diaspora. Covers liberation struggles in Africa and the Civil Rights movement in the United States. Crosslisted with HIST395.

BAMS 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. Crosslisted with SOC1415.

BAMS 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. Crosslisted with PSYC416. PREREQ: Grades of C- or better in PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

BAMS 418  RACE, GENDER, AND POVERTY 3
An examination of contemporary American poverty with attention to race and gender as fundamental dimensions of inequality. Social policy, employment and family composition are key topics. Crosslisted with SOC1418. PREREQ: SOC1201.

BAMS 420  RACE AND SEXUALITY 3
Examine sexuality as a structure of power and identity. Study how race is sexualized and sexuality is racialized. Explore the impact of binary thinking (white/non-white, straight/gay) on social relationships. The perspective of racial minorities, particularly African-Americans, is emphasized. Review research on culture, history, and policy. Crosslisted with SOC1420. PREREQ: SOC1201

BAMS 439  TOPICS IN AFRICAN POLITICS 3
Examination of selected topics in contemporary African politics. Topics will vary. Crosslisted with POSC439. RESTRICTIONS: May be taken twice for credit when topics vary.

BAMS 440  BLACK BODIES ON DISPLAY: RACE IN MUSEUMS 3-9
Analysis of important themes in the study of Black American and African diasporic culture and history in relationship to museums and histories of display. Topics may vary each time the course is offered. RESTRICTIONS: Open to juniors and seniors only. May be repeated for nine credits.

BAMS 455  YOUTH STREET OUTREACH 4
Implements an outreach program to youth in a low income, urbanized community in Wilmington. Students trained and monitored as outreach workers by their professor and by community volunteers. Outreach workers trained to approach youth hanging out on the street, engage them (through conversation and recreational activities), identify their needs, and direct them to resources. Students keep journals to record their observations and feelings. The goal of the class is to increase social capital among youth by encouraging and facilitating youth participation in community educational, recreational, and social support services/activities. Crosslisted with SOC1455.

BAMS 476  TOPICS IN HUMAN DEVELOPMENT AND FAMILY STUDIES 1-3
Selected topics focusing on current issues affecting families from an interdisciplinary and global perspective. Crosslisted with HDFS475. PREREQ: Vary by Instructor and topic. RESTRICTIONS: Vary by Instructor and topic.

BAMS 490  SENIOR PROJECT 3
A required research/methodological component to the BAMS major. Students will integrate the knowledge they have developed throughout their undergraduate academic careers into a final research project. PREREQ: BAMS391. RESTRICTIONS: Juniors and Seniors Only.

BAMS 649  CIVIL RIGHTS LAW AND POLICY 3
Examines the origin and evolution of the laws and policies that govern the rights of African-Americans and other people of color in the United States. Examines emerging approaches to civil rights scholarship and considers the implications of the Supreme Court's recent embrace of a conservative posture in civil rights issues. Crosslisted with UAPP649.

BAMS 650  BLACK COMMUNITY STUDIES 3-6
Investigation and analysis of various topics and developments of interest and significance to the Black community. May be crosslisted with EDUC610, UAPP610. RESTRICTIONS: May be repeated for credit when topics vary.

BAMS 660  RESEARCH AND BLACK AMERICAN STUDIES 1-6

Behavioral Health & Nutrition

BHAN 106  INTRODUCTION TO ANTHROPOLOGY OF HEALTH 3
Introduces biocultural anthropological approaches to health. It covers topics ranging from evolutionary perspectives on health, ethnomedical systems, disease vs. illness, alternative medicine, placebo and nocebo, diet and nutrition, growth and development, reproductive health, aging, infections and chronic disease, stress, mental health, social determinants and health disparities. Crosslisted with ANTH106.

BHAN 120  PHYSICAL EDUCATION 1-12 PF
Introduces knowledge and skills in physical activity. The program is geared toward lifetime sports and allows for selection.

BHAN 121  WATER SAFETY INSTRUCTOR 2
Prepares students with the skills and knowledge to teach people to swim and be safe in and around water. Topics covered: basic water safety, swimmer strokes, advanced lifesaving skills, first aid, artificial resuscitation, teaching techniques, lesson plans, unit plans and practical teaching experience.

BHAN 122  LIFEGUARD TRAINING 2
Skills and knowledge for the professional lifeguard. Topics include the professional lifeguard; rescue skills; breathing and cardiac emergencies; first aid; oxygen administration in the use of Automated External Defibrillation (AED); and spinal injuries.

BHAN 130  HEALTH TOPICS 1
Through a variety of relevant health topics students will examine how they can take responsibility for their health behaviors and live a healthier and more productive life.

BHAN 132  SCUBA 2
Prepares students with the skills and knowledge necessary to continue their training for open water scuba certification.
**BHAN 135  FRESHMAN SEMINAR**  
Covers basic survival skills: effective coping strategies to meet personal, academic, career and social challenges. Enhances student success and develops positive lifelong learning skills.  
**RESTRICTIONS:** Open to first semester freshmen.

**BHAN 140  FUNDAMENTAL SKILLS ANALYSIS**  
Designed to develop cognitive understanding and practical experience for teaching and refinement of fundamental skills in grades K-12. Emphasis on processes of perceiving, extending, refining and applying fundamental skills through teaching progressions, lead-up games, and activities.

**BHAN 141  ADVENTURE CHALLENGE AND OUTDOOR RECREATION**  
Provides opportunity to develop skills and techniques, learn methods and acquire knowledge of designated outdoor recreation skills and adventure challenge activities. Emphasis on developing readiness for presenting such activities in group settings.  
**PREREQ:** BHAN140.

**BHAN 145  INTRODUCTION TO PHYSICAL EDUCATION**  
Focuses on curriculum and teaching methods for K-12 physical education. Examines student characteristics, domains of learning, movement concepts, planning and assessment to meet national and state content standards.

**BHAN 155  PERSONAL HEALTH MANAGEMENT: AN APPROACH FOR A LIFETIME**  
Utilizing group problem solving techniques and on-line resources, students develop a comprehensive approach to managing their own health.

**BHAN 160  HEALTH BEHAVIOR SCIENCE SEMINAR**  
Explore the multiple disciplines within the area of health behavior science through guest lectures by experts and student engagement in community health related activities.

**BHAN 164  INCLUSIVE ACTIVITY SEMINAR**  
Examines ways to help people with disabilities remain physically active. Students assist an adult who has a disability one day per week with their existing exercise program. Adults are responsible for their own care and students simply assist them with their agreed upon exercise program.

**BHAN 166  SPECIAL PROBLEM**  
1-3 **PF**

**BHAN 168  FRESHMAN SPECIAL TOPICS**  
1-4  
Freshman level independent study.

**BHAN 206  FARM TO TABLE**  
How does food get from the farm to your table? Explore traditional agriculture and contemporary food production models like Community Supported Agriculture (CSA), community gardens and the local food movement. Learn about new crops and dietary strategies that can be incorporated into the way people eat today. Examine cultural influences on food production and consumption patterns, and biocultural aspects of nutrition. Students will complete several projects that include interviews, research, food shopping excursions, film critiques and menu planning. Students will volunteer at the Delaware Food Bank and/or Gardens for the Community. Crosslisted with PLSC206.

**BHAN 207  FOUNDATIONS OF LEISURE AND SPORT MANAGEMENT**  
History, theory, and philosophy of leisure and sport and their influence on society, with emphasis on principles and objectives of program planning and execution.

**BHAN 225  OFFICIATING RECREATIONAL SPORTS**  
1-2  
Theory and practice of officiating recreational sports. Introduced as a lifetime activity, emphasis is placed on practical experience with the intramural program. Minimal classroom time. Offers excellent leadership training.  
**RESTRICTIONS:** Meets one half of a semester. Spring sports: basketball and softball.

**BHAN 226  SPORT, RECREATION AND LEISURE ABROAD**  
Exploring the roles of sport, recreation and leisure in different international societies as part of a study abroad program. Includes opportunities to participate in and study popular sport, recreation, and leisure activities and may include visiting world class sporting events and facilities.

**BHAN 230  GROUP FACILITATION SKILLS IN HEALTH AND PHYSICAL EDUCATION**  
Effective group facilitation, management and communication proficiency modeled and practiced. Participation in a variety of group models to enhance delivery of diverse classroom topics. Develops preliminary health education planning skills including communication of sensitive issues.  
**PREREQ:** BHAN155.

**BHAN 231  TEACHING COMMUNITY AND MENTAL HEALTH**  
Development of teaching approaches for mental health issues such as death and dying, suicide, depression, stress reduction and self-esteem. Emphasis on developing partnerships with community-based health programs and accessing pertinent health information.  
**PREREQ:** BHAN155.  
**RESTRICTIONS:** Open to HPE majors only.

**BHAN 236  GLOBAL HEALTH AND PHYSICAL ACTIVITY**  
Engage in culturally relevant activities and reflect on how these experiences have impacted their understanding of health in a global context. Discussions focus on how culture, environment, and climate influence health choices people make. Students will reflect on how these experiences have impacted them.

**BHAN 241  TEACHING INDIVIDUAL SPORTS**  
Designed to prepare physical education teacher candidates to teach a variety of individual sports that have been identified as relevant to national and state standards, and current K-12 physical education curricula. Emphasis on developing readiness for teaching these activities in public school setting.  
**RESTRICTIONS:** HPE students only.

**BHAN 245  TEACHING TEAM SPORTS**  
Designed to prepare physical education teacher candidates to teach a variety of team sports identified as relevant for K-12 physical education settings and both state and national standards. Emphasis placed on developing content and pedagogical knowledge necessary to teach these activities in public school settings.  
**RESTRICTIONS:** HPE students only.

**BHAN 251  SKILLS, TECHNIQUES AND KNOWLEDGE OF RHYTHMS AND DANCE**  
1  
Preparation of physical education teachers. Provides opportunity to develop skills, learn methods and techniques and acquire knowledge of the above activities. Emphasis on developing readiness for presenting such activities in public school settings.  
**RESTRICTIONS:** Open to HPEI and HPE majors only.

**BHAN 261  LEADERSHIP IN LEISURE AND SPORT MANAGEMENT**  
3  
Dynamics of group interaction and theories, principles, and practices of leadership. Review of research in leadership and group dynamics. Practical experience in applying theories and techniques through group execution of major campus-wide special event.

**BHAN 263  LEADERSHIP PRACTICUM**  
1-3 **PF**  
Students work under the auspices of an appointed professional to develop leadership skills in fitness activities.

**BHAN 266  SPECIAL PROBLEM**  
1-3 **PF**

**BHAN 268  SOPHOMORE SPECIAL TOPICS**  
1-4  
Sophomore level independent study.

**BHAN 276  TECHNOLOGY IN HEALTH AND PHYSICAL EDUCATION**  
1  
Focuses on future educators integrating technology into the classroom. Hands-on work involves designing educational experiences for professional and student use.  
**RESTRICTIONS:** Open to HPE majors only.

**BHAN 301  THE ART OF HAPPINESS**  
3  
Designed to challenge students to examine how they can impact their happiness and improve their overall health and quality of life. Students will complete weekly assignments developed to address a variety of issues that impact happiness and quality of life.

**BHAN 302  MEDICAL ANTHROPOLOGY**  
3  
This course introduces the field of Medical Anthropology. It examines the interaction of biology and culture as it affects health and medical systems and focuses on: 1) cross cultural comparisons; 2) notion of adaptation in biocultural evolution; 3) understanding and appreciation of “exotic” ethnomedical systems; 4) critical cultural analysis of Biomedicine; 5) understanding issues of stigma, disability and the social process of health and illness; and 6) application of the concept of culture to practical problems in health delivery in a multicultural society. Crosslisted with ANTH302.
BHAN 304 CULTURE, HEALTH & ENVIRONMENT 3
Human health and environmental health are intimately connected. Human behavior influences the health of the environment, which in turn influences human health. This course provides a biocultural perspective on culture, health, and environment, and their interactions. We will cover relationships between: 1) health and biodiversity, climate change, water, toxins, and energy; and 2) relationships between health and food, agriculture and dietary environment. Crosslisted with ANTH304.

BHAN 307 NUTRITIONAL ANTHROPOLOGY 3
Nutritional Anthropology takes an explicit biocultural approach to nutrition, examining the interaction of biology and culture as they affect food systems, customs, practices and nutrition. Specific foci of the course include: evolutionary and comparative perspectives (biological baseline, agriculture, contemporary food systems); why we eat what we eat (materialist, symbolic explanations for foodways); adaptation of food to people and people to food; foods as medicines; under- and over-nutrition in contemporary world; child and infant feeding; hunger; solutions to diet-related problems. Crosslisted with ANTH307.

BHAN 311 ISSUES IN HEALTH BEHAVIOR SCIENCE 3
Issues surrounding health behavior science, with emphasis on role of professional in promoting individual and community behavior change. 

BHAN 315 INSTRUCTIONAL STRATEGIES FOR DRUG EDUCATION 3
Prerequisite: BHAN 155 and BHAN 230.

BHAN 319 HEALTH RELATED FITNESS 3
Provides knowledge/techniques for teaching K-12 students to incorporate daily physical activity and nutrition into their personal wellness plans. Emphasis on health-related fitness, lifetime physical activity and nutrition using a nationally approved program.

BHAN 322 INTERNATIONAL COMMUNITY HEALTH 3
Examines how culture, environment, economics, and knowledge impacts community health. Students will visit health agencies while abroad and engage in service learning at a local agency addressing the needs of an underserved population.

BHAN 324 MEASUREMENT AND EVALUATION 3
Measurement and evaluation of physical skills and knowledge as related to physical education. Includes descriptive statistics, knowledge tests, grading, physical performance tests and tests of sports skills. PREREQ: Three-credit math course. Restrictions: Open to HPE majors only.

BHAN 325 INSTRUCTIONAL STRATEGIES FOR HUMAN SEXUALITY 3
Develops content knowledge and presents teaching methodologies relative to all facets of human sexuality. Emphasis on the process of integrating information into effective age specific educational strategies. PREREQ: BHAN135. Restrictions: HPE majors or permission of instructor.

BHAN 326 RESEARCH METHODS AND STATISTICS FOR BEHAVIORAL SCIENCE 3
Overview of types of research and statistical techniques commonly used in health behavior science, including research proposal development. Restrictions: Open to juniors and seniors in health behavior sciences majors only.

BHAN 329 DYNAMICS OF TEAM PROBLEM SOLVING 3
Development of teaming skills and their application in solving real life health-related issues. Topics include facilitation and leadership, dialogue and discussion, team maintenance and development and conflict resolution.

BHAN 332 HEALTH BEHAVIOR THEORY AND MODELS 3
Provides understanding and application of health behavior theory and models to behavior change and health program development and evaluation. Emphasizes skills and competencies necessary for utilizing health behavior theories and models in developing health promotion programs at individual and community levels. Restrictions: Open to students in health behavior science and the following minors: Public Health; Health, Physical Activity and Disability; Health and Wellness.

BHAN 333 HEALTH BEHAVIOR THEORY and PROGRAM PLANNING 3
Health behavior theories as they relate to youth health behaviors and development of health education programs, including development and use of instruments for assessing health behaviors. Restrictions: Open only to HPE majors.

BHAN 334 HEALTH BEHAVIOR ASSESSMENT 3
Skill development using qualitative and quantitative assessments in health behavior. Methods include focus groups, interviews, questionnaire development, and quantitative assessment of local, state and national level health data bases. Coreq: BHAN326, BHAN332. Restrictions: This course is restricted to HBS majors only.

BHAN 335 HEALTH AND AGING 3
Aging process addressed from biopsychosocial perspective. Particular emphasis placed on developing understanding of complex interrelations among aging, health and social structure.

BHAN 341 PRINCIPLES OF OUTDOOR RECREATION 3
Presents an orientation to the field of outdoor recreation. Attention given to heritage, trends, resources, economics, management approaches, ecological and educational goals and ethics toward an outdoor natural environment. Laboratory section involves participation and skill development in a variety of outdoor recreation activities.

BHAN 342 INTRODUCTION TO ADAPTED PHYSICAL ACTIVITY 3
Current concepts and trends in adapted physical activity across the lifespan, including skills necessary to prepare meaningful individualized movement experiences for people with special needs. Field work required.

BHAN 343 ADAPTED PHYSICAL EDUCATION 3
Knowledge and skills required to meet the professional and legal mandates pertaining to individualized health and physical education for students with special needs. PREREQ: KAAPP220, KAAPP301. Restrictions: Open to HPE majors with junior or senior standing.

BHAN 345 TACTICAL APPROACH TO TEACHING SPORTS 3
Uses tactical problems to teach invasion, wall/net and fielding/run-scoring activities. Students analyze strategies for successful transfer across similar games. Appropriate practices and outcomes of quality physical education programs emphasized. PREREQ: BHAN140. Restrictions: Open to HPE majors only.

BHAN 351 THE MODERN OLYMPIC GAMES 3
Examines the social, economic, and political impact of The Modern Olympic Games through exploration of how this international event influences health behaviors and activity levels of people including those with a disability around the world.

BHAN 366 INDEPENDENT STUDY 1-6 PF

BHAN 368 JUNIOR SPECIAL TOPICS 1-4
1-4 Junior level independent study.

BHAN 371 OUTDOOR ADVENTURE LEADERSHIP 3
Introduces recreation leadership in outdoor adventure activities. Attention directed toward conceptual and technical aspects of adventure programs.

BHAN 390 PRINCIPLES OF COACHING 3
Introduces students to the general philosophy and methods of coaching. Covers communication skills, teaching skills, sport psychology and managing team related responsibilities and relationships, including risk management. PREREQ: KAAPP320. Restrictions: Open to coaching science minors only.

BHAN 401 FOUNDATIONS OF HUMAN SEXUALITY 3
A multidisciplinary study of human sexuality focusing on the implications for individuals and society of the biological, psychological and sociocultural determinants of human sexuality. Deals with sexually explicit material. Crosslisted with HDF5401.

BHAN 403 PRACTICUM IN ADAPTED PHYSICAL ACTIVITY 1-6 PF
Supervised learning experiences in designing, implementing, and evaluating appropriate physical activity programs and interventions for individuals with special needs participating in a variety of clinical settings (e.g., schools, community centers, private clubs, camps, sport leagues, institutions, clinics, or group homes). Restrictions: Permission of the Instructor.

University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015
BHAN 414 METHODS AND MATERIALS IN HEALTH EDUCATION 3
Emphasis on health education in school curriculum: curriculum content and organization of materials for instructional purposes.
PREREQ: BHAN155, KAAP210, BHAN231, BHAN315 and BHAN325. Satisfactory completion of Praxis I. RESTRICTIONS: Junior status, upper division clearance, minimum GPA of 2.50, major index of 2.75 and completion of all skills requirements. Open to HPE majors only.

BHAN 416 METHODS / MATERIALS PHYSICAL EDUCATION 3
This is a culminating course that is the pre-cursor to the student teaching capstone experience. Extensive time will be spent teaching in the K-12 setting with emphasis on designing and delivering developmentally appropriate units of instruction and pedagogical analysis of effective teaching behaviors.
PREREQ: All BHAN courses listed in the program of study except for 415 and 465 and EDUC courses except for EDUC 420 and satisfactory completion of Praxis I. RESTRICTIONS: Approval from HPE program chair.

BHAN 422 ORGANIZATION AND ADMINISTRATION OF LEISURE SERVICES 3
Study of operation and management of sport, recreation and fitness facilities. Emphasis placed on developing skills necessary to conduct day-to-day operations and manage these types of facilities.
RESTRICTIONS: Open to senior health behavior science majors.

BHAN 432 EXERCISE TESTING AND PRESCRIPTION 4
Basic exercise prescription and fitness testing, including considerations for populations with special needs. Provides background content for American College of Sports Medicine’s Health Fitness Instructor exam.
PREREQ: KAAP220 or KAAP310 or BISC276, and KAAP430 or KAAP433. RESTRICTIONS: Open only to majors in HNES, or those with health and exercise or weight management concentrations.

BHAN 435 PHYSICAL ACTIVITY BEHAVIOR 3
Introduction to behavioral and psychological aspects of physical activity participation with emphasis on determinants of physical activity patterns across the lifespan and the psychosocial antecedents and consequences of physical activity participation.
PREREQ: KAAP220 or KAAP309.

BHAN 440 STRATEGIES FOR ATHLETIC PEAK PERFORMANCE 3
Presentation of methods and techniques for the mental preparation necessary to attain athletic peak performance. Provides experiential activities in the areas of relaxation, visual imagery, motor behavior rehearsal, hypnosis stress reduction and concentration techniques.

BHAN 445 HEALTH, PHYSICAL ACTIVITY, & DISABILITY 3
Advanced study and implementation of individualized physical activities for people with various disabilities in a variety of settings that promote health and wellness. Development of professional, advocacy, and leadership skills will be emphasized.
PREREQ: BHAN342 or BHAN343. RESTRICTIONS: Restricted to students with junior or senior standing.

BHAN 460 COACHING/PERFORMANCE PRACTICUM 3 PF
Practical coaching/performance experience in a scholastic/clinical setting with the season chosen corresponding to each student’s interest. The student must keep a daily log of methods and experiences and choose an appropriate project. Observations will be made by the minor coordinator and the cooperating supervisor.
PREREQ: KAAP210, KAAP220, KAAP320, and BHAN390. RESTRICTIONS: Students must have Junior/ Senior status and be accepted into the Coaching Science Minor.

BHAN 464 INTERNSHIP 4-9 PF
Practical learning experiences in fitness, sport and/or leisure service management. Working in a content area related setting, students complete a pre-determined number of hours with faculty advisement throughout the semester.
RESTRICTIONS: Requires permission of instructor.

BHAN 465 TEACHING SEMINAR IN HEALTH AND PHYSICAL EDUCATION 2
Examines the role of the health and physical education teacher in the elementary and secondary schools. Provides a forum for analyzing and discussing topics of interest to preprofessionals and includes participation of professionals from the school community.
PREREQ: BHAN414, COREQ: EDUC400. RESTRICTIONS: Open to HPE majors only.

BHAN 466 INDEPENDENT STUDY 1-6 PF

BHAN 468 SENIOR SPECIAL TOPICS 1-4
Senior level independent study.
BINF 815  ETHICS, BUSINESS AND COMMUNICATION  3
Provides professional development in ethics, business and communication related to systems biology research applications in stem cell, tissue engineering, and drug delivery technologies. Intended for PhD students in interdisciplinary life science and engineering programs. May be crosslisted with BISC815, BMEG815, CHEG815, CHEM815, ENTR815, MAST812, MSEGB815, PHIL815.

BINF 816  SYSTEMS BIOLOGY OF CELLS IN ENGINEERED ENVIRONMENTS  3
Provides a technical review of systems biology approaches including genomics, transcriptomics, proteomics, metabolomics, and bioinformatics as well as applications in tissue engineering, stem cell differentiation, and drug delivery. Intended for PhD students in interdisciplinary life science and engineering programs. May be crosslisted with BISC816, BMEG816, CHEG816, CHEM816, ELEG806, MAST813, MSEGB816.

BINF 864  INTERSHIP  1-6
Supervised, on-the-job experience on specialized topics in bioinformatics or industry research and analysis related to bioinformatics. Topics range from bioinformatics method, tool and database development to application of bioinformatics approaches to biotechnology and medicine. Industry research and analysis include topics on product development, project or operations management, and ethical, legal and regulatory affairs.

BINF 865  SEMINAR  1
Lectures and discussions by guest speakers, faculty, and students on specialized topics and cutting-edge developments in bioinformatics and computational biology.

BINF 866  SPECIAL PROBLEM  1-12

BINF 868  RESEARCH  1-6

BINF 869  MASTER’S THESIS  1-6
Independent research leading to the Master’s Thesis.

BINF 964  PRE-CANDIDACY STUDY  3-12 PF

BINF 969  DOCTORAL DISSERTATION  1-12 PF

BIS 100  FRESHMAN SEMINAR  1 PF
Provides a forum for the discussion of topics in biology that relate to material being covered in BISC207. Papers from the scientific literature and/or world wide web may be discussed.

BISC 103  PRINCIPLES OF BIOLOGY  3
The study of biological principles at multiple levels of organization. Fosters biological literacy through the exploration of concepts, theories, practices, and new developments and their impact on individuals and society. RESTRICTIONS: Open to non-majors only. Students may not receive credit for both BISC103 and BISC104. Students may not receive credit for BISC103 if taken after successful completion (C- or better) of BISC205, BISC207 or BISC208. Non-majors may take only one of BISC103.

BISC 104  PRINCIPLES OF BIOLOGY WITH LABORATORY  4
The study of biological principles at multiple levels of organization. Fosters biological literacy through the exploration of concepts, theories, practices and new developments and their impact on individuals and society. The laboratory component provides concrete examples of some of the principles discussed in the lecture component. RESTRICTIONS: Open to non-majors only. Students cannot receive credit for both BISC103 and BISC104. Students may not receive credit for BISC104 if taken after successful completion (C- or better) of BISC205, BISC207 or BISC208. Non-majors may take only one of BISC103.

BISC 105  HUMAN HEREDITY AND DEVELOPMENT  3
Heredity and human affairs; pedigree analysis; physical and chemical basis of heredity; heredity and environment; radiation and mutation; heredity and diseases; and birth defects. RESTRICTIONS: Open to non-majors only.

BISC 106  ELEMENTARY HUMAN PHYSIOLOGY  3
The structure and function of humans; mechanisms of maintenance and reproductive behavior. RESTRICTIONS: Open to non-majors only. Students may not receive credit for BISC 106 if taken after successful completion (C- or better) of BISC207 or BISC306.

BISC 107  ELEMENTARY EVOLUTIONARY ECOLOGY  3
Describes the fundamental processes in ecology and evolution: natural selection, adaptation, population biology, competition, predation, symbiosis and ecosystem dynamics. RESTRICTIONS: Open to non-majors only.

BISC 110  VIRUSES, GENES AND CANCER  3
Biology of normal and malignant cells, and current knowledge of the genetic lesions causing malignancy. Environmental and inherited factors contributing to one’s risk of cancer, and prospects for prevention. Standard and innovative means for detection and treatment of cancer. RESTRICTIONS: Open to non-majors only.

BISC 113  GENERAL BIOLOGY LABORATORY  1
Structure and function of cells, and selected experiments dealing with the physiology of plants and animals. COREQ: BISC103 RESTRICTIONS: Offered only on Associate in Arts Program campuses.

BISC 115  HUMAN HEREDITY AND DEVELOPMENT LABORATORY  1
Laboratory exercises dealing with probability, selection, karyotyping and pedigrees of humans. COREQ: BISC105. RESTRICTIONS: Offered only on Associate in Arts Program campuses.

BISC 116  ELEMENTARY HUMAN PHYSIOLOGY LABORATORY  1
Selected experiments in physiology that demonstrate some of the concepts developed in BISC106, and a study of human anatomy. COREQ: BISC106. RESTRICTIONS: Offered only on Associate in Arts Program campuses.

BISC 117  ELEMENTARY EVOLUTIONARY ECOLOGY LABORATORY  1
Laboratory exercises to compliment the subject matter of BISC107. COREQ: BISC107 RESTRICTIONS: Open to non-majors only. Offered only on Associate in Arts Program campuses.

BISC 127  ENVIRONMENTS AND CULTURES IN CONFLICT  4
Examines how individual cultures and advances in technology have impacted our environment. Potential solutions for resolving conflicts are developed by the students and presented in class. Relationships between human cultures, technology, and environmental degradation are stressed. RESTRICTIONS: Open to non-majors only.

BISC 152  BIOLOGY OF HUMAN SEXUALITY  3
Discusses human sexual differentiation plus the anatomy and physiology of reproduction by considering the pertinent areas of genetics, cytology, embryology, endocrinology, immunology and physiology. Topics include genetic sex, gonadal sex, phenotypic sex, hormonal sex and behavioral sex. RESTRICTIONS: Open to non-majors only.

BISC 171  MICROBIOLOGY IN MODERN SOCIETY  3
Microbial activities and their effect on society and individuals. RESTRICTIONS: Open to non-majors only.

BISC 195  BIOLOGICAL EVOLUTION  3
Historical background of the idea of evolution, the work of Charles Darwin, an exploration of the modern theory of evolution and the contributions to it from other biological disciplines, and philosophical issues related to evolution. RESTRICTIONS: Open to non-majors only.

BISC 205  BIOLOGY FOR HEALTH SCIENCES  4
One semester course designed as an introduction to the Biological Sciences for nursing majors and health-science related majors. Concepts include Biological Molecules, Cell Structure, Membrane Function, Energy and Enzymes, Cell Division, Genetics, Molecular Biology, Evolution and Ecology. The lecture and laboratory will include applications of these concepts to Human Physiology and Anatomy. COREQ: CHEM101, or CHEM103, or CHEM105. RESTRICTIONS: Credit towards graduation cannot be received for both BISC205 and BISC207. Enrollment in BISC205 is not open to Biology majors.

BISC 207  INTRODUCTORY BIOLOGY I  4
Molecular basis of life. Structure and function of cells, including signal transduction pathways. Energy transformations. Classical Mendelian genetics and the flow of information from DNA to RNA to proteins. Laboratory focuses on the testing of hypotheses, data analysis and scientific writing. COREQ: CHEM103 or CHEM111. RESTRICTIONS: Non-majors may take only one of BISC103, BISC104 or BISC207 to fulfill the group D requirement in the College of Arts and Sciences.
**BISC 208 Introductory Biology II**  
Mechanisms of evolution. Physiology of multicellular plants and animals. Principles of ecology with emphasis on the biology of populations. Laboratory focuses on testing of hypotheses, data analysis and scientific writing. Animal and plant anatomy also studied.  
**PREREQ:** BISC207 or BISC205. **COREQ:** CHEM104 or CHEM112.  

**BISC 276 Human Physiology**  
Physiology of the basic organ systems of humans.  
**PREREQ:** BISC205, BISC208 or BISC208; and CHEM101, CHEM103, CHEM105 or CHEM111. **RESTRICTIONS:** Open to non-majors only.  

**BISC 280 Fundamentals of Biotechnology**  
Introduction to biotechnology in which students will be exposed to scientific, legal and ethical aspects of biotechnology. **COREQ:** BISC208 (may be taken prior to BISC280).  

**BISC 300 Introduction to Microbiology**  
Major groups of microorganisms (algae, protista, fungi and bacteria) are studied. Emphasis on the physiology, metabolism, diversity and interactions between and among each group and bacteria and their interactions with humans. Lab included.  
**PREREQ:** BISC207 or BISC205.  

**BISC 302 General Ecology**  
Interactions between organisms and their environments, population dynamics and interactions, communities, energy transfer within an ecological system, and components of the ecosystem.  
**PREREQ:** BISC208  

**BISC 305 Cell Biology**  
The structure and function of eucaryotic cell organelles. Emphasis on dynamic processes such as membrane transport, cell motility and protein trafficking. Current studies from the literature and experimental techniques are also stressed.  
**PREREQ:** BISC208 and CHEM104.  

**BISC 306 General Physiology**  
Principles underlying function of organisms at the organ system level; ionic composition and regulation, respiration, circulation, nutritive metabolism, excretion and neuromuscular activity.  
**PREREQ:** BISC208 and two semesters of chemistry.  

**BISC 312 Field Ecology**  
Laboratory and field exercises demonstrating basic ecological principles and quantitative techniques. Emphasis on population and community phenomena. Natural habitats studied include local fields, forests and streams. May be crosslisted with ENWC312.  
**PREREQ:** BISC302. **COREQ:** BISC302.  

**BISC 315 Experimental Cell Biology**  
Starts with a series of inquiry-based laboratory experiences in cell biology, centered on microscopy and cell culture techniques. In second half of semester, students conduct a 5-6 week hypothesis-driven independent study project. Project proposals are peer-critiqued. Group presentations at end of semester detail the experiments they carried out and discuss how the results fit with previously published data and with original hypotheses.  
**PREREQ:** BISC208, BISC305, and CHEM321 or CHEM213. **RESTRICTIONS:** BISC305 must be completed before taking this course.  

**BISC 316 Experimental Physiology**  
Short-term experimental research course in animal physiology. Conduct, in a group, an independent research project based on primary literature. Beginning with practicing basic skills on background information research, data collection and quantitative analysis, students construct a research question based on previous findings in the literature, conduct a series of experiment, and communicate the discoveries in formal writings and oral presentation.  
**PREREQ:** BISC208, CHEM104, and BISC306.  

**BISC 317 Tropical Ecology**  
Basic aspects of tropical ecology including climatic, geological and adaptive components. Focuses on species' interactions and ecosystems. Includes at least two field trips.  
**PREREQ:** BISC208. **RESTRICTIONS:** Taught in Costa Rica.  

**BISC 318 Tropical Amphibians and Reptiles**  
Topics in worldwide herpetology with a major focus on Costa Rica. Topics include evolution, extinct groups and the orders Gephyphona, Caudata, Anina, Turtles, Crocodylia and others. Field trips included.  
**PREREQ:** BISC107 or BISC207. **RESTRICTIONS:** Taught in Costa Rica.  

**BISC 321 Environmental Biology**  
Basic ecological and physical principles with major emphasis on the effect of human-caused environmental changes on populations, communities and ecosystems.  
**PREREQ:** BISC208 or permission of instructor  

**BISC 326 General Physiology Discussion**  
Discussion of selected topics in physiology with emphasis on experimental evidence.  
**COREQ:** BISC306.  

**BISC 366 Independent Study**  
1-6  

**BISC 400 Special Topics in Biology**  
Exploration of special topics in biological sciences at a level appropriate for junior and senior biological sciences majors. Subject matter taught will vary depending on instructor and semester.  
**PREREQ:** BISC208. **RESTRICTIONS:** May be repeated for credit when topics vary.  

**BISC 401 Molecular Biology of the Cell**  
Introduction to the molecular biology of eucaryotes and procaryotes. Topics include structure and function of proteins and nucleic acids; replication and repair of DNA; biosynthesis of RNA and proteins; membranes, transport, composition and function of the eucaryotic cell, chromosomes, viruses, the immune system and recombinant DNA.  
**PREREQ:** BISC207 or BISC205 and one semester of organic chemistry.  

**BISC 403 Genetic and Evolutionary Biology**  
The physical and chemical basis of heredity, the nature and mechanisms of gene action, genes in populations, speciation.  
**PREREQ:** BISC207 or BISC205 and one semester of organic chemistry.  

**BISC 408 Microscopic Anatomy**  
Microscopic organization, identification and functional anatomy of mammalian organ systems and tissues.  
**PREREQ:** BISC208.  

**BISC 411 Experimental Molecular Biology**  
Introduction to the process of scientific inquiry as it relates to cellular molecular biology. Learn the theory behind experimental procedures in the field and perform a series of laboratory exercises emphasizing experimental design and data analysis. Pose related scientific questions, design experiments and present results in written, poster or oral format.  
**PREREQ:** BISC208, BISC401, CHEM321 or CHEM213.  

**BISC 413 Advanced Genetics Laboratory**  
Students conduct laboratory investigations in Mendelian genetics, population and evolutionary genetics, and molecular genetics; learn to use several common bioinformatics tools; and design, perform and analyze original experiments.  
**PREREQ:** BISC208, BISC403.  

**BISC 415 Developmental Biology**  
Explore mechanisms underlying development. Topics: gamete interactions, establishment of body plans, cell signaling and tissue interactions, morphogenetic pattern formation, developmental regulation of gene expression, molecular control of tissue specification and diversification, and the evolutionary comparison of developmental processes. Diseases resulting from developmental defects will be discussed.  
May be crosslisted with ANFS415. **PREREQ:** BISC207 and BISC208.  

**BISC 422 Teaching Experience**  
1-2  
Teaching experience in an undergraduate laboratory. Evaluation based on teaching performance and preparation of required material for laboratory. **RESTRICTIONS:** Prior completion of core requirements necessary. Requires permission of instructor.  

**BISC 435 Population Ecology**  
Understand population processes by combining a discussion of theory and practical applications. Includes exponential, logistic, and age-specific growth as well as predation, competition, disease, and metapopulations. Model-building exercises actively used to understand theoretical dynamics. Crosslisted with ENWC435. **PREREQ:** BISC302.  

**BISC 439 Developmental Neurobiology**  
Developmental biology of the nervous system, including cellular components, neural induction, neurogenesis and neuronal migration, cellular determination, axon outgrowth and pathfinding, synapse formation, programmed cell death, neurotrophic factors, neurodevelopmental disorders, and early critical periods.  
**PREREQ:** BISC208. **RESTRICTIONS:** Suggested prerequisite is BISC305 or BISC401.  

**BISC 440 Conservation of Tropical Biodiversity**  
A 3-week intensive, field-based experience in the mechanics of conserving tropical biodiversity. Focuses on group projects quantifying and comparing the diversity of montane cloud forests, lowland rainforests and tropical dry forests. Crosslisted with ENWC444. **RESTRICTIONS:** Winter or Summer Session only. Taught in Costa Rica or Peru.
BISC 442 \textbf{VERTEBRATE MORPHOLOGY} 4
The vocabulary describing vertebrate anatomy is introduced and discussed by tracing the evolutionary and developmental histories of major vertebrate organ systems. Laboratory involves detailed dissections of representative vertebrates.
PREREQ: BISC208

BISC 451 \textbf{UNDERGRADUATE THESIS I} 3
Independent research under direction of faculty member.
PREREQ: Admission to B.S. in Biology in either CMG or EOB concentration.
RESTRICTIONS: Not for students pursuing degree with distinction.

BISC 452 \textbf{UNDERGRADUATE THESIS II} 3
Continuation of BISC451.
PREREQ: BISC451 and admission to B.S. in Biology in either CMG or EOB concentration. RESTRICTIONS: Not for students pursuing degree with distinction.

BISC 466 \textbf{INDEPENDENT STUDY} 1-6

BISC 468 \textbf{RESEARCH} 1-6

BISC 471 \textbf{INTRODUCTORY IMMUNOLOGY} 3
The biological basis of adaptive immunity including participating cells, cellular interactions, counted mechanisms and immunopathologies.
PREREQ: BISC305 or BISC306 or BISC401.

BISC 475 \textbf{CARDIOVASCULAR BIOLOGY} 3
Basic physiology of the human cardiovascular system, basis of cardiovascular diseases and current treatments. Focuses on heart failure, hypertension, atherosclerosis, thrombosis and leukemia.

BISC 480 \textbf{VERTEBRATE NATURAL HISTORY} 3
Biology of vertebrate organisms dealing specifically with adaptations to the environment, morphology, physiology and taxonomy.
PREREQ: BISC208

BISC 484 \textbf{COMPUTER BASED GENETICS LABORATORY} 3
Explore the use of genome databases and the tools of bioinformatics, then and apply those skills to design and carry out wet lab experiments, which will involve the isolation and manipulation of DNA and RNA from human and animal subjects.
PREREQ: BISC401 or BISC403.

BISC 492 \textbf{HUMAN MOLECULAR CYTOGENETICS} 3
Introduction to the molecular and genetic organization, function, and behavior of eukaryotic chromosomes, with special emphasis on humans. Covers various state-of-art techniques that are used in the preparation and analysis of mammalian chromosomes, the contribution of chromosome studies to our understanding of the mechanisms of gene regulation, and medical cytogenetics.
PREREQ: BISC208. RESTRICTIONS: BISC403 recommended in addition to prerequisite. Offered in even numbered years.

BISC 495 \textbf{EVOLUTION} 3
Present status of the theory of biological evolution and its implications in the different areas of biology.
PREREQ: BISC208

BISC 498 \textbf{TOPICS IN BIOLOGY} 3-6
Topics may vary from section to section. Information about each section is available in the Biology Office prior to registration.
PREREQ: BISC208 (or two BISC100-level courses). RESTRICTIONS: Requires junior or senior status. May be taken more than once but only three credits can count towards the major.

BISC 510 \textbf{TOPICS IN MIDDLE SCHOOL BIOLOGY EDUCATION: GENETICS} 3
Strengthens the content understanding of the developmentally appropriate genetic concepts for middle school students. Instructors model effective inquiry-based classroom pedagogy and teachers engage in reflective discussions of how to enhance student appreciation of genetics.
RESTRICTIONS: Enrollment limited to in-service high school science educators.

BISC 530 \textbf{TOPICS IN BIOLOGY EDUCATION: NATURE OF SCIENCE AND EVOLUTION} 3
Strengthens understanding in key areas of evolutionary biology and the nature of science, using methods that model inquiry-based classroom practices. Discussions focus on best ways to enhance student understanding, and on dealing with controversies in the teaching of evolution in high school.
RESTRICTIONS: Enrollment limited to in-service high school science educators.

BISC 600 \textbf{BIOTECHNOLOGY AND MOLECULAR MEDICINE} 3
Application of molecular and cellular biology techniques and principles to the field of biotechnology. Stresses the applied side of science and focuses on the practical side of molecular biology and how scientists and companies reduce the basic knowledge to practice. Emphasis on product formation and the skills required to meet such goals. Covers tangential issues of biotechnology and the ethical choices made in developing clinical trial protocols.
PREREQ: Undergraduate course in biology or chemistry or permission of the instructor.

BISC 601 \textbf{IMMUNOLOGY} 4
Methods as basic as immunization and as complex as developing monoclonal antibodies. Methods used to investigate the genetics and protein structure of B-galactosidase.
PREREQ: BISC401 or biochemistry RESTRICTIONS: Requires permission of the instructor.

BISC 602 \textbf{MOLECULAR BIOLOGY OF ANIMAL CELLS} 3
Examination of eucaryotic genes, synthesis and processing of messenger RNA and control of protein synthesis with emphasis on regulation of normal cellular growth and differentiation and the process of cancer cell transformation. Emphasis on recombinant DNA technology, monoclonal antibody production and tissue culture.
PREREQ: BISC401 and BISC403

BISC 603 \textbf{INTRODUCTION TO LABORATORY INSTRUCTION} 1 PF
Introduction to the safe use of laboratory equipment. Introduces teaching assistants to become effective instructors. Topics relate to the theory and practice of teaching in a laboratory setting.
Croslisted with CHEM601. COREQ: Having a chemistry (or another science) teaching assistantship.

BISC 604 \textbf{NUCLEAR ACIDS LABORATORY} 4
Introduces techniques of gene cloning, amplification, manipulation and expression.
PREREQ: BISC401. RESTRICTIONS: Biochemistry recommended. Senior or graduate status required.

BISC 605 \textbf{ADVANCED MAMMALIAN PHYSIOLOGY} 4
Systemic mammalian physiology: cellular mechanisms, muscle, cardiovascular, respiratory, renal, digestive and endocrine systems. Emphasizes human physiology and includes discussions of primary literature in the field of physiology research.
PREREQ: BISC401 and BISC403 RESTRICTIONS: Prior to the graduation, students can take this course.

BISC 606 \textbf{ADVANCED MAMMALIAN PHYSIOLOGY II} 4
Continuation of BISC605. Systemic mammalian physiology: respiratory, renal, gastrointestinal, and reproductive systems and metabolism.
May be croslisted with KAAPP615. PREREQ: BISC605.

BISC 609 \textbf{MOLECULAR BIOLOGY OF THE CELLS} 3
Introduction to the molecular biology of eucaryotes and procaryotes. Topics include structure and function of proteins and nucleic acids; replication and repair of DNA; biosynthesis of RNA and proteins; membranes, transport, composition and function of the eucaryotic cell, chromosomes, viruses, the immune system and recombinant DNA.
RESTRICTIONS: Graduate students only. Does not count for major credit for graduate students in Biological Sciences.

BISC 610 \textbf{ENDOCRINE PHYSIOLOGY} 3
Focus on how hormones produced by endocrine glands regulate physiological functions. Endocrine glands include pancreas, thyroid, adrenal, pituitary and reproductive organs, which produce hormones affecting reproduction, metabolism, growth and development. Endocrine dysfunction underlies disorders such as diabetes, cancer, stress, obesity, osteoporosis, and infertility.
PREREQ: BISC305, BISC306. RESTRICTIONS: Permission of the instructor.

BISC 612 \textbf{ADVANCED CELL BIOLOGY} 3
Four major sections: (1) cell structure/function; (2) signaling mechanisms and cell fate; (3) protein biosynthesis and trafficking and (4) integrative cell biology.
Requires interpreting and evaluating data from primary scientific literature.
PREREQ: BISC305, BISC401 and either BISC306 or BISC403. RESTRICTIONS: Meets literature requirement for biology majors.

BISC 615 \textbf{DEVELOPMENTAL BIOLOGY} 3
Explore mechanisms underlying development. Topics: gamete interactions, establishment of body plans, cell signaling and tissue interactions, morphogenetic pattern formation, developmental regulation of gene expression, molecular control of tissue specification and diversification, and the evolutionary comparison of developmental processes. Diseases resulting from developmental defects will be discussed.
May be croslisted with ANF6515. PREREQ: BISC401 and BISC403. RESTRICTIONS: Requires instructor approval.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BISC 619</td>
<td>Gene Expression Laboratory</td>
<td>4</td>
<td>Laboratory course in techniques of molecular biology. Student generates recombinant viruses which can express large amounts of foreign protein. The protein will be purified and characterized functionally and biochemically using such methods as in vitro DNA replication, DNA footprinting, DNA melting and/or unwinding and gel retardation. PREREQ: BISC401. RESTRICTIONS: Limited to ten students. Preference given to Previous 600-level students. Requires permission of instructor.</td>
</tr>
<tr>
<td>BISC 625</td>
<td>Cancer Biology</td>
<td>3</td>
<td>Provides an integrated lecture series summarizing current knowledge in cancer biology. Topics include: statistics of incidence/survival, pathology, the process of chemical carcinogenesis and sources of carcinogens, genetic and epigenetic mechanisms and consequences, viral and hormonal carcinogenesis as well as current treatment options. PREREQ: BISC207, BISC401, CHEM103, CHEM104, CHEM321. RESTRICTIONS: Permission of instructor.</td>
</tr>
<tr>
<td>BISC 626</td>
<td>Advanced Neuroanatomy</td>
<td>3</td>
<td>Covers the functional organization of the nervous system from a clinical perspective, with emphasis on the brain stem, cranial nerves, limbic system, and cerebral cortex. Also surveys basic etiology, signs and symptoms of injury to spinal pathways, sensory-motor systems, methods of neurologic testing, and the Mental Status Exam. Crosslisted with NSC626.</td>
</tr>
<tr>
<td>BISC 627</td>
<td>Advanced Neurophysiology</td>
<td>3</td>
<td>Study of the physiology of the central nervous system, with an emphasis on the cellular and molecular basis of signal transmission in the brain. May be crosslisted with NSC627, PSYC627.</td>
</tr>
<tr>
<td>BISC 630</td>
<td>Ichthyology</td>
<td>3</td>
<td>Biology of fishes including structure and function, reproduction, development, behavior, geographic distribution and systematics. PREREQ: Physiology course</td>
</tr>
<tr>
<td>BISC 631</td>
<td>Practice of Science</td>
<td>3</td>
<td>Uses historical, philosophical, and sociological perspectives to better understand the nature of modern science and its practice. Examines &quot;science misconduct,&quot; and satisfies the NIH mandate requiring graduate training in &quot;the responsible conduct of research&quot;. May be crosslisted with CHEM631.</td>
</tr>
<tr>
<td>BISC 634</td>
<td>Ecotoxicology and Risk Assessment</td>
<td>3</td>
<td>Principles of ecotoxicology are applied along with Environmental Risk Assessment (ERA) to solve environmentally related problems. Methodologies to evaluate the effects and fate of biological, chemical and physical stressors are provided along with case studies. Student teams will apply the concepts learned by conducting actual ERAs.</td>
</tr>
<tr>
<td>BISC 635</td>
<td>Population Ecology</td>
<td>3</td>
<td>Understand population processes by combining a discussion of theory and practical applications. Includes exponential, logistic, and age-specific growth as well as predation, competition, disease, and metapopulations. Model-building exercises actively used to understand theoretical dynamics. Crosslisted with ENVC635. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>BISC 639</td>
<td>Developmental Neurobiology</td>
<td>4</td>
<td>Developmental biology of the nervous system, including cellular components, neural induction, neurogenesis and neuronal migration, cellular determination, axon outgrowth and pathfinding, synapse formation, programmed cell death, neurotrophic factors, neurodevelopmental disorders, and early critical periods. PREREQ: BISC305 or BISC401.</td>
</tr>
<tr>
<td>BISC 641</td>
<td>Microbial Ecology</td>
<td>3</td>
<td>Principles of microbial interactions in natural environments, including applications to industrial microbiology and certain types of pollution. PREREQ: BISC300.</td>
</tr>
<tr>
<td>BISC 643</td>
<td>Biological Data Analysis</td>
<td>3</td>
<td>Single-Semester introduction to the numerical analysis of biological data in fields such as molecular and cellular biology. Emphasis on choosing and using the correct analysis method for each experiment by using small number of relatively simple statistical tests.</td>
</tr>
<tr>
<td>BISC 645</td>
<td>Bacterial Evolution</td>
<td>3</td>
<td>Explores the development of the enormous bacterial diversity beginning with current theories on the origin of life. Examines the evolution of viruses and the &quot;directed evolution&quot; controversy which concerns mechanisms of bacterial evolution. PREREQ: BISC300 or equivalent.</td>
</tr>
<tr>
<td>BISC 654</td>
<td>Biochemical Genetics</td>
<td>3</td>
<td>Covers the use of genetic model organisms to answer biological questions, including mapping and cloning of human disease genes and the creation of animal models for human genetic diseases. There is an emphasis on examples from the recent scientific literature and building scientific writing skills. PREREQ: BISC403 and BISC401; or permission of instructor.</td>
</tr>
<tr>
<td>BISC 656</td>
<td>Evolutionary Genetics</td>
<td>3</td>
<td>Exploration of the theory, methods and experiments underlying current research in evolutionary processes determining genetic variation within and between species, estimation of population structure from genetic data, and the genetics of speciation. PREREQ: BISC403</td>
</tr>
<tr>
<td>BISC 660</td>
<td>Environmental Physiology</td>
<td>3</td>
<td>Biochemical and morphological adaptive responses of animals to environmental factors; adjustments to changes in salinity, temperature, oxygen, etc. at the level of the whole organism, organ system and cell. PREREQ: BISC306</td>
</tr>
<tr>
<td>BISC 665</td>
<td>Advanced Molecular Biology &amp; Genetics</td>
<td>3</td>
<td>Presents concepts and approaches regarding our current understanding of molecular biology and molecular genetics in eukaryotic organisms. Requires a solid background in biochemistry, cell biology and introductory molecular biology. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>BISC 671</td>
<td>Cellular and Molecular Immunology</td>
<td>4</td>
<td>Introduces the basic concepts of immunology and describes how different immune responses can either protect the body from infection or lead to immunological based diseases. Focuses on cellular interactions and the resultant molecular responses that lead to immune protection. PREREQ: BISC401 or BISC305 or BISC300. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>BISC 675</td>
<td>Cardiovascular Physiology</td>
<td>3</td>
<td>Basic physiology of the human cardiovascular system, basis of cardiovascular diseases and current treatments. The focus is on heart failure, hypertension, atherosclerosis, thrombosis and leukemia. PREREQ: A physiology course or at above the 300 level and one of the following: BISC401, CHEM527, and CHEM641.</td>
</tr>
<tr>
<td>BISC 679</td>
<td>Virology</td>
<td>3</td>
<td>Molecular biology of animal viruses. Virus structure and organization; mechanisms of penetration, replication, maturation and transformation. PREREQ: BISC401 or biochemistry.</td>
</tr>
<tr>
<td>BISC 682</td>
<td>Bacterial Pathogens: Molecular Mechanisms</td>
<td>3</td>
<td>Explore the molecular mechanisms of infectious diseases. Disease transmission and infection, horizontal gene transfer and pathogenomics are reviewed using primary research literature. Topics include water and food borne, airborne, vector borne and human borne pathogens, their molecular mechanisms of invasion, colonization, virulence and immune avoidance. PREREQ: BISC300.</td>
</tr>
<tr>
<td>BISC 690</td>
<td>Fundamentals of Pharmacology</td>
<td>3</td>
<td>Focus on basic principles of drug/receptor interactions, mechanisms of drug action, and pharmacokinetics. Emphasis on pharmacological problems in the current experimental literature. Goals are to understand drug-receptor theory, interpret agonist/antagonist dose-response relationships, and interpret results from experimental literature in written and oral formats. RESTRICTIONS: This is a graduate level course. Permission of the instructor is required for undergraduates.</td>
</tr>
<tr>
<td>BISC 693</td>
<td>Human Genetics</td>
<td>3</td>
<td>Emphasis on the medical and social implications of our knowledge of human genetics. Discusses theoretical and practical principles of genetics useful in studying human variation such as cytogenetics and cell genetics, biochemical genetics, developmental genetics and teratology, principles of genetic counseling, multi-factorial inheritance and the genetics of cancer. PREREQ: BISC403.</td>
</tr>
<tr>
<td>BISC 801</td>
<td>Seminar in Ecology</td>
<td>2</td>
<td>Critical examination of selected topics in ecology, through evaluation of relevant literature. Students prepare seminars on topics provided each semester. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>BISC 805</td>
<td>Multidisciplinary Biotechnology</td>
<td>3</td>
<td>Introduces science, engineering, and business graduate students to challenges of conducting and managing scientific inquiry across disciplines and within industry. Focuses on biotechnology industry. Crosslisted with CHEG805.</td>
</tr>
<tr>
<td>BISC 806</td>
<td>Advances in Cell and Organ Systems</td>
<td>3</td>
<td>Literature-based current topics in cell and organ systems. PREREQ: Requires permission of instructor. RESTRICTIONS: May be repeated up to nine credits when topics vary. Offered only in Spring.</td>
</tr>
</tbody>
</table>
**BISC 815 ETHICS, BUSINESS AND COMMUNICATION** 3
Provides professional development in ethics, business and communication related to systems biology research applications in stem cell, tissue engineering, and drug delivery technologies. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF815.

**BISC 816 SYSTEMS BIOLOGY OF CELLS IN ENGINEERED ENVIRONMENTS** 3
Provides a technical review of systems biology approaches including genomics, transcriptomics, proteomics, metabolomics, and bioinformatics as well as applications in tissue engineering, stem cell differentiation, and drug delivery. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF816.

**BISC 822 TEACHING EXPERIENCE** 2-6
Mentored teaching experience in an undergraduate lecture or laboratory course. Evaluation based on teaching performance. Each laboratory section taught will correspond to two credits. Grades will be assigned by the faculty instructor for the course taught.

**RESTRICTIONS:** Requires permission of instructor.

**BISC 827 GRADUATE RESEARCH SEMINAR** 0-1 PF
Seminar allowing graduate students in the Department of Biology to report on the progress of their research projects. Both students and faculty attend presentations.

**BISC 833 SPECIAL TOPICS IN BIOLOGY** 1-4
Various topics in biology.

**BISC 850 ADVANCED TOPICS IN BIOLOGY** 1
Intensive exploration of advanced topics in biological sciences at a level appropriate for second year graduate students. Subject matter taught will vary depending on instructor and semester.

**BISC 864 RESEARCH TUTORIAL** 1-8
First year doctoral students will complete six weeks of research training in the laboratory of a Biological Sciences Faculty member. Students may enroll in either one or two sections of BISC864 in a single semester. Students gain breadth of research training and are better able to identify appropriate dissertation advisors.

**RESTRICTIONS:** Requires approval of instructor.

**BISC 868 RESEARCH** 1-12

**BISC 869 MASTER’S THESIS** 1-6
Independent research leading to the Master's Thesis.

**BISC 872 INTERNSHIP** 0-6
Off or on campus practical learning experience under the supervision of a faculty member requiring two written reports 1) a plan of work outlining the background of the project and the learning objectives for the internship and 2) a scholarly paper outlining the objectives of internship, what was accomplished on each objective and recommendations for future work.

**RESTRICTIONS:** Requires permission of instructor.

**BISC 964 PRE-CANDIDACY STUDY** 3-12 PF
Independent doctoral dissertation research prior to completion of the Ph.D. Candidacy Examination.

**BISC 969 DOCTORAL DISSERTATION** 1-12 PF
Independent dissertation research after completion of the Candidacy Examination.

**BUSINESS: MULTIDISCIPLINARY BUSINESS ADMIN**

**BMBA 865 CORE UPDATES SEMINAR** 1-3
Topics include accounting, finance, IT, management, marketing and operations management.

**PREREQ:** BSBA degree required

**BIOMEDICAL ENGINEERING**

**BMEG 101 INTRODUCTION TO BIOMEDICAL ENGINEERING** 2
Introduces first year students to college life and provides a learning experience vital to their success at the University, in Engineering, and in Biomedical Engineering. Course content includes that of the university First Year Seminar, technical skills for engineers, and career opportunities in biomedical engineering.

**RESTRICTIONS:** First year students only. Biomedical engineering majors only.

**BMEG 166 INDEPENDENT STUDY** 1-3

**BMEG 211 CELL & TISSUE LABORATORY** 2
The Cellular Laboratory will teach students the fundamentals of cell culture for use in Biomedical Engineering investigations. Students will acquire skills in aseptic cell culture techniques, standard test methods, quantitative analysis, notebook keeping, report writing and oral presentation.

**PREREQ:** CHEM104, BISC207. **RESTRICTIONS:** The course is open to BME sophomores, ENGG, Chem & BIO students may take it with the instructors permission.

**BMEG 266 INDEPENDENT STUDY** 1-3

**BMEG 301 QUANTITATIVE CELLULAR PHYSIOLOGY** 3
Mammalian cellular physiology from a quantitative viewpoint. Principles i) cellular and molecular biology, ii) communication, integration, and homeostasis, iii) and nervous, musculoskeletal, and endocrine systems. Topics include molecular and cellular physiology, neurophysiology, musculoskeletal physiology, sensory physiology, somatic and autonomic nervous system physiology, and endocrine physiology.

**PREREQ:** BISC207, CHEM103, CHEM104, MATH241. **RESTRICTIONS:** pen to BME student; ENGG students may take it with the instructor's permission.

**BMEG 302 QUANTITATIVE SYSTEMS PHYSIOLOGY** 3
Quantitative approaches to understand the human body during normal function and disease. Examine tissues and organs systems in an integrated manner using principles from engineering kinetics and transport processes. Topics include anatomy, organ system physiology (cardiovascular, renal, respiratory, gastrointestinal), and pathophysiology.

**PREREQ:** BMED301. **RESTRICTIONS:** the course is open to BME student; ENGG students may take it with the instructor's permission.

**BMEG 310 BIOENGINEERING MECHANICS** 4
Introduction to statics, dynamics and mechanics of solids with application to biomedical problems.

**PREREQ:** PHYS207 and MATH243.

**BMEG 311 BIOENGINEERING MECHANICS II** 3
Introduction to statics, dynamics and mechanics of solids with application to biomedical problems. Topics include viscoelasticity, particle and 3D kinematics and kinetics, impulse, momentum and energy. Continued from BMED310.

**PREREQ:** BMED310.

**BMEG 330 BIOMEDICAL INSTRUMENTATION** 4
Introduction to the basics of assembling and using instrumentation for the purposes of recording electrophysiological signals. Mechanical, chemical, electrical and biological principles for biomedical measurements. Instrumentation for measuring bioelectrical signals, temperature, blood pressure, and body chemistry are covered.

**PREREQ:** ELEG305 and MATH305.

**BMEG 340 BIOENGINEERING MODELING AND SIMULATION** 3
Developing mathematical models of biomedical processes and experiments.
Topics include unit analysis, exponential growth/decay, half-life, exponential vs. age-structured death models, sigmoidal growth models, sigmoidal effect models, mass-action reaction rates, and experimental measurement noise models. Simulation of all of the above using MATLAB.

**PREREQ:** MATH305, CISC106. **RESTRICTIONS:** Open to BME students; ENGG students may take it with the instructors permission.

**BMEG 341 BIOMEDICAL EXPERIMENT DESIGN & ANALYSIS** 3
Biomedical engineering undergraduate students are introduced to the fundamental principles and techniques involved in the design, execution, and interpretation of biomedical research experiments. In addition to introducing students to analytical techniques used for biomedical data and training them how to properly communicate experimental results, students will have an understanding of their professional and ethical responsibilities as biomedical engineers.

**PREREQ:** BMED340. **RESTRICTIONS:** Open to BME students; ENGG students may take it with the instructor's permission.
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

BMEG 350  CLINICAL IMMERSION FOR ENGINEERS  3
Gain exposure to current clinical practices, identify unmet clinical needs, and consider future career options. Students will be matched with local clinical sites to provide a unique opportunity for innovative and interdisciplinary approaches to problem solving subject to practical constraints.
RESTRICTIONS: For BME majors only; Limited capacity (depends on number of participating sites available); Students in good standing will be admitted by seniority.

BMEG 360  BIOMEDICAL ENGINEERING JUNIOR DESIGN  2
Biomedical engineering problems from industrial and clinical applications are addressed and solved in small groups using problem-based learning methodologies. Team-oriented design project in biomedical engineering, incorporating engineering standards and realistic design constraints. Includes introduction to relevant regulatory, intellectual property, and business management topics.
PREREQ: BMEG310. COREQ: BMEG311. RESTRICTIONS: Open to BME student; ENGG students may take it with the instructor's permission.

BMEG 366  INDEPENDENT STUDY  1-6

BMEG 401  SYSTEMS PHYSIOLOGY I  3
Human physiology from a quantitative viewpoint. Anatomy and pathology, where appropriate. Functional/structural aspects of mammalian nervous and musculoskeletal systems. Topics include cellular physiology, autonomous nervous system, neurophysiology and cardiovascular system.
PREREQ: BISC207, BISC208, PHYS207.

BMEG 411  ADVANCED TECHNIQUES CELL AND TISSUE  4
Builds-on the techniques developed in Cell & Tissue Lab I. The experiments include many of the basic experiments that would be used in the development of tissue-engineered products and used in the regulatory approval processes. The students will design and execute independent, open-ended hypothesis-driven experiments.
PREREQ: BMEG201, BMEG301 or equivalent. RESTRICTIONS: Open to BME student; other students may take it with the instructor's permission.

BMEG 420  BIOLOGICAL TRANSPORT PHENOMENA  6
Fundamental and biomedical applications of fluid mechanics. Introduction to diffusive and convective mass and heat transfer with biomedical applications.
PREREQ: PHYS207 and MATH305. RESTRICTIONS: Open to BME student; ENGG students may take it with the instructor's permission.

BMEG 450  BIOMEDICAL ENGINEERING DESIGN  6
Open-ended team-based design projects in the medical devices or research area. Systems approach requiring design strategy and concepts, including reliability, safety, ethics, economic analysis, marketing, FDA regulations, and patents. RESTRICTIONS: Open to BME seniors only.

BMEG 461  CELL ENGINEERING  3
Examine how engineered biomaterials can be implemented to regulate cell function with respect to lineage-specific stem cell differentiation, prevention of de-differentiation during culture and expansion, regulation of migration, and induction of proliferation or apoptosis among others.
PREREQ: BMEG301 or equivalent. RESTRICTIONS: Open to BME student; ENGG students may take it with the instructor's permission.

BMEG 462  ENGINEERING BIOMEDICAL NANOSTRUCTURES  3
Describes how to use the engineering design process to create, characterize, and evaluate nanoscale structures for biotechnological applications, with an emphasis on noble metal nanoparticles. Topics include understanding and exploiting the physical properties that emerge at the nanoscale; precisely engineering the architecture and properties of noble metal nanoparticles; and rationally designing experiments to evaluate nanomaterials in biological/biomedical settings.
PREREQ: BMEG301 or equivalent. RESTRICTIONS: Open to BME students; other students may take the course with the instructor's permission.

BMEG 463  MECHANOTRANSDUCTION  3
Covers topics of mechanosensation and mechanotransduction in biological systems. Includes the principles and evolution of mechanosensory/mechanotransduction systems, their cellular machinery and mechanisms, and their role in health, disease and the engineering of tissues.
PREREQ: BMEG401 or equivalent; BMEG301 or equivalent. COREQ: BMEG302 or equivalent; BMEG420 or equivalent. RESTRICTIONS: Open to BME students; ENGG students may take it with the instructor's permission.

BMEG 464  MEDICAL DEVICE DEVELOPMENT  3
Explore the medical device design process, from research and development to regulation and commercialization. Through these devices, key concepts in medical device design will be examined including principles of design, biocompatibility, device degradation, sterilization, manufacturing and benefit/risk ratio and regulation.
PREREQ: MSEE302. RESTRICTIONS: Open to BME student; other students may take it with the instructor's permission.

BMEG 466  INDEPENDENT STUDY  1-6

BMEG 471  MATHEMATICAL PHYSIOLOGY  3
May be crosslisted with ELEG471. RESTRICTIONS: Seniors only. Requires permission of instructor.

BMEG 479  INTRODUCTION TO MEDICAL IMAGING SYSTEMS  3
Physics, instrumentation, system design, and image reconstruction algorithms will be covered for the following modalities: radiography, x-ray computed tomography (CT), single photon emission computed tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), and real-time ultrasound.
May be crosslisted with ELEG479. PREREQ: Requires permission of instructor.

BMEG 605  PRINC OF BME I: MOLEC AND CELL SYSTEMS  3
Develop a foundation for and fundamental knowledge of Biomedical Engineering with a multi-scale approach. Fundamental concepts of molecular and cellular physiology, applies quantitative engineering analysis to physiology at this length scale, and think critically about the physiology and cell biology literature.
PREREQ: General Physiology (BISC 306 or equivalent). RESTRICTIONS: Class size limited to 20. Preference to graduate students in Biomedical Engineering or by permission of instructor.

BMEG 606  PRINC OF BME II: TISS AND ORG SYSTEMS  3
Develop a fundamental knowledge of Biomedical Engineering with a multi-scale approach. Fundamental concepts of tissue and organ physiology, applies quantitative engineering analysis at this length scale, and teaches students to think critically about the organ function, such as musculoskeletal, cardiovascular, pulmonary, and nervous systems.
PREREQ: General physiology, BISC 306 or equivalent. RESTRICTIONS: Class size limited to 20. Graduate students in biomedical engineering or by permission of instructor.

BMEG 610  TISSUE BIOMECHANICS & MODELING  3
Introduction to fundamental laws and material models used to describe the mechanical behavior of orthopaedic tissues. Nonlinearity, anisotropy, viscoelasticity, inhomogeneity properties of orthopaedic tissues. Constitutive modeling and finite element (FEmo) modeling.
PREREQ: BMEG310 or equivalent (statics, strength of materials); MATH305 or equivalent (first order ODE, second order linear ODE, Laplace transform, partial differential equations, use of Matlab as a computational tool).

BMEG 662  ENGINEERING BIOMEDICAL NANOSTRUCTURES  3
Describes how to use the engineering design process to create, characterize, and evaluate nanoscale structures for biotechnological applications, with an emphasis on noble metal nanoparticles. Topics include understanding and exploiting the physical properties that emerge at the nanoscale; precisely engineering the architecture and properties of noble metal nanoparticles; and rationally designing experiments to evaluate nanomaterials in biological/biomedical settings.
PREREQ: BMEG301 or equivalent. RESTRICTIONS: Open to BME students; other students may take the course with the instructor's permission.

BMEG 665  TISSUE BIOMECHANICS AND MODELING  3
Introduction to fundamental laws and material models used to describe the mechanical behavior of biological tissues. Application of these models to musculoskeletal tissues. Introduction to numerical methods used to simulate the response of these tissue to physiological loading.
PREREQ: BMEG310 or equivalent (statics, strength of materials); MATH305 or equivalent (first order ODE, second order linear ODE, Laplace transform, partial differential equations, use of Matlab as a computational tool). RESTRICTIONS: Open to BME student; other students may take it with the instructor's permission.

BMEG 666  SPECIAL PROBLEM  1-12

BMEG 671  MATHEMATICAL PHYSIOLOGY  3
May be crosslisted with ELEG671. RESTRICTIONS: Seniors, graduate students only.
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

BMEG 679 INTRODUCTION TO MEDICAL IMAGING SYSTEMS 3
Physics, instrumentation, system design, and image reconstruction algorithms will be covered for the following modalities: radiography, x-ray computed tomography (CT), single photon emission computed tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), and real-time ultrasound. May be crosslisted with ELEG679. PREREQ: Requires permission of instructor.

BMEG 695 COMPUTATIONAL SYSTEM BIOLOGY 3
Computational/mathematical techniques for modeling & analysis of biological systems. Includes properties of gene-regulatory and signaling networks; network reconstruction from data; stochastic modeling to study cellular variation & physiological modeling. Crosslisted with BINF695.

BMEG 801 COMMUNICATION AND ETHICS IN BIOMED ENG 3
Communication methods for professional development such as written and oral presentations. Preparing proposals, journal papers, and dissertations. Selecting a research topic, reviewing literature, generating hypotheses, writing study designs. Issues of authorship, peer review, plagiarism, recordkeeping, patents, technology transfer, conflicts of interest, and copyright addressed. RESTRICTIONS: Class size limited to 20. Graduate students in biomedical engineering or by permission of instructor.

BMEG 815 ETHICS, BUSINESS AND COMMUNICATION 3
Provides professional development in ethics, business and communication related to systems biology research applications in stem cell, tissue engineering, and drug delivery technologies. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF815.

BMEG 816 SYSTEMS BIOLOGY OF CELLS IN ENGINEERED ENVIRONMENTS 3
Provides a technical review of systems biology approaches including genomics, transcriptomics, proteomics, metabolomics, and bioinformatics as well as applications in tissue engineering, stem cell differentiation, and drug delivery. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF816.

BMEG 844 COMPUTATIONAL BIOMEDICINE 3
Survey methods and approaches in algorithms, statistics and machine learning, along with their current applications in bio- and medical-informatics. Crosslisted with CISC844. RESTRICTIONS: Should have some background in basic probability and statistics, and background in computing (algorithms). For students outside CIS, Biomedical Engineering or Bioinformatics, permission from the instructor.

BMEG 866 SPECIAL PROBLEM 1-12
BMEG 868 RESEARCH 1-9

BMEG 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 coursework.

BMEG 969 DOCTORAL DISSERTATION 1-12 PF

BIOMECHANICS AND MOVEMENT SCIENCE

BMSC 630 HUMAN MOVEMENT CONTROL 3

BMSC 640 SEMINAR IN MOTOR SYSTEMS NEUROSCIENCE 0-3
Students present and lead discussion of influential articles in the field of motor systems neuroscience, with an emphasis on supraspinal control of movement. Crosslisted with PHYT640. RESTRICTIONS: Class size limited to 8. Permission to enroll required by course coordinator. Previous course work in basic neuroanatomy and neurophysiology strongly recommended. Course is designed for graduate students, but very strong undergraduates student may enroll

BMSC 666 SPECIAL PROBLEM 1-12

BMSC 686 MATHEMATICS FOR BIOMECHANICS 3
Mathematical techniques for research in biomechanics and related fields, with emphasis on methods useful for biomedical signal processing. Topics include Fourier analysis, matrix algebra, and signal processing. Crosslisted with KAAP686. PREREQ: MATH211 and MATH222 or equivalent.

BMSC 865 SEMINAR 0 PF
BMSC 866 SPECIAL PROBLEM 1-12
BMSC 868 RESEARCH 1-6
BMSC 869 MASTER’S THESIS 1-6

BMSC 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.

BMSC 969 DOCTORAL DISSERTATION 1-12 PF

BIORESOURCES ENGINEERING

BREG 107 WELDING AND METALS 2
Arc welding, gas welding, soldering, sheet metal layout and fabrication, and properties of metals.

BREG 108 UTILITIES 2
Domestic water supply and waste disposal, house wiring, heating systems.

BREG 112 PERSONAL COMPUTERS AND TECHNOLOGY 3
Introduction to personal computers. PC operation systems, programming, and software packages such as spreadsheets and word processing. Statistical and numerical analysis techniques applied to production problems in engineering technology.

BREG 115 INTRODUCTION TO COMPUTER BASED PROBLEM SOLVING 4
Provides foundation in the application of computers and engineering principles for agriculture, industry and the environmental sciences. Emphasizes fundamentals of computer programming, problem solving and practical applications within the field. Includes a design project and laboratory. COREQ: MATH117 or higher.

BREG 165 FRESHMAN SEMINAR I 0
Focuses on academic services, career exploration and preparation, campus resources, and practical skills helpful in mastering freshman year. Orientation to the ET major. Professionalism and Ethics. Accreditation issues and introduction to ePortfolios.

BREG 175 FRESHMAN SEMINAR 1
Continuation of BREG 165 for Freshman. ePortfolio and resume development, orientation to the ET major.

BREG 209 TECHNICAL AND COMPUTER AIDED DRAFTING 3
Two dimensional drafting including layouts, geometric constructions, lettering, dimensioning, multiview projections, sectional and auxiliary views using AutoCAD for drafting, entity creation and modification and data management.

BREG 215 APPLIED FLUID MECHANICS 4
Fluid properties, fluid statics, conservation of mass, energy, and momentum as applied to engineering systems. Pipe flow, distribution systems, pumps, open channel flow, hydraulics structures. Laboratory includes flow measurements, energy measurements and analysis of data. PREREQ: MATH211/251 and PHYS210/217. COREQ: CISC106.

BREG 231 FUNDAMENTALS OF STATICS AND STRENGTH OF MATERIALS 4
Analysis of forces and equilibrium on bodies in two and three dimensions and forces on building components. Stresses, displacement and failure in beams and columns. Strength of wood, steel, concrete and masonry. PREREQ: MATH211/241, PHYS210/217
BREG 244  ELECTRICITY FOR ENGINEERING TECHNOLOGY 4
Electrical power systems for buildings, including distribution equipment and motor selection. Fundamentals of alternating current, single phase and three phase circuits. Laboratory emphasizes control logic and electro-mechanical devices.

BREG 265  ENGINEERING TECHNOLOGY SOPHOMORE SEMINAR 1
Accreditation, ePortfolio development, resume updates, entrepreneurship, ethics, and professional practice issues.
PREREQ: BREG175

BREG 306  COST ESTIMATING 3
Building components, bill of materials and cost estimating using cost of materials plus labor system.
PREREQ: BREG209.

BREG 311  FUNDAMENTALS OF THERMODYNAMICS 3
PREREQ: BREG215. COREQ: MATH222 or MATH242.

BREG 365  ENGINEERING TECHNOLOGY JUNIOR SEMINAR 1
Accreditation, ePortfolio development, professional certifications and licensure, leadership and ethics, case studies, entrepreneurship, resume updates, preparation for internship experience.
PREREQ: BREG265

BREG 366  INDEPENDENT STUDY 1-4

BREG 416  PROJECT ECONOMIC ANALYSIS 3
Fundamentals of engineering economic analysis. Topics include cash flow, time value of money, equivalence, compound interest formulas, annual cost, present worth, capitalized cost, rate of return, future worth, break even analysis, depreciation and income taxes. Use of computer applications and differential calculus in economic analysis.
PREREQ: MATH221 or equivalent, CISC106.

BREG 417  PROJECT MANAGEMENT 3
Basic procedures for finding limiting sequence of events, constructing flow network describing project steps, and project planning and control for optimum scheduling. Project analysis using Critical Path Method (CPM), Project Evaluation and Review Technique (PERT) and binomial programming.
PREREQ: CISC106. RESTRICTIONS: Junior or senior standing.

BREG 423  ADVANCED STORM-WATER MANAGEMENT 3
Design of gutters, storm drain inlets, and storm drains. Design of distributed and low impact development storm-water management systems. Erosion and sediment control for site development, flood plain hydraulics and analysis.
PREREQ: BREG321

BREG 424  WATER SUPPLY AND WATER TREATMENT SYSTEMS 3
Water supply sources, hydraulics of water distribution systems, water softening, sedimentation, chemical precipitation, filtration, and disinfection.
PREREQ: BREG215, CHEM103.

BREG 443  INSTRUMENTATION 3
Selection, operating principles and application of physical and chemical devices for indicating, recording and controlling laboratory and field conditions or processes.
PREREQ: PHYS202 or PHYS208, BREG244 or equivalent.

BREG 444  PROGRAMMABLE LOGIC CONTROL APPLICATIONS 3
Designed to teach application of PLCs and how to use them effectively. Major topics include control systems and terminology, PLC structure and instruction sets, control of sequential processes, and safety and implementation. Applications will be programmed and tested on actual PLCs.
PREREQ: CISC106, BREG244 or equivalent.

BREG 445  FOOD ENGINEERING TECHNOLOGY 4
Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations.
Crosslisted with ANFS443. PREREQ: PHYS201. RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

BREG 449  APPLIED CONTROLS 3
The selection, operating principles and application of electrical, mechanical and mechatronic systems for industrial, agricultural and environmental applications. Includes a laboratory and design project.
PREREQ: CISC106, CPEG202 and MATH222/242. RESTRICTIONS: Requires junior or senior status in the major or approval of the department.

BREG 450  TECHNICAL PRACTICUM IN INDUSTRY 1-3
Structured experience in industry. A minimum of 40 hours of technical activities per credit hour. Upon completion, students present results to the department faculty and industrial sponsor through written reports and oral presentations. Proposals must be approved in advance by the department faculty, and a designated faculty advisor is required.
RESTRICTIONS: Senior standing. May be repeated for a maximum of 6 credits total.

BREG 454  WOOD AND STEEL STRUCTURES 3
Analysis and design of structures using wood and steel for building materials. Design aspects of building construction.
PREREQ: BREG231 and PHYS201 or PHYS207.

BREG 456  FUNDAMENTALS OF HEATING, VENTILATION AND AIR CONDITIONING 3
Heating, ventilating and air conditioning of rural, residential and light commercial buildings. Heat transmission in structures, space heating and cooling loads, air distribution, piping and fluid flow, heat and water production in livestock and poultry, heating systems for specific plant and animal structures.
PREREQ: CISC106, BREG215 and BREG311.

BREG 465  SENIOR SEMINAR AND CAPSTONE EXPERIENCE 1
Accreditation, professional practice issues, leadership and ethics, ePortfolio submission for evaluation, report writing, oral presentations.
PREREQ: BREG365

BREG 466  INDEPENDENT STUDY 1-3

BREG 468  UNDERGRADUATE RESEARCH 0-6
Undergraduate research conducted on or off campus, out of class, and under the supervision of a BREG faculty member.
RESTRICTIONS: Requires permission of instructor.

BREG 603  SOIL PHYSICS 3
Examines the importance of soil physics in relation to other disciplines of soil and environmental sciences. Topics include status of water in soil, fundamental principles of water flow, differences between saturated and unsaturated water flow, water balance in the field, infiltration, evapotranspiration, heat, gas and solute (contaminant) transport in soil.
Crosslisted with PLSC603.

BREG 623  ADVANCED STORM-WATER MANAGEMENT 3
Design of gutters, storm drain inlets, and storm drains. Design of distributed and low impact development storm-water management systems. Erosion and sediment control for site development, flood plain hydraulics and analysis.
PREREQ: BREG321

BREG 628  NATURAL WASTEWATER TREATMENT SYSTEMS 3
Land treatment systems for wastewater, biosolids and septage land application, constructed wetlands and aquatic treatment systems, lagoons and decentralized wastewater management.
PREREQ: BREG328 or CIEG233 or CIEG331.

BREG 666  SPECIAL PROBLEM 1-12

---

**BUSINESS ADMINISTRATION**

**BUAD 030**  COOPERATIVE EDUCATION PROGRAM 1 RP
Assists students to integrate classroom theory with on-the-job experience through analysis of their Cooperative work assignments. Business Administration, Accounting, and Economics Co-op students must enroll for one credit hour of BUAD030 during their Co-op work term.

**BUAD 100**  INTRODUCTION TO BUSINESS 3
Survey of basic business concepts designed for non-business major. Topics covered include business organization, management, marketing, operations research and finance. RESTRICTIONS: No majors within the business administration, finance, accounting, management information systems, or hotel, restaurant, and institutional management degree programs may receive credit for this course.

**BUAD 110**  BASICS OF BUSINESS 3
Introduction to business for majors to inform them about each of the functional areas of business through lectures, readings, discussions, guest speakers, cases and projects. Includes topics relating to operations, marketing, finance, management, accounting and management information systems, as well as business ethics, and critical thinking and decision making.
RESTRICTIONS: Open to freshmen only.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUAD 150</td>
<td>BUSINESS BASICS FOR ENTREPRENEURS</td>
<td>This course introduces students to basic concepts from accounting, finance, management, and operations management that are pertinent to starting and running a new business. Topics are covered by subject matter experts. Crosslisted with ENTR150. RESTRICTIONS: This course provides foundational knowledge for students who will not otherwise acquire business basics knowledge as part of their major degree program. This course is NOT required for students who complete a business core that includes FINC200 or higher.</td>
</tr>
<tr>
<td>BUAD 210</td>
<td>FOUNDATIONS OF SPORT MANAGEMENT</td>
<td>Overview of sport management field and segments of sport industry, including types of employment opportunities, as well as skills, educational background, and experiences essential for successful career in sport industry.</td>
</tr>
<tr>
<td>BUAD 301</td>
<td>INTRODUCTION TO MARKETING</td>
<td>Management of the marketing functions, marketing research, product planning, distribution channels, pricing, personal selling, and advertising. Emphasis on consumer behavior and view of the firm as a social entity focused on the marketing research process as an aid in marketing decision making. Defining marketing problems, identifying marketing information needs, developing methods to gather information, and applying research results to marketing problems. PREREQ: MATH202, BUAD301, and MISY160 or CISC101.</td>
</tr>
<tr>
<td>BUAD 306</td>
<td>INTRODUCTION TO SERVICE AND OPERATIONS MANAGEMENT</td>
<td>Analysis of major problems faced by operations managers at different levels of management. Topics include scheduling, forecasting, process design, inventory management and quality management. PREREQ: MATH201. RESTRICTIONS: Requires sophomore status.</td>
</tr>
<tr>
<td>BUAD 309</td>
<td>ORGANIZATIONAL BEHAVIOR</td>
<td>Examines individual, group, and organizational determinants of work behavior in organizations. Theory and concepts relevant to individual differences, attitudes, motivation, teams, leadership, power, and organizational culture and change are discussed with an emphasis on applying this knowledge to the challenges of management in a variety of organizations. RESTRICTIONS: Requires sophomore status.</td>
</tr>
<tr>
<td>BUAD 311</td>
<td>PRACTICUM IN SPORT MANAGEMENT</td>
<td>A pre-internship professional experience in a sport management/recreation agency. Students work under the auspices of a faculty supervisor and professional mentor to gain practical experience. RESTRICTIONS: Open to sport management majors only.</td>
</tr>
<tr>
<td>BUAD 313</td>
<td>MANAGEMENT OF SPORT INFORMATION</td>
<td>An analysis of the information management process in the sport industry. The relationships between sport organizations, the public and the media are explored. RESTRICTIONS: Open to sport management majors only.</td>
</tr>
<tr>
<td>BUAD 314</td>
<td>FINANCIAL ASPECTS OF SPORT MANAGEMENT</td>
<td>Analysis of economic and societal variables impacting the financial viability of professional, intercollegiate and Olympic sport organizations. RESTRICTIONS: Open to junior/senior sport management majors only.</td>
</tr>
<tr>
<td>BUAD 315</td>
<td>LEGAL ASPECTS OF SPORTS MANAGEMENT</td>
<td>An introduction to the legal system and liability issues of tort law, agency law, antitrust labor law and constitutional law as they apply to professional and amateur sports. RESTRICTIONS: Open to junior/senior sport management majors, health behavior science majors with a concentration in leisure service management, and legal studies minors.</td>
</tr>
<tr>
<td>BUAD 317</td>
<td>SPA/WELLNESS MANAGEMENT &amp; ENTREPRENEURSHIP</td>
<td>Spa and Wellness industries are one of the fastest growing segments in the service industry offering a variety of fitness, wellness, life enhancement, and management opportunities. Globally, hotels and hospitals are adding spa/wellness programs to their offerings, as their customers are increasingly demanding complimentary and alternative medicine (CAM). The geographic market of this segment transcends the national borders into international destinations. This program could be offered both at the UD campus or any popular spa/wellness destinations in the world. Crosslisted with HRIM317.</td>
</tr>
<tr>
<td>BUAD 320</td>
<td>MANAGING COLLEGE SPORTS</td>
<td>Analyze administrative and management aspects of intercollegiate athletics programs in all three NCAA divisions, with emphasis on Division I program issues. RESTRICTIONS: At least Jr Status.</td>
</tr>
<tr>
<td>BUAD 346</td>
<td>ANALYTICAL DECISION MAKING</td>
<td>Intensive treatment of topics covered in BUAD306 to include the investigation and development of the decision making process in an operations environment. Emphasis on practical applications. PREREQ: BUAD306.</td>
</tr>
<tr>
<td>BUAD 350</td>
<td>INTRODUCTION TO ENTREPRENEURSHIP</td>
<td>This course focuses on understanding the basic concepts, tools, and practices of entrepreneurship and the development of entrepreneurial skills. The entrepreneurial process (opportunity recognition, resource marshaling, and team building driven by communication, creativity, and leadership) and business planning are emphasized. Crosslisted with ENTR350.</td>
</tr>
<tr>
<td>BUAD 351</td>
<td>ENTREPRENEURIAL MARKETING</td>
<td>This course covers basic and advanced marketing topics pertinent to bringing new innovations to market, including: product concept testing and the new product development process; consumer behavior as it relates to the adoption of new products; characteristics of high technology and other types of entrepreneurial markets; test marketing; market segmentation, targeting, and positioning; the formulation of go-to-market strategies (including product, distribution, promotional, and pricing strategies); and entrepreneurial selling. Crosslisted with ENTR351.</td>
</tr>
<tr>
<td>BUAD 352</td>
<td>BUSINESS LAUNCH PAD</td>
<td>This course introduces students to the lean startup concept, and focuses on the development of viable business models. Such models result from customer and other marketplace interactions, so students will be required to get out of the classroom by speaking with customers and others to test hypotheses about the product, the market, channels, revenue streams, costs, and other aspects of their business models. Students will be expected to use marketplace feedback to rapidly iterate/pivot until a viable model is created. Prerequisites: ENTR/BUAD350 and ENTR/BUAD351 or instructor's permission. Crosslisted with ENTR352. PREREQ: ENTR/BUAD350 ENTR/BUAD351 or permission of instructor.</td>
</tr>
<tr>
<td>BUAD 355</td>
<td>ECO TOURISM ENTREPRENEURSHIP</td>
<td>Sustainable development has received international recognition and a source of business social and economic responsibility. The underlying principles for a sustainable business development are complex, involving interaction among social, economic, and environmental issues, which make the subject critical for intellectual enquiry. The concept of sustainable development is multidisciplinary requiring students how to draw knowledge from various disciplines, such as business and economics, sociology, environmental sciences, and public administration among others. Crosslisted with HRIM355.</td>
</tr>
<tr>
<td>BUAD 363</td>
<td>ENTREPRENEURSHIP IN PRACTICE: INTERNSHIP</td>
<td>Emphasizes career development, reflection, and personal assessment. It is designed to accompany a minimum of 100 hours of employment in an entrepreneurial context. Restriction: Enrollment is limited to students who are participating in the E-Internship Program (through the Entrepreneurial Studies Program) or an internship that has been approved by the course instructor. Crosslisted with ENTR364. PREREQ: ENTR350 and ENTR351 or Permission of Instructor. RESTRICTIONS: None.</td>
</tr>
<tr>
<td>BUAD 364</td>
<td>BUSINESS ADMINISTRATION IN PRACTICE</td>
<td>Requires completion of at least 120 hours of a management, marketing, operations management, or international business internship with verification by the hiring company. Term paper relating the real-world duties and experiences of the internship to principles learned in traditional business courses also required. RESTRICTIONS: Registration by permission of instructor only.</td>
</tr>
<tr>
<td>BUAD 366</td>
<td>INDEPENDENT STUDY</td>
<td>1-6</td>
</tr>
<tr>
<td>BUAD 383</td>
<td>SEMINAR ON INTERNATIONAL BUSINESS</td>
<td>Surveys the economic, political, and institutional context of international business as well as the strategic operations of the international company. Special attention is given to cross-discipline topics, both in the form of interdisciplinary materials and lectures and institutional and company visits. RESTRICTIONS: Taught abroad.</td>
</tr>
<tr>
<td>BUAD 384</td>
<td>GLOBAL BUSINESS ENVIRONMENT</td>
<td>Evaluation of the elements of the national, international, and global environments that influence the context and conduct of international business. Emphasizes aspects of the cultural, political, economic, legal-regulatory, trade, financial, and institutional environments. RESTRICTIONS: Requires junior status.</td>
</tr>
<tr>
<td>BUAD 386</td>
<td>INTERNATIONAL BUSINESS MANAGEMENT</td>
<td>Focuses on management of international business through analysis of opportunities and challenges that face international companies. Develops the perspectives and frameworks that guide how managers direct international business activities. PREREQ: BUAD384.</td>
</tr>
</tbody>
</table>
BUAD 391 SEMINAR ON INTERNATIONAL MANAGEMENT 3
Seminar on selected topics in international management. Combines lectures and visits to local organizations. Research paper typically required. PREREQ: BUAD309 RESTRICTIONS: Taught abroad. Counts as BUAD elective for BS candidates.

BUAD 393 SEMINAR ON INTERNATIONAL MARKETING MANAGEMENT 3
Seminar on selected topics in international marketing management. Combines lectures and visits to local organizations. Research paper typically required. PREREQ: BUAD301 RESTRICTIONS: Taught abroad. Counts as BUAD elective for BS candidates.

BUAD 394 SEMINAR ON INTERNATIONAL OPERATIONS MANAGEMENT 3
Seminar on selected topics in international operations management. Combines lectures and visits to local organizations. Research paper typically required. PREREQ: BUAD306 RESTRICTIONS: Taught abroad. Counts as BUAD elective for BS candidates.

BUAD 411 PROFESSIONAL BASEBALL MANAGEMENT 3
An examination of the operation and management of a professional baseball organization, including a brief history of professional baseball (with focus on types of league competition and player/manager relations), as well as the study of the hierarchy of the typical baseball operations department. RESTRICTIONS: Open to junior and senior sport management students.

BUAD 416 INTERNATIONAL SPORT MANAGEMENT 3
Overview of the international sport environment and structure. Topics include the bid and host process for international sport competitions; the organization of the international sport community; sport development, the penetration strategies of American sport leagues and products into international markets; and the structure of sport in other countries. RESTRICTIONS: Open to junior and senior sport management majors.

BUAD 417 SPORT MARKETING 3
A study of basic marketing concepts with applications to sport organizations, both amateur and professional. Topics include promotions and public relations, sport consumer behavior, strategic marketing planning, marketing information management, marketing communications and sponsorship. RESTRICTIONS: Open to junior and senior sport management majors.

BUAD 418 SPORT EVENT AND FACILITY MANAGEMENT 3
Management of sport events and facilities, including sponsorship acquisition, marketing and promotions, volunteer management, budgeting, participant registration, facility design, and event and facility operations. RESTRICTIONS: Open only to junior/senior sport management majors.

BUAD 419 ETHICS AND ISSUES IN SPORT MANAGEMENT 3
Examination of the importance of sport in society as a transmitter of values, including major ethical theories in sport and ethical perspectives on current issues in sport. RESTRICTIONS: Open to senior sport management majors.

BUAD 420 LABOR RELATIONS 3
Treatment of labor-management relationships, with an emphasis on collective bargaining behavior and the settlement of disputes. The various environmental factors (history, philosophy, law and structure) which have greatly affected union-management affairs are first inspected, as a vital background to understanding. PREREQ: BUAD309.

BUAD 421 HUMAN RESOURCE MANAGEMENT 3
Explores traditional topic areas (e.g., planning, selection, training, compensation, performance appraisal, career development, legal regulations) and contemporary issues (e.g., workforce diversity, the link between human resource strategy and firm strategy) related to the effective management of human resources in organizations. PREREQ: BUAD309.

BUAD 422 DESIGNING EFFECTIVE ORGANIZATIONS 3
Examines practices that contribute to managerial effectiveness, with an emphasis on the organizational level of analysis. Topics include organization structure and design, innovation, growth, leadership, inter-organizational processes and intra-organizational coordination. PREREQ: BUAD309.

BUAD 423 NEGOTIATION AND CONFLICT RESOLUTION 3
Introduces students to the strategy and psychology underlying negotiation and conflict resolution through readings, lectures, and class discussions. Students have the opportunity to put this knowledge into practice by engaging in simulated negotiations with classmates throughout the semester. Topics include preparation, communication, power, emotions, and relationships. PREREQ: BUAD309.

BUAD 424 ETHICS IN THE WORKPLACE 3
Examines the behavioral and organizational underpinnings of ethical and unethical workplace behavior, and the various bases (societal, religious, etc.) on which particular management practices can be ethically evaluated. Students are encouraged to develop their skills in articulating and implementing ethical behavior in businesses and other organizations. PREREQ: BUAD309. RESTRICTIONS: Requires junior status.

BUAD 425 CURRENT ISSUES IN GLOBAL BUSINESS 3
Current topics and emerging issues in the changing global marketplace. May focus on regional issues, global business sectors, current issues in the globalization of business, or a combination of these. PREREQ: Senior standing or BUAD100 or at least one of ACCT483, BUAD386, ECON340, or FINC415.

BUAD 426 LEADERSHIP AND TEAMWORK 3
Provides an analysis of the theories and principles of leadership in organizations. Topics include leadership traits and behaviors, social influence, motivation, and how to facilitate relationships with followers. Examine key aspects of effective teams including member selection, team design and development, collective decision making and team leadership. PREREQ: BUAD309.

BUAD 429 SELECTED TOPICS IN MANAGEMENT 3
Topical seminar on such management issues as organizational socialization, work motivation, and organization-environment relations. Development of an individual research project is stressed. PREREQ: BUAD309.

BUAD 441 STRATEGIC MANAGEMENT 3
Case studies and concepts in the determination of top-level company policy and the solution of problems that cross major functional areas in business. PREREQ: BUAD301, BUAD306, BUAD309 and FINC311. RESTRICTIONS: Requires senior standing in business administration, finance or accounting.

BUAD 444 ENTREPRENEURSHIP AND SMALL BUSINESS MANAGEMENT 3

BUAD 446 PLANNING OPERATIONS AND SUPPLY CHAINS 3
Management of operations and inventories in a variety of organizations including banks, hospitals, government and manufacturing firms. Topics include forecasting, operations planning and scheduling, material requirements planning and purchasing. PREREQ: BUAD306. COREQ: BUAD447.

BUAD 447 DATA ANALYSIS AND QUALITY CONTROL 3
The new technology for quality and productivity. Emphasis on actual implementation of total quality management in general and statistical process control in particular. PREREQ: BUAD306. COREQ: BUAD446.

BUAD 448 PROJECT MANAGEMENT: CONSULTING PRACTICUM 3
Effective design and implementation of decision support for operations. Selection of appropriate models for decision support. Emphasis on project work in which an actual decision support system is designed and implemented. PREREQ: BUAD306 and MISY160 or CISY101. RESTRICTIONS: Open to senior operations management majors only.

BUAD 449 BUSINESS PROCESS ANALYSIS 3
Focuses on how unstructured problems in various areas of operations management can be structured and solved using a variety of tools and techniques. Emphasis on logistics problems and other unstructured problems related to forecasting, inventory management, scheduling, and supply chain management. PREREQ: BUAD306, BUAD446 and BUAD447. RESTRICTIONS: Not open to students who have taken or are taking MISY432. Senior operations management majors only.

BUAD 450 BUSINESS ACCELERATOR FOR NEW VENTURES 1-6
This course focuses on helping students who have well-developed business ideas and/or existing businesses to accelerate the startup & growth of their companies. The course will begin with the conduct of a business model audit to determine appropriate goals/milestones for each business. Students will then be tasked with developing and implementing strategies to accomplish their goals/milestones. Whenever possible, students will be connected with providers of needed services, financial resources, and mentors. Prerequisites: Students must be licensees of the Venture Center; ENTR/BUAD350, ENTR/BUAD351 or instructor’s permission. Note: This will be a variable credit course, allowing students to earn 1-3 credits per semester up to a total of 6 credits. Crosslisted with ENTR450. PREREQ: ENTR/BUAD 350 AND ENTR/BUAD 351 OR PERMISSION OF INSTRUCTOR.
BUAD 451 Special Topics in Entrepreneurship 3
Examines selected topics of current interest in various areas of entrepreneurship. 
Prerequisites: ENTR/BUAD350, ENTR/BUAD351 or instructor's permission. 
Crosslisted with ENTR451. PREREQ: ENTR/BUAD350 ENTR/BUAD351 or permission of instructor.

BUAD 464 Sport Management Capstone Internship 9
Practical learning experience in Sport Management. Reflect on the theoretical aspects of the industry by analyzing real world issues and identifying professional ethical obligations. Faculty feedback is intended to enhance students' skills and competencies in a targeted career orientation. 
RESTRICTIONS: Requires permission of instructor.

BUAD 466 Independent Study 1-6

BUAD 468 Undergraduate Research 1-6
Directed research for undergraduate Honors students and Summer Scholars. Research must be scholarly research of thesis level potentially leading to an undergraduate thesis. 
PREREQ: Upperclass standing. RESTRICTIONS: Permission of instructor and department chairperson.

BUAD 470 Sales Management and Selling 3
Selling as the process of commercial persuasion and as a service to the customer. Major operating responsibilities of the sales manager, recruitment, training, motivation, compensation, territory management and manpower planning and control. 
PREREQ: BUAD301.

BUAD 471 Advertising Management and Media Management 3
This course covers a variety of topics including: determining advertising objectives, media planning including media characteristics, media-market measurements and media purchasing; selecting campaign themes and developing creative strategies for traditional and electronic markets; controlling advertising expenditures; the impact of regulations as well as social and economic effects of advertising. 
PREREQ: BUAD301.

BUAD 472 Marketing, Society and the Environment 3
Focuses on the interface between marketing management and the social-environmental dynamics of the surrounding society. Students critically analyze concepts and practices relating to socially responsible marketing management to gain an understanding of emerging social and environmental issues relevant to marketing decision making. 
PREREQ: BUAD301.

BUAD 473 Consumer Behavior 3
Explores a variety of topics including: the decision processes associated with buying, consuming, and disposing of products, services, and ideas; social, cultural, and psychological influences on consumer decision making and consumption patterns; the relationship between consumer behavior and marketing decision making. 
PREREQ: BUAD301.

BUAD 474 Marketing Channels and Retailing 3
Focus on decision processes involved in establishing the paths for the movement of products, title, payment, and information between producers and users. Emphasis on the decisions necessary for successful retail operations. 
PREREQ: BUAD301.

BUAD 475 International Marketing 3
Analysis of the concepts and practices relating to the marketing of products and services internationally. Focus on the uncontrollable environmental forces facing an international marketer, issues relating to the standardization of marketing strategies across countries and the unique problems of specific international markets. 
PREREQ: BUAD100 or BUAD301.

BUAD 476 Marketing Analytics 3
Explores various quantitatively-based marketing models used to make decisions related to segmentation, positioning, new product diffusion, and allocation of marketing mix expenditures. 
PREREQ: BUAD301, BUAD302, and MATH202.

BUAD 477 Digital Marketing 3
Explore the possibility and limitations of various internet marketing media and learn how to apply and adapt basic and advanced marketing strategies to construct and critically evaluate internet marketing efforts, their impact, and their practical use in marketing contexts. Develop skills related to social media, web analytics, and a wide variety of other formats. Examine strategies for creating, managing, and measuring two-way marketing conversations with consumers on a variety of digital platforms, including mobile devices. 
PREREQ: BUAD301. RESTRICTIONS: Open to international business studies and marketing majors only.

BUAD 478 Field Projects in Marketing 3
Student teams apply knowledge of marketing and business in a "real world" setting with local, regional, and national profit and nonprofit businesses on marketing projects funded by the companies. Projects involve: defining objectives, collecting relevant data, analyzing, interpreting, and reporting results/recommendations to management. 
PREREQ: At least nine credits in marketing including BUAD302, or permission of instructor.

BUAD 479 Marketing Strategy for the Firm 3
The application of management decision processes and strategies to the integration of the firm's total marketing mix. Multifaceted problems are studied in large, medium and small firms. Students analyze cases and other real marketing problems. 
PREREQ: Twelve credit hours of marketing courses including BUAD302.

BUAD 616 Sport Marketing 3
Marketing applications for amateur and professional sport organizations and the use of sport in the marketing of traditional products and services. Topics include the marketing mix, sport consumer behavior, strategic market planning, branding, and sponsorship.

BUAD 620 International Sport Management and Marketing 3
Overview of the global sport industry, including the bid and host process for international sport competitions, the organization of the international sport community, the penetration strategies of American sport leagues and products into international markets, and the structure of sport in other countries.

BUAD 634 Sport Business and Finance 3
Principles of financial management and microeconomics as applied to the sport industry, with a focus on spectator sports at both professional and collegiate levels. Topics include the financing of sport facility construction, budgeting in collegiate athletics, and the financial effects of collective bargaining agreements.

BUAD 635 Administration of Intercollegiate Athletics 3
In-depth analysis of governance, management, marketing and financing of intercollegiate athletics at institutional, conference and national governance levels, including major issues facing leadership of intercollegiate athletics. 
RESTRICTIONS: Open to MBA and educational leadership majors.

BUAD 647 Legal Aspects of Sport Management 3
Overview of the legal principles relevant to sport managers, including tort law, contract law, constitutional law, agency law, risk management, judicial review and administrative law related to the operations and administration of sport and athletic programs.

BUAD 700 Survey of Business 3
Survey of business principles including business organization and management, market research and marketing, operations management and decision analysis, accounting and financial analysis. Course assignments stress business technical writing and presentation skills. 
RESTRICTIONS: Course open to the ODC program and students in graduate programs outside the Lerner College. No majors within finance, accounting, or information systems degree programs may receive credit for this course.

BUAD 800 Strategic Thinking for the Executive Leader 3
A broad introduction to the MBA program and the nature of management thought. Topics include strategy, decision-making and organizational behavior. Emphasizes understanding underlying assumptions/limitations of different business perspectives. Provides a foundation for the MBA program and gives students practical skills.

BUAD 805 Multidisciplinary Biotechnology 3
Introduces science, engineering, and business graduate students to challenges of conducting and managing scientific inquiry across disciplines and within industry. Focuses on biotechnology industry. 
Crosslisted with CHEG805.

BUAD 811 Globalization and Business 3
Assesses environmental, institutional, industrial, strategic, and organizational features of globalization and business. Considers frameworks that guide managers' understanding of globalization and business, how managers interpret the challenges and opportunities of globalization and the implications of globalization to professional development.
BUAD 820 **STATISTICAL DATA ANALYSIS FOR BUSINESS** 3
Focuses on data analysis for the purpose of measurement, inference, quality and productivity improvement, and improved managerial decision making. Exploratory data analysis, graphical analysis, descriptive statistics, inferential statistics, and techniques such as regression are covered.

BUAD 831 **OPERATIONS MANAGEMENT AND MANAGEMENT SCIENCE** 3
Topics include decision analysis tools, mathematical programming, operations strategy, process management and planning and inventory management concepts. PREREQ: BUAD820.

BUAD 832 **OPERATIONS PLANNING AND CONTROL** 3
Analyzes problems and advanced decision techniques for effective management of operating resources. Topics include forecasting, capacity requirements determination, operations planning and scheduling, and inventory management. Applications in both manufacturing and service settings are emphasized. PREREQ: BUAD831.

BUAD 833 **INTERNATIONAL OPERATIONS** 3
Focuses on issues concerning the management of international operations. Topics include international sourcing for materials and services, location decisions for non-domestic production activities, worldwide logistical systems, and managing non-domestic operations and projects. PREREQ: BUAD831.

BUAD 834 **SPECIAL TOPICS IN OPERATION MANAGEMENT** 1-3
Covers various topics in operations management at all levels of the firm. Individual inquiry stressed. PREREQ: BUAD831.

BUAD 835 **MANAGING NEW PRODUCT DEVELOPMENT PROJECTS** 3
Examines techniques and issues in project management, with special emphasis on new product development projects. Topics include models for cost estimation, process selection, competitive benchmarking, concurrent engineering, and successful project management. Teams prepare proposal for developing and introducing a new product into the marketplace. PREREQ: BUAD831, BUAD880, FINC850.

BUAD 836 **PROBLEM STRUCTURING AND ANALYSIS FOR DECISION MAKING** 3
Introduces problem structuring and analysis for decision making under risk. Emphasizes both applications and methodology. Examines the effects of creativity and problem definition on decision making. Uses various problems involving uncertainty to enhance decision making skills and expand students' awareness and understanding of business problems. PREREQ: BUAD831.

BUAD 837 **DECISION SUPPORT AND EXPERT SYSTEMS FOR BUSINESS** 3
Focuses on using decision support systems (DSS) and expert systems (ES) to enhance decision making in business. Critically examines the literature on the development of information systems. Discusses technical and behavioral issues related to the design and implementation of effective DSS and ES. PREREQ: BUAD831.

BUAD 840 **ETHICAL ISSUES IN DOMESTIC AND GLOBAL BUSINESS ENVIRONMENTS** 3
Topics include ethics in organizations, and problems and challenges dealing with external environment demands including global issues.

BUAD 841 **MANAGING THE GLOBAL ENTERPRISE** 3
Focuses on the development of business strategies and management practices for managing the multinational business organization. RESTRICTIONS: Counts toward MBA as an elective.

BUAD 842 **SPECIAL TOPICS IN MANAGEMENT OF TECHNOLOGY** 1-3
Examines selected topics in the management of technology. Individual inquiry stressed. PREREQ: BUAD870.

BUAD 843 **SPECIAL TOPICS IN GLOBAL BUSINESS** 3
Examines selected topics in global business that may focus on one or more areas of the world (e.g. the European Union, Latin America, Pacific Basin, etc.). May be offered overseas.

BUAD 849 **SEMINAR IN BUSINESS ADMINISTRATION** 3
With an emphasis on research methodology, individual inquiry, and communication of results, students will pursue areas of interest and prepare formal presentations of their findings. PREREQ: Requires 24 MBA credits.

BUAD 851 **CREATIVITY AND INNOVATION FOR NEW VENTURES** 1
New Venture Creation module explores the creative and innovative process and the linkages between creativity and innovation both within a corporate environment as well as in an entrepreneurial venture. Students gain an understanding of the creative and innovative process, know how to stimulate creativity and break down barriers to innovation. PREREQ: BUAD870.

BUAD 852 **MARKET RESEARCH FOR NEW VENTURES** 1
New Venture Creation module focuses on marketing issues related to new product development. Addresses how to use research to design products that meet customer needs, assess market potential, and segment heterogeneous markets. Strategic issues related to achieving a desirable market position, overcoming obstacles to successful product diffusion, and building equity in new brands are also considered. Depending on student interests, varying emphasis will be given to business-to-business and business-to-consumer markets. PREREQ: BUAD880.

BUAD 853 **PROJECT PLANNING AND MANAGEMENT** 1
Focuses on the innovation process. Various approaches to project planning and management are explored and specific project management techniques such as PACE and Stage Gate process are covered. The objective is to be able to plan an innovation process, know the various tools that are available and to appropriately apply the tools to an innovation project. Learning assessed through a written exam involving a case application. PREREQ: BUAD880.

BUAD 854 **STRATEGIC, TECHNICAL AND INDUSTRY ANALYSIS** 1
New Venture module develops the principle that effective strategies follow from the founder and firm's fundamental goals. Key course outcomes include: (1) develop skills in analyzing environment in which they or their firm compete; (2) understand how to define a strategy and design a business; (3) interpret the management processes used to analyze, formulate and implement effective strategies. PREREQ: BUAD890.

BUAD 855 **ETHICAL AND REGULATORY ISSUES FOR NEW VENTURES** 1
Extension of the legal and regulatory module in the MBA core as it applies to technological innovation and new venture creation. Content may vary depending on students' interests. PREREQ: BUAD940.

BUAD 856 **SPECIAL TOPICS IN NEW VENTURE CREATION I** 3
Specialized modules designed for students pursuing a concentration in New Venture Creation. Topics include: strategic, technical and industry analysis; project planning and management; ethical and regulatory issues for new ventures. PREREQ: Complete tier 1 of MBA program RESTRICTIONS: Cannot be counted in program along with BUAD853, BUAD854 or BUAD855.

BUAD 857 **SPECIAL TOPICS IN NEW VENTURE CREATION II** 3
Specialized modules designed for students pursuing a concentration in New Venture Creation. Topics include: creativity and innovation for new ventures; market research for new ventures; financing new ventures. PREREQ: Complete tier 1 of MBA program RESTRICTIONS: Cannot be counted in program along with BUAD851, BUAD852 or FINC860.

BUAD 861 **ETHICAL LEADERSHIP DEVELOPMENT** 3
Focus is on two primary learning objectives. First objective: explore theory in management, psychology, and neuroscience as well as current popular notions regarding what constitutes effective leadership. Second objective: explore your own personal leadership and management potential through cases, discussions, and diagnostic tools and assessments. PREREQ: BUAD870.

BUAD 864 **INTERNSHIP** 1-6 PF
Fieldwork designed to allow a student to apply acquired knowledge in a corporate setting. Requires a corporate sponsorship, a performance evaluation to be completed by that sponsor, and a written paper to be submitted to the administrator of internships.

BUAD 868 **PROFESSIONAL PROJECT** 3-6
OECD Project demonstrating ability to apply Organizational Development and Change in field setting. Requires written and oral presentation of the professional project following UD Thesis guidelines.

BUAD 869 **MASTER'S THESIS** 3-6
Can be taken for up to 6 credits in the MS program.

BUAD 870 **LEADERSHIP AND ORGANIZATIONAL BEHAVIOR** 3
Develops a knowledge base and requisite skills for managing individual, group, and organizational processes through the use of diagnostic models, cases, and/or simulated exercises.
BUAD 871 MANAGING FOR CREATIVITY AND INNOVATION 3
Focuses on individual characteristics and group and organizational factors that influence the ability of organizations to generate new products and/or processes, and to implement new products/processes. Students practice skills to diagnose barriers and develop creative organizations.
PREREQ: BUAD870

BUAD 872 ORGANIZATIONAL DEVELOPMENT AND CHANGE 3
Provides knowledge and skills to function as effective change agents in organizations. Particularly appropriate for students seeking potential employment in positions requiring skills in facilitating change. Classic OD concepts are studied along with contemporary concepts, approaches and techniques for planned organizational change.
PREREQ: BUAD870. COREQ: BUAD870.

BUAD 874 SPECIAL TOPICS IN ADMINISTRATION 1-3
Examines selected current organizational topics: e.g., new compensation and benefits initiatives, employee involvement, teamwork designs and re-engineering. Individual inquiry is stressed.
PREREQ: BUAD870

BUAD 875 STRATEGIC HUMAN RESOURCES 3
Takes an evidence-based approach to examining the science and practice of strategic human resource management. This includes HR planning and recruiting, selection, training and development, performance management, and compensation. Throughout, attention is directed toward issues of ethics and the global management of HR.
PREREQ: BUAD870. COREQ: BUAD870.

BUAD 876 LABOR MANAGEMENT RELATIONS 3
Labor-management relationships. Primary focus on contract negotiations and administration as well as inspection of the various environmental factors (history, philosophy, law and structure) that underpin collective bargaining.

BUAD 877 SKILLS FOR CHANGE AGENTS 3
Skill and ability for driving change at the individual, team, and organization levels. Team development skills, leadership skills, and negotiation skills are emphasized through simulation exercises.

BUAD 878 LEADERSHIP IN INTERNATIONAL BUSINESS CULTURES 3
Focuses on cultural similarities and differences worldwide and how they affect managers' effectiveness. Attention is given to general cultural dimensions as well as specific cultural practices with a special emphasis on cross-cultural communications.
PREREQ: BUAD870

BUAD 879 NEGOTIATION AND CONFLICT RESOLUTION 3
Acquires students with theory and research on negotiation and conflict resolution and involves students in active negotiation exercises with discussions, including feedback on students' negotiation skills. Negotiation is broadly defined to include many varieties of bargaining, third party dispute intervention and organizational justice.
PREREQ: BUAD870

BUAD 880 MARKETING MANAGEMENT 3
Management of marketing functions in modern profit and non-profit enterprises. Introduction to the marketing management process.
PREREQ: ACCT800 and ECON503

BUAD 881 RESEARCH METHODS FOR MARKETING DECISIONS 3
Focuses on the techniques of research design, data collection, and data analysis for making marketing decisions. Helps students develop an appreciation for the potential contributions and limitations of marketing research data, enabling them to evaluate marketing research activities. Emphasizes interpretation, not computation, from statistical analyses.
PREREQ: BUAD820 and BUAD880

BUAD 882 INTERNATIONAL MARKETING MANAGEMENT 3
Develops managerial decision-making skills in several areas related to international/global marketing such as environmental analysis, planning/organization, marketing research, segmentation, targeting and positioning/competitive analysis, and method of entry.
PREREQ: BUAD880

BUAD 883 PRODUCT AND PRICE MANAGEMENT 3
Integrates topics in product management and pricing strategy. Special emphasis is given to the use of conceptual frameworks and analytical methods that may be used to improve product and price decisions. The concepts and methods are applied to real-world case studies.
PREREQ: BUAD880

BUAD 884 SPECIAL TOPICS IN MARKETING 1-3
Examines selected current marketing topics: e.g., strategy development, opportunity assessment, modeling and marketing programming. Individual inquiry is stressed.
PREREQ: BUAD880

BUAD 885 MARKETING CHANNELS 3
Analyzes marketing channels as social, economic and political systems. Strong emphasis placed on understanding the behavioral dimension of the channel relationship after focusing on the economic and structural aspects of retailing, wholesaling, and physical distribution. Governmental and other constraints on channel activities are also studied.
PREREQ: BUAD880

BUAD 886 ADVERTISING STRATEGY 3
For those with little or no prior experience in advertising. Intended to improve students' skills with respect to determining advertising strategy. Features a mixture of lecture, case study analysis, class discussion, and team development and presentation of an entire advertising campaign.
PREREQ: BUAD880

BUAD 887 BUYER BEHAVIOR 3
Applied concepts from the social sciences to study factors that influence the acquisition, consumption and disposition of products, services, and ideas. Covers: 1) buyer decision processes; 2) influences on consumer decisions and consumption patterns; and 3) the relationship between buying behavior and strategic decision making.
PREREQ: BUAD880

BUAD 888 ADVANCED MARKETING MANAGEMENT AND STRATEGY SEMINAR 3
Focuses on the issues faced by senior and middle level marketing executives in an organization. Emphasizes developing a comprehensive marketing strategy that is consistent with corporate plans. Issues explored include: opportunity assessment and competitive analysis, segmentation and positioning, and the development of integrated marketing mix programs.
PREREQ: BUAD880

BUAD 889 INDUSTRIAL MARKETING 3
Studies the marketing of goods and services to businesses, institutions, and the government. Covers organizational buying behavior, product/market planning, sales force and distribution management, pricing and promotion from the perspective of both the buyer and the seller.
PREREQ: BUAD880

BUAD 890 CORPORATE STRATEGY 3
Emphasizes total organization function and performance in a global environment. Examines general management responsibilities for determining objectives and future strategies and seeking commitment for their implementation, integrates functional course concepts to enhance decision making and communication skills through individual and group analyses of specific companies.
PREREQ: FINC850, BUAD831, BUAD870, BUAD880

BUAD 892 EXPERIENCES IN STRATEGIC INTEGRATION FOR TOP MANAGERS 3
Develops strategic and decision making skills from the perspective of senior management running an organization. The course is designed to help future managers integrate concerns from multiple functions, including finance, marketing, and operations, in addressing complex problems in an uncertain environment. The emphasis is on experiential learning through actual and simulated cases.
PREREQ: FINC850, BUAD831, BUAD870, BUAD880.

BUAD 894 EVIDENCE-BASED MANAGEMENT 3
Field research methods for diagnosing, planning and testing management practices and ODC interventions are covered. Design and analysis of survey, interview, focus group, field observation and archival data sources including quantitative and qualitative analyses are addressed. Students will design and propose a field project which forms the basis for the ODC Professional Project.
PREREQ: BUAD872, BUAD875, & BUAD820. COREQ: BUAD872, BUAD875, & BUAD820.

BUAD 895 PROFESSIONAL FIELD PROJECT SEMINAR 3
Students implement a professional field project that is designed in the BUAD894 course. The student compiles a portfolio or report of their project & makes a presentation. Seminar discussions provide a forum for consultation, advice and support from faculty and fellow students.
PREREQ: BUAD894.

BUAD 896 ODC-E PORTFOLIO ASSESSMENT 1 PF
Development, assessment, and evaluation of MS in ODC student e-portfolio.
RESTRICTIONS: Open to Master's candidates in the Organizational Development and Change program only and must be registered in the first fall semester of the program. Continuing progress on the portfolio through the program is designated with the temporary grade of S (s
CGSC 100  FIRST YEAR EXPERIENCE  1 PF
Intended for CGSC Interest Majors. Discusses the rationale for the CGSC curriculum; the work of research labs at UD; graduate school opportunities; career options; and current research in the field.

CGSC 102  LANGUAGE, MIND AND SOCIETY  3
Explores the interrelation between language, mind and society. Topics will vary depending on instructor, but may include: origins of language, impact of culture on language and thought, structural aspects of language variation and the mental representation of language, role of universal grammar in language learning, regional and social variation in language, sociolinguistics of multilingual/multietnic communities, language change, and the role of language in social and political decision making. Crosslisted with LING102.

CGSC 170  INTRODUCTION TO COGNITIVE SCIENCE  3
Examines three approaches to the study of cognition: The mind as a special type of computer; the mind as an artificial neural network; the mind as brain. Evaluates each view by examining its usefulness for understanding cognitive tasks (vision, memory, language, consciousness), cognitive dysfunction (autism, aphasia, etc.), and artificial intelligence.

CGSC 202  HUMAN EVOLUTION AND THE FOSSIL RECORD  3
A survey of the human fossil record from the origin of the human species to the establishment of agriculture. Includes evolutionary theory, anatomical interpretation and reconstruction of early social behavior. Crosslisted with ANTH202.

CGSC 205  ANTHROPOLOGY AND HUMAN NATURE  3
Archaeological, biological and cultural anthropology organized around the theme of human nature. Crosslisted with ANTH205.

CGSC 266  SPECIAL PROBLEM  1-6

CGSC 310  COGNITIVE SCIENCE INTERNSHIP  1-3
Work with practicing professionals and gain "hands on" work experience in a chosen field in cognitive science. RESTRICTIONS: Open only to junior and senior Cognitive Science majors. Requires permission from Undergraduate Advisor.

CGSC 314  BRAIN AND BEHAVIOR  3
Surveys the neural bases of phenomena such as perception, learning, memory, motivation, anxiety, and depression from a psychobiological perspective. Crosslisted with PSYC314. PREREQ: Grade of C- or better in PSYC100 or NSCI100.

CGSC 320  THEORY OF KNOWLEDGE  3
An examination of some central issues in epistemology: classical and contemporary analyses of empirical knowledge; the nature of justification and rationality; implications for science, religion and metaphysics. Crosslisted with PHIL320.

CGSC 327  RACE, GENDER, SCIENCE  3
Critically examines a number of metaphysical, epistemological, and ethical issues related to science of race, gender, and sexual orientation. Topics may include (a)evolution of sex and gender, (b) gender and cognition, (c) biological basis, or lack thereof, of sexual orientation/preference (d) evolutionary, cognitive, historical, and political origins of race thinking, (d) relationship between everyday conceptions of race and gender as compared with scientific conceptions of race and gender, (e) ethical issues raised by human kind classification schemes. Crosslisted with PHIL327.

CGSC 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. Crosslisted with PHIL330.

CGSC 340  COGNITION  3
Examination of how the mind works, covering topics such as perception, vision, attention, memory, language, concepts and decision making. Major themes include understanding the mind/brain relationship, using empirical data to develop and evaluate cognitive theories, and understanding the implications of cognitive research for everyday life. Crosslisted with PSYC340. PREREQ: Grades of C- or better in PSYC207 and in PSYC209 or substitutes (MATH202, MATH205, STAT200, SOCI301), except for Neuroscience majors. RESTRICTIONS: Open to psychology majors and minors and Neuroscience majors.

CGSC 366  INDEPENDENT STUDY  1-6

CGSC 376  INTRODUCTION TO COMMUNICATION DISORDERS  3
Provides an introduction to the field of communication disorders. Examines the complex behaviors of speech, language and hearing, and their changes throughout the lifespan, as well as the variety of communication disorders arising from biological, environmental and behavioral factors. PREREQ: LING101.

CGSC 378  ANATOMY AND PHYSIOLOGY OF SPEAKING  3
Introduction to structures and processes underlying human speech production. Anatomical, physiological and neurological bases of speech-related processes, including breathing, phonation and articulation. Primary emphasis is to learn names and functions of various structures involved in speech production and to gain understanding of how they serve to support speaking in normally functioning humans. PREREQ: A grade of "C" or better in CGSC376.

CGSC 379  INTRODUCTION TO AUDIOLOGY  3
Provides an overview to the field of audiology. Content includes a study of the anatomy and physiology of the hearing mechanism, hearing assessment, classification of hearing disorders, auditory pathologies, and management of hearing loss. PREREQ: Grade of C or better in CGSC376; LING101.

CGSC 380  CLINICAL PRINCIPLES AND PROCEDURES IN SPEECH PATHOLOGY  3
Focuses on clinical principles and procedures in assessment, planning and intervention in speech pathology. Assessment issues related to measurement concepts and descriptive statistics including the use of norm-referenced tests, defining target behaviors and developing observation skills are covered. Treatment planning and intervention include developing a treatment program, getting target behavior baselines and documenting treatment effectiveness. PREREQ: Grade of C or better in CGSC376; LING101.

CGSC 404  ANIMAL MINDS  3
Examines philosophical, theoretical, and methodological issues raised by study of animal cognition and behavior. Topics may include mental continuity between human and nonhuman animals, animal communication and deception, self-recognition, emotions, culture, as well as the ethical treatment of animals. May be crosslisted with PHIL404.

CGSC 410  EMBODIED COGNITION  3
An examination of the thesis that cognition is not sandwiched between the perceptual input and motor output systems, but is spread across the sensory-motor system. This thesis breaks with classical cognitivism claim that cognition performs computations on symbols, without regard to the sensory system or the motor system.

CGSC 411  NATURALIZED SEMANTICS  3
An examination of theories that purport to explain the naturalistic causal and counterfactual relations between mind and world to establish contents of concepts and thought.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGSC 418</td>
<td>MEANING AND LANGUAGE USE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduction to theories of meaning based on the notion of truth and their application to language use. Crosslisted with LING418. PREREQ: LING101.</td>
<td></td>
</tr>
<tr>
<td>CGSC 420</td>
<td>RESEARCH METHODS IN COGNITIVE SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Cognitive science is a multi-disciplinary approach to the study of mind. Provides a practical and hands-on introduction to specific research methods from one or more disciplines (e.g. computational neuroscience modeling, experimental psychology related to cognitive science, or anthropological and linguistic research methods). PREREQ: PSYC209 or MATH201 or MATH202 or STAT200 or SOC201. COREQ: PSYC209 or MATH201 or MATH202 or STAT200 or SOC201.</td>
<td></td>
</tr>
<tr>
<td>CGSC 421</td>
<td>PHILOSOPHY, BIOLOGY, SOCIETY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Recent topics in philosophy of biology, with emphasis on those related to self, community, and society at large. Topics may include intelligent design, evolutionary altruism, psychological altruism, evolutionary psychology, cultural evolution, evolutionary game theory, and evolutionary ethics. May be crosslisted with PHIL421.</td>
<td></td>
</tr>
<tr>
<td>CGSC 433</td>
<td>INTRODUCTION TO ACOUSTIC PHONETICS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily lecture format with assigned text, a few laboratory sessions provide an introduction to computer-based methods in instrumental studies of speech. Crosslisted with LING433. PREREQ: LING253.</td>
<td></td>
</tr>
<tr>
<td>CGSC 450</td>
<td>RECENT TOPICS IN PHILOSOPHY OF MIND</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Recent topics in the philosophy of mind such as theory of mind, naturalized semantics, animal cognition, evolution of language. Crosslisted with PHIL450.</td>
<td></td>
</tr>
<tr>
<td>CGSC 451</td>
<td>TOPICS IN COGNITIVE SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Current topics in cognitive science. PREREQ: CGSC170. RESTRICTIONS: May be repeated for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>CGSC 455</td>
<td>COMPUTATIONAL LINGUISTICS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Natural language can be studied from a computational perspective. Course content includes aspects of formal language theory, model theory, formal grammars, computational complexity, and computational learning theory as it pertains to natural language syntax, semantics, morphology, and phonology. Crosslisted with LING455. PREREQ: LING101.</td>
<td></td>
</tr>
<tr>
<td>CGSC 466</td>
<td>INDEPENDENT STUDY</td>
<td>1-6</td>
</tr>
<tr>
<td>CGSC 470</td>
<td>ELEMENTS OF COGNITIVE SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduction to the interdisciplinary study of the mind. Concentrates on the symbolic view of mind, and illustrates linguistic, psychological, anthropological, philosophical and computational approaches to language, thought, visual perception and other areas of cognition. Examines the role of representation and algorithm in theories of processing and development. Crosslisted with LING471. PREREQ: LING101.</td>
<td></td>
</tr>
<tr>
<td>CGSC 471</td>
<td>DISCOVERING HUMAN LANGUAGE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduction to field linguistics. Examines how languages are put together through a face-to-face encounter with an unknown language. Determine how this language and human language in general is constructed. Explores culture, people and even the food where the language is spoken. Crosslisted with LING471. PREREQ: LING101.</td>
<td></td>
</tr>
<tr>
<td>CGSC 481</td>
<td>ARTIFICIAL INTELLIGENCE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Programming techniques for problems not amenable to algorithmic solutions. Problem formulation, search strategies, state spaces, applications of logic, knowledge representation, planning and application areas. Crosslisted with CISC481. PREREQ: CISC220 with a minimum grade of C-. CISC304. RESTRICTIONS: Credit cannot be received for both CISC481 and CISC681.</td>
<td></td>
</tr>
<tr>
<td>CGSC 485</td>
<td>SEMINAR IN COGNITIVE SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Intensive study of topics in cognitive science, such as mental representation, vision, computational modeling, disorders. RESTRICTIONS: May be repeated for credit as topic changes.</td>
<td></td>
</tr>
<tr>
<td>CGSC 490</td>
<td>PHILOSOPHY OF LANGUAGE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Traditional scientific and philosophical issues associated with theories of meaning and reference of language.</td>
<td></td>
</tr>
<tr>
<td>CGSC 496</td>
<td>PSYCHOLINGUISTICS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Linguistic approaches to cognition. Issues in the relation of language to thought, universals, language acquisition, and theories of syntactic and semantic processing. May be crosslisted with LING496. PREREQ: LING101.</td>
<td></td>
</tr>
<tr>
<td>CGSC 604</td>
<td>ANIMAL MINDS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Examines philosophical, theoretical, and methodological issues raised by study of animal cognition and behavior. Topics may include mental continuity between human and nonhuman animals, animal communication and deception, self-recognition, emotions, culture, as well as ethical treatment of animals. May be crosslisted with PHIL604.</td>
<td></td>
</tr>
<tr>
<td>CGSC 610</td>
<td>EMBODIED COGNITION</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>An examination of the thesis that cognition is not sandwiched between the perceptual input and motor output systems, but is spread across the sensory-motor system. This thesis breaks with classical cognitivism’s claim that cognition performs computations on symbols, without regard to the sensory system or the motor system.</td>
<td></td>
</tr>
<tr>
<td>CGSC 611</td>
<td>NATURALIZED SEMANTICS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>An examination of theories that purport to explain the naturalistic causal and counterfactual relations between mind and world to establish contents of concepts and thought.</td>
<td></td>
</tr>
<tr>
<td>CGSC 618</td>
<td>MEANING AND LANGUAGE USE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>A graduate introduction to theories of meaning based on the notion of truth and their application to language use. Crosslisted with LING618.</td>
<td></td>
</tr>
<tr>
<td>CGSC 620</td>
<td>RESEARCH METHODS IN COGNITIVE SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Cognitive science is a multi-disciplinary approach to the study of mind. Provides a practical and hands-on introduction to specific research methods from one or more disciplines (e.g. computational neuroscience modeling, experimental psychology related to cognitive science, or anthropological and linguistic research methods).</td>
<td></td>
</tr>
<tr>
<td>CGSC 621</td>
<td>PHILOSOPHY, BIOLOGY, SOCIETY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Recent topics in philosophy of biology, with emphasis on those related to self, community, and society at large. Topics may include intelligent design, evolutionary altruism, psychological altruism, evolutionary psychology, cultural evolution, evolutionary game theory, and evolutionary ethics.</td>
<td></td>
</tr>
<tr>
<td>CGSC 633</td>
<td>INTRODUCTION TO ACOUSTIC PHONETICS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily lecture format with assigned text, a few laboratory sessions provide an introduction to computer-based methods used in instrumental studies of speech.</td>
<td></td>
</tr>
<tr>
<td>CGSC 642</td>
<td>MENTAL REPRESENTATION AND MEMORY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Human memory can be conceptualized in terms of representation and information storage within various interrelated mental systems. Critically evaluates research on human memory and representation within the context of major cognitive models. Crosslisted with PSYC642. RESTRICTIONS: Requires permission of instructor.</td>
<td></td>
</tr>
<tr>
<td>CGSC 650</td>
<td>RECENT TOPICS IN THE PHILOSOPHY OF MIND</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Recent topics in the philosophy of mind such as theory of mind, naturalized semantics, animal cognition, evolution of language. Crosslisted with PHIL650.</td>
<td></td>
</tr>
<tr>
<td>CGSC 651</td>
<td>TOPICS IN COGNITIVE SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Current topics in cognitive science. RESTRICTIONS: May be repeated for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>CGSC 655</td>
<td>COMPUTATIONAL LINGUISTICS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Natural language can be studied from a computational perspective. Course content includes aspects of formal language theory, model theory, formal grammars, computational complexity, and computational learning theory as it pertains to natural language syntax, semantics, morphology, and phonology. Crosslisted with LING655.</td>
<td></td>
</tr>
<tr>
<td>CGSC 666</td>
<td>SPECIAL PROBLEM</td>
<td>1-12</td>
</tr>
<tr>
<td>CGSC 670</td>
<td>ELEMENTS OF COGNITIVE SCIENCE</td>
<td>3-6</td>
</tr>
<tr>
<td></td>
<td>Introduction to the interdisciplinary study of the mind. Concentrates on the symbolic view of mind, and illustrates linguistic, psychological, anthropological, philosophical and computational approaches to language, thought, visual perception and other areas of cognition. Examines the role of representation and algorithm in theories of processing and development.</td>
<td></td>
</tr>
</tbody>
</table>
**CHEG 671 DISCOVERING HUMAN LANGUAGE** 3  
Introduction to field linguistics. Examines how languages are put together through a face-to-face encounter with an unknown language. Determine how this language - human language in general - is constructed. Explores culture, people and even the food where the language is spoken.  
Crosslisted with Ling671.

**CHEG 681 ARTIFICIAL INTELLIGENCE** 3  
Programming techniques for problems not amenable to algorithmic solutions. Problem formulation, search strategies, state spaces, applications of logic, knowledge representation, planning and application areas.  
Crosslisted with CISC681. PREREQ: CISC220 and CISC304 or equivalent.  
RESTRICTIONS: Credit cannot be received for both CISC681 and CISC481.

**CHEG 685 SEMINAR IN COGNITIVE SCIENCE** 3  
Intensive study of topics in cognitive science, such as mental representation, vision, computational modeling, disorders.  
RESTRICTIONS: May be repeated for credit as topic changes.

**CHEG 690 MEANING AND REFERENCE** 3  
Traditional scientific and philosophical issues associated with meaning and reference of language.

**CHEG 696 PSYCHOLINGUISTICS** 3  
Study of linguistic approaches to cognition. Issues in the relation of language to thought: universals, language acquisition and theories of syntactic and semantic processing.  
May be crosslisted with Ling696.

**CHEG 848 SEMINAR IN LANGUAGE DEVELOPMENT** 3  
Covers aspects of semantic, syntactic and phonological development through examination of current research and theory in the field. Treats educational implications of language development.  
Crosslisted with EDUC848.

**CHEG 850 TOPICS IN EXPERIMENTAL METHODS** 3  
Detailed examination of one or more issues in cognitive science studied by the use of experimental methods.  
RESTRICTIONS: May be repeated for credit when topics vary.

**CHEG 855 ADVANCED COMPUTATIONAL LINGUISTICS** 3  
This is an advanced course in computational linguistics addressing advanced topics in formal language theory, model theory, formal grammars, computational complexity, and computational learning theory as it pertains to natural language syntax, semantics, morphology, and phonology.  
Crosslisted with Ling855. PREREQ: Ling655, CGSC655, or permission of instructor.

**CGSC 866 INDEPENDENT STUDY** 1-12

**CGSC 890 STUDIES IN LINGUISTICS** 3-9  
Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing.  
Crosslisted with Ling890. RESTRICTIONS: May be repeated for credit when topics vary.

**CHEG 112 INTRODUCTION TO CHEMICAL ENGINEERING** 3  
Development of quantitative models for physical systems using a combination of conservation principles and carefully focused experimental data. Studies the conservation of matter and energy.  
PREREQ: A minimum grade of C- in MATH241. COREQ: MATH242.

**CHEG 166 SPECIAL PROBLEM** 1-3  
RESTRICTIONS: Cannot count toward graduation in chemical engineering.

**CHEG 231 CHEMICAL ENGINEERING THERMODYNAMICS** 3  
The first law energy balance; the entropy balance; thermodynamic constitutive equations for gases and liquids; thermodynamic cycles and energy conversion; and stability. Kinetic Theory and Partition functions.  
PREREQ: A minimum grade of C- in CHEG112 or, for environmental engineering majors, in CIEG233. A minimum grade of C- in MATH243.

**CHEG 266 SPECIAL PROBLEM** 1-3  
RESTRICTIONS: Cannot count toward graduation in chemical engineering.

**CHEG 304 RANDOM VARIABILITY IN CHEMICAL PROCESSES** 3  
Fundamental approach to characterization and analysis of randomly varying phenomena. Students will learn to apply the basic principles, methods, and tools in probability and statistics for solving engineering problems involving random phenomena. Applications will include chemical process analysis, manufacturing, system reliability, and design of experiments.  
COREQ: MATH302 or MATH305.

**CHEG 305 APPLIED MATHEMATICS FOR BIOMED, CHEM AND BIOMOL ENGG** 3  
A special applied mathematics course designed for chemical engineering majors. Emphasis is given on the interaction between mathematical theory and its engineering applications.  
Crosslisted with MATH305. PREREQ: A minimum grade of C- in MATH242 and CISC 106. RESTRICTIONS: For chemical engineering and biomedical engineering majors only. Credits cannot be received for both MATH302 and MATH305.

**CHEG 325 CHEMICAL ENGINEERING THERMODYNAMICS** 3  
A continuation of CHEG231. The thermodynamics of mixtures; phase and chemical equilibrium. Application to staged separations processes, particularly distillation.  
PREREQ: A minimum grade of C- in CHEG231

**CHEG 332 CHEMICAL ENGINEERING KINETICS** 3  
Systematic description of rates of homogeneous and heterogeneous chemical reactions of industrial importance. Application of these principles to analysis and design of chemical reactors.  
PREREQ: A minimum grade of C- in MATH305, CHEG325 and CHEM444

**CHEG 341 FLUID MECHANICS** 3  
Theory of flow of incompressible viscous and nonviscous fluids; flow of non-Newtonian fluids; empirical correlations for laminar and turbulent flow; and applications in chemical processing.  
PREREQ: A minimum grade of C- in CHEG231 and MATH305

**CHEG 342 HEAT AND MASS TRANSFER** 3  
Teaches proficiency in engineering analysis of mass contactors and heat exchangers. Learn use of transport theory required to quantify analysis and to tailor experiments needed for the design, operation and control of laboratory, pilot or commercial sale equipment.  
PREREQ: Minimum grade of C- in CHEG341, or for environmental engineering majors, in CIEG305.

**CHEG 345 CHEMICAL ENGINEERING LABORATORY I** 3  
Laboratory studies demonstrating the principles of fluid mechanics, reaction engineering, heat transfer, mass transfer and thermodynamics. Emphasis on correlation of experimental results with theoretical analysis.  
PREREQ: A minimum grade of C- in CHEG325, CHEG332 and CHEG341 COREQ: CHEG342.

**CHEG 366 INDEPENDENT STUDY** 1-6

**CHEG 401 CHEMICAL PROCESS DYNAMICS AND CONTROL** 3  
Analysis of transient behavior of chemical processing equipment and chemical reactors. Modelization and identification of process systems. Design of linear control systems. Introduction to model-based, multivariable and statistical process control.  
PREREQ: A minimum grade of C- in MATH305, CHEG332 and CHEG342 COREQ: CHEG443

**CHEG 404 PROBABILITY AND STATISTICS FOR ENGINEER** 3  
Fundamental approach to modeling, characterization and analysis of random phenomena with the objective of providing students with the basic principles, methods and tools for solving engineering problems involving random varying phenomena. Application areas explored include experimental design, manufacturing, system reliability, and cellular biology.  
PREREQ: MATH302, MATH305, or equivalent with permission of instructor.

**CHEG 420 BIOCHEMICAL ENGINEERING** 3  
Application of chemical engineering principles to analyze different molecular engineering approaches, evaluate bioreactors and product recovery processes, analyze cellular engineering approaches and critically evaluate primary bioengineering data from literature and laboratory experiments.  
PREREQ: MATH243. COREQ: CHEM527, or CHEM641 and CHEM642.

**CHEG 431 CHEMICAL PROCESS ANALYSIS** 3  
Design of chemical processes with a focus on distillation columns, recycle loops, and other mass contactors. Process simulations are developed using Aspen software. Operating and capital costs are analyzed and safety and environmental impacts are considered.  
PREREQ: Minimum grade of C- in CHEG325, CHEG332, and CHEG342. COREQ: CHEG401.
CHEG 432 Chemical Process Analysis 3
A study of the economic/energy utilization/ environmental principles of conceptual process design. The optimization of a design along with the safety and ethics issues are taught by several case process synthesis studies. Aspen software is used.
PREREQ: A minimum grade of C- in CHEG332, CHEG401 and CHEG443.

CHEG 443 Mass Transfer Operations 3
Application of chemical engineering fundamentals to the analysis and design of mass transfer processes for separation and purification. Applications of computer-aided design for distillation-based separations. Examples involving absorption, extraction, membrane separations etc. with special emphasis on bioseparations.
PREREQ: A minimum grade of C- in CHEG325 and CHEG342

CHEG 445 Chemical Engineering Laboratory II 3
Intensive laboratory experiments illustrate the application of chemical and physical principles to industrial processes. Expands upon CHEG332 and CHEG443. Technical report writing emphasized.
PREREQ: A minimum grade of C- in CHEG332, CHEG342 and CHEG345 COREQ: CHEG443

CHEG 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. Crosslisted with MATH460. PREREQ: One of BISC302, BISC305, BISC306, BISC401 or BISC403.

CHEG 466 Independent Study 1-6

CHEG 468 Research 1-9

CHEG 473 Chemical Engineering Projects 3
Experimental, theoretical and literature studies of chemical engineering problems. COREQ: CHEG346.

CHEG 474 Chemical Engineering Projects 3
A continuation of CHEG473.

CHEG 595 Intellectual Property for Engineers and Scientists 3
Methods of protecting intellectual property. Patents, trademarks, copyrights, trade secrets and unfair methods of competition, including analyses of significant court decisions in each area. Directed to innovators in all fields interested in legal protection of their ideas.

CHEG 600 Introduction to Science and Engineering of Polymer Systems 3
Provides an understanding of the science and engineering of macromolecules from a structure/property perspective. Topics include polymerization, chain structure and configuration, polymer size and shape, phase separation behavior, amorphous and crystalline state, glass-rubber transition, cross linking/rubber elasticity, viscoelasticity, rheology polymer processing and mechanical behavior. May be crosslisted with MSEG630.

CHEG 602 Polymer Process Analysis and Design 3
Development of the tools of continuum mechanics necessary for the quantitative description of viscoelastic media. Use of principles of chemical kinetics, fluid and continuum mechanics, and heat and mass transfer to describe the production and processing of polymeric materials.
PREREQ: CHEG342; CHEG600 suggested

CHEG 604 Probability and Statistics for Engineering Problem Solving 3
Fundamental approach to modeling, characterization and analysis of random phenomena with the objective of providing students with the basic principles, methods and tools for solving engineering problems involving randomly varying phenomena. Application areas explored include experimental design, manufacturing, system reliability, and cellular biology.
PREREQ: MATH302, MATH305, or equivalent with permission of instructor.

CHEG 605 Multiphase Fluid Mechanics 3
Presents topics in fluid dynamics of practical importance in the chemical process industries, emphasizing two-phase flow and other advanced topics. Covers two-phase gas-liquid and solid-liquid flow, compressible flow, turbulence, non-Newtonian flow and prime movers.
PREREQ: CHEG341 or other introductory course in fluid mechanics.

CHEG 606 Introduction to Catalysis 3
Introduction to modern principles of catalysis with emphasis on industrial catalytic reactions, mechanisms and kinetics. Principles of homogeneous organometallic catalysis, supported-metal and solid acid heterogeneous catalysis.
PREREQ: CHEM331 and CHEM444

CHEG 612 Applied Process Heat Transfer 3
Principles of heat transfer by conduction, convection and radiation illustrated through the case study approach. Emphasis on analyzing heat balance and heat transfer equations with their proper boundary conditions.
PREREQ: CHEG342

CHEG 613 Topics in Energy and the Environment 3
Non-renewable and renewable energy, along with environmental issues that are likely to arise for an industry will be analyzed in a way that leads to profitable processes and product management while maintaining environmental excellence. RESTRICTIONS: CHEG Seniors, or CHEG Graduate level status.

CHEG 614 Special Topics in Energy 3
Introduces fundamental and engineering aspects of energy production technology with emphasis on emerging technologies such as microreactors, fuel cells and others.
PREREQ: CHEG332 or equivalent.

CHEG 615 Special Topics in Mixing 3
Introduces basic principles of fluid dynamics, rheology and turbulence that dictate the mixing behavior required to implement a desired process result. Agitation in vessels and pipeline and viscous mixing discussed. Emphasis on recent research on the effects of mixing on chemical reactions.
PREREQ: CHEG341

CHEG 616 Chemistry and Physics of Surfaces and Interfaces 3
Fundamental and engineering aspects of metal, semiconductor, and oxide surfaces; their structure and defects, characterization, electronic properties, adsorption and reaction kinetics and thermodynamics. Applications to catalysis, microelectronics, and environment sensitive behavior. May be crosslisted with MSEG616. PREREQ: CHEG332 and CHEM444. RESTRICTIONS: Open to seniors and graduate students only.

CHEG 617 Colloid Science and Engineering 3
Surface thermodynamics and intermolecular forces are related to the properties of colloidal dispersions and micellar and surfactant structures. Applications to biological systems, nanotechnology, powder dispersions and supramolecular structures.
PREREQ: CHEG325 and CHEM444

CHEG 621 Metabolic Engineering 3
Focuses on design and control of cellular metabolism and includes analysis of metabolic function using systems engineering and molecular biology tools. Goals are to learn computational approaches for analyzing metabolic behavior, and experimental techniques to measure cellular components, metabolites, proteins and nucleic acids.
PREREQ: CHEM527 or CHEM641; MATH305 RESTRICTIONS: Open only to graduate students, seniors and juniors.

CHEG 622 Chemicals, Risk and the Environment 3
Develops the foundation for understanding the transport and fate of chemical materials in the environment, and how these materials may possibly affect human health and ecology. The principles of heat, mass and momentum transfer, and chemical reaction kinetics are used to develop a quantitative understanding of transport and fate. These are used in conjunction with risk analysis and risk assessment practices to understand how environmental policy evolves.
PREREQ: CHEG325 and CHEG341 COREQ: CHEG342

CHEG 623 Research Tutorial 1-3
First year doctoral students complete research training in the laboratory of a faculty member and report on the progress of their research training experience. RESTRICTIONS: May enroll in one or two sections in a single semester.

CHEG 624 Bio-Based Materials 3
The conversion of biomass to useful materials such as polymers and composites has considerable economic and environmental value, particularly in times of global warming and diminishing petroleum oil reserves. Focus on the development of bio-based materials in support of renewable energy (Solar, Wind, Hydro, Hydrogen) and related Advanced Materials Technologies (especially Energy Efficient Housing). The objective of this multidisciplinary approach is to address climate change by providing a sustainable supply of low cost, bio-based materials for the coming renewable energy infrastructure. RESTRICTIONS: Chemistry, Physics, Math, Engineering background.

CHEG 625 Green Engineering 3
Design, commercialization and use of processes and products which are feasible and economical while minimizing generation of pollution at the source and risk to human health and environment.
CHEG 626  STRUCTURE  OF  MATERIALS  
Explores  the  basics  of  symmetry  and  mathematical  crystallography,  scattering  of  X-rays,  electrons,  and  neutrons,  and  structural  analysis  of  crystalline  materials.  Electron  imaging  with  atomic  resolution  is  introduced.  Common  structure  types  such  as  zinc  blende,  wurtzite,  perovskite,  and  spinels  will  be  used  as  examples.  PREREQ:  MSEG302  or  equivalent.

CHEG 648  BIOMATERIALS  FOR  DRUG  AND  GENE  DELIVERY  
Application  of  biomolecular  engineering  principles  to  the  design  and  assembly  of  biomaterials  with  specific  applications  in  drug  and  gene  delivery,  evaluation  of  host  and  cellular-level  responses  to  biomaterials,  understanding  and  application  of  key  principles  in  targeted  delivery  and  controlled  release.  PREREQ:  BISC207.

CHEG 649  MOLECULAR  BIOPHYSICS  
Biophysical  principles  and  methods;  thermodynamic  and  kinetic  analysis  of  folding;  protein-nucleic  acid  interactions;  ligand  binding;  spectroscopy;  structural  methods;  modeling;  calorimetry;  ultracentrifugation;  SPR.  Problem  solving  in  macromolecular  interactions;  protein  refolding;  altering  ligand  affinity;  increasing  protein  stability;  drug  design  and  HTS;  protein  expression  and  solubility;  protein  engineering.  May  be  crosslisted  with  CHEM649.  PREREQ:  Introductory-level  courses  in  chemistry,  physics  biochemistry.

CHEG 650  BIOMEDICAL  ENGINEERING  I  
Application  of  engineering  concepts  and  techniques  to  problems  in  biomedicine.  Mass  transfer  and  chemical  reactions  in  the  body,  drug  distribution,  kidney  and  other  organ  physiology,  and  artificial  organs.  PREREQ:  Upper  division  or  graduate  standing  in  engineering  or  equivalent  COREQ:  CHEG443.

CHEG 660  SYSTEMS  BIOLOGY  
Emphasize  the  systems  biology  approach  and  the  synergy  between  experimental  data  and  biological  models.  Topics  include  modeling  and  analysis  of:  gene-regulatory  and  signaling  networks,  reaction  networks,  dynamics  of  microbial  population  growth,  pharmacokinetics,  and  mechanistic  descriptions  of  diseases.  PREREQ:  MATH302  or  MATH305,  Basic  knowledge  of  life  sciences,  programming  and  statistics  preferred  but  not  required.

CHEG 670  RATE  PROCESSES  AND  KINETICS  
Analysis  of  physical-chemical  fundamentals  and  rate  equations  for  key  particle  formation,  growth  and  size  reduction  processes  including:  physical  and  chemical  nucleation,  accretional  growth  mechanisms,  collisional  growth,  droplet  and  bubble  coalescence,  solid-state  sintering,  dissolution  and  comminution.  RESTRICTIONS:  Requires  permission  of  instructor.

CHEG 671  PARTICLE  TRANSPORT  IN  FLUIDS  AND  POWDERS  
Analysis  of  the  fundamentals  of  particle  motion  and  their  applications  to  transport  processes  involving  particles,  including  granular  and  powder  flows,  dense  and  lean-phase  pneumatic  conveying,  and  slurry  flows.  PREREQ:  CHEG341  or  equivalent  undergraduate  fluid  mechanics.  RESTRICTIONS:  Requires  permission  of  instructor.

CHEG 672  MATHEMATICS  FOR  PARTICULATE  SYSTEMS  
Analysis  of  population  balance  modeling  in  particulate  systems  with  application  to  the  design  of  particle-based  unit  operations.  The  course  will  drawn  on  elements  of  linear  analysis,  ordinary  differential  equations  and  partial  differential  equations  as  needed  to  enable  the  solution  of  mathematical  models  of  particulate  systems  based  on  the  rate  kernels.  PREREQ:  Math305  or  equivalent.  RESTRICTIONS:  Requires  permission  of  instructor.

CHEG 673  PARTICLE  CHARACTERIZATION  &  MEASUREMENT  
Analysis  of  particle  properties,  including  single  particle,  aggregated  particle,  and  particle  population  descriptors  and  the  various  techniques  available  for  sampling,  measurement  and  characterization  particle  systems.  These  include  methods  based  on  sedimentation,  light  scattering,  particle  charging,  and  microscopy.  PREREQ:  CHEM444  or  equivalent  undergraduate  level  physical  chemistry  II.  RESTRICTIONS:  Requires  permission  of  instructor.

CHEG 674  PARTICLE  SEPARATION  AND  CLASSIFICATION  
Analysis  of  fundamental  principles  for  separating  particles  from  fluids  as  well  as  the  various  means  of  particle  classification  into  fractions.  Separators  in  wet  systems  include  filters,  centrifuges,  hydroclones  and  particle  scrubbers.  Separators  in  dry  systems  include  baghouses,  cyclones  and  electrostatic  precipitators.  Classifiers  include  sieves  and  screens,  settlers,  and  flotation  columns.  PREREQ:  CHEG341  or  equivalent  undergraduate  fluid  mechanics.  RESTRICTIONS:  Requires  permission  of  instructor.

CHEG 675  PARTICLE  PRODUCT  ENGINEERING  AND  ECONOMICS  
Capstone  design  course  synthesizing  the  fundamentals  of  particle  science  and  engineering  into  the  design  and  production  of  particle-based  products  as  well  as  the  state-gate  process  for  product  engineering  and  development.  This  development  process  includes  the  phases  of  product  conceptualization,  feasibility  testing,  prototyping,  assessment  of  manufacturing  needs  and  costs,  and  development  of  a  product  introduction  plan.  The  students  will  also  develop  a  business  plan  for  attracting  capital  necessary  to  startup  a  business  based  on  their  product  concept.  PREREQ:  CHEG670,  CHEG671,  CHEG672,  and  CHEG673.  COREQ:  CHEG674.  RESTRICTIONS:  Requires  permission  of  instructor.

CHEG 684  PARTICLE  TECHNOLOGY  INTERNSHIP  
Fieldwork  designed  to  allow  a  student  to  apply  acquired  knowledge  in  an  industrial  setting.  Requires  a  company  sponsorship,  a  performance  evaluation  to  be  completed  by  that  sponsor  including  an  oral  presentation,  and  a  written  paper  to  be  submitted  to  the  administrator  of  internships.  PREREQ:  CHEG670,  CHEG671,  CHEG672,  CHEG673,  CHEG674,  and  CHEG675.  RESTRICTIONS:  Requires  permission  of  instructor.

CHEG 801  PROCESS  CONTROL  AND  DYNAMICS  
Advanced  concepts  on  MIMO  system  modeling,  identification,  analysis  and  control  appropriate  to  the  chemical  and  allied  industries.  Crosslisted  with  CHEM801,  CHEB805,  BUAD805,  CHEM805.

CHEG 814  ADVANCED  TOPICS  IN  ENERGY  
Advanced  topics  in  fundamental  and  engineering  aspects  of  energy  production  technology,  with  emphasis  on  emerging  technologies  such  as  microreactors,  fuel  cells  and  others.  RESTRICTIONS:  For  graduate  students  only.

CHEG 815  ETHICS,  BUSINESS  AND  COMMUNICATION  
Provides  professional  development  in  ethics,  business  and  communication  related  to  systems  biology  research  applications  in  stem  cell,  tissue  engineering,  and  drug  delivery  technologies.  Intended  for  PhD  students  in  interdisciplinary  life  science  and  engineering  programs.  Crosslisted  with  BINF815.

CHEG 816  SYSTEMS  BIOLOGY  OF  CELLS  IN  ENGINEERED  ENVIRONMENTS  
Provides  a  technical  review  of  systems  biology  approaches  including  genomics,  transcriptomics,  proteomics,  metabolomics,  and  bioinformatics  as  well  as  applications  in  tissue  engineering,  stem  cell  differentiation,  and  drug  delivery.  Intended  for  PhD  students  in  interdisciplinary  life  science  and  engineering  programs.  Crosslisted  with  BINF816.

CHEG 818  SCATTERING  METHODS  FOR  SOFT  MATTER  
Neutron,  light,  and  X-ray  scattering  techniques  provide  structural  information  covering  the  atomic,  nano,  and  micro  length-scales.  Provides  a  practical  introduction,  including  the  underlying  theory  and  application  of  these  methods  to  complex  fluids,  polymers,  self-assembled  gels  and  solutions,  nanoparticles,  and  nanostructured  materials.

CHEG 823  TRANSMISSION  ELECTRON  MICROSCOPY  IN  MATERIALS  SCIENCE  

CHEG 825  CHEMICAL  ENGINEERING  THERMODYNAMICS  
Applications  of  classical  and  molecular  thermodynamics  to  industrial  problems  in  chemical  and  phase  equilibrium.  Topics  include  nonideal  solutions,  high  pressure  systems,  complex  reaction  equilibria,  generalized  correlations  and  equations  of  state.  PREREQ:  CHEG325  and  CHEM444.

CHEG 827  CHEMICAL  ENGINEERING  PROBLEMS  
The  application  of  numerical  methods  for  the  solution  of  chemical  engineering  problems.  Linear  and  nonlinear  analysis.  Numerical  methods  applied  to  the  solution  of  ODE's,  PDE's  and  optimization  problems  with  applications  to  fluid  flow,  heat  and  mass  transfer  reaction  engineering.  Monte-Carlo  and  molecular  dynamics.  PREREQ:  Undergraduate  linear  algebra  and  differential  equations.
CHEG 828  STATISTICAL THERMODYNAMICS  2-3
A discussion of the concepts of classical statistical mechanics, with special emphasis on applications, thermodynamic modeling and physical properties correlations.
PREREQ: CHEG825 or equivalent

CHEG 831  CHEMICAL ENGINEERING PRINCIPLES I  3
Equips incoming graduate students with necessary applied mathematical background emerging from a discussion of Chemical Engineering Principles in Kinetics, Thermodynamics, and Transport phenomena. Linear algebra, ordinary differential equations, and stochastic differential equations are typical topics covered.
PREREQ: CHEG305 or MATH305, or equivalent.

CHEG 835  APPLIED CHEMICAL KINETICS  3
PREREQ: Requires undergraduate reaction engineering and physical chemistry

CHEG 836  ADVANCED CHEMICAL KINETICS  3
Examination of the physical interpretation of kinetic rate expressions via elementary reaction steps, transition state theory, estimation of enthalpies and entropies of activation. Development of reaction networks from elementary kinetic steps using concepts of the steady-state approximation, rate determining step and most abundant reaction intermediate. Application to thermal cracking, pyrolysis, polymerization, combustion and heterogeneous catalysis.

CHEG 841  CHEMICAL ENGINEERING PRINCIPLES II  4
Second of two required courses (first one CHEG831) to equip graduate students with applied mathematical and statistical background emerging from a discussion of Chemical Engineering Principles in Kinetics, Thermodynamics and Transport Phenomena. Topics include vector and tensor analysis, partial differential equations, statistical analysis of experiments, design of experiments and molecular dynamics, and stochastic simulations.
PREREQ: CHEG831.

CHEG 842  SELECTED TOPICS IN BIOCHEMICAL ENG  1 PF
Presentation of state-of-the-art research, techniques, and technology in biotechnology. Major course topics include: drug delivery, proteomics and metabolic engineering, biophysical characterization, and protein-protein interactions.
RESTRICTIONS: Requires permission of instructor.

CHEG 845  ADVANCED TRANSPORT PHENOMENA  4
Principles and applications of momentum, mass and energy transfer. Topics include molecular analysis of transport, continuum and macroscopic conservation and constitutive equations, scaling and dimension analysis, and exact and approximate solutions for problems of practical importance.
PREREQ: Undergraduate studies in transport phenomena

CHEG 868  RESEARCH  1-9

CHEG 869  MASTER'S THESIS  1-6
Laboratory study of some phase of chemical engineering on which information is lacking, with the goals of contributing new data and theory. Although supervised, work will be independent in nature to encourage the development of initiative.

CHEG 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.

CHEG 969  DOCTORAL DISSERTATION  1-12 PF

CHEM 100  CHEMISTRY AND HUMAN ENVIRONMENT  3
Non-mathematical introduction to chemistry, emphasizing how chemistry can be employed to help understand phenomena in the student’s environment, demonstrating relationships between chemistry and energy, food, toxic and solid waste, air and water pollution, drugs and other student-generated topics.

CHEM 101  GENERAL CHEMISTRY  4
Fundamental laws of chemical action and the properties, uses and methods of preparation of the more important elements and their compounds. Includes 42 hours of laboratory work that introduces basic experiments in general chemistry.
RESTRICTIONS: One year of high school chemistry recommended; high school algebra or concurrent enrollment in MATH101 or higher mathematics course strongly recommended. Only one course among CHEM101, CHEM103, CHEM105, CHEM107, and CHEM111 can count toward graduation.

CHEM 102  GENERAL CHEMISTRY  4
A continuation of CHEM101. Includes 42 hours of laboratory work that is a continuation of the laboratory experience begun in CHEM101.
PREREQ: CHEM101. RESTRICTIONS: Only one course among CHEM102, CHEM104, CHEM108, and CHEM112 can count toward graduation.

CHEM 103  GENERAL CHEMISTRY  4
Matter, the changes that matter undergoes, and the laws governing these changes, with greater emphasis on atomic and molecular structure, chemical bonding, and energy relationships. Properties of gases, liquids, solids and solutions. Includes 42 hours of laboratory work.
COREQ: MATH114 or higher. MATH115 or MATH117 strongly recommended.
RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. One year of high school chemistry strongly recommended. Only one course among CHEM103, CHEM105, CHEM107, and CHEM111 can count toward graduation.

CHEM 104  GENERAL CHEMISTRY  4
Continuation and application of CHEM103 with additional emphasis on chemical spontaneity, equilibrium, rates of reactions, electrochemistry and organic chemistry. Includes 42 hours of laboratory work.
PREREQ: CHEM101, CHEM103, CHEM105, CHEM107, or CHEM111.
RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. Only one course among CHEM102, CHEM104, CHEM108, and CHEM112 can count toward graduation.

CHEM 105  GENERAL CHEMISTRY  4
Nuclear chemistry, periodicity, structure and bonding, states of matter, classes of reactions, stoichiometry, solution chemistry, chemical kinetics, equilibria and electrochemistry.
COREQ: MATH101 RESTRICTIONS: For nursing majors who will continue with CHEM106. High school algebra required in lieu of corequisite; one year of high school chemistry recommended. Only one course from among CHEM101, CHEM103, CHEM105, and CHEM111 can count toward graduation.

CHEM 106  ELEMENTARY BIOORGANIC CHEMISTRY  5
Survey of organic chemistry and biochemistry, with emphasis on the latter. Includes one-three hour laboratory per week that deals with selected concepts in biochemistry and bioorganic chemistry.
PREREQ: CHEM105 RESTRICTIONS: For nursing majors.

CHEM 111  GENERAL CHEMISTRY  3
Fundamental laws of chemical action with emphasis on atomic structure, chemical bonding and important classes of substances.
PREREQ: One year of high school chemistry, two years strongly preferred. COREQ: CHEM115, and MATH117 or higher MATH course.
RESTRICTIONS: For chemistry, chemical engineering majors. Only one course among CHEM101, CHEM103, CHEM105, CHEM107, and CHEM111 can count toward graduation.

CHEM 112  GENERAL CHEMISTRY  3
Introduction to most of the major sub-fields of chemistry: descriptive inorganic chemistry, coordination chemistry, organic chemistry, nuclear chemistry, thermodynamics, kinetics and electrochemistry.
PREREQ: CHEM103, CHEM107, or CHEM111. COREQ: CHEM120 (except for Chemical Engineering majors).
RESTRICTIONS: For biochemistry, chemistry, and chemical engineering majors. Only one course among CHEM102, CHEM104, CHEM108, and CHEM112 can count toward graduation.

CHEM 115  INTRODUCTION TO CHEMICAL SCIENCES  2
Aqueous chemistry; nomenclature, properties, and reactions. Individual, pair, and group experiments. Excel and calculator use for data analysis and presentation.
COREQ: CHEM 111. RESTRICTIONS: For first-year BS majors in Chemistry and Biochemistry. Fall semesters only.

CHEM 120  QUANTITATIVE CHEMISTRY  3
The theory of analytical chemistry with introductory practice in UV-visible spectroscopy, electrochemistry, separation science, and statistics. Includes two three-hour laboratories per week.
PREREQ: CHEM104, or CHEM111 and CHEM115. COREQ: CHEM112.
RESTRICTIONS: For biochemistry and chemistry majors. Spring semester only.
CHEM 164  FRESHMAN MAJORS SEMINAR  1
Introduction to the CHEM/BIOC Department, as well as to the CHEM/BIOC professions. Discussion topics include courses and curricula, subdisciplines in the field, communication tools, and career and research opportunities. Social events and mentoring help integrate new students into the Department community.
RESTRICTIONS: Freshmen majoring in CHEM, BIOC, or XCE only.

CHEM 166  SPECIAL PROBLEM  1-12 PF

CHEM 210  SCIENCE OF COLOR PHENOMENA  4
Introduction to basic physical and chemical principles which describe nature of light and color of objects. Targeted for non-science majors who seek a descriptive understanding of scientific principles underlying formation of color phenomena found in nature and works of art.
Crosslisted with ARTC210. PREREQ: High school chemistry and algebra.

CHEM 213  ELEMENTARY ORGANIC CHEMISTRY  3
A survey of the fundamentals of organic chemistry. Topics include molecular structure, organic nomenclature, functional groups, isomerism and stereoisomerism, reaction mechanisms, and organic synthesis. Basic principles will be illustrated with examples of biological significance.
PREREQ: CHEM102 or CHEM104 or CHEM105 or CHEM108 or CHEM112.
RESTRICTIONS: Designed for students of agriculture, human resources, and medical technology.

CHEM 214  ELEMENTARY BIOCHEMISTRY  3
Principal classes of biomolecules and their structural and metabolic interrelationships.
PREREQ: CHEM213

CHEM 215  ELEMENTARY ORGANIC CHEMISTRY LABORATORY  1
A survey of elementary laboratory techniques that are useful to organic chemists. Separation and purification techniques and examples of typical organic reactions will be included.
PREREQ: CHEM102 or CHEM104 or CHEM105 or CHEM108 or CHEM112. COREQ: CHEM213. RESTRICTIONS: Designed for students of agriculture, human resources, and medical technology.

CHEM 216  ELEMENTARY BIOCHEMISTRY LABORATORY  1
Basic manipulations and techniques for the characterization of biomolecules.
PREREQ: CHEM213 COREQ: CHEM214

CHEM 220  QUANTITATIVE ANALYSIS  3
Chemical equilibrium in aqueous solutions; volumetric and gravimetric analysis; and introduction to chromatography and spectrometry.
PREREQ: CHEM102, CHEM104, CHEM105, or CHEM112. COREQ: CHEM221.
RESTRICTIONS: Fall semester only.

CHEM 221  QUANTITATIVE ANALYSIS LABORATORY  1
The practice and application of volumetric and gravimetric analysis, as well as basic chromatographic and spectrometric measurements.
PREREQ: CHEM102, CHEM104, CHEM105, or CHEM112. COREQ: CHEM220.
RESTRICTIONS: Fall semester only.

CHEM 321  ORGANIC CHEMISTRY I  3
First half of two-semester survey of structure, synthesis, and reactions of organic compounds.
PREREQ: CHEM104 or CHEM112. COREQ: CHEM325. RESTRICTIONS: Not for CHEM/BIOC BS majors. CHEM321 and CHEM331 cannot both be counted toward graduation.

CHEM 322  ORGANIC CHEMISTRY II  3
Second half of two-semester survey of structure, synthesis and reactions of organic compounds.
PREREQ: CHEM321. COREQ: CHEM326. RESTRICTIONS: Not for CHEM/BIOC BS majors. CHEM322 and CHEM332 cannot both be counted toward graduation.

CHEM 325  ORGANIC CHEMISTRY LABORATORY I  1
Laboratory work that introduces the basic laboratory techniques of organic chemistry.
PREREQ: CHEM104. COREQ: CHEM321. RESTRICTIONS: Not for CHEM/BIOC BS majors.

CHEM 326  ORGANIC CHEMISTRY LABORATORY II  1
Laboratory work that introduces the basic laboratory techniques of organic chemistry.
PREREQ: CHEM325. COREQ: CHEM322. RESTRICTIONS: Not for CHEM/BIOC BS majors.

CHEM 331  ORGANIC CHEMISTRY  3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods.
PREREQ: CHEM104, CHEM108, CHEM112 or CHEM120. COREQ: CHEM333.
RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other majors desiring fuller treatment than in CHEM321. CHEM321 and CHEM331 cannot both count toward graduation.

CHEM 332  ORGANIC CHEMISTRY  3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods.
PREREQ: CHEM331, CHEM333. COREQ: CHEM334 (except for Chemical Engineering majors). RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other majors desiring fuller treatment than in CHEM332. CHEM322 and CHEM332 cannot both be counted toward graduation.

CHEM 333  ORGANIC CHEMISTRY MAJORS LABORATORY I  1-2
The theory and practice of basic techniques of laboratory work with organic compounds, including separation methods and instrumental methods of analysis and identification.
PREREQ: CHEM104, CHEM108 or preferably CHEM112, or CHEM120. COREQ: CHEM331. RESTRICTIONS: Registration for two credits involves both a lecture period and a laboratory period each week. Registration for one credit involves only the weekly lecture.

CHEM 334  ORGANIC CHEMISTRY MAJORS LABORATORY II  2
Continuation of CHEM333. Two lab periods each week.
PREREQ: CHEM333 COREQ: CHEM332.

CHEM 342  INTRODUCTION TO BIOCHEMISTRY  3
Introduction to the discipline of biochemistry, integrating its foundations in chemistry, biology, physics, and mathematics through study in a PBL format of a historical series of classic research articles on hemoglobin and sickle cell anemia.
PREREQ: CHEM331.

CHEM 357  INORGANIC CHEMISTRY I  3
Basic theoretical concepts of inorganic chemistry with major emphasis on group theory as applied to structure and bonding of polyatomic chemical compounds and solid state materials. Introduction to chemistry of the elements.
PREREQ: CHEM104 or CHEM112.

CHEM 366  INDEPENDENT STUDY  1-3 PF

CHEM 402  TEACHING EXPERIENCE  1-3 PF
Teaching experience in an undergraduate laboratory (as a teaching assistant), in tutorial/grading sessions (as a teacher's assistant) or as a problem-based learning workshop mentor. Evaluation based on performance.
RESTRICTIONS: Requires permission of Associate Chair and instructor.

CHEM 410  HISTORY OF CHEMISTRY  3
A survey of the development of chemistry's fields of study emphasizing the nature of individual contributions to the subfields of chemistry.

CHEM 418  INTRODUCTORY PHYSICAL CHEMISTRY I  3
Introduction to the principles of physical chemistry with a focus on thermodynamics, using minimal calculus, for B.A. chemistry and B.S. biochemistry majors.
PREREQ: General chemistry; MATH241; PHYS202 or PHYS208 RESTRICTIONS: Not acceptable for B.S. degree in chemistry. CHEM418 and CHEM443 cannot both be counted toward graduation.

CHEM 419  INTRODUCTORY PHYSICAL CHEMISTRY  3
Introduction to the principles of physical chemistry with a focus on kinetics and spectroscopy, using minimal calculus, for B.A. chemistry and B.S. biochemistry majors.
PREREQ: CHEM418 RESTRICTIONS: Not acceptable for B.S. degree in chemistry. CHEM419 and CHEM444 cannot both be counted toward graduation.

CHEM 437  INSTRUMENTAL METHODS  3
Study of the principles of design and application of spectroscopic, chromatographic and electroanalytical instrumentation in chemical analysis.
PREREQ: CHEM120 or CHEM220 and CHEM221.

CHEM 438  INSTRUMENTAL METHODS LABORATORY  1
Application of spectrophotometric, chromatographic and electroanalytical techniques.
PREREQ: CHEM120 or CHEM220 and CHEM221. RESTRICTIONS: May be taken concurrently with or after CHEM437.

CHEM 443  PHYSICAL CHEMISTRY I  3
Application of the principles and methods of mathematics and physics to the quantitative study of chemistry, focusing on thermodynamics.
PREREQ: CHEM120, or CHEM220 and CHEM221; MATH242 (MATH243 recommended); PHYS208 (recommended) or PHYS202. RESTRICTIONS: CHEM418 and CHEM443 cannot both be counted toward graduation.
CHEM 444 PHYSICAL CHEMISTRY II 3
Application of the principles and methods of physics and mathematics to the quantitative study of chemistry, focusing on kinetics and quantum mechanics. PREREQ: CHEM120, or CHEM220 and CHEM221; MATH242 (MATH243 recommended); PHYS208 (recommended) or PHYS202. RESTRICTIONS: CHEM419 and CHEM444 cannot both be counted toward graduation.

CHEM 445 PHYSICAL CHEMISTRY LABORATORY I 1
Physical methods for studying properties of matter. PREREQ: CHEM120, or CHEM220 and CHEM221. RESTRICTIONS: To be taken concurrently with or subsequent to CHEM418 or CHEM443 or CHEG231.

CHEM 446 PHYSICAL CHEMISTRY LABORATORY II 1
Physical methods for studying properties of matter. PREREQ: CHEM120, or CHEM220 and CHEM221. RESTRICTIONS: To be taken concurrently with or subsequent to CHEM419 or CHEM444.

CHEM 457 INORGANIC CHEMISTRY II 3
Overview of the chemistry of transition metal complexes. Emphasis on their structure, bonding and spectroscopy, as well as the mechanistic understanding of their reactivity. Introduction to advanced topics such as organometallic chemistry, bioinorganic chemistry, and the frontiers of inorganic chemistry as applied to the fields of energy, catalysis, human health, and advanced materials. PREREQ: CHEM418 or CHEM443, and CHEM357.

CHEM 458 INORGANIC CHEMISTRY LABORATORY 1
Laboratory synthesis and characterization of inorganic and organometallic compounds and independent study. COREQ: CHEM457.

CHEM 465 SENIOR SEMINAR 1 PF
REstrictions: Requires senior status.

CHEM 466 INDEPENDENT STUDY 1-3 PF
CHEM 468 UNDERGRADUATE RESEARCH 1-6 PF
Chemistry research on an assigned subject under the supervision of a member of the faculty. REstrictions: Requires permission of instructor. (Letter grade upon completion of written report).

CHEM 527 INTRODUCTORY BIOCHEMISTRY 3
A one-semester survey of the fundamentals of biochemistry. PREREQ: CHEM331 or CHEM332; CHEM332 or CHEM333 recommended. RESTRICTIONS: Intended for undergraduate majors in biology and chemistry, graduate students in agriculture, biology, nutrition, marine sciences and engineering not using biochemistry professionally. BISC104 or BISC207 strongly recommended.

CHEM 601 INTRODUCTION TO LABORATORY INSTRUCTION 1 PF
Inservice required of first-year graduate teaching assistants. Prepares teaching assistants to become effective instructors. Topics relate to the theory and practice of teaching in a laboratory setting. May be crosslisted with BISC603. COREQ: Having a chemistry (or another science) teaching assistantship.

CHEM 603 PRACTICAL NMR SPECTROSCOPY 1
Elements of NMR spectroscopic techniques, the practical operation of NMR spectrometers, spectral acquisition and special analysis techniques. COREQ: CHEM444 recommended. RESTRICTIONS: Requires permission of instructor.

CHEM 604 PRACTICAL MASS SPECTROMETRY 1
Laboratory experimentation with mass spectrometry. COREQ: CHEM624 recommended as corequisite or prerequisite. RESTRICTIONS: Requires permission of instructor.

CHEM 605 SPECTROSCOPY OF ORGANIC COMPOUNDS 1
Introductory organic structure determination by modern spectroscopic methods. PREREQ: One year of general chemistry RESTRICTIONS: Restricted to graduate students.

CHEM 606 INTRODUCTION TO RESEARCH AT THE CHEMISTRY/BIOLOGY INTERFACE 3
Research experiences in biochemistry, molecular biology, biochemical engineering, materials science, protein crystallography, agricultural biochemistry, virology, and cell biology. Attendance at the weekly Chemistry-Biology Interface Seminar is required. RESTRICTIONS: Restricted to graduate students admitted to the Chemistry/Biology Interface Program.

CHEM 608 ENVIRONMENTAL SOIL CHEMISTRY 3
Principles of soil chemical reactions and their application to environment including: inorganic and organic soil components, soil solution-solid phase equilibria, sorption phenomena, ion exchange reactions, kinetics of soil chemical processes, redox chemistry, soil acidity and salinity. Crosslisted with PLSC608. PREREQ: CHEM102 or CHEM104.

CHEM 620 ANALYTICAL SPECTROSCOPY 3
Experimental aspects of electronic and vibrational spectroscopy. Survey of measurements based on optical spectroscopies emphasizing underlying light/matter interactions, operation of major components, and data handling via critique of papers from recent literature. PREREQ: CHEM437, or permission of instructor.

CHEM 621 CHEMICAL SEPARATIONS 3
Fundamental examination of chemical separation methods and principles. Mathematical modeling of the thermodynamic and steady state principles governing efficiency in chemical separations. Investigation of fundamental chemical separation principles applied to chromatographic instrumentation. PREREQ: CHEM437, or permission of instructor.

CHEM 622 ELECTROANALYTICAL CHEMISTRY 3
Introduction to the theory and analytical applications of electrochemistry: dynamic and steady-state methods in potentiometry, coulometry, voltammetry, and ancillary techniques. PREREQ: CHEM437, or permission of instructor.

CHEM 623 CHEMOMETRICS 3
An introduction to modern methods of reducing and analyzing chemical data using computers. A survey of probability and simple statistics, optimization methods, pattern recognition, factor analysis, chemical calibration, regression, time series analysis of chemical data, and data transformation methods. PREREQ: CHEM437, or permission of instructor.

CHEM 624 PRINCIPLES OF MASS SPECTROMETRY 3
Principles of mass spectral measurements for the elucidation of molecular structure, applications to biomolecular materials and topics from the current literature. PREREQ: CHEM437 or permission of instructor.

CHEM 625 HETEROGENEOUS ATMOSPHERIC CHEMISTRY 3
Interaction of atmospheric gases with liquids and solid surfaces important in atmospheric and energy sciences. Application of principles of thermodynamics, kinetics, and photochemistry. Coverage of laboratory instrumentation used in heterogeneous chemistry II. PREREQ: CHEM437, or permission of instructor.

CHEM 628 CHEMICAL SENSORS 3
Survey of state-of-the-art methods and philosophy for designing and deploying chemical sensors for environmental and biomedical applications. Covers optical, electrochemical, and/or mass-based transduction schemes. PREREQ: CHEM437 or permission of instructor.

CHEM 629 SURFACE CHEMISTRY AND ANALYSIS 3
An introduction to, and overview of, the principles, methods, and analytical techniques of modern surface science, as used in chemistry and related fields. Course lectures and laboratory analyses using state-of-the-art surface analytical instruments introduce students to theory and practice. PREREQ: CHEM437 or permission of instructor.

CHEM 631 PRACTICE OF SCIENCE 3
Uses historical, philosophical, and sociological perspectives to better understand the nature of modern science and its practice. Examines "science misconduct," and satisfies the NIH mandate requiring graduate training in "the responsible conduct of research". Crosslisted with BISC631.

CHEM 633 ADVANCED ORGANIC CHEMISTRY: PHYSICAL 3
Stereochemistry and reactivity of organic compounds; and reaction mechanisms, structure and bonding. PREREQ: CHEM332

CHEM 634 ADVANCED ORGANIC CHEMISTRY: SYNTHESIS AND REACTIVITY 3
Reactions of organic compounds with emphasis on synthetic methods. PREREQ: CHEM332 COREQ: CHEM633, or permission of instructor.

CHEM 635 ORGANIC REACTIVITY AND TOTAL SYNTHESIS 3
Focuses on the development of new organic reactivity, as exemplified by current accomplishments in the total synthesis of natural products. Additional focus on the strategies of total synthesis. PREREQ: CHEM634 or permission of instructor.
CHEM 636  **CHEMICAL BIOLOGY AND BIOORGANIC CHEMISTRY**  3
Application of the concepts and tools of organic chemistry, including molecular design, kinetics and thermodynamics, to problems in biology.
PREREQ: CHEM322 or CHEM332. CHEM527 or CHEM641 strongly recommended.
RESTRICTIONS: In the absence of BIOC coursework, students should have a working knowledge of amino acids and primary, secondary, and tertiary protein structure.

CHEM 641  **BIOCHEMISTRY**  3
Structure and function of proteins, enzymes and coenzymes; kinetics and mechanisms; carbohydrate metabolism and its regulation; and citric acid cycle.
PREREQ: CHEM322 or CHEM332.

CHEM 642  **BIOCHEMISTRY**  3
PREREQ: CHEM641.

CHEM 643  **INTERMEDIARY METABOLISM**  3
General principles of intermediary metabolism with emphasis on biosynthetic pathways of amino acids, nucleotides, coenzymes, antibiotics and toxic secondary metabolites.
PREREQ: CHEM641.

CHEM 644  **MECHANISMS OF ENZYME CATALYSIS**  3
Detailed chemical mechanisms of enzyme catalysis for several representatives. Emphasis on kinetic and physical organic methods.
PREREQ: CHEM641 or CHEM527.

CHEM 645  **PROTEIN STRUCTURE AND FUNCTION**  3
Overview of structural biology, including how x-ray crystallography, NMR spectroscopy, homology modeling and other techniques are used to solve or model structures of macromolecules. Representative proteins discussed in terms of how a protein’s structure relates to its function.
PREREQ: CHEM641

CHEM 646  **DNA-PROTEIN INTERACTIONS**  3
Current topics of DNA-protein interactions which focus on DNA replication, DNA recombination, DNA damage repair, transcription and translation processes.
PREREQ: CHEM642.

CHEM 649  **MOLECULAR BIOPHYSICS**  3
Biophysical principles and methods; thermodynamic and kinetic analysis of folding; protein-nucleic acid interactions; ligand binding; spectroscopy; structural methods; modeling; calorimetry; ultracentrifugation; SPR. Problem solving in macromolecular interactions: protein refolding; altering ligand affinity; increasing protein stability; drug design and HTS; protein expression and solubility; protein engineering.
Crosslisted with CHEG649. PREREQ: Introductory-level courses in chemistry, physics biochemistry.

CHEM 651  **ADVANCED INORGANIC CHEMISTRY I**  3
Inorganic chemistry: application of the principles of structure and reactivity, examples from compounds of both the representative elements and the transition metals.
PREREQ: CHEM444 and CHEM457.

CHEM 652  **ORGANOMETALLIC CHEMISTRY**  3
Chemistry of carbon to transition-metal bonds beginning with rules governing structure and stability; effects of metal and ancillary ligand environment; general mechanistic steps; NMR and IR spectroscopy; fluxional processes. Followed by applications in homogeneous catalysis and stoichiometric organic synthesis.
PREREQ: CHEM444 and CHEM457.

CHEM 653  **BIOWINORGANIC CHEMISTRY**  3
Overview of our current understanding of the role of metal ions in the structure and function of proteins, enzymes and nucleic acids including applications in medicine. Emphasis is placed on the synergism between biochemical and synthetic model studies with examples provided by the current literature.
PREREQ: CHEM457.

CHEM 654  **ADVANCED INORGANIC CHEMISTRY II**  3
A group theoretical approach to structure and bonding in inorganic compounds.
PREREQ: CHEM444 and CHEM457.

CHEM 671  **QUANTUM CHEMISTRY**  3
Basic principles and methods of quantum theory including wave mechanics of simple systems, angular momentum and the hydrogen atom, and approximate methods applied to atomic and molecular structure.
PREREQ: CHEM444.

CHEM 672  **ADVANCED QUANTUM CHEMISTRY**  3
Applications of quantum theory to predictions of molecular structure, energetics, spectra and reactivity; principles of spectroscopy and the interaction of light with molecules; other topics at the instructor’s discretion.
PREREQ: CHEM671.

CHEM 674  **CHEMICAL DYNAMICS**  3
Experimental methods in chemical kinetics, rate laws and mechanisms, statistical and dynamical theories of reaction rates, and applications of the principles and techniques of kinetics to a variety of systems.
PREREQ: CHEM444.

CHEM 677  **CHEMICAL THERMODYNAMICS**  3
The elements of classical and statistical thermodynamics and their application to chemical problems.
PREREQ: CHEM443.

CHEM 678  **SURFACE STRUCTURE AND PROPERTIES**  3
Explores the structure and chemical properties of solid surfaces involving lectures and laboratory work in a surface science facility. Lectures will be followed by practical applications of surface analytical techniques and computational experiments using density functional theory.
PREREQ: CHEM443 and CHEM444 (preferred), or CHEM418 and CHEM419.
RESTRICTIONS: Permission of instructor required for students not in chemistry, biochemistry, physics, chemical and biomolecular engineering, materials science and engineering, and plant and soil sciences.

CHEM 679  **BIOMOLECULAR NMR SPECTROSCOPY**  3
Overview of modern NMR theoretical and experimental approaches used for solving problems in structural biology, biochemistry, and biophysics. Introduction to NMR theory and instrumentation, modern multidimensional NMR experiments; applications to structure, dynamics, protein folding, drug design, ligand and ion binding, mechanisms of enzyme reactions.
RESTRICTIONS: Bachelor’s degree in chemistry, chemical engineering, physics or related science or engineering field.

CHEM 680  **INTRODUCTORY POLYMER SCIENCE**  3
Provides a broad foundation in the basic concepts of polymer science, including synthesis, physical structures and phase transitions, structure/property relationships, material properties, characterization methods and current trends in polymer technology.
PREREQ: CHEM322 or CHEM332; and CHEM419 or CHEM444.

CHEM 681  **GREEN CHEMISTRY**  3
Pollution prevention - how to eliminate toxic chemicals and hazardous wastes while using less energy and, preferably, starting with renewable materials.
PREREQ: One year of organic chemistry, or permission of the instructor.

CHEM 683  **ENVIRONMENTAL CHEMISTRY**  3
Reactions in gas, liquid and solid phases of the Earth’s atmosphere, hydrosphere, and geosphere, and energy fluxes and chemical exchanges across these interfaces discussed in the context of basic chemical principles. Applications to current issues such as climate change and air/water pollution discussed. May be crosslisted with MAST683.

CHEM 684  **BIOCHEMISTRY OF NUCLEIC ACIDS**  3
Focus on contemporary problems in nucleic acid chemistry, with a strong emphasis on the chemical aspects of nucleic acid research. Topics include DNA/RNA, the repair tolerance of DNA damage, and epigenetic regulation of gene expression.
PREREQ: CHEM641.

CHEM 685  **COLLOID CHEMISTRY**  3
Introduction to the principles of colloid chemistry and discussion of applications, including surface and interfacial thermodynamics, surface and interfacial tension, capillarity, interfacial adsorption, colloid isotherms, sol-gel transitions, curvilinear geometry, surface wetting and dewetting, emulsification, foaming and defoaming, interfacial thermodynamics and electrostacis.

CHEM 686  **BIOPHYSICAL CHEMISTRY**  3
Introduction to biophysical chemistry: molecular forces, conformationds and dynamics of macromolecules, theory and applications of biophysical methods emphasizing spectroscopic and imaging techniques, optical spectroscopy and microscopy, x-ray crystallography, electron microscopy and nuclear magnetic resonance spectroscopy, membrane biophysics.
PREREQ: CHEM418 or CHEM443 CHEM527 or CHEM641.

CHEM 805  **MULTIDISCIPLINARY BIOTECHNOLOGY**  3
Introduces science, engineering, and business graduate students to challenges of conducting and managing scientific inquiry across disciplines and within industry. Focuses on biotechnology industry.
Crosslisted with CHEG805.
CHEM 810 KINETICS AND SURFACE CHEMISTRY OF SOILS 3 Kinetics and mechanisms of soil chemical reactions, including application of chemical kinetics to natural systems, rates of sorption/desorption, redox, precipitation/dissolution, and ion exchange processes and application of surface spectroscopic and microscopic techniques to elucidate reactions at the soil mineral/water interface. Crosslisted with PLSC810. PREREQ: PLSC608, and either CHEM418 or CHEM443.

CHEM 815 ETHICS, BUSINESS AND COMMUNICATION 3 Provides professional development in ethics, business and communication related to systems biology research applications in stem cell, tissue engineering, and drug delivery technologies. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF815.

CHEM 816 SYSTEMS BIOLOGY OF CELLS IN ENGINEERED ENVIRONMENTS 3 Provides a technical review of systems biology approaches including genomics, transcriptomics, proteomics, metabolomics, and bioinformatics as well as applications in tissue engineering, stem cell differentiation, and drug delivery. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF815.

CHEM 820 SPECIAL TOPICS IN ANALYTICAL CHEMISTRY 1-3 Advanced topics in analytical methods and techniques from the current literature. PREREQ: CHEM407, or permission of instructor. RESTRICTIONS: May be repeated for credit when topics vary.

CHEM 830 SPECIAL TOPICS IN ORGANIC CHEMISTRY 1-3 Topics from natural product chemistry (alkaloids, terpenes, steroids), organic nitrogen and phosphorus compounds, alicyclic and heterocyclic compounds, stereochemistry, organometallic chemistry, photochemistry and theoretical organic chemistry. PREREQ: CHEM634. RESTRICTIONS: May be repeated for credit when topics vary.

CHEM 840 MODERN TOPICS IN BIOCHEMISTRY 1-3 Detailed examination of a number of problems of current research interest in biochemistry. PREREQ: CHEM641. RESTRICTIONS: May be repeated for credit when topics vary.

CHEM 850 SPECIAL TOPICS IN INORGANIC CHEMISTRY 1-3 Advanced topics selected from the chemistry of the less common elements, metal hydrides, organometallic compounds, coordination compounds and metal ions in biology. PREREQ: CHEM651. RESTRICTIONS: May be repeated for credit when topics vary.

CHEM 855 MARINE INORGANIC CHEMISTRY 3 Principles of inorganic chemistry are used to explain and to understand the speciation and reactivity of the elements in the marine environment. Emphasis on the mechanistic aspects of important marine processes including mineral dissolution and formation, electron transfer reactions and the role of metals in biogeochemical reactions. Crosslisted with MAST850. PREREQ: MAST646, aquatic chemistry or physical chemistry.

CHEM 865 SEMINAR 0 PF

CHEM 868 RESEARCH 1-9

CHEM 869 MASTER’S THESIS 1-6

CHEM 874 SPECIAL TOPICS IN PHYSICAL CHEMISTRY 1-3 RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.

CHEM 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.

CHEM 969 DOCTORAL DISSERTATION 1-12 PF

---

CHIN 105 CHINESE I - ELEMENTARY 4 Introduction to the contemporary Mandarin Chinese language through developing listening comprehension, speaking, reading, and writing skills, including mastery of the pinyin pronunciation system and introduction to Chinese characters.

CHIN 106 CHINESE II - ELEMENTARY/INTERMEDIATE 4 Continued practice in the aural, oral, reading and writing skills of Mandarin Chinese including the identification and reproduction of basic Chinese characters. Introduction to phonology and to reading and writing texts in Chinese characters. PREREQ: CHIN105.

CHIN 107 CHINESE III - INTERMEDIATE 4 Development of aural, oral, reading and writing skills at the intermediate Chinese level, including continued practice in identifying and reproducing Chinese characters, handling a greater variety of phonology levels, and further comprehension of spoken (Koutouyu) and written (Shumianyu) language differences. PREREQ: CHIN106. RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.

CHIN 200 CHINESE GRAMMAR AND COMPOSITION 3 Further study of Mandarin Chinese grammar, and further development of all four language skills for communication. Emphasis on grammar and essay writing. PREREQ: CHIN107 or instructor’s permission.

CHIN 201 ADVANCED INTERMEDIATE CHINESE I 3 First of the two-course series which form the core of 200-level Chinese, the other being CHIN202. The goal is to build upper intermediate-level grammar, vocabulary, and sophisticated character recognition and writing. All four areas of language (listening, reading, speaking, and writing) are emphasized. PREREQ: CHIN107.

CHIN 202 ADVANCED INTERMEDIATE CHINESE II 3 Second of the two-course series which form the core of 200-level Chinese, the other being CHIN201. The goal is to build upper intermediate-level grammar, vocabulary, and sophisticated character recognition and writing, with specific emphasis on fluency. All four areas of language (listening, reading, speaking, and writing) are emphasized. PREREQ: CHIN107.

CHIN 204 THE ART OF CHINESE CALLIGRAPHY 3 Introduction to the rich art of Chinese calligraphy that has a long history of over 2,000 years. Explore the evolution of Chinese characters, the aesthetics of Chinese calligraphy, various kinds of intriguing ink and brush writing. Students will learn how to use brush pen and some basics of Chinese painting and be able to paint simple objects.

CHIN 205 CHINESE CONVERSATION 3 Practical use of Mandarin Chinese by means of oral reports on a variety of topics including family, school, and work life. Emphasis on improvement of conversational skills for social situations which require grammatical and written competence. PREREQ: CHIN107 or instructor’s permission.

CHIN 206 CULTURE THROUGH CONVERSATION 3 Discussion of topics drawn from contemporary Chinese life. Designed for students who wish to broaden their knowledge of Chinese culture while improving their oral and aural language skills. PREREQ: CHIN107. RESTRICTIONS: Taught abroad only.

CHIN 208 CONTEMPORARY CHINESE SOCIETY 3 Introduction to contemporary China, its culture, people, way of life and issues confronting them. RESTRICTIONS: Taught abroad only, in both English and Chinese. Not for major credit. Does not satisfy College of Arts and Sciences language requirement.

CHIN 209 INTERMEDIATE SITUATIONAL CHINESE 3 Increase fluency and vocabulary, providing practical training in Chinese for various kinds of communicative situations that emphasize use of formal expressions and language etiquette. Develop four language skills in such contexts as telephone etiquette, formal social occasions, correspondence and relations with senior colleagues/co-workers and supervisors.

CHIN 266 SPECIAL PROBLEM 1-4

CHIN 305 CHINESE CONVERSATION AND COMPOSITION 3 Discussion of current cultural, social and political topics in Mandarin Chinese. Vocabulary building, grammar exercises and frequent compositions. PREREQ: Two courses at the 200-level, one of which must be CHIN200 or CHIN205 or instructor’s permission.

CHIN 350 BUSINESS CHINESE 3 CHIN350 aims to prepare students for effective communication in casual and formal business settings in Chinese society. Incorporates discussion of Chinese business culture and etiquette in order to promote socially appropriate language use. PREREQ: Two CHIN courses at the 200 level and one CHIN course at the 300 level, with the exception of CHIN206.
CIEG 355  SPECIAL TOPICS  3
Explores an area of special interest in Chinese literature or culture studies. See http://primus.nss.udel.edu/CoursesSearch/ for topics.
PREREQ: Two courses at the 200-level, one of which must be CHIN200 or CHIN205 or instructor’s permission. RESTRICTIONS: May be repeated for credit when topics vary.

CIEG 366  INDEPENDENT STUDY  1-3
Discussion of subject matters of students’ special interest related to Chinese language, literature, and/or culture.
PREREQ: Two courses at the 200-level, one of which must be CHIN200 or CHIN205 or instructor’s permission.

CIEG 455  CLASSICAL CHINESE  3
Basic training in classical Chinese, the gem of the Chinese language. Introduces students to basic grammatical structures of classical Chinese, its syntactic patterns and historical development, as well as providing comparison with modern vernacular Chinese.
PREREQ: Two CHIN courses at the 300 level and one CHIN course at the 400 level.

CIEG 466  INDEPENDENT STUDY  1-3
Discussion of subject matters of students’ special interest related to Chinese language, literature, and/or culture.
PREREQ: Two courses at the 300 level, one of which must be CHIN305 or CHIN355, or instructor’s permission.

CIEG 610  ISSUES IN MODERN CHINA  3
Provides an overall picture of modern and contemporary China in its complexity and diversity. Surveys major aspects of Chinese society such as socioeconomic reforms, societal transformation, modernization drives, privatization, the banking system and foreign trade, and the impact of China’s modernization on the world. Taught in Chinese.

CIEG 612  TRANSLATION PRACTICUM I  3
First in a two-course sequence focused on Chinese/English translation. Designed to help students obtain real world experiences in the translation industry by providing them with the opportunity to work with professionals in the industry.

CIEG 613  TRANSLATION PRACTICUM II  3
Second in a two-course sequence focused on Chinese/English translation. Designed to help students obtain real world experiences in the translation industry by providing them with the opportunity to work with professionals in the industry.
PREREQ: CHIN612.

CIEG 615  TECHNICAL TRANSLATION  3
Trains students how to translate technically complex texts from the domains of finance, business, and industry. Designed to help students develop a basic proficiency in technical translation, to become skilled in clear expression and to develop sensitivity to stylistic issues involved in specialized translation.

CIEG 617  LEGAL AND MEDICAL TRANSLATION  3
Presents an overview of the field of legal and medical translation from English to Chinese via a wide range of materials, including legal documents, medical journal articles, and information on the pharmaceutical industry. It focuses on problem areas and provides information on sources for this type of translation.

CIEG 619  COMPUTER-ASSISTED TRANSLATION  3
Provides an overview of computer-assisted translation that utilizes computer software and applications to facilitate translation projects and process. Students will learn how to use computer applications such as machine translation, terminology management, database repository, translation memory, digital and online dictionaries, language identifiers, and source text assessment.

CIEG 620  TRANSLATION PRACTICE & INTERNSHIP  6
Immerses students in the ‘real world’ of translation where they will be engaged in a wide array of projects that involve technical, legal, and medical translation, as well as computer-assisted translation. Under the supervision of the instructors and professional translators, students will be assigned translation projects.

CIEG 161  FRESHMAN DESIGN  3
Introduction to engineering analysis and design methods. Elementary theory with design applications to transportation, fluids, and structural systems are introduced through group activities. Additionally, engineering issues related to surveying and sustainability are discussed. Computer applications using computer-aided drafting and engineering analysis software are also included.

CIEG 211  STATICS  3
Analysis of force systems and equilibrium of rigid bodies in two and three dimensions. Determination of centers of gravity and of centroids. Analysis of statically determinate trusses, simple frames and “machines.” Introduction to the analysis of beams.
COREQ: MATH243.

CIEG 212  SOLID MECHANICS  3
Stresses and displacements in axially loaded beams and in bars subjected to torsion. Analysis of stresses and deflections of laterally loaded beams. Study of stresses and strains in a plane. Mohr’s circle for stresses. Failure theories. Design of structural members using strength criteria.
PREREQ: CIEG211. COREQ: MATH302 or MATH351.

CIEG 213  CIVIL ENGINEERING MATERIALS LABORATORY  1
Experiments in the mechanics of materials and the strength of materials to complement the content of CIEG212. Emphasis on the behavior of civil engineering materials including steel, aluminum, concrete and timber. PREREQ: CIEG212. COREQ: CIEG212.

CIEG 222  INTRODUCTION TO SURVEYING  3
Emphasizes concepts and methods of plane surveying for construction applications. Provides field experience with modern surveying instruments. Topics include: distance measurement, leveling, angle measurement, error analysis, coordinate systems, mapping, traversing, and calculation of land areas and earth volumes. Crosslisted with PLSC222. RESTRICTIONS: Requires knowledge of trigonometry.

CIEG 233  ENVIRONMENTAL ENGINEERING PROCESSES  3
Quantified descriptions of physical, chemical and biological processes of environmental importance. Introductory level analysis of pollution transport, treatment, containment, remediation. Process engineering approach to contaminant removal methods, including use of appropriate computer software.
PREREQ: CHEM120 and MATH242. RESTRICTIONS: Open to majors only.

CIEG 301  STRUCTURAL ANALYSIS  4
PREREQ: CIEG212, MATH242.

CIEG 302  STRUCTURAL DESIGN  4
Basic concepts of structural design including methodologies, applicable limit states and design codes. Structural members and systems, fabrication issues, loads and load paths. Design of steel and concrete members subjected to tension, compression and bending. Additional topics including connections and combined axial compression and bending.
PREREQ: CIEG301.

CIEG 305  FLUID MECHANICS  3
Incompressible fluid mechanics: fluid statics, control volume analysis of fluid flows, differential analysis of inviscid and viscous fluid flows and dimensional analysis.
PREREQ: MATH302 or MATH351.

CIEG 306  FLUID MECHANICS LABORATORY  1
Experiments in fluid mechanics.

CIEG 311  DYNAMICS  3
An intermediate-level development of the kinematics and dynamics of particles, systems of particles and rigid bodies. Vibrations of machines and structures. Emphasis on solution of engineering problems by force, energy and momentum methods of analysis. Applications to the dynamics of machines, structures and vehicles.
PREREQ: PHYS207 and MATH243.

CIEG 315  PROBABILITY AND STATISTICS FOR ENGINEERS  3
The role of chance and variability in engineering activities. Topics include set operations, probability, Bayes’ theorem, random variables, common probability distributions, data reduction, statistical estimation and inference, probability model selection, regression analyses and introduction to probability-based design and Monte-Carlo simulation.
PREREQ: MATH242 and MATH243 or equivalents.

CIEG 320  SOIL MECHANICS  3
Soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures.
PREREQ: CIEG212. COREQ: CIEG323.
CIEG 321  GEOTECHNICAL ENGINEERING  3
Introduction to Geotechnical Engineering. Topics include shallow foundation analysis and design, deep foundation analysis and design, earth retaining structure analysis and design and introduction to slope stability analysis.
PREREQ: CIEG320 and CIEG323.

CIEG 323  SOIL MECHANICS LABORATORY  1
Demonstrates soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures.
PREREQ: CIEG212. COREQ: CIEG320.

CIEG 331  ENVIRONMENTAL ENGINEERING  3
Introduction to environmental engineering topics faced by consulting engineers and public works and regulatory agencies. Topics include water treatment, water quality management, wastewater treatment, air pollution control, solid waste management and hazardous waste management.
PREREQ:CIEG305 or MEEG331.

CIEG 337  ENVIRONMENTAL ENGINEERING LABORATORY  3
Unit operations and unit processes in environmental engineering, with an emphasis on biological processes. Introduction to contaminant transport processes in the subsurface. Utilizes collaborative, problem-based learning within a laboratory context.

CIEG 351  TRANSPORTATION ENGINEERING  3
Four components of transportation: vehicle, way, terminal and control; design and dynamic characteristics of vehicles; geometric design of highways and railroad tracks; operation and design of stations, airports and bus terminals; highway traffic flow analysis.
RESTRICTIONS: Requires junior status in civil engineering.

CIEG 366  INDEPENDENT STUDY  1-6

CIEG 401  INTRODUCTION TO THE FINITE ELEMENT METHOD  3
Discusses the following approximate solution techniques: finite difference method, weighted residual and variational methods, and the finite element method. Develops finite element solutions for various one- and two-dimensional problems in applied mechanics. Detailed discussions of various aspects associated with the finite element method (e.g., interpolation functions, element mapping, programming techniques).
PREREQ: MATH351 and MATH353.

CIEG 402  INTRODUCTION TO SUSTAINABILITY PRINCIPLES IN CIVIL ENGINEERING  3
Introduction to the principles of sustainability in the context of civil engineering design and construction. Presentation of life cycle assessment techniques, including software applications; discussion of "green" building materials; evaluation of specific materials for use in "green" construction; and consideration of various sustainable construction assessment tools, including LEED, Green Globes, and similar standards.

CIEG 403  SUSTAINABILITY APPLICATIONS IN INFRASTRUCTURE  3
Explores the applications of sustainability principles to civil engineering infrastructure, such as building, site, geotechnical, transportation, and coastal infrastructure projects. Application of life cycle assessment techniques; cost-benefit analyses; evaluation of economic, environmental, and societal impacts of projects; and comparisons of alternative design solutions.

CIEG 407  BUILDING DESIGN  3
Design of building structural systems and elements. Topics include dead and live loading; earthquake and wind forces; load paths; and gravity and lateral load resisting systems. Approximate analysis of building frames and details regarding design elements for steel and concrete buildings.
PREREQ: CIEG301 and CIEG302.

CIEG 408  INTRODUCTION TO BRIDGE DESIGN  3
Provides practical insight into the art and science of bridge design. Various design methodologies in use today in the field of bridge design and evaluation are investigated. Bridges of steel, reinforced concrete, prestressed concrete, wood and composite materials are included.
PREREQ: CIEG302.

CIEG 409  FORENSIC ENGINEERING  3
Provides practical insight into structural engineering by examining failures. Examples include bridge and building failures; infamous catastrophically collapses to little known examples of design criteria being violated to the structures detriment. The main objective is to learn sound engineering practices through the study of failures.
PREREQ: CIEG301 and CIEG302.

CIEG 412  STRUCTURAL STEEL DESIGN  3
Fundamental concepts of structural steel design such as material properties, design methodologies, limit states, and design standards. Design of structural steel members subjected to tension, compression, bending, combined bending and compression, and other loadings are considered. Design of bolted and welded connections is also considered.
PREREQ: CIEG302.

CIEG 413  ADVANCED STRUCTURAL ANALYSIS  3
Introduction to the various methods of analysis of statically indeterminate structures. Force methods and displacement methods are discussed, including method of consistent distortions, equation of three moments, slope deflection, and moment distribution. Approximate methods of analysis, including portal method and cantilever method are also considered.
PREREQ: CIEG301.

CIEG 414  RAILROAD GEOTECHNICAL ENGINEERING  3
Designing, constructing, maintaining railway track. Developing railway track substructure: materials, mechanics, drainage, loading, slopes, design, maintenance, measurements and management and case studies. Track substructure issues related to load freight and high speed passenger rail traffic.
PREREQ: MATH351 and CIEG212 or equivalent.

CIEG 415  METEOROLOGIC PROCESSES IN AIR POLLUTION  3
An introduction to meteorological processes that affect air pollution, such as diffusion, atmospheric stability, and turbulence, with a focus on the atmospheric boundary layer.
Croslisted with MAST415. PREREQ: MATH241 and MATH242; CHEM104 or CHEM112; PHYS201 or PHYS207.

CIEG 417  INTRODUCTION TO RAILROAD SAFETY AND DERAILMENT ENGINEERING  3
Explores the engineering issues associated with common types of derailments, including track, equipment and operator derailments. The specific failure mechanisms associated with key classes of derailments will be examined with the technologies available for reducing these types of derailments.
PREREQ: MATH351; CIEG212 or equivalent.

CIEG 418  INTRODUCTION TO RAILROAD ENGINEERING  3
Introduction to railroad track structures and their major components; including functions and modes of degradation and failure. Explore static and dynamic load environments and engineering design to effectively distribute loads throughout a structure. Provides both theoretical and practical approaches to track design as well as useful design, optimization and maintenance recommendations for key track components.
PREREQ: MATH351; CIEG212 or equivalent.

CIEG 421  FOUNDATION ENGINEERING  3
Field investigation techniques; interpretation of data; theory and design of shallow and deep foundations, retaining walls, sheet pile walls, cofferdams braced excavations and geotechnically reinforced soil.
PREREQ: CIEG320 and CIEG323.

CIEG 422  EARTH STRUCTURES ENGINEERING  3
Properties of soils and methods to determine them: water flow through inhomogeneous and anisotropic earth mass; predictions of pore-water pressures; stresses and settlement predictions; slope stability: type and causes of slope failures, effective and total stability analyses, design strength parameters and safety factors, construction considerations; design of earth dams; and predictions vs. field performance. Computer software used in problem solving.
PREREQ: CIEG320 and CIEG323.

CIEG 424  EARTH RETAINING STRUCTURES  3
Selection, design and construction of earth retaining structures. Topics include earth pressure theory, and commonly used cut and fill wall types. Practice oriented course utilizes case histories and design examples to demonstrate applications, design procedures, and construction considerations.
PREREQ: CIEG321.

CIEG 427  DEEP FOUNDATIONS  3

CIEG 428  GROUND IMPROVEMENT METHODS  3
Design and construction principles of ground improvement methods to soil and rock engineering problems. Topics include: grouting, prefabricated vertical drains, stone columns, mechanically stabilized earth systems, soil nailing, soil mixing, vibro compaction, lightweight fill materials and geosynthetics.
CIEG 429 CONCRETE DESIGN 3
Explores the fundamentals of concrete design introduced in CIEG302. Applications of design principles to various reinforced concrete structural elements are considered. Topics include design of doubly reinforced beams; design for torsion; reinforcement details and slender column design.
PREREQ: CIEG302.

CIEG 430 WATER QUALITY MODELING 3
Water quality modeling and criteria. Application to lakes, streams, and estuaries. Dissolved oxygen, BOD, nitrification. Eutrophication: carbon, nitrogen, phosphorus and silica mass balances; chlorophyll, primary production and dissolved oxygen; Toxic chemicals: PCBs, PAHs, toxic metals: partitioning theory, organic carbon normalization; coupled water column-sediment models.
PREREQ: MATH302 or MATH351.

CIEG 433 HAZARDOUS WASTE MANAGEMENT 3
Toxicological, risk assessment and regulatory aspects of hazardous waste management; characterization of hazardous wastes and materials; waste reduction strategies; storage and transportation methods; engineering processes for the chemical, physical and biological treatment of toxic and hazardous wastes; remediation of contaminated soil and groundwater at existing disposal sites.
PREREQ: CIEG233.

CIEG 434 AIR POLLUTION CONTROL 3
Introduces the origins, characteristics and environmental and health effects of priority air pollutants and the equipment commonly used to control emissions of these pollutants from stationary sources. Emphasis placed on understanding the principles, operation and design of different control devices.
PREREQ: CIEG233 or CIEG331

CIEG 436 PROCESSING, RECYCLING, MANAGEMENT OF SOLID WASTES 3
Examines the problem of solid waste management in a throw-away society: landfills, incineration, composting, recycle and reuse options are described from regulatory, economic, and engineering perspectives. Includes design and operational aspects of common processes and landfills, management of hazardous wastes, and future alternatives.
PREREQ: CIEG233 or CIEG331

CIEG 437 WATER AND WASTEWATER QUALITY 3
Principles and applications of analysis of solids, organic load, dissolved oxygen, disinfectants, nutrients, trace metals, trace organic compounds and microorganisms. Lecture and laboratory.
PREREQ: CIEG233

CIEG 438 WATER AND WASTEWATER ENGINEERING 3
Sources and characteristics of water and wastewater; water quality criteria and monitoring; principles and application of physical, chemical, and biological processes for water purification and wastewater treatment. Design and operation of treatment systems to meet water quality and effluent standards.
PREREQ: CIEG233.

CIEG 439 BIOSUSTAINABILITY AND PUBLIC HEALTH 3
Introduces principles of sustainable engineering; application to ecosystems, water, wastes, agriculture, and how these managed systems affect public health. Application in both developed and developing worlds.

CIEG 440 WATER RESOURCES ENGINEERING 3
Basics of water resources systems and analysis and introduction to hydraulics. Covers water resources systems, rainfall analysis and flood routing, pipe flow and hydraulic machinery, open channel flow and computer models.
PREREQ: CIEG305 or MEEG331 and CIEG306.

CIEG 442 STORMWATER MANAGEMENT 4
Hydrology and water quality for small urban/suburban/rural watersheds. Design of culverts, vegetated waterways, conventional and distributed stormwater management systems. Crosslisted with PLSC442. PREREQ: CIEG305 or PLSC331 or permission of instructor.

CIEG 443 WATERSHED ENGINEERING, PLANNING AND DESIGN 3
Engineering of watershed management practices to protect and restore quality and quantity of surface and ground waters. Complete water resources projects as part of a service based learning approach. Various projects include rain gardens, bicycle trail drainage, wet detention ponds, bioretention areas, wetlands, stream restoration, and bioengineering. Field oriented course.

CIEG 444 MICROBIOLOGY OF ENGINEERED SYSTEMS 3
This course covers macromolecular structure and function, carbon metabolism, and energy metabolism in microbial organisms of use in engineered systems.
PREREQ: CHEM103 and CHEM104, BI5207, CIEG233.

CIEG 445 INDUSTRIAL ECOLOGY 3
Focus on recent environmental issues related to climate changes using unconventional tools and approaches. Topics include: climate changes; sustainable development; green transportation systems; eco-industrial parks.

CIEG 451 TRANSPORTATION ENGINEERING LABORATORY 1
Exercises related to transportation: design, control, measurement, calculation/simulation, reasoning, and communication. Topics may include geometric roadway design, traffic signal control, design of transportation terminals, traffic simulation and pedestrian flow, pavement design and maintenance, design justification, and contemporary issues involving transportation policies and technologies.
PREREQ: CIEG351. COREQ: CIEG351.

CIEG 452 TRANSPORTATION FACILITIES DESIGN 3
Theoretical concepts of general transportation demand, supply and flow analysis. Planning and design of multi-modal transportation facilities including streets and highways, railways and guideways, airports, and harbors and ports. Engineering, social and economic evaluation of alternative design schemes for simple case studies and existing transportation facilities.
PREREQ: CIEG351.

CIEG 453 ROADWAY GEOMETRIC DESIGN 3
Physical dimensions of roadways such as vertical and horizontal curvatures, superelevation rates, lane widths, cross sections, and grades. Topics include roadway functions, design controls and criteria, elements of design, local roads and streets, collector roads and streets, rural and urban arterials, freeways, intersections, and grade separations.

CIEG 454 URBAN TRANSPORTATION PLANNING 3
Characteristics of urban travel demand, travel demand forecasting models, urban transportation modes and their characteristics, urban transportation planning processes and issues, evaluation of plans, economic analysis, transportation financing, transportation policy and regulations, and urban transportation systems management.
PREREQ: CIEG351

CIEG 456 REGIONAL ANALYSIS METHODS 3
Analysis of land-use and transportation issues in modern society. Focus on relationships between existing, planned and proposed transportation systems; forecast population and employment distributions. Applications and modeling aspects of these relationships using the latest computer software programs.

CIEG 458 PAVEMENT ANALYSIS AND DESIGN 3
Presents both flexible and rigid pavement design procedures, as well as detailed descriptions of various inputs used in the mechanistic pavement design procedures.
PREREQ: CIEG351.

CIEG 461 SENIOR DESIGN PROJECT 1-4
Work with advisors from engineering firms and faculty on design projects requiring knowledge and skills acquired in previous courses.
RESTRICTIONS: Requires senior status in engineering.

CIEG 465 ENGINEERS WITHOUT BORDERS 1-3
Sustainability applied to cultures and economies in the developing world. Planning and implementation of appropriate and alternative technologies. 1 credit seminar with paper or report; 3 credits requires group project with significant technical content using current case study, professional review, and presentation.

CIEG 466 INDEPENDENT STUDY 1-6

CIEG 468 PRINCIPLES OF WATER QUALITY CRITERIA 3
Toxicological and chemical background and technical basis necessary for understanding the models of water and sediment quality criteria for individual and mixtures of organic chemicals and metals that focus on bioavailability; narciss models of toxicity, complexation models applied to both the water column and sediments.
PREREQ: CHEM104 or CHEM103. RESTRICTIONS: Requires permission of instructor.

CIEG 471 INTRODUCTION TO COASTAL ENGINEERING 3
Problems of design in the ocean and coastal environment. Mechanics of wave motion, tides and storm surge, littoral processes, wave forces on structures and design of coastal structures. Includes observations of hydraulic model tests in the Ocean Engineering Laboratory.
PREREQ: CIEG305
CIEG 486  ENGINEERING PROJECT MANAGEMENT  3
Understand the principles of planning, controlling, and evaluating engineering projects. Learn the use of tools and techniques and practice their use on a personal project. Topics include project organization, project budgeting and scheduling, resource allocation and leveling, change control, and communications. RESTRICTIONS: CIEG486 is only open to Civil Engineering Majors and Minors ONLY.

CIEG 498  GROUNDWATER FLOW AND CONTAMINANT TRANSPORT  3
Development and application of models for fluid flow and contaminant transport in porous media. Derivation of governing equations, analytical and numerical solutions, and application to movement of groundwater and transport of contaminants at an actual field site. PREREQ: Previous coursework in fluid mechanics and partial differential equations, or permission of instructor.

CIEG 601  INTRODUCTION TO THE FINITE ELEMENT METHOD  3
Discusses the following approximate solution techniques: finite difference method, weighted residual and variational methods, and the finite element method. Develops finite element solutions for various one- and two-dimensional problems in applied mechanics. Detailed discussions of various aspects associated with the finite element method (e.g. interpolation functions, element mapping, programming techniques). PREREQ: MATH351 and MATH353.

CIEG 604  PRESTRESSED CONCRETE DESIGN  3

CIEG 605  INTERMEDIATE TOPICS IN FINITE ELEMENT ANALYSIS  3
Topics include finite element analyses of linear steady-state scalar field problems, linear elastostatics, analysis techniques for linear transient and dynamic analyses of solids, overview of elements commonly used in matrix structural analyses, and discussion of mixed finite element formulations. In each case, element formulations and solution algorithms are assessed, limitations and possible improvements are presented and numerical methods examined. PREREQ: CIEG601.

CIEG 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. Crosslisted with MAST606.

CIEG 608  INTRODUCTION TO BRIDGE DESIGN  3
Provides practical insight into the art and science of bridge design. Various design methodologies in use today in the field of bridge design and evaluation are investigated. Bridges of steel, reinforced concrete, prestressed concrete, wood and composite materials are included. PREREQ: CIEG302.

CIEG 611  STRUCTURAL DYNAMICS DESIGN  3
Design of structures (buildings, bridges, dams, foundation piles and offshore platforms) for dynamic loadings (severe wind force, ocean wave force, strong earthquake excitations, machine vibrations, and general impulse and time dependent forces and motions). Determination of realistic dynamic loadings and application of design concepts. PREREQ: CIEG311 and MATH302 or MATH351.

CIEG 612  ADVANCED MECHANICS OF MATERIALS  3
Covers unsymmetrical bending, shear center in thin-walled beams, torsion in thin-walled structures, lateral-torsional buckling, curved beams, energy methods, principal stress and strain in three dimensions. Theory and applications.

CIEG 614  RAILROAD GEOTECHNICAL ENGINEERING  3
Designing, constructing, maintaining railway track. Developing railway track structure: materials, mechanics, drainage, loading, slopes, design, maintenance, measurements and management and case studies. Track substructure issues related to load freight and high speed passenger rail traffic. PREREQ: MATH351 and CIEG212 or equivalent. COREQ: MATH353 and CIEG301 or equivalent.

CIEG 615  METEOROLOGICAL PROCESSES IN AIR POLLUTION  3
An introduction to meteorological processes that affect air pollution, such as diffusion, atmospheric stability, and turbulence, with a focus on the atmospheric boundary layer. Crosslisted with MAST615. PREREQ: MATH 241 and MATH 242; CHEM104 or CHEM112; PHYS201 or PHYS207.

CIEG 617  INTRODUCTION TO RAILROAD SAFETY AND DERAILEMENT ENGINEERING  3
Explores the engineering issues associated with common types of derailments, including track, equipment and operator derailments. The specific failure mechanisms associated with key classes of derailments will be examined with the technologies available for reducing these types of derailments. PREREQ: MATH351; CIEG212 or equivalent. COREQ: MATH353; CIEG301 or equivalent.

CIEG 618  INTRODUCTION TO RAILROAD ENGINEERING  3
Introduction railroad track structures and their major components; including functions and modes of degradation and failure. Explore static and dynamic load environments and engineering design to effectively distribute loads throughout a structure. Provides both theoretical and practical approaches to track design as well as useful design, optimization and maintenance recommendations for key track components. PREREQ: MATH351; CIEG212 or equivalent. COREQ: MATH353; CIEG301 or equivalent.

CIEG 620  SOIL MECHANICS II  3
Behavior of cohesionless and cohesive soils; failure theories and lateral earth pressures; stresses within earth mass; steady-state flow through porous media; consolidation and time rate settlement; shear strength of cohesive soils. PREREQ: CIEG302/323.

CIEG 621  FOUNDATION ENGINEERING  3
Field investigation techniques; interpretation of data; theory and design of shallow and deep foundations, retaining walls, sheet pile walls, cofferdams braced excavations and geosynthetically reinforced soil.

CIEG 622  EARTH STRUCTURES ENGINEERING  3
Properties of soils and methods to determine them: water flow through inhomogeneous and anisotropic earth mass; predictions of pore-water pressures; stresses and settlement predictions; slope stability: type and causes of slope failures, effective and total stability analyses, design strength parameters and safety factors, construction considerations; design of earth dams; and predictions vs. field performance. Computer software used in problem solving. PREREQ: CIEG320 and CIEG323.

CIEG 623  SOIL MECHANICS LAB  3
Enhances knowledge of soil properties and behavior. Generally, the following tests are performed: Atterberg limits, sieve and hydrometer analysis, compaction, relative density, permeability, flow-net simulation, consolidation, specific gravity, direct shear, traxial (CU, CD, UU) tests simulating various loading paths, and liquefaction. PREREQ: CIEG320 and CIEG323.

CIEG 624  EARTH RETAINING STRUCTURES  3
Selection, design and construction of earth retaining structures. Topics include earth pressure theory, and commonly used cut and fill wall types. Practice oriented course utilizes case histories and design examples to demonstrate applications, design procedures, and construction considerations. PREREQ: CIEG321.

CIEG 626  SOIL BEHAVIOR  3
Measuring the shear strength of soils. Soil behavior of soil examined from a fundamental soil perspective. Review of methods of testing to define response; rationale for choosing shear strength and deformation parameters of soils for design applications.

CIEG 627  DEEP FOUNDATIONS  3
Addresses the application, selection, design, construction and inspection of deep foundations. Examines driven piles, drilled shafts, augercast and micropiles. Includes development of cost comparisons, specifications, contract documents and bidding practices. Design issues address the geotechnical and structural considerations.

CIEG 628  GROUND IMPROVEMENT METHODS  3
Design and construction principles of ground improvement methods to address soil and rock engineering problems. Topics include: grouting, prefabricated vertical drains, stone columns, mechanically stabilized earth systems, soil nailing, soil mixing, vibro compaction, lightweight fill materials and geosynthetics.

CIEG 629  CONCRETE DESIGN  3
Explores the fundamentals of concrete design introduced in CIEG 302. Applications of design principles to various reinforced concrete structural elements are considered. Topics include design of doubly reinforced beams; design for torsion; reinforcement details and slender column design. PREREQ: CIEG302.
CIEG 630  WATeR QUALITY MODELiNG  3
Water quality modeling and criteria. Application to lakes, streams, and estuaries. Dissolved oxygen, BOD, nitrification. Eutrophication: carbon, nitrogen, phosphorus and silica mass balances; chlorophyll, primary production and dissolved oxygen; Toxic chemicals: PCBs, PAHs, toxic metals; partitioning theory, organic carbon normalization; coupled water column-sediment models. PREREQ: MATH302 or MATH531.

CIEG 632  CHEMICAL ASPECTS OF ENVIRONMENTAL ENGINEERING  3
The principles and applications of aqueous chemistry to environmental systems. Includes a review of general chemistry, with emphasis on the structure of matter and stoichiometry; chemical thermodynamics; chemical kinetics; equilibrium reactions in homogeneous and heterogeneous solutions; applied electrochemistry and Redox reaction; and interfacial phenomena.

CIEG 633  HAZARDOUS WASTE MANAGEMENT  3
Toxicological, risk assessment and regulatory aspects of hazardous waste management, characterization of hazardous wastes and materials, waste reduction strategies, storage and transportation methods, engineering processes for the chemical, physical and biological treatment of toxic and hazardous wastes, remediation of contaminated soil and groundwater of existing disposal sites.

CIEG 634  CONTAMINANT TRANSPORT AND SEPARATION IN ENVIRONMENTAL SYSTEMS  3

CIEG 635  AIR POLLUTION AND ITS CONTROL  3
Sources and effects of atmospheric pollutants: meteorological and solar radiation phenomena and atmospheric chemistry. Emphasis on gas cleaning operations such as absorption, chemical conversion and particulate removal process design, among other control measures. RESTRICTIONS: Requires upper division or graduate standing in engineering.

CIEG 636  BIOLOGICAL ASPECTS OF ENVIRONMENTAL ENGINEERING  3
Presents fundamental molecular biological concepts which pertain to cellular function in the environment and in engineered environmental treatment systems. Briefly reviews elementary organic chemical classifications. PREREQ: CIEG233.

CIEG 637  WATER AND WASTEWATER QUALITY  3
Principles and applications of analysis of solids, organic load, dissolved oxygen, disinfectants, nutrients, trace metals, trace organic compounds and microorganisms. Lecture and laboratory. PREREQ: CIEG233

CIEG 638  ALLIED ENVIRONMENTAL STATISTICS AND DATA ANALYSIS  3
Statistical and graphical tools useful for practicing environmental scientists and engineers. Modern computer based methods: tests of significance, maximum likelihood estimates; bootstrap based confidence limits; linear, nonlinear and errors-in-variables regression; censored (less/greater than) data; probability and box and whisker plots; analysis of variance.

CIEG 639  OCEAN FLUID DYNAMICS  4
Kinematics and dynamics of incompressible fluids with emphasis on coastal and ocean problems. Governing equations, examples of solutions for viscous flows, potential flows, vorticity, flows on a rotating planet, density vary flows, boundary layers, turbulence. PREREQ: CIEG305.

CIEG 641  RISK ANALYSIS  3
Framework to understand, characterize, and support decisionmaking involving risk. Specific engineering risk analysis concepts and methods, e.g., fault trees, event trees, Markov models, simulation. Focus on engineering perspective, but includes some discussion of interdisciplinary context. Applications to all areas of engineering. Many real-world case studies. PREREQ: CIEG315 or equivalent.

CIEG 643  WATERSHED ENGINEERING, PLANNING AND DESIGN  3
Engineering of watershed management practices to protect and restore quality and quantity of surface and ground waters. Complete water resources projects as part of a service based learning approach. Various projects include rain gardens, bicycle trail drainage, wet detention ponds, bioretention areas, wetlands, stream restoration, and bioengineering. Field oriented course.

CIEG 644  MICROBIOLOGY OF ENGINEERED SYSTEMS  3
This course covers macromolecular structure and function, carbon metabolism, and energy metabolism in microbial organisms of use in engineered systems. PREREQ: CHEM103 and CHEM104, BIOC207, CIEG233.

CIEG 645  INDUSTRIAL ECOLOGY  3
Focus on recent environmental issues related to climate changes using unconventional tools and approaches. Topics include: climate changes; sustainable development; green transportation systems; co-industrial parks.

CIEG 650  URBAN TRANSPORTATION SYSTEMS  3
Design and operation of urban transportation systems, characteristics of public transportation modes, vehicle design, right-of-way types and terminal facilities. Application of operations research techniques to analysis of scheduling, network optimization, capacity and evaluation of alternatives. May be crosslisted with APEC650.

CIEG 652  TRANSPORTATION FACILITIES DESIGN  3
Theoretical concepts of general transportation demand, supply and flow analysis. Planning and design of multi-modal transportation facilities including streets and highways, railways and guideways, airports, and harbors and ports. Engineering, social and economic evaluation of alternative design schemes for case studies and existing transportation facilities.

CIEG 653  ROADWAY GEOMETRIC DESIGN  3
Physical dimensions of roadways such as vertical and horizontal curvatures, superelevation rates, lane widths, cross sections, and grades. Topics include roadway functions, design controls and criteria, elements of design, local roads and streets, collector roads and streets, rural and urban arterials, freeways, intersections, and grade separations.

CIEG 654  URBAN TRANSPORTATION PLANNING  3
Characteristics of urban travel demand, travel demand forecasting models, urban transportation modes and their characteristics, urban transportation planning processes and issues, evaluation of plans, economic analysis, transportation financing, transportation policy and regulations, and urban transportation systems management. RESTRICTIONS: Requires permission of instructor.

CIEG 655  CIVIL INFRASTRUCTURE SYSTEMS  3
Presents unified approach to management of civil infrastructure systems. Topics include analytical methods, development of data collection technologies, life cycle cost, prioritization, and optimization. Software tools for infrastructure management decision making introduced and critical infrastructure protection addressed. Types of infrastructure considered include pavements (roads and airports), bridges, drainage and sewer systems, water supply systems, and power supply facilities.

CIEG 656  REGIONAL ANALYSIS METHODS  3
Analysis of land-use and transportation issues in modern society. Focus on relationships between existing, planned and proposed transportation systems; forecast population and employment distributions. Applications and modeling aspects of these relationships using the latest computer software programs.

CIEG 658  PAVEMENT ANALYSIS AND DESIGN  3
Presents both flexible and rigid pavement design procedures, as well as detailed descriptions of various inputs used in the mechanistic pavement design procedures. PREREQ: CIEG351.

CIEG 661  INTRODUCTION TO OCEAN MODELING  3
Introduction to numerical methods used to solve the equations of ocean motion. Topics range from basic numerical concepts with applications to general transport and shallow-water equations to an overview of turbulence and ocean circulation models that are employed to understand weather and climate. Crosslisted with MAST661. PREREQ: CIEG639, or permission from instructor.

CIEG 668  PRINCIPLES OF WATER QUALITY CRITERIA  3
Toxicological and chemical background and technical basis necessary for understanding the models of water and sediment quality criteria for individual and mixtures of organic chemicals and metals that focus on bioavailability; narcosis models of toxicity, complexation models applied to both the water column and sediments. PREREQ: CHEM 104 (or 103) or permission of instructor.

CIEG 670  PHYSICS OF COHESIVE SEDIMENT  3
Mechanics of fine sediment transport processes in coastal environment; overview of sediment source to sink; bottom boundary layer; mechanics of transport; mixture theory; flocculation; settling and deposition, turbulence-sediment interactions; rheological effects; consolidation and bed erodibility; fluid mud; convective sedimentation; tidal flats. PREREQ: CIEG 305 Fluid Mechanics; MATH 351 Engineering Math I (or equivalent). COREQ: CIEG 639 Ocean Fluid Dynamics (or equivalent).
CIEG 672  
**WATER WAVE MECHANICS***  
3  
Primary emphasis on linear water wave theory and its applications. Shoaling, refraction and diffraction of waves. Basic aspects of wave-structure and wave-bottom interaction. Introduction to basic wave propagation models. May be crosslisted with MAST648. PREREQ: CIEG639.

CIEG 675  
**MATLAB FOR ENGINEERING ANALYSIS***  
3  
Description and usage of commercial Matrix Laboratory (Matlab) software for analyzing multi-dimensional engineering data sets and formulating numerical models of engineering processes.

CIEG 678  
**TRANSPORT AND MIXING PROCESSES***  
3  
Application of fluid mechanics to problems of turbulent mixing and transport of substances in the natural environments; Advection-diffusion processes; Introduction to turbulent flow; Turbulent flow simulation and modeling; Mixing in stratified flow; Mixture and multi-phase flows. Turbulence modulation; Applications to rivers and coastal waters. Numerical model applications. PREREQ: CIEG639 or similar.

CIEG 679  
**SEDIMENT TRANSPORT MECHANICS***  
3  
Mechanics and mathematical modeling of sediment transport in unidirectional and oscillatory flow; sediment properties, initiation of sediment movement, bedload and suspended load transport rates, formation of bed forms and flow resistance, erosion and deposition in the vicinity of structures, and practical applications. PREREQ: CIEG6305

CIEG 680  
**LITTORAL PROCESSES***  
3  
Coastal morphology, equilibrium beach profiles, onshore-offshore response, sediment transport relationships, sand budgets around inlets and along open coasts, modeling of shoreline response, analyses of beach problems and recommendations of remedial measures. PREREQ: CIEG672 and CIEG639.

CIEG 681  
**WATER WAVE SPECTRA***  
3  
Concepts of amplitude and energy spectra, covariances and cross-spectra; linear response functions; use of the Fast Fourier Transform for ocean engineering applications including analysis of one-dimensional and directional spectra, probability of ocean waves and wave forces. RESTRICTIONS: Requires permission of instructor.

CIEG 682  
**NEARSHORE HYDRODYNAMICS***  
3  
The mechanics of waves and currents in the nearshore zone: wave breaking, surf zone dynamics, cross- and long-shore currents, turbulence and bottom boundary layers, infra-gravity and edge waves and nearshore modeling. PREREQ: CIEG672 and CIEG639.

CIEG 684  
**NUMERICAL METHODS FOR COASTAL MODELING***  
3  
Principles of finite difference, finite volume and finite element approaches for basic parabolic, hyperbolic and elliptic partial differential equations. Stability and conservation properties of basic schemes. Coastal engineering applications for surface waves, nearshore circulation, sediment transport and morphology. Introduction to popular models in each area. PREREQ: CIEG672 and CIEG639.

CIEG 686  
**ENGINEERING PROJECT MANAGEMENT***  
3  
Understand the principles of planning, controlling, and evaluating engineering projects. Learn the use of tools and techniques and practice their use on a personal project. Topics include project organization, project budgeting and scheduling, resource allocation and leveling, change control, and communications. RESTRICTIONS: CIEG686 is only open to Civil Engineering Majors and Minors only.

CIEG 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. Crosslisted with MAST693. PREREQ: MEEG690

CIEG 698  
**GROUNDWATER FLOW AND CONTAMINANT TRANSPORT***  
3  
Development and application of models for fluid flow and contaminant transport in porous media. Derivation of governing equations, analytical and numerical solutions, and application to the movement of groundwater and transport of contaminants at an actual field site. PREREQ: CIEG6305 and MATH302 or MATH351, or permission of instructor.

CIEG 801  
**ADVANCED TOPICS IN FINITE ELEMENT ANALYSIS***  
3  
Review of elementary aspects of the finite element method. Application of the method to linear and nonlinear one-, two- and three-dimensional problems in applied mechanics. Basic and advanced numerical methods and computer programming techniques appropriate to finite element analyses (includes two to three computational laboratory classes). PREREQ: CIEG401

CIEG 802  
**ADVANCED STEEL DESIGN***  
3  
Application of ultimate and elastic design procedures to continuous beams and frames, composite members, statically indeterminate trusses and arches. Projects and special topics focus attention to the basis and limitations of codes and specifications for steel structures.

CIEG 811  
**ADVANCED STRUCTURAL DYNAMICS DESIGN***  
3  
Linear and nonlinear dynamic analysis of multiple degree of freedom systems subjected to earthquake, wind and impact loadings; the use of analysis results in design. Computer analysis of complex structural systems; distributed, consistent and lumped mass models; wave propagation; random excitations; and structural control. PREREQ: CIEG611

CIEG 817  
**STABILITY OF STRUCTURES***  
3  
Structural instability phenomena caused by static and dynamic loads. Stability analyses of structures by equilibrium, energy and dynamic methods. Conservative and non-conservative problems. Elastic and non-elastic buckling of beams, frames and arches caused by mechanical and thermal loads. Buckling of continuously supported beams, plates, and shells. Delamination buckling in composites. PREREQ: CIEG212 and MATH302 or MATH351.

CIEG 820  
**INELASTIC BEHAVIOR OF GEOMATERIALS***  
3  
Introduces constitutive laws and numerical methods used to characterize the stress-strain-time behavior of geomaterials. Correlation between laboratory experiments and numerical predictions. Finite element analyses of coupled stress-flow problems (e.g., consolidation), reinforced earth structures and slopes. Discussion of anisotropy, time effects and frictional interfaces. PREREQ: CIEG661 RESTRICTIONS: CIEG662 is highly recommended as a prerequisite.

CIEG 832  
**THEORY OF WASTEWATER TREATMENT***  
3  
Composition of wastes; physical, chemical and biological methods of wastewater treatment; treatment and disposal of sludges produced at wastewater treatment plants. PREREQ: CIEG636

CIEG 833  
**FATE OF ORGANIC POLLUTANTS IN THE ENVIRONMENT***  
3  

CIEG 865  
**CIVIL ENGINEERING SEMINAR***  
0 PF  
Graduate seminar covering current topics in structural, environmental, ocean and transportation engineering.

CIEG 868  
**RESEARCH***  
1-6

CIEG 869  
**MASTER'S THESIS***  
1-6

An independent investigation under supervision of a member of the civil engineering graduate faculty.

CIEG 870  
**OFFSHORE DESIGN***  
3

Naval hydrodynamics, behavior of submerged and floating bodies, and ship waves. Tsunamis and harbor response. PREREQ: CIEG672 and CIEG639

CIEG 871  
**COASTAL STRUCTURES***  
3

Advanced design procedures of coastal structures. Includes statistics and spectra of random sea waves, random sea transformation in the nearshore, design of vertical and rubble mound breakwaters, harbor oscillations and tranquility, and hydraulic model tests.

CIEG 872  
**ADVANCED WATER WAVE MECHANICS***  
3

Development of finite amplitude wave theories such as solitary, conoidal stokes and stream function. Application to coastal and ocean engineering problems. PREREQ: CIEG639, CIEG672

CIEG 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.

CIEG 969  
**DOCTORAL DISSERTATION***  
1-12 PF
### COMPUTER AND INFORMATION SCIENCES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISC 101</td>
<td>PRINCIPLES OF COMPUTING</td>
<td>3</td>
</tr>
<tr>
<td>CISC 103</td>
<td>INTRODUCTION TO COMPUTER SCIENCE WITH WEB APPLICATIONS</td>
<td>3</td>
</tr>
<tr>
<td>CISC 106</td>
<td>GENERAL COMPUTER SCIENCE FOR ENGINEERS</td>
<td>3</td>
</tr>
<tr>
<td>CISC 108</td>
<td>INTRODUCTION TO COMPUTER SCIENCE I</td>
<td>3</td>
</tr>
<tr>
<td>CISC 181</td>
<td>INTRODUCTION TO COMPUTER SCIENCE II</td>
<td>3</td>
</tr>
<tr>
<td>CISC 220</td>
<td>DATA STRUCTURES</td>
<td>3</td>
</tr>
<tr>
<td>CISC 250</td>
<td>BUSINESS TELECOMMUNICATION NETWORKS</td>
<td>3</td>
</tr>
<tr>
<td>CISC 260</td>
<td>MACHINE ORGANIZATION AND ASSEMBLY LANGUAGE</td>
<td>3</td>
</tr>
<tr>
<td>CISC 275</td>
<td>INTRODUCTION TO SOFTWARE ENGINEERING</td>
<td>3</td>
</tr>
<tr>
<td>CISC 303</td>
<td>AUTOMATA THEORY</td>
<td>3</td>
</tr>
<tr>
<td>CISC 304</td>
<td>LOGIC AND PROGRAMMING</td>
<td>3</td>
</tr>
<tr>
<td>CISC 305</td>
<td>COMPUTERS, ETHICS AND SOCIETY</td>
<td>3</td>
</tr>
<tr>
<td>CISC 356</td>
<td>INTELLECTUAL PROPERTY IN THE DIGITAL AGE</td>
<td>3</td>
</tr>
<tr>
<td>CISC 361</td>
<td>OPERATING SYSTEMS</td>
<td>3</td>
</tr>
<tr>
<td>CISC 364</td>
<td>SYSTEM SECURITY</td>
<td>3</td>
</tr>
<tr>
<td>CISC 366</td>
<td>INDEPENDENT STUDY</td>
<td>1-6</td>
</tr>
<tr>
<td>CISC 372</td>
<td>PARALLEL PROGRAMMING</td>
<td>3</td>
</tr>
<tr>
<td>CISC 374</td>
<td>EDUCATIONAL GAME DEVELOPMENT</td>
<td>3</td>
</tr>
<tr>
<td>CISC 401</td>
<td>ELEMENTS OF THE THEORY OF COMPUTATION</td>
<td>3</td>
</tr>
</tbody>
</table>

**CISC 101 PRINCIPLES OF COMPUTING**
Introduces students to the central ideas of computing and computer science including programs, algorithms, abstraction, the internet, and information systems. Instills ideas and practices of computational thinking and engages students in activities that show how computing and computer science change the world. Explores computing as a creative activity and empowers students to apply computational thinking to all disciplines including the arts, humanities, business, social and physical sciences, health, and entertainment.

**RESTRICTIONS:** Does not count toward graduation if taken after any other CISC course. Not open to students with credit for MYS160 or 260, or PREC135.

**CISC 103 INTRODUCTION TO COMPUTER SCIENCE WITH WEB APPLICATIONS**
Principles of computer science illustrated through programming in scripting languages such as JavaScript and VBScript. Topics include control structures, arrays, functions, and procedures. Programming projects illustrate web-based applications.

**RESTRICTIONS:** Open to non-majors. Student may not receive credit for CISC103 after receiving credit for CISC106 or CISC108.

**CISC 106 GENERAL COMPUTER SCIENCE FOR ENGINEERS**
Principles of computer science illustrated and applied through programming in a general-purpose language. Programming projects illustrate computational problems, styles, and issues that arise in engineering.

**COREQ:** MATH241 or any higher level MATH course. **RESTRICTIONS:** Student may not receive credit for both CISC106 and CISC108.

**CISC 108 INTRODUCTION TO COMPUTER SCIENCE I**
Computing and principles of programming with an emphasis on systematic program design. Topics include functional programming, data abstraction, procedural abstraction, use of control and state, recursion, testing, and object-oriented programming concepts. Requires no prior programming experience, open to any major, but intended primarily for majors and minors in computer science or mathematics.

**COREQ:** MATH115, MATH117, or higher math course or math placement. **RESTRICTIONS:** Student may not receive credit for both CISC106 and CISC108.

**CISC 181 INTRODUCTION TO COMPUTER SCIENCE II**
Principles of computer science illustrated and applied through programming in an object oriented language. Programming projects illustrate computational problems, styles and issues that arise in computer systems development and in all application areas of computation.

**PREREQ:** Grade of C- or better in CISC108 or CISC106. **COREQ:** MATH221, MATH241, or a higher level math course or math placement.

**CISC 220 DATA STRUCTURES**
Review of data type abstraction, recursion, arrays, stacks, queues, multiple stacks and linked lists. Emphasis on dynamic storage management, garbage collection, trees, graphs, tables, sorting and searching.

**PREREQ:** A minimum grade of C- in CISC181. **COREQ:** MATH210 or MATH241.

**CISC 250 BUSINESS TELECOMMUNICATION NETWORKS**
Examines technologies of information transmission currently utilized in the business environments and the implications of these technologies upon the development and implementation of information systems. Provides a basic background in the convergence of voice, data and video services into common digital networks. Security issues also considered.

**PREREQ:** CISC181 or MYS160. **RESTRICTIONS:** Degree credit will not be given for both CISC250 and CISC450.

**CISC 260 MACHINE ORGANIZATION AND ASSEMBLY LANGUAGE**
Introduction to the basics of machine organization. Programming tools and techniques at the machine and assembly levels. Assembly language programming and computer arithmetic techniques.

**PREREQ:** A minimum grade of C- in CISC181.

**CISC 275 INTRODUCTION TO SOFTWARE ENGINEERING**
Object oriented software design and development through use of the Java programming language. Topics include team programming, design patterns, graphical user interfaces, software engineering tools (e.g., integrated development environments, version control, build management, bug tracking, automated testing).

**PREREQ:** Minimum grade of C- in CISC220.

**CISC 303 AUTOMATA THEORY**
Automata and formal language theory. Background for advanced applications in compilers, computer networks, operating systems, and natural language processing. Finite automata and regular languages. Push down automata and context free grammars. Turing machines.

**PREREQ:** A minimum grade of C- in both MATH210 and CISC220.

**CISC 304 LOGIC AND PROGRAMMING**
Propositional and predicate logic for general reasoning and advanced applications in knowledge representation in artificial intelligence and database, program correctness and programming semantics. Models, resolution, logic programming, and natural deduction.

**PREREQ:** CISC220, MATH210 (with minimum C- grade in both).  

**CISC 320 INTRODUCTION TO ALGORITHMS**

**PREREQ:** MATH210 and a minimum grade of C- in CISC220.

**CISC 355 COMPUTERS, ETHICS AND SOCIETY**
Explains relationships among information technology, society and ethics by examining issues raised by increasingly widespread use of computers. Topics include ethics for computer professionals, computer impact on factory work, office work, personal privacy and social power distribution.

**RESTRICTIONS:** Cannot be used as a technical elective for CISC or INSY majors or minors.

**CISC 356 INTELLECTUAL PROPERTY IN THE DIGITAL AGE**
Explore economic, philosophical, social, and technical approaches to intellectual property (1500 BCE to present) then will research contemporary IP issues in software, entertainment, the Internet, and biotechnology.

**RESTRICTIONS:** Junior or Senior standing. Cannot be used as a technical elective for CISC or INSY majors or minors.

**CISC 357 FIELD EXPERIENCES IN TEACHING COMPUTING**
1-3
Introduction to computer science teaching methodology which is immediately put into practice in local schools. Lectures hone teaching and classroom skills while examining the state of CS education in terms of pedagogy, AP exams, and K-12 requirements. Students produce written lesson plans, journals, and collaborative projects.

**PREREQ:** CISC101 or CISC103 or CISC106 or CISC108. **RESTRICTIONS:** Student must have sufficient time in their schedule to visit schools weekly between 9am and 3pm. Students must pass a background check that clears them for teaching. Cannot be used as a technical elective by CISC or INSY majors.

**CISC 360 COMPUTER ARCHITECTURE**
Principles and techniques used in the architecture of digital computers. Machine elements and their interrelation. Instruction sets, risc vs cisc, registers, busses and swapping.

**PREREQ:** A minimum grade of C- in CISC220 and CISC260 (or equivalent courses).

**CISC 361 OPERATING SYSTEMS**
Principles and techniques employed in the development of operating systems and their control programs. Includes management of memory, processors, I/O devices.

**PREREQ:** A minimum grade of C- in both CISC220 and CISC260. CPEG222 may be substituted for CISC260. **RESTRICTIONS:** CISC360 recommended as a prerequisite.

**CISC 364 SYSTEM SECURITY**
Concepts in maintaining a secure network of computers connected to the Internet. Topics include information security, classic/common exploits of operating system and networking weaknesses (e.g., buffer overflows, denial of service) and how to prevent them, symmetric and public-key cryptography, digital signatures, wireless LAN security, and firewalls.

**PREREQ:** CISC361

**CISC 366 INDEPENDENT STUDY**
1-6

**CISC 372 PARALLEL PROGRAMMING**
Introduction to parallel programming concepts, methodologies, and tools. Programming techniques for programs that contain code segments which will run simultaneously on multiple processors. Topics include: concurrency, program decomposition, data distribution, communication, load balancing, scalability, locality, granularity, debugging, performance evaluation.

**PREREQ:** CISC220

**CISC 374 EDUCATIONAL GAME DEVELOPMENT**
Experience the software engineering process through creating educational games for youth; open-ended, project-oriented team learning while assisting regional teachers in integrating computing and computational thinking into the classroom; interact with teachers as clients, hone communication skills and experience design-studio-based critiques of your ideas.

**PREREQ:** CISC 220.

**CISC 401 ELEMENTS OF THE THEORY OF COMPUTATION**
General models of computation, formal languages and automata theory and algorithmic unsolvability.

**PREREQ:** CISC303 **RESTRICTIONS:** Credit cannot be received for both CISC401 and CISC601.
CISC 404 LOGIC IN COMPUTER SCIENCE 3
Formal introduction to first-order logic with emphasis on its relevance to computer science. Syntax, semantics, models, formal proofs and results on soundness, consistency, completeness, compactness and undecidability. Automated theorem proving also covered.
PREREQ: CISC304. RESTRICTIONS: Credit cannot be received for both CISC404 and CISC604.

CISC 409 TOPICS IN THEORETICAL COMPUTER SCIENCE 3
Contents vary to coincide with the interests of students and current faculty. PREREQ: CISC401. RESTRICTIONS: Credit cannot be received for both CISC409 and CISC609.

CISC 410 COMPUTATIONAL MATHEMATICS I 3
Floating point numbers; conditioning and stability; LU, Cholesky, and QR factorizations; square and overdetermined linear systems; Newton and quasi-Newton rootfinding methods; piecewise polynomials for interpolation, integration, and finite differences; explicit methods for initial-value problems. Prerequisite: MATH 305, MATH 369, or MATH 351. Students may not receive credit for both MATH 353 and MATH 426. Crosslisted with MATH426. PREREQ: MATH305 or MATH351 or MATH349. RESTRICTIONS: Requires familiarity with computing (e.g., programming language).

CISC 411 COMPUTATIONAL MATHEMATICS II 3
Eigenvalue and singular-value decompositions; power and Krylov subspace iterations; global interpolation and quadrature; methods for boundary-value problems and Poisson’s equation; implicit solvers for stiff problems; method of lines for partial differential equations; diffusion and advection problems. Crosslisted with MATH428. PREREQ: MATH426 or CISC410 or MATH533.

CISC 414 FORMAL METHODS IN SOFTWARE ENGINEERING 3
Formal approaches to the specification, verification, and design of software systems. Topics include representing programs as transition systems; liveness and safety properties; state space reachability; explicit, symbolic and automata-based model checking; temporal logics; symbolic execution; automated theorem-proving; and relational calculus. Learn to use state-of-the-art tools based on these methods, such as the model checker Spin.
PREREQ: CISC304 or equivalent course, or permission of instructor. RESTRICTIONS: Credit cannot be received for both CISC614/CPEG614 and CISC414.

CISC 429 TOPICS IN ALGORITHMS AND COMPLEXITY THEORY 3
Contents vary to coincide with the interests of students and current faculty. RESTRICTIONS: Credit cannot be received for both CISC429 and CISC629.

CISC 436 BIOCOMPUTATIONAL AND BIINFORMATICS 3
Concepts, methodologies, and tools in bioinformatics. Abstraction of biological problems for computational solutions. Genome sequencing and assembly, bio-sequence analysis and comparison and database search, dynamics programming, hidden Markov models, and phylogenetic trees.
PREREQ: CISC220 or permission of instructor.

CISC 437 DATABASE SYSTEMS 3
Physical and logical organization of databases. Data retrieval languages, relational database languages, security and integrity, concurrency, distributed databases.
PREREQ: A minimum grade of C- in CISC220. RESTRICTIONS: Credit cannot be received for both CISC437 and CISC637.

CISC 440 COMPUTER GRAPHICS 3
Computer graphics technology, two- and three-dimensional systems, graphics software systems, modeling and object hierarchy, and animation.
PREREQ: CISC220 and MATH241. RESTRICTIONS: CISC320 recommended. Credit cannot be received for both CISC440 and CISC640.

CISC 442 INTRODUCTION TO COMPUTER VISION 3
Analysis of images and video to recognize, reconstruct, model, and otherwise infer static and dynamic properties of objects in the three-dimensional world. Geometry of image formation; image processing such as smoothing, edge and feature detection, color, and texture; segmentation; shape representation including deformable templates; stereo vision; motion estimation and tracking; techniques for 3-D reconstruction; image registration methods.
PREREQ: CISC220. RESTRICTIONS: Credit cannot be received for both CISC442 and CISC642.

CISC 449 TOPICS IN COMPUTER APPLICATIONS 3
Contents will vary to coincide with the interests of students and current faculty. RESTRICTIONS: Credit cannot be received for both CISC449 and CISC649.
CISC 477 SYSTEMS ADMINISTRATION 3
Introduces students to the internals of UNIX, trouble-shooting system and network problems, hardware and software configuration and installation, and security aspects of hosts on the internet. Multi-operating system integration will also be discussed.
PREREQ: CISC361.

CISC 479 TOPICS IN ARCHITECTURE AND SOFTWARE 3-6
Contents will vary to coincide with the interests of students and faculty.
PREREQ: CISC361. RESTRICTIONS: Credit cannot be received for both CISC479 and CISC679.

CISC 481 ARTIFICIAL INTELLIGENCE 3
Programming techniques for problems not amenable to algorithmic solutions. Problem formulation, search strategies, state spaces, applications of logic, knowledge representation, planning and application areas. May be crosslisted with CGS481. PREREQ: CISC220 with a minimum grade of C-, CISC304. RESTRICTIONS: Credit cannot be received for both CISC481 and CISC681.

CISC 483 INTRODUCTION TO DATA MINING 3
Concepts, techniques, and algorithms for mining large data sets to discover structural patterns that can be used to make subsequent predictions. Emphasis on practical approaches and empirical evaluation. Use of a workbench of data mining tools, such as the Weka toolkit.
PREREQ: CISC-275, or permission of instructor.

CISC 484 INTRODUCTION TO MACHINE LEARNING 3
Development of methods to learn to solve a task using examples. Explore different machine learning algorithms/techniques and discuss their strengths and weaknesses and situations they are or are not suited for. PREREQ: CISC220 and MATH205, or permission of instructor. RESTRICTIONS: Credit cannot be received for both CISC484 and CISC684.

CISC 489 TOPICS: ARTIFICIAL INTELLIGENCE 3
Contents vary to coincide with the interests of students and current faculty. PREREQ: CISC481 or CISC681. RESTRICTIONS: Credit cannot be received for both CISC489 and CISC689.

CISC 601 ELEMENTS OF THE THEORY OF COMPUTATION 3
General models of computation, formal languages and automata theory, and algorithmic unsolvability. PREREQ: A course in which the student was required to prove theorems RESTRICTIONS: Credit cannot be received for both CISC401 and CISC601.

CISC 604 LOGIC IN COMPUTER SCIENCE 3
Formal introduction to first-order logic with emphasis on its relevance to computer science. Syntax, semantics, models, formal proofs and results on soundness, consistency, completeness, compactness and undecidability. Automated theorem proving also covered.
PREREQ: CISC304 equivalent. RESTRICTIONS: Credit cannot be received for both CISC604 and CISC404.

CISC 609 TOPICS IN THEORETICAL COMPUTER SCIENCE 3-12
Contents vary to coincide with the interests of students and current faculty. PREREQ: CISC601. RESTRICTIONS: Credit cannot be received for both CISC609 and CISC409.

CISC 611 SOFTWARE PROCESS MANAGEMENT 3
Software management studies processes and concepts for planning and monitoring all software life-cycle phases. Topics include management models and structures, project planning including scheduling, effort estimation and risk management, project personnel and organization, project control (monitoring, measurement, correction and performance standards), software configuration management, and process description languages and tools. May be crosslisted with CPEG611.

CISC 612 SOFTWARE DESIGN 3
Key software design concepts are introduced. Topics include basic design concepts, principles of good design, design strategies, software architecture and styles of architectural design, and design and architectural notations and languages. Detailed design, including design patterns and component design are also covered. Implementation issues that affect the design, including design support tools and tools for analyzing designs are discussed. May be crosslisted with CPEG612.

CISC 613 SOFTWARE REQUIREMENTS ENGINEERING 3
Rigorous methods to elicit, analyze, and specify the requirements of a software system. The tasks range from identifying stakeholders and their goals producing a precise software specification document. Topics may include data flow diagrams, use cases, UML sequence and collaboration diagrams, finite state machines, requirements for real-time and concurrent systems, entity-relationship diagrams, and logic-based specifications, as well as the analysis of specifications for consistency and completeness. May be crosslisted with CPEG613.

CISC 614 FORMAL METHODS IN SOFTWARE ENGINEERING 3
Formal approaches to the specification, verification, and design of software systems. Topics include representing programs as transition systems; liveness and safety properties; state space reachability; explicit, symbolic and automata-based model checking; temporal logics; symbolic execution; automated theorem proving; and relational calculus. Learn to use state-of-the-art tools based on these methods, such as the model checker Spin. May be crosslisted with CPEG614. RESTRICTIONS: Credit cannot be received for both CISC614 and CISC414.

CISC 615 SOFTWARE TESTING AND MAINTENANCE 3
Study of software testing and maintenance methodologies for modern software. Topics include approaches to automatic test case generation, test oracles, test coverage analysis, regression testing, program understanding, and software maintenance tools. A primary focus will be automation in software testing and maintenance approaches. May be crosslisted with CPEG615.

CISC 621 ALGORITHM DESIGN AND ANALYSIS 3
Emphasis on developing expertise in the design and analysis of algorithms. Equal importance given to techniques and specific algorithms. Particular topics include advanced data structures, graph algorithms, disjoint set manipulation, sorting and selection, amortized analysis, NP-completeness, and matrix and polynomial multiplication.
PREREQ: Undergraduate algorithms and discrete math courses.

CISC 636 COMPUTATIONAL BIOLOGY AND BIINFORMATICS 3
Concepts, methodologies, and tools in bioinformatics. Abstraction of biological problems for computational solutions. Genome sequencing and assembly, bio-sequence analysis and comparison and database search, dynamics programming, hidden Markov models, and phylogenetic trees.
PREREQ: CISC220 or permission of instructor. RESTRICTIONS: Credit can not be earned for both CISC636 and CISC436.

CISC 637 DATABASE SYSTEMS 3
Physical and logical organization of databases. Data retrieval languages, relational database languages, security and integrity, concurrency, distributed databases. PREREQ: CISC220 and CISC304 or equivalent RESTRICTIONS: Credit cannot be received for both CISC637 and CISC437.

CISC 640 COMPUTER GRAPHICS 3
Computer graphics technology, two- and three-dimensional systems, graphics software systems, modeling and object hierarchy, and animation.
PREREQ: CISC220 or equivalent COREQ: CISC320 recommended RESTRICTIONS: Credit cannot be received for both CISC640 and CISC440.

CISC 642 INTRODUCTION TO COMPUTER VISION 3
An introduction to the analysis of images and video in order to recognize, reconstruct, model, and otherwise infer static and dynamic properties of objects in the three-dimensional world. Studies the geometry of image formation; basic concepts in image processing such as smoothing, edge and feature detection, color, and texture; segmentation; shape representation including deformable templates; stereo vision; motion estimation and tracking; techniques for 3-D reconstruction; image registration methods.
PREREQ: CISC220 equivalent RESTRICTIONS: Credit cannot be received for both CISC642 and CISC642.

CISC 649 TOPICS IN COMPUTER APPLICATIONS 3-12
Contents will vary to coincide with the interests of students and current faculty.
RESTRICTIONS: Credit cannot be received for both CISC649 and CISC449.

CISC 650 COMPUTER NETWORKS 3
Foundation principles, architectures, and techniques employed in computer and communication networks. Focuses on mechanisms used in TCP/IP protocol suite. Topics include connection management, end-to-end reliable data transfer, sliding window protocols, quality of service, flow control, congestion control, routing, LANs, framing, error control, analog versus digital transmission, packet versus circuit switching, multiplexing.
May be crosslisted with CPEG651, ELEG651.
PREREQ: An undergraduate level course in computer architecture and operating systems. RESTRICTIONS: Knowledge of probability and statistics recommended.
Credit cannot be received for CISC650 and any of the following courses: CIS250, CPEG419, CIS450, ELEG651.

CISC 651 DATA COMPRESSION IN MULTIMEDIA 3
PREREQ: CISC220, MATH210, MATH241, MATH205, or equivalent.
RESTRICTIONS: Credit cannot be received for both CISC651 and CISC451.
CISC 653  SIMULATION OF COMPUTER NETWORKS 3
Modeling and computer simulation of discrete systems using discrete event simulation techniques. Application to the performance evaluation and modeling of computer networks and networking protocols. Study and use of simulation systems, such as OPNET, Qualnet, and ns-2. PREREQ: CISC450 or CISC560. RESTRICTIONS: Credit cannot be received for both CISC653 and CISC453.

CISC 659  TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING AND NETWORKS 3
Contents vary to coincide with the interests of students and faculty. PREREQ: CISC650 RESTRICTIONS: Credit cannot be received for both CISC659 and CISC459.

CISC 662  COMPUTER SYSTEMS: ARCHITECTURE 3
Recent advances in computer architecture and their impact on architectural design. Multicomputer and multiprocessor architectures. Parallel machines. PREREQ: CISC360 or equivalent RESTRICTIONS: Credit cannot be received for both CISC662 and CISC462.

CISC 663  OPERATING SYSTEMS 3
Comparison and analysis of strategies for the management of memory, processors, I/O devices and file systems. PREREQ: CISC260 or equivalent.

CISC 664  INTRODUCTION TO NETWORK SECURITY 3
Detailed, in-depth overview of pressing network security problems and discusses potential solutions. Covers a broad variety of security topics, such as cryptography, authentication, denial-of-service attacks, worms, viruses, etc. Lecture and optional reading provide background information on the key network security concepts, and course projects create opportunity to exercise concepts learned in class. PREREQ: CISC450 or CISC560. RESTRICTIONS: Credit cannot be received for both CISC664 and CISC464.

CISC 665  INTRODUCTION TO CYBERSECURITY 3
Introduction to computer and network security and covers the foundation security policies and methods to provide confidentiality, integrity, and availability, as well as cryptography, auditing, and user security. Topics are reinforced with hands-on exercises run in a virtual machine environment. Crosslisted with CPE665.

CISC 666  SPECIAL PROBLEM 1-12

CISC 670  PROGRAMMING LANGUAGES 3
Selection, use and implementation of appropriate language(s) for given problems. Syntax, semantics, pragmatics, parameter passing and abstract data types. PREREQ: CISC303 or equivalent. RESTRICTIONS: Credit cannot be received for both CISC670 and CISC470.

CISC 672  COMPILER CONSTRUCTION 3
Advanced design and implementation of programming language translators. Emphasis on parsing methods, run-time, storage management techniques, code generation and optimization. PREREQ: CISC320 or equivalent, and CISC601 recommended. RESTRICTIONS: Undergraduates must obtain instructor’s permission. Credit cannot be received for both CISC672 and CISC471.

CISC 673  PROGRAM ANALYSIS AND TRANSFORMATION 3
Analysis and transformation of software with applications to code optimization and software engineering. Topics include control flow analysis, advanced program representations, intraprocedural and interprocedural data flow analysis, and code improving transformations. PREREQ: CISC672, or permission of instructor.

CISC 675  SOFTWARE ENGINEERING PRINCIPLES AND PRACTICES 3
Understand and apply a complete modern software engineering process. Topics include requirements analysis, specification, design, implementation, verification, and project management. Real-life team projects cover all aspects of software development lifecycle, from requirements to acceptance testing. Use of formal methods in the specification, design, and verification of software will be explored. PREREQ: By permission of instructor only. RESTRICTIONS: Credit cannot be received for both CISC475 and CISC675.

CISC 681  ARTIFICIAL INTELLIGENCE 3
Programming techniques for problems not amenable to algorithmic solutions. Problem formulation, search strategies, state spaces, applications of logic, knowledge representation, planning and application areas. May be crosslisted with CS681. PREREQ: CISC220 and CISC304 or equivalent. RESTRICTIONS: Credit cannot be received for both CISC681 and CISC481.

CISC 683  INTRODUCTION TO DATA MINING 3
Concepts, techniques, and algorithms for mining large data sets to discover structural patterns that can be used to make subsequent predictions. Emphasis on practical approaches and empirical evaluation. Use of a workbench of data mining tools, such as the Weka toolkit. RESTRICTIONS: Credit cannot be received for both CISC683 and CISC483.

CISC 684  INTRODUCTION TO MACHINE LEARNING 3
Development of methods to learn to solve a task using examples. Explore different machine learning algorithms/techniques and discuss their strengths and weaknesses and situations they are or are not suited for. May be crosslisted with BINF684. PREREQ: Basic background in probability and statistics. RESTRICTIONS: Credit cannot be received for both CISC484 and CISC684.

CISC 689  TOPICS: ARTIFICIAL INTELLIGENCE 3-12
Contents vary to coincide with the interests of students and faculty. Crosslisted with BINF689. PREREQ: CISC681 RESTRICTIONS: Credit cannot be received for both CISC689 and CISC489.

CISC 691  SOFTWARE ENGINEERING PRACTICUM 3
Technical practicum guided by the individual student’s interests. The student will contribute a significant software engineering project either on campus or in association with an off-campus private business or government agency. Must be arranged with, and approved in advance by, a CIS or ECE faculty member. May be crosslisted with CPE691.

CISC 699  GRADUATE INTERNSHIP 1 PF
On-the-job experience performing technical computer science related work. RESTRICTIONS: Requires permission of the instructor.

CISC 801  ADVANCED COMPUTABILITY THEORY 3
Advanced abstract computability (or recursive function) theory with emphasis on the tools underpinning research in the area. Topics include universal programming systems, complexity results, oracular computations and quantifier hierarchies, classification of algorithmically enumerable sets, machine self-reference and priority arguments. PREREQ: CISC601.

CISC 805  COMPUTABILITY THEORETICAL LEARNING 3
Mathematically circumscribes the absolute boundaries of what algorithms can do about learning grammars for languages and programs for functions. Proves results in the recursion-theoretic theory of machine learning. Provides interpretations of results regarding human language learning and philosophy of science. PREREQ: CISC601.

CISC 809  ADVANCED TOPICS IN THEORETICAL COMPUTER SCIENCE 3-12
Contents vary to coincide with the interests of students and faculty. PREREQ: CISC601.

CISC 822  ALGEBRAIC ALGORITHMS 3

CISC 829  ADVANCED TOPICS IN ALGORITHMS AND COMPLEXITY THEORY 3-12
Contents vary to coincide with the interests of students and faculty.

CISC 841  ALGORITHMS IN BIOINFORMATICS 3
Advanced topics in current bioinformatics research, such as hidden Markov models, kernel based methods, and bayesian based analysis with applications to functional annotation, structural prediction, and biological networks inferences. PREREQ: CISC436 or CISC636 or permission of instructor.

CISC 884  COMPUTATIONAL BIOMEDICINE 3
Survey methods and approaches in algorithms, statistics and machine learning, along with their current applications in bio- and medical- informatics. May be crosslisted with BMGEB44. RESTRICTIONS: Should have some background in basic probability and statistics, and background in computing (algorithms). For students outside CIS, Biomedical Engineering or Bioinformatics, permission from the instructor.

CISC 899  ADVANCED TOPICS IN COMPUTER APPLICATIONS 3-12
Contents vary to coincide with the interests of students and faculty. RESTRICTIONS: Requires permission of instructor.
CISC 852 COMPUTER NETWORK PERFORMANCE 3
Performance analysis of computer network and network protocols. Introduction to queuing theory, stochastic processes, Markov chains, and various queuing models. Open and closed queuing networks. Analysis of ARQ retransmission strategies, multi-access communication, routing, flow control, and congestion control schemes. PREREQ: CISC650 or equivalent.

CISC 853 NETWORK MANAGEMENT 3
Introduction to network management concepts. Network management architectures and protocols: the Internet and OSI frameworks, management functionalities, management domains and objects, protocols and services (SNMP, CMIS/P). Design of management agents and clients. Concepts of performance management, fault management, configuration management and other management applications. PREREQ: CISC650.

CISC 856 TCP/IP AND UPPER LAYER PROTOCOLS 3
Advanced principles and techniques of the TCP/IP protocol suite. Emphasis on network, transport and application layers, and recent new protocols as proposed by the IETF. Examples: FTP, SMTP, telnet, NTP, HTTP, DNS, Multicast, DHCP, ECN, ICMP. PREREQ: CISC650.

CISC 859 ADVANCED TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING NETWORKS 3-12
Contents vary to coincide with the interests of students and faculty. PREREQ: CISC650.

CISC 861 WIRELESS NETWORKS AND MOBILE COMPUTING 3
Provides an in-depth study of networking protocol and system software in wireless networks and mobile computing. Topics include MAC layer and 802.11, ad hoc networks, sensor networks, GloMoSim simulation package, Mobile IP, Cellular IP, wireless TCP, middleware for mobile computing, and 3G wireless networks. PREREQ: CISC650.

CISC 864 RESEARCH TOPICS IN NETWORK SECURITY 3
Focuses on research and emphasizes reading and writing of technical papers, and project work. Covers a variety of network security topics, such as denial-of-service, worm and virus attacks, privacy, anonymization techniques, IP spoofing, social engineering, etc. PREREQ: CISC450 or CISC650.

CISC 866 SPECIAL PROBLEM 1-12

CISC 868 RESEARCH 1-9
Upper-division graduate research oriented toward a student's potential master's thesis or Ph.D. dissertation.

CISC 869 MASTER'S THESIS 1-6

CISC 873 COMPILING FOR ADVANCED ARCHITECTURES 3
Techniques for generating code for advanced uniprocessor and multiprocessor architectures. Topics include register allocation, code generation for pipelined, superscalar, VLIW architectures, dependence analysis, locality transformations, compiling for shared memory, message passing, distributed shared memory and multi-threaded architectures. PREREQ: CISC662 or previous course in compilers, and CISC662 or previous course in computer architecture. RESTRICTIONS: CISC872 is recommended.

CISC 875 IMPLEMENTING OBJECT ORIENTED LANGUAGES 3
Program analysis and code generation for object oriented languages. Program analysis in the presence of polymorphism, threads, exceptions, templates and multiple inheritance. Compiling high-level languages to virtual machines (like JVM) and compiling virtual machine codes to register instruction sets. Garbage collection and memory management. PREREQ: CISC672 or previous compiler course and exposure to object oriented programming. RESTRICTIONS: CISC872 is recommended.

CISC 879 ADVANCED TOPICS IN ARCHITECTURE AND SOFTWARE SYSTEMS 3-12
Contents vary to coincide with the interests of students and faculty. PREREQ: CISC662 or CISC663.

CISC 882 NATURAL LANGUAGE PROCESSING 3
Introduction to computational models of syntax, semantics and pragmatics for natural language understanding. Emphasis on design of English interfaces to data bases and ill-formed input. PREREQ: CISC681.

CISC 883 NATURAL LANGUAGE GENERATION 3
Current research directions in generation, models of generation, differences between generation and understanding, text structure and coherence, grammars for generation. PREREQ: CISC681 and CISC682.

CISC 885 DISCOURSE AND DIALOGUE 3
Pragmatic issues involved in developing intelligent discourse and dialogue systems. Topics: speech acts, characteristics of a coherent dialogue, explicit versus implicit communication, discourse models, planning and plan recognition, ill-formed input, cooperative responses, user models and default reasoning. PREREQ: CISC681.

CISC 886 MULTI-AGENT SYSTEMS 3
Introduction to the field of Multi-Agent Systems, examining issues that arise when groups of self-interested or cooperating autonomous agents interact to solve shared problems. Issues include reasoning about the knowledge and beliefs of other agents, communication and negotiation, computational organization, coordination and control. PREREQ: CISC681 or equivalent.

CISC 887 INTERNET INFORMATION GATHERING 3
Approaches to information gathering, filtering, and integration including work in the heterogeneous database, information retrieval and agent-oriented communities. Text indexing, vector-based and probabilistic retrieval, semantic web technologies, wrappers and mediators, query planning and optimization, collaborative filtering, information agents, applications. PREREQ: CISC681 or equivalent.

CISC 888 MACHINE LEARNING 3
Concepts and algorithms underlying computer programs that learn from data to solve a task will be discussed. A range of modern machine learning algorithms will be covered. RESTRICTIONS: Requires permission of instructor.

CISC 889 ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE 3-12
Contents vary to coincide with the interests of students and faculty. PREREQ: CISC681.

CISC 890 COLLOQUIUM: COMPUTER SCIENCE 0 PF
Weekly lectures by faculty and visiting researchers provide a broad overview of the scope as well as an insight into significant results of current research in computer science.

CISC 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.

CISC 969 DOCTORAL DISSERTATION 1-12 PF

COMPARATIVE LITERATURE

CMLT 207 GREAT WRITERS OF THE WESTERN WORLD I: 1100-1700 3
Studies writers such as Dante, Chaucer, Rabelais and Cervantes, in translation. May be crosslisted with ENGL211. PREREQ: ENGL110

CMLT 208 GREAT WRITERS OF THE WESTERN WORLD II: 1650-1950 3
Studies writers such as Moliere, Voltaire, Goethe, Dostoevski, Thomas Mann and Herman Hesse, in translation. May be crosslisted with ENGL212. PREREQ: ENGL110

CMLT 217 INTRODUCTION TO FILM 3
Focuses on different techniques of acting, mise-en-scene, cinematography, editing, sound and color to assess how films encourage audiences to respond in the ways they do. Crosslisted with ENGL217. PREREQ: ENGL110

CMLT 218 INTRODUCTION TO DRAMA 3
Representative masterworks from the classical era to the present. Crosslisted with ENGL208. PREREQ: ENGL110

CMLT 219 INTRODUCTION TO THE NOVEL 3
Representative masterworks of fiction, emphasizing those of Europe and America. Crosslisted with ENGL209. PREREQ: ENGL110

CMLT 316 CLASSICAL MYTHOLOGY: GODS, HEROES, AND MONSTERS 3
Cosmological myths and heroic sagas in the literature and art of Greece and Rome. The influence of the mythology in later art and literature. Crosslisted with FLIT316.
CMLT 317  FILM HISTORY  3
History of American or various foreign national cinemas.
Crosslisted with ENGL317. PREREQ: ENGL110. RESTRICTIONS: May be repeated for credit when topics vary.

CMLT 318  STUDIES IN FILM  3
Special topics such as film genres, major directors and Soviet cinema.
Crosslisted with ENGL318. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

CMLT 320  VARYING AUTHORS AND GENRES  3
Cultural, especially cross-cultural and/or interdisciplinary studies with primary emphasis on the aesthetic context of the announced topic, e.g., Nordic Saga and Myth; Courty Love; and the European Postwar Novel.
Crosslisted with FLIT320. RESTRICTIONS: May be repeated for credit when topics vary.

CMLT 321  MEDIEVAL LITERATURE AND CULTURE  3
Study of selected topics in medieval literature (romance, Chaucer’s contemporaries, drama). Texts usually read in English translations. Emphasis on medieval culture as a European phenomenon. Variable content.
Crosslisted with ENGL321. PREREQ: ENGL110

CMLT 322  TOPICS: CLASSICAL LITERATURE IN TRANSLATION  3
Special topics in Greek and Roman culture and civilization. Particular areas and writers to be announced, e.g., ancient epic, ancient drama, Greek literature in translation.
Crosslisted with FLIT322. RESTRICTIONS: May be repeated for credit when topics vary.

CMLT 330  VARYING AUTHORS, THEMES, AND MOVEMENTS  3
Cultural, especially cross-cultural, study with primary emphasis on the historical development of the announced area, e.g., The Faust Theme in Western Literature, Dante Through the Ages, Don Juan, and the Transformation of a Myth. See http://primus.nss.udel.edu/CoursesSearch/ for topics.
Crosslisted with FLIT330. RESTRICTIONS: May be repeated three times for credit when topics vary.

CMLT 341  THEATRE/DRAMA: CLASSIC/MEVAL  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.
Crosslisted with THEA341.

CMLT 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.
Crosslisted with THEA342.

CMLT 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.
Crosslisted with THEA343.

CMLT 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.
Crosslisted with THEA344.

CMLT 360  HUMANITIES COLLOQUIUM  3

CMLT 361  STUDIES IN LITERARY CRITICISM AND THEORY  3
Study of problems in textual interpretation and aesthetics from the ancient world through the present, with attention to both the principal movements in critical theory and the social and philosophical contexts of interpretation. Content varies by expertise of instructor.
Crosslisted with ENGL361. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

CMLT 366  INDEPENDENT STUDY  1-3

CMLT 385  STUDIES IN LITERARY CRITICISM AND THEORY  3
Studies in selected topics in literary criticism and critical theory.
Crosslisted with ENGL385. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

CMLT 390  HONORS COLLOQUIUM  3

CMLT 466  INDEPENDENT STUDY  1-3

COMM 200  HUMAN COMMUNICATION SYSTEMS  3
Analysis of various human communication systems which may include interpersonal, organizational and/or mass.
RESTRICTIONS: May be repeated up to 3 times when topics vary.

COMM 204  GENDER AND COMMUNICATION  3
Deals with gender differences in communication in varied contexts, such as conflict, marriage, family, friendship, and work.
May be crosslisted with WOMS204.

COMM 206  SEX, VIOLENCE, AND THE MEDIA  3
Examine the issues surrounding the prevalence of sex and violence in the media. Topics include free speech/pres decisions and their impact, why people watch, the possible effects, and the market forces that encourage corporations to carry such content.

COMM 212  ORAL COMMUNICATION IN BUSINESS  3
Includes an analysis of the types and principles of the communication inherent in the business and professional setting; a concentration upon the development of presentational skills: analyzing audiences, questioning, interviewing, researching, supporting, organizing and delivering information; an opportunity to develop and present materials within dyads, small groups and public contexts.
RESTRICTIONS: Not open to communication and communication interest majors.
Credit not given for both COMM212 AND COMM350.

COMM 227  FAMILY COMMUNICATION  3
Introduces students to the area of family communication. Gain knowledge about basic theories of family communication and learn to apply theories and research to real-world contexts.

COMM 245  MASS COMMUNICATION AND CULTURE  3
The relationship between media and culture; how media affect culture (i.e., socialization and role modeling); and exploration of new forms of mass communication.

COMM 252  COMMUNICATING EFFECTIVELY  1 PF
Designed to teach students the fundamentals of written communication techniques that are used in communication industries, such as broadcast journalism, public relations, and organizational communication.

COMM 256  PRINCIPLES OF COMMUNICATION THEORY  3
Introduction to theories and research in communication including a survey of the areas of the field.

COMM 263  COMMUNICATIVE BEHAVIOR AND CULTURE  3
Communicative processes in other cultures as well as subcultures in the US will be discussed. Students will become more mindful and aware of their own cultural patterns as well. Difficulties in cross cultural communication will also be discussed.

COMM 284  GENDER, CULTURE AND DIGITAL MEDIA  3
Explores the relationship between gender, culture, and digital media.
Crosslisted with WOMS284.

COMM 301  INTRODUCTION TO COMMUNICATION RESEARCH METHODS  3
The conceptual bases of research methodology: formulating questions, designing, conducting and analyzing research.
PREREQ: COMM256 or COMM245 or COMM330. RESTRICTIONS: Not open to freshmen.

COMM 305  TOPICS: COMMUNICATION AND POLITICS  3
Topics vary and focus on significant areas of political communication with an emphasis on content, trends, processes, theories, and effects. Topics may include political entertainment, news, political advertising and campaigning, ethics, public opinion, or audience research.
COMM 306  DIGITAL TECHNOLOGY IN POLITICS  3
Focuses on how technology influences and is used in political campaigns, public policy debates, governance, and public opinion, as well as how politics shapes technological development, processes, and policy. Special attention given to synergy among political actors, media, non-governmental organizations and citizens in shaping, consuming, and producing communication technology and policy.

COMM 309  INTRODUCTION TO PUBLIC RELATIONS  3
Examination of the public relations process, practices and principles in various settings, including corporations, non-profit organizations, educational institutions and government. Insights are gained through case studies and interviews with public relations professionals.

COMM 311  PUBLIC RELATIONS WRITING  3
Development of writing skills with emphasis on clarity, conciseness, color, organization and flow. Application of skills in various public relations formats (news releases, features, profiles, brochures, etc.) geared to specific audiences and appropriate channels.
PREREQ: COMM309.

COMM 313  COMMUNICATION PRINCIPLES IN ADVERTISING  3
Provides a comprehensive overview of the marketing function, emphasizing integrated marketing communication. Includes historical perspective and current advertising and promotion principles and practices. Combines both individual and small team projects, such as developing an Integrated Marketing Communication campaign.

COMM 318  TOPICS IN MASS COMMUNICATION  3
Focus on introductory areas of study in mass communication. RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 319  TOPICS IN POLITICS AND BROADCAST JOURNALISM  3
Topics vary and may include the influence of the media on foreign policy, the responsibility of the media on foreign policy or for policy failures or successes. May be crosslisted with POSC319. RESTRICTIONS: May be repeated up to three times for credit when topics vary.

COMM 324  ELECTRONIC MEDIA PRODUCTION  3
Foundational concepts and skills to be built upon in subsequent courses in broadcast production/broadcast news sequences. Introduction to program content planning, writing for visual media, studio equipment, field equipment, and non-linear editing.
RESTRICTIONS: OPEN TO COMI & COMM Majors or Permission of Instructor. Serves as suggested prerequisite for COMM326, COMM388, and COMM425 (News Documentary).

COMM 325  STUDIO TELEVISION PRODUCTION  3
Television as a mass communication medium. Background, programming, production and studio procedures in educational television, broadcasting and closed circuit. Laboratory observation and practices.

COMM 326  FIELD TELEVISION PRODUCTION  3
Students gain practical knowledge of field television news production and utilize this knowledge to conceptualize, shoot, write, and edit videos, while working on a production deadline.
RESTRICTIONS: Suggested prerequisite - COMM324.

COMM 327  PRODUCTION LABORATORY I  1-6 PF
Practice of production techniques.
RESTRICTIONS: Permission required from department.

COMM 328  PRODUCTION LABORATORY II  1-6 PF
Further practice of production techniques.
RESTRICTIONS: Permission required from department.

COMM 329  BROADCAST NEWSWRITING  3
Emphasizes broadcast newswriting fundamentals and comparisons to other forms of writing. Includes news judgment, news gathering, and news editing, as well as integration of current events. May be crosslisted with JOUR329. RESTRICTIONS: COMM and COMI majors not minoring in JOUR.

COMM 330  COMMUNICATION AND INTERPERSONAL BEHAVIOR  3
Introduces key principles of interpersonal communication and discusses their application across diverse contexts.

COMM 337  POLICY COMM LECTURE SERIES  1 PF
This lecture series focuses on various thematic issues in political communication and campaign politics to highlight the University of Delaware’s place at the epicenter of politics. The lectures are given by UD scholars and national political practitioners in a variety of fields. May be crosslisted with LEAD337, POSC337, UAPP337.

COMM 340  POLICIES AND THE MEDIA  3
Political roles of the media in socialization, political competence, agenda setting, the electoral process and political crises. Emphasis on media-political system interaction and its import in a democratic society.
Crosslisted with PSOC340. RESTRICTIONS: Open to majors only.

COMM 341  THEORIES OF INTERPERSONAL COMMUNICATION  3
Survey of concepts and theories in interpersonal communication. Focuses on dyadic interaction and relationships as created, maintained, and modified through verbal and nonverbal behavior.

COMM 343  TOPICS IN INTERPERSONAL COMMUNICATION  3
Focuses on introductory areas of study in interpersonal communication. RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 345  LEGAL ISSUES OF THE MASS MEDIA  3
Survey of legal issues affecting the development and performance of the mass media. The foundation of American communications law outlined through the study of First Amendment theory, its origin and development. Legal issues concerning libel, obscenity, copyright and broadcast regulation discussed. May be crosslisted with LEST345.

COMM 350  PUBLIC SPEAKING  3
Analyzes and applies theory and research in public speaking. Develops skills in preparation, presentation and evaluation of speeches. Includes classroom performances.

COMM 351  ORAL COMMUNICATION FELLOWS  3
Oral Communication Fellows training.
PREREQ: COMM350 RESTRICTIONS: Enrollment by department invitation only.

COMM 364  INTERNSHIP  1-3 PF
Practical, on-the-job training in the student’s field of interest: i.e., interpersonal, mass media, public relations or organizational communication.
RESTRICTIONS: Offered in spring and fall semesters only. Open to junior and senior communication majors only. May be repeated 2 times for credit.

COMM 366  INDEPENDENT STUDY  1-3

COMM 370  THEORIES OF MASS COMMUNICATION  3
An examination of the foundations and development of theories of mass communication. Specific Areas of study include media, society and the individual, media violence, cultivation theory, personal influence, social learning theory, diffusion theory and general media effects.

COMM 388  VIDEO PRODUCTION PRACTICUM  1-4
Involves intensive work on specific productions. Includes practice in various aspects of video production: development, direction, management, production, and editing.
RESTRICTIONS: Requires permission of instructor. May be repeated for eight credits.

COMM 401  CAREERS IN COMMUNICATION  1 PF
Offers insights into the many careers open to those with communication degrees and includes guest lectures from successful alumni. Provides strategies for career development.
RESTRICTIONS: Open to junior and senior communication majors only.

COMM 408  NEW MEDIA PROJECT DEVELOPMENT  3
Application of communication research processes to designing new media (e.g., web sites, streaming video, electronic communication, interactive media) for a client. Involves conducting research for planning, developing strategies, designing prototypes, and making recommendations for implementation and evaluation.
PREREQ: ART307 and CISC103 OR CISC181.

COMM 409  PUBLIC RELATIONS CAMPAIGN PLANNING  3
Comprehensive recap of the Integrated Marketing Communication function, with an emphasis on public relations research, objectives, strategies, integrated tactics, and campaign evaluation. Utilizes a small team “service learning” setup, wherein the team adopts a community non-profit organization and works closely with Board and staff members to produce and present a comprehensive public relations campaign plan.
PREREQ: COMM309 RESTRICTIONS: Not open to COMI majors.

University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015
COMM 413  PUBLIC RELATIONS MANAGEMENT  3
Focuses on case studies and tactics that public relations practitioners need to
know in corporate, non-profit, government, education, agency, entertainment, or
media settings. Includes a strong emphasis on social media and e-portfolio
development.
PREREQ: COMM309. RESTRICTIONS: Not open to COMI majors.

COMM 417  COMMUNICATION AND THE MANAGEMENT OF CONFLICT  3
An overview of communication and the conflict process in face-to-face interaction.
Emphasis on theories concerning the structure, analysis, and management of
conflict situations.

COMM 418  TOPICS IN MASS COMMUNICATION  3-9
Current directions in mass communication theory and practice including new
technologies, politics, broadcast programming and research, advertising and
audience responses to media content.
RESTRICTIONS: Not open to COMI majors. May be repeated three times for credit
when topics vary.

COMM 421  INTERCULTURAL COMMUNICATION  3
Enhances students' understanding of cultures, communication and intercultural
communication processes. In addition, communicative strategies for improving
intercultural communication is discussed.
RESTRICTIONS: Some sections offered in Madrid, Spain and Costa Rica.

COMM 422  COMMUNICATION, ADVERTISING, AND THE CONSUMER  3
Introduction to the content of advertising, including portrayals of gender, race
and sexuality. Investigate the relationship between advertising and the individual
consumer, particularly what advertising cognitive effects can be and how they
may result in behavioral effects.
RESTRICTIONS: Not open to COMI majors.

COMM 424  MEDIA MESSAGE ANALYSIS  3
Examination of methodology used to study media content and effects. Focus on
past and ongoing research in broadcast, nonbroadcast and print media. Method of
how to conduct and assess research relating to mass media.

COMM 425  ADVANCED TOPICS IN POLITICS AND BROADCAST JOURNALISM  3-9
Topics vary and may include influence of crisis news on national and international
politics, effectiveness of political documentaries and ethical and historical
underpinnings of broadcast journalism.
May be crosslisted with POSC425. RESTRICTIONS: Not open to COMI majors. May
be repeated for nine credits when topics vary. When topic is News Documentary,
COMM324 suggested prerequisite.

COMM 427  BROADCAST NEWS  4
Communication students learn the pressures and standards of broadcast news
while writing and producing a scheduled studio TV program. Emphasis on writing
news for broadcast, program story-selection issues, video selection, interviewing
techniques, professionalism. Students produce a weekly news program in the lab.
RESTRICTIONS: Not open to COMI majors.

COMM 440  TOPICS IN INTERPERSONAL COMMUNICATION  3
Topics vary and focus on significant areas of theory and research in interpersonal
communication. Topics may include nonverbal communication, lifespan
communication and communication in intimate relationships.
May be crosslisted with WOMS440. RESTRICTIONS: May be repeated three times
for credit when topics vary.

COMM 442  TOPICS IN ORGANIZATIONAL COMMUNICATION  3-9
Focuses on significant areas of theory and research in organizational
communication. Topics may include gender, communication, or interpersonal
relations in organizations, such as superior/subordinate relationships.
May be crosslisted with PSYC443, WOMS442. RESTRICTIONS: May be repeated
for up to nine credits when topics vary.

COMM 443  COMMUNICATION AND EMOTION  3
Introduces students to the role emotion plays in interpersonal communication and
how communication influences our feelings. The course presents students with
skill building exercises and writing assignments that are designed to put what they
learn in the classroom into action in the real world.
RESTRICTIONS: COMM majors only.

COMM 444  GLOBAL AGENDA  3
Seminar survey of current geopolitical problems facing the US government and
global news media. Guest lecturers and practitioners in diplomacy and the
international media explore the problems, US foreign policy and media influence
upon both.
Crosslisted with POSC444. RESTRICTIONS: May be repeated for credit when
topics vary.

COMM 447  NATIONAL AGENDA  3
Seminar offered in conjunction with speaker series focused on current policy and
political problems facing the United States. Guest lecturers, office holders and
candidates, political and media practitioners explore the problems and their
implications for the nation and for campaigns and decision making.
Crosslisted with POSC447.

COMM 450  MASS COMMUNICATION EFFECTS  3
Examines history and nature of research on effects of mass media, particularly
television, in such areas as attitude change, socialization, role modeling and sex
and violence.
PREREQ: COMM370.

COMM 452  COMMUNICATION AND PERSUASION  3
An examination of how influence is created and resisted through communication
in various settings, including personal relationships, public relations, advertising
and political campaigns. Emphasis on contemporary theories of persuasion and
attitude change, with applications to the various content areas studied.
RESTRICTIONS: Not open to COMI majors.

COMM 453  HEALTH COMMUNICATION  3
This course examines theories and methods for studying relationships between
media and health. Topics include media portrayals of health issues; public
engagements with health information and technologies; and the role of media in
health promotion.

COMM 454  CHILDREN AND THE MASS MEDIA  3
Mass media research and theory as they relate to children. Substantive areas
include children's use and comprehension of media, content of children's
television programming, television and the family, children and advertising and
the media's contribution to social values and roles.

COMM 456  COMMUNICATION IN ORGANIZATIONS  3
Introduction to concepts and research related to communication processes in
organizational settings. Both traditional and interpretive approaches are
emphasized.

COMM 458  SCIENCE COMMUNICATION  3
This course examines how scientists communicate with journalists and citizens;
how news and entertainment media present science and scientists; how messages
about science shape public perceptions; and how citizens engage with scientific
issues.

COMM 466  INDEPENDENT STUDY  1-3

COMM 468  UNDERGRADUATE RESEARCH IN COMMUNICATION  1-6
Undergraduate research in area of communication conducted on or off campus,
out of class, and under supervision of faculty member.
RESTRICTIONS: Open to junior and senior communication majors only. Requires
permission of instructor.

COMM 476  SOCIAL MEDIA AND COMMUNICATION  3
Focus on how and why people use social media. Various social media platforms
will be explored and their effect on communicative processes will be examined.
RESTRICTIONS: COMM majors only.

COMM 485  ANALYSIS OF FACE-TO-FACE COMMUNICATION  3
An examination of methods for analyzing face-to-face interaction, message
construction, and message interpretation.

COMM 486  MULTIMEDIA LITERACY  3
Defines multimedia and discusses its impact on society. Surveys applications
across the curriculum and reflects on the effects of multimedia on current
teaching practice. Provides a multimedia toolbox and shows how to use it to
create and publish multimedia applications on the Internet. Discusses multimedia
frontiers, emerging technology and societal issues including human impact,
regulation, copyright, fair use, equity, cost and universal access.
Crosslisted with EDUC485.

COMM 490  HONORS CAPSTONE  3
This course provides a capstone experience for Communication Honors majors.
RESTRICTIONS: Restricted to Communication Honors majors.

COMM 601  EPISTEMOLOGY AND THEORY IN COMMUNICATION  3
General issues in the philosophy of knowledge and science critical for the
understanding of theoretical conceptions and a comprehensive survey of theories
in communication.
RESTRICTIONS: Open to Communication graduate students only.
COMM 603 COMMUNICATION RESEARCH METHODS - PROCEDURES 3
Introduction to communication research methods including general research procedures, sampling, laboratory research and experimental design, survey research, field research, content analysis and longitudinal research. Includes an introduction to using the computer in research.
RESTRICTIONS: Open to Communication graduate students only.

COMM 604 COMMUNICATION RESEARCH METHODS - ANALYSIS 3
Introduction to the tools and techniques of data analysis in communication research including descriptive statistics, hypothesis testing, inferential statistics, as well as advanced statistical procedures.
RESTRICTIONS: Open to Communication graduate students only.

COMM 609 PUBLIC RELATIONS CAMPAIGN PLANNING 3
Comprehensive recap of the Integrated Marketing Communication function, with an emphasis on public relations research, objectives, strategies, integrated tactics, and campaign evaluation. Utilizes a small team "service learning" setup, wherein the teams adopt a community non-profit organization and work closely with Board and staff members to produce and present a comprehensive public relations campaign plan.
RESTRICTIONS: Open to graduate students only.

COMM 610 ORGANIZATIONAL COMMUNICATION THEORY 3
An examination of major theories of organizations including functionalist paradigm; interpretive paradigm; neoclassical paradigms (classical, social exchange systems theory and structural systems theory); and modern paradigms (technological systems theory, adaptive systems theory and integrative organizational theory).
RESTRICTIONS: Open to Communication graduate students only.

COMM 613 ADVANCED PUBLIC RELATIONS MANAGEMENT 3
Course focuses on case studies and tactics that public relations practitioners need to know in corporate, non-profit, government, education, agency, entertainment, or media settings. Includes a strong emphasis on social media and e-portfolio development.
RESTRICTIONS: Open to graduate students only.

COMM 617 COMMUNICATION AND THE MANAGEMENT OF CONFLICT 3
An overview of communication and the conflict process in face-to-face interaction. Emphasis on theories concerning the structure, analysis, and management of conflict situations.
RESTRICTIONS: Open to graduate students only.

COMM 618 TOPICS IN MASS COMMUNICATION 3-9
Current directions in mass communication theory and research, cable television, radio and TV regulations, public policy.
RESTRICTIONS: May be repeated three times for credit when topics vary. Open to graduate students only.

COMM 621 INTERCULTURAL COMMUNICATION 3
Enhances students’ understanding of cultures, communication and inter-cultural communication processes. In addition, communicative strategies for improving inter-cultural communication discussed.
RESTRICTIONS: Open to graduate students only.

COMM 623 COMMUNICATION, ADVERTISING AND THE CONSUMER 3
Introduction to the content of advertising, including portrayals of gender, race and sexuality. Investigates the relationship between advertising and the individual consumer; particularly what advertising’s cognitive effects can be and how they may result in behavioral effects.
RESTRICTIONS: Open to grad students only.

COMM 624 MEDIA MESSAGE ANALYSIS 3
Examination of methodology used to study media content and effects. Focus on past and ongoing research in broadcast, nonbroadcast and print media. The method of how to conduct and assess research relating to the mass media.
RESTRICTIONS: Open to graduate students only.

COMM 625 ADVANCED TOPICS IN POLITICAL AND BROADCAST JOURNALISM 3
Topics vary and focus on significant areas in politics and broadcast journalism. Topics may include crises news, political documentaries, broadcast presentations and credibility.
RESTRICTIONS: Open to graduate students only.

COMM 630 INTERPERSONAL COMMUNICATION THEORY 3
An examination of the theoretical orientations taken by scholars who study interpersonal relationships as well as a number of focused research areas. Of particular importance is the development of an understanding of the role of communication in creating and maintaining relationships.
RESTRICTIONS: Open to Communication graduate students only.

COMM 640 TOPICS IN INTERPERSONAL COMMUNICATION 3-9
Significant research, theories and literature in communication, research design and theory building.
RESTRICTIONS: May be repeated three times for credit when topics vary. Open to graduate students only.

COMM 642 TOPICS IN ORGANIZATIONAL COMMUNICATION 3-9
Significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships.
RESTRICTIONS: May be repeated for up to nine credits when topics vary. Open to graduate students only.

COMM 652 COMMUNICATION AND PERSUASION 3
An examination of how influence is created and resisted through communication in various settings, including personal relationships, public relations, advertising and political campaigns. Emphasis on contemporary theories of persuasion and attitude change, with applications to the various content areas studied.
RESTRICTIONS: Open to graduate students only.

COMM 653 HEALTH COMMUNICATION 3
Examines theories and methods for studying relationships between media and health such as media portrayals of health issues; public engagements with health info and technologies; and the role of media in health promotion.
RESTRICTIONS: Graduate Students.

COMM 654 CHILDREN AND THE MASS MEDIA 3
Mass media research and theory as they relate to children. Substantive areas include children’s use and comprehension of media, content of children’s television programming, television and the family, children and advertising, and the media’s contribution to social values and roles.
RESTRICTIONS: Open to graduate students only.

COMM 656 COMMUNICATION IN ORGANIZATIONS 3
An introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretive approaches are emphasized.
RESTRICTIONS: Open to graduate students only.

COMM 657 CHILDREN, TELEVISION AND EDUCATION 3
Issues relating to education, academic achievement, and the development of critical viewing skills; media and comprehension; content of children’s television programming and advertising directed toward children; and the media’s contribution to social values and roles; development of critical viewing skills curriculum.
May be crosslisted with EDUC657. RESTRICTIONS: Open to graduate students only.

COMM 658 SCIENCE COMMUNICATION 3
Examines how scientists communicate with journalists and citizens; how news and entertainment media present science and scientists; how messages about science shape public perceptions; and how citizens engage with scientific issues.
RESTRICTIONS: Graduate students.

COMM 664 INTERNSHIP 1-6
Provides the student with practical, on-the-job training in the field of his or her interest, i.e., interpersonal, mass media, public relations or organizational communication.
RESTRICTIONS: Open to graduate students only.

COMM 667 MASS COMMUNICATION THEORY 3
Examination of theories of mass communication focusing upon media, society and the individual; sociocultural influences; the social context of the broadcast media; theories relating to effects of media violence; personal influence; social learning theory; diffusion theory; and media effects.
RESTRICTIONS: Open to Communication graduate students only.

COMM 685 ANALYSIS OF FACE-TO-FACE COMMUNICATION 3
An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.
RESTRICTIONS: Open to graduate students only.

COMM 686 MULTIMEDIA LITERACY 3
Defines multimedia and discusses the impact it is having on society. Surveys applications across the curriculum and reflects on the effects of multimedia on current teaching practice. Provides a multimedia toolbox and shows how to use it to create and publish multimedia applications on the Internet. Discusses multimedia frontiers, emerging technology, and societal issues including human impact, regulation, copyright, fair use, equity, cost and universal access. Crosslisted with EDUC685.

COMM 868 RESEARCH 1-12

COMM 869 MASTER’S THESIS 1-6
CPEG 202 **INTRODUCTION TO DIGITAL SYSTEMS**
Analysis and design of logic circuits. Topics include: Boolean algebra and its application to switching circuits, simplification of switching functions, design of logic circuits at gate level and with MSI and LSI components. Analysis and design of synchronous and asynchronous sequential state machines.

CPEG 222 **MICROPROCESSOR SYSTEMS**
Introduction to microprocessors as embedded devices. Emphasizes Input/Output techniques, interrupts, real-time operation, high-level code debugging and interfacing to various types of sensors and actuators. Projects that address various embedded applications are a major part of the course.
PREREQ: CPEG202 and CISC220.

CPEG 323 **INTRODUCTION TO COMPUTER SYSTEMS ENGINEERING**
Studies general purpose, special purpose and embedded computer architecture. Principles of digital system design introduced including an introduction to tools for automated design and use of programmable logic devices.
PREREQ: CPEG222.

CPEG 324 **COMPUTER SYSTEMS DESIGN I**
Principles of computer system design are studied emphasizing tradeoffs involving cost, performance, testability, reliability and manufacturability. Topics include timing analysis, component and subsystem interconnect, noise effects debugging techniques, boundary scan testing and printed circuit layout. Laboratory work involves design and implementation of a computer subsystem.
PREREQ: CPEG323

CPEG 419 **COMPUTER NETWORKS**
Foundation principles, architectures and techniques employed in computer and communication networks. Focuses on mechanisms used in TCP/IP protocol suite. Topics include connection management, end-to-end reliable data transfer, sliding window protocols, quality of service, flow control, congestion control, routing, LANs, framing, error control, analog versus digital transmission, packet versus circuit switching, multiplexing. Crosslisted with CISC450. PREREQ: CISC260 or CPEG222. RESTRICTIONS: Knowledge of probability and statistics recommended. Credit cannot be received for both CISC450 and any of the following courses: CISC250, CPEG419, CISC650, ELEG651.

CPEG 420 **COMPUTER NETWORK DESIGN AND MANAGEMENT**
Introduces data networks and telecommunications, with emphasis on practical design and engineering. Covers fundamental computer and voice networking, aided by case studies and hands-on laboratories. Explores standards, protocols, current tools and technologies. Examines issues such as security, convergence, wireless, IPv6 and network management.

CPEG 421 **COMPILER DESIGN**
Introduction to compiler design, syntax and semantics, code generation and optimization. Design of high performance computers together with high performance optimizing compilers as an integral unit. Software/hardware tradeoffs in pipelined computers, superscalar computers and computers embedded in other systems.
PREREQ: CPEG323 and CISC361.

CPEG 422 **EMBEDDED SYSTEM DESIGN**
Examinates modern digital computer design methods using industry standard electronic CAD synthesis tools. Topics include hardware design using VHDL, logic synthesis tools, simulation methods for synthesis and efficient coding techniques for synthesis. Includes experimental laboratory work to design and evaluate FPGA-based digital computer hardware.
RESTRICTIONS: Students should have previous knowledge of VHDL programming language.

CPEG 423 **PCB & FPGA HARDWARE PROTOTYPING**
This course focuses on the design, fabrication, and construction of Printed Circuit Boards and on using FPGA design kits.
PREREQ: CISC220 CPEG222.

CPEG 455 **HIGH-PERFORMANCE COMPUTING WITH COMMODITY HARDWARE**
New commodity computing devices, e.g., GPUs, bring the originally elite high performance computing into the reach of general public. Principles of program optimization, GPU and IBM Cell architecture, along with concepts and techniques for optimizing general purpose computing on the new hardware.
Crosslisted with ELEG455.

CPEG 457 **SEARCH AND DATA MINING**
With the increasing amount of textual information, it is important to develop effective search engines, such as Google, to help users manage and exploit the information. Examine the underlying technologies of search engines and get hands-on project experience. Requires good programming skills. Crosslisted with ELEG457.

CPEG 460 **INTRODUCTION TO VLSI SYSTEMS**
Study of CMOS VLSI devices, circuits and systems implemented in VLSI. CAD tools for the design and simulation of VLSI. Topics include the performance and limitations of VLSI systems, low level circuit design and system design with an emphasis on digital systems. Major chip design project required.
RESTRICTIONS: students should have previous knowledge of logic design and MOS transistor operation.

CPEG 465 **INTRODUCTION TO CYBERSECURITY**
This cybersecurity course is an introduction to computer and network security and covers the foundation security policies and methods to provide confidentiality, integrity, and availability, as well as cryptography, auditing, and user security. Topics are reinforced with hands-on exercises run in a virtual machine environment.
May be crosslisted with CISC465, ELEG465, MISY465.

CPEG 470 **WEB APPLICATIONS SECURITY**
This seminar-style cybersecurity course covers one specific discipline of information security known as web security. The discipline (APPSEC) refers to the development of software that can function correctly even under constant scrutiny and attack by determined adversaries.
RESTRICTIONS: Programming experience in a high level language (e.g. C, C++, java, python). Credit cannot be received for both CPEG470 and CPEG670.

CPEG 471 **PEN TEST AND REVERSE ENGINEERING**
This cybersecurity course introduces techniques used to (1) identify strengths and exploit weaknesses in networked systems or hosts, and (2) reverse engineer programs of unknown origin and identify their function so to classify them as malware and highlight the level of risk that they represent.
PREREQ: CPEG465/CPEG665 or CPEG494/CPEG694. Programming experience in assembly language (CISC260, CPEG222, or equivalent). RESTRICTIONS: Credit cannot be received for both CPEG471 and CPEG671.

CPEG 472 **APPLIED CRYPTOGRAPHY**
This cybersecurity course explores modern Cryptography covering algorithms and cryptosystems, cryptanalysis, and best practices for application and implementation of crypto in software systems.
PREREQ: CPEG465/CPEG665 or CPEG494/CPEG694. RESTRICTIONS: Programming experience in a high level language (e.g. C, C++, java, python). Credit cannot be received for both CPEG472 and CPEG672.

CPEG 473 **CLOUD COMPUTING AND SECURITY**
This cybersecurity course introduces the virtualization and cloud computing technologies used in most modern online services. The unique and conventional security issues related to protecting these types of systems are addressed and reinforced with hands-on exercises run in a virtual machine environment.
PREREQ: CPEG/EG/CISC/MIST 465/665 or CPEG/ELEG 494/694 or experience with virtualization and computer networking. RESTRICTIONS: Credit cannot be received for both CPEG473 and CPEG673.

CPEG 474 **SCADA SYSTEMS AND SECURITY**
This cybersecurity course introduces SCADA (Supervisory Control And Data Acquisition) industrial control systems widely used in manufacturing, infrastructure, utilities, and control of buildings, ships, etc. Types of SCADA, use in critical infrastructure, use of communications, vulnerabilities, and best security practices and design will be addressed.
PREREQ: CPEG465/CPEG665 or CPEG494/CPEG694. RESTRICTIONS: Credit cannot be received for both CPEG474 and CPEG674. Course in computer networking recommended.

CPEG 475 **EMBEDDED COMPUTER SYSTEMS**
Explores the practice of embedding computers and software in most modern devices - appliances, games, phones, vehicles, etc. Covers engineering issues as well as understanding best cybersecurity practices so that the resulting device does not become a target of attack for its owner.
PREREQ: CPEG465/CPEG665 or CPEG494/CPEG694. RESTRICTIONS: Credit cannot be received for both CPEG475 and CPEG675.

CPEG 476 **SECURE SOFTWARE DESIGN**
This cybersecurity course introduces the theory and practices used to help make a computer program secure and provide the skills needed to implement programs that are free from vulnerabilities.
RESTRICTIONS: Programming experience in a high level language (e.g. C, C++, java, python). Credit cannot be received for both CPEG476 and CPEG676. Graduate or upper level software course (design, etc.) recommended.
CPEG 494  **SYSTEM HARDENING AND PROTECTION**  3
Practical treatment of the defensive techniques used to harden computer systems to make them less vulnerable to cyber-attacks. Defect management, configuration/hardening, account control, logs/auditing, and risk assessment are covered and reinforced with hands-on exercises run in a virtual machine environment.
May be crosslisted with ELEG494.

CPEG 495  **DIGITAL FORENSICS**  3
Introduction to digital forensics as used to analyze criminal evidence in computer systems and digital media. Forensic tools and techniques for storage and memory analysis of windows/Linux, network traffic, documentation are covered and reinforced with hands-on exercises run in a virtual machine environment.
May be crosslisted with ELEG495.

CPEG 496  **TOPICS IN CYBERSECURITY**  3
Explore varied topics in cybersecurity to coincide with the interests of students and current faculty. Potential topics include: (1) applications, web or cloud security, (2) risk management and incident response, (3) malware and reverse engineering, or (4) wireless, smartphone, or SCADA security.
May be crosslisted with CPEG496.

CPEG 497  **ADVANCED CYBERSECURITY**  3
This seminar course explores areas in advanced computer and network security not covered in introductory cybersecurity classes. Provides insight into realistic complex defensive and offensive cybersecurity topics such as DoS attacks, DNS security, Email spam, On-line Authentication, Phishing, Cloud Security, Malware, and Web security.
PREREQ: CPEG465/CPEG665. Familiarity with basic networking protocols and operating systems. RESTRICTIONS: Credit cannot be received for both CPEG497 and CPEG697.

CPEG 498  **SPECIAL DESIGN I**  3
Students apply their accumulated classroom knowledge to an electrical and computer engineering design problem. Students work in small teams and must present their finished designs at the end of the term.
Crosslisted with ELEG498.

CPEG 499  **SPECIAL DESIGN II**  3
Students apply their accumulated classroom knowledge to an electrical and computer engineering design problem. Students work in small teams and must present their finished designs at the end of the term.
Crosslisted with ELEG499.

CPEG 611  **SOFTWARE PROCESS MANAGEMENT**  3
Software management studies processes and concepts for planning and monitoring all software life-cycle phases. Topics include management models and structures, project planning including scheduling, effort estimation and risk management, project personnel and organization, project control (monitoring, measurement, correction and performance standards), software configuration management, and process description languages and tools.
Crosslisted with CISC611.

CPEG 612  **SOFTWARE DESIGN**  3
Key software design concepts are introduced. Topics include basic design concepts, principles of good design, design strategies, software architecture and styles of architectural design, and design and architectural notations and languages. Detailed design, including design patterns and component design are also covered. Implementation issues that affect the design, including design support tools and tools for analyzing designs are discussed.
Crosslisted with CISC612.

CPEG 613  **SOFTWARE REQUIREMENTS ENGINEERING**  3
Rigorous methods to elicit, analyze, and specify the requirements of a software system. The tasks range from identifying stakeholders and their goals producing a precise software specification document. Topics may include data flow diagrams, use cases, UML sequence and collaboration diagrams, finite state machines, requirements for real-time and concurrent systems, entity-relationship diagrams, and logic-based specifications, as well as the analysis of specifications for consistency and completeness.
Crosslisted with CISC613.

CPEG 614  **FORMAL METHODS IN SOFTWARE ENGINEERING**  3
Formal approaches to the specification, verification, and design of software systems. Topics include representing programs as transition systems; liveness and safety properties; state space reachability; explicit, symbolic and automata-based model checking; temporal logics; symbolic execution; automated theorem proving; and relational calculus. Learn to use state-of-the-art tools based on these methods, such as the model checker Spin.
Crosslisted with CISC614. RESTRICTIONS: Credit cannot be received for both CISC614 and CISC414.

CPEG 615  **SOFTWARE TESTING AND MAINTENANCE**  3
Study of software testing and maintenance methodologies for modern software. Topics include approaches to automatic test case generation, test oracles, test coverage analysis, regression testing, program understanding, and software maintenance tools. A primary focus will be automation in software testing and maintenance approaches.
Crosslisted with CIS615.

CPEG 621  **COMPILER DESIGN**  3
Introduction to compiler design, syntax and semantics, code generation and optimization. Design of high performance computers together with high performance optimizing compilers as an integral unit. Software/hardware tradeoffs in pipelined computers, super-scaler computers and computers embedded in other systems.
PREREQ: CPEG323 or equivalent. RESTRICTIONS: Students should have previous knowledge of VHDL programming language.

CPEG 623  **PCB & FPGA HARDWARE PROTOTYPING**  3
This course focuses on the design, fabrication, and construction of Printed Circuit Boards and on using FPGA design kits.
PREREQ: CISC520 CPEG222.

CPEG 651  **COMPUTER NETWORKS II**  3
Foundation principles, architectures, and techniques employed in computer and communication networks. Focuses on mechanisms used in TCP/IP protocol suite. Topics include connection management, end-to-end reliable data transfer, sliding window protocols, quality of service, flow control, congestion control, routing, LANs, framing, error control, analog versus digital transmission, packet versus circuit switching, multiplexing.
Crosslisted with CISC650. PREREQ: An undergraduate level course in computer architecture and operating systems. RESTRICTIONS: Knowledge of probability and statistics recommended. Credit cannot be received for CISC650 and any of the following courses: CISC520, CPEG419, CIS450, ELEG651.

CPEG 652  **PRINCIPLES OF PARALLEL COMPUTER ARCHITECTURES**  3
Provides an introduction to the principles of parallel computer architecture. Begins at a level that assumes experience in introductory undergraduate courses such as digital system design, computer architecture, and microprocessor based systems.
Crosslisted with ELEG652.

CPEG 655  **HIGH-PERFORMANCE COMPUTING WITH COMMODORE HARDWARE**  3
New commodity computing devices, e.g., GPUs, bring the originally elite high performance computing into the reach of general public. Principles of program optimization, GPU and IBM Cell architecture, along with concepts and techniques for optimizing general purpose computing on the new hardware.
Crosslisted with ELEG655.

CPEG 657  **SEARCH AND DATA MINING**  3
With the increasing amount of textual information, it is important to develop effective search engines, such as Google, to help users manage and exploit the information. Examine the underlying technologies of search engines and get hands-on project experience. Requires good programming skills. May be crosslisted with CISC657.

CPEG 660  **INTRODUCTION TO VLSI SYSTEMS**  4
Study of CMOS VLSI devices, circuits and systems implemented in VLSI. CAD tools for the design and simulation of VLSI. Topics include the performance and limitations of VLSI systems, low level circuit design and system design with an emphasis on digital systems. Major chip design project required.
PREREQ: Students should have previous knowledge of logic design and MOS transistor operation.

CPEG 665  **INTRODUCTION TO CYBERSECURITY**  3
Introduction to computer and network security and covers the foundation security policies and methods to provide confidentiality, integrity, and availability, as well as cryptography, auditing, and user security. Topics are reinforced with hands-on exercises run in a virtual machine environment.
May be crosslisted with CISC665, ELEG665, MISE665.

CPEG 670  **WEB APPLICATIONS SECURITY**  4
This seminar-style cybersecurity course covers one specific discipline of information security known as application security. This discipline (APSEW) refers to the development of software that can continue to function correctly even under constant scrutiny and attack by determined adversaries.
RESTRICTIONS: Programming experience in a high level language (e.g. C, C++, java, python). Credit cannot be received for both CPEG470 and CPEG670.
CPEG 671 PEN TEST AND REVERSE ENGINEERING 3 
This cybersecurity course introduces techniques used to (1) identify strengths and exploit weaknesses in networked systems or hosts, and (2) reverse engineer programs of unknown origin and identify their function so as to classify them as malware and highlight the level of risk that they represent. PREREQ: CPEG465/CPEG665 or CPEG494/CPEG694. Programming experience in assembly language (CISC260, CPEG222, or equivalent). RESTRICTIONS: Credit cannot be received for both CPEG471 and CPEG671.

CPEG 672 APPLIED CRYPTOGRAPHY 3 
This cybersecurity course explores modern Cryptography covering algorithms and cryptosystems, cryptanalysis, and best practices for application and implementation of crypto in software systems. PREREQ: CPEG465/CPEG665 or MATH49 or equivalent. RESTRICTIONS: Programming experience in a high level language (e.g. C, C++, java, python). Credit cannot be received for both CPEG472 and CPEG672.

CPEG 673 CLOUD COMPUTING AND SECURITY 3 
This cybersecurity course introduces the virtualization and cloud computing technologies used in most modern online services. The unique and conventional security issues related to protecting these types of systems are addressed and reinforced with hands-on exercises run in a virtual machine environment. PREREQ: CPEG465/CPEG665 or CPEG494/CPEG694. RESTRICTIONS: Credit cannot be received for both CPEG473 and CPEG673.

CPEG 674 SCADA SYSTEMS AND SECURITY 3 
This cybersecurity course introduces SCADA (Supervisory Control And Data Acquisition) industrial control systems widely used in manufacturing, infrastructure, utilities, and control of buildings, ships, etc. Types of SCADA, use in critical infrastructure, use of communications, vulnerabilities, and best security practices and design will be addressed. PREREQ: CPEG465/CPEG665 or CPEG494/CPEG694. RESTRICTIONS: Credit cannot be received for both CPEG474 and CPEG674. Course in computer networking recommended.

CPEG 675 EMBEDDED COMPUTER SYSTEMS 3 
Explores the practice of embedding computers and software in most modern devices - appliances, games, phones, vehicles, etc. Covers engineering issues as well as understanding best cybersecurity practices so that the resulting device does not become a target of attack for its own. PREREQ: CPEG465/CPEG665 or CPEG494/CPEG694. RESTRICTIONS: Credit cannot be received for both CPEG475 and CPEG675.

CPEG 676 SECURE SOFTWARE DESIGN 3 
This cybersecurity course introduce the theory and practices used to help make a computer program secure and provide the skills needed to implement programs that are free from vulnerabilities. RESTRICTIONS: Programming experience in a high level language (e.g. C, C++, java, python). Credit cannot be received for both CPEG476 and CPEG676. Graduate or upper level software course (design, etc.) recommended.

CPEG 691 SOFTWARE ENGINEERING PRACTICUM 3 
Technical practicum guided by the individual student's interests. The student will contribute a significant software engineering project either on campus or in association with an off-campus private business or government agency. Must be arranged with, and approved in advance by, a CIS or ECE faculty member. Crosslisted with CISC691.

CPEG 694 SYSTEM HARDENING AND PROTECTION 3 
Practical treatment of the defensive techniques used to harden computer systems to make them less vulnerable to cyber-attacks. Defect management, configuration/hardening, account control, logs/auditing, and risk assessment are covered and reinforced with hands-on exercises run in a virtual machine environment. May be crosslisted with ELEG694.

CPEG 695 DIGITAL FORENSICS 3 
Introduction to digital forensics as used to analyze criminal evidence in computer systems and digital media. Forensic tools and techniques for storage and memory analysis of windows/linux, network traffic, documentation are covered and reinforced with hands-on exercises run in a virtual machine environment. May be crosslisted with ELEG695.

CPEG 696 TOPICS IN CYBERSECURITY 3 
Examine varied topics in cybersecurity to coincide with the interests of students and current faculty. Potential topics include: (1) applications, web or cloud security, (2) risk management and incident response, (3) malware and reverse engineering, or (4) wireless, smartphone, or SCADA security. May be crosslisted with ELEG696.

CPEG 697 ADVANCED CYBERSECURITY 3 
This seminar course explores areas in advanced computer and network security not covered in introductory cybersecurity classes. Course provides insight into realistic complex defensive and offensive cybersecurity topics such as DoS attacks, DNS security, Email spam, On-line Authentication, Phishing, Cloud Security, Malware, and Web security. PREREQ: CPEG465/CPEG665. Familiarity with basic networking protocols and operating systems. RESTRICTIONS: Credit cannot be received for both CPEG497 and CPEG697.

CPEG 819 TOPICS IN NETWORKING 3 
Examines standard routing protocols for wired networks such as OSPF and BGP, protocols for wireless mesh and ad hoc networks. Includes theoretical analysis of protocols and examination of data collected from networks. Topics such as load balancing, multicasting, and cross-layer interactions are covered. Crosslisted with ELEG819. PREREQ: CPEG419, CISC450, ELEG650, or ELEG651 or equivalent. RESTRICTIONS: May be repeated two times for credit.

CPEG 852 ADVANCED TOPICS IN COMPUTING SYSTEMS 3 
Focus on the challenges and opportunities in parallel computing systems and on the design and implementation of future high-end computer systems from multiple peta-scale up to exa-scale computers. Challenges are centered on the definition and specification of parallel program execution models that are sound, scalable and programmable for the intended applications. RESTRICTIONS: May be repeated two times for credit. May be crosslisted with ELEG852.

CPEG 853 COMPUTER SYSTEM RELIABILITY 3 
Introduction to reliability challenges in computer systems, including permanent, transient, and intermittent faults. Various types of redundancy for fault tolerant computing will be studied. Hardware/software approaches for reliability enhancement in various computer systems will be examined, emphasizing tradeoffs involving performance, power, and reliability.

CPEG 869 MASTER'S THESIS 3 
Independent and laboratory study conducted for the purpose of contributing new data and theory in some field of Cybersecurity in which information is lacking. Although supervised, the work will be independent in character to encourage the development of initiative.

---

**Criminal Justice**

CRIU 110 INTRODUCTION TO CRIMINAL JUSTICE 3 
Responses in American society to the problems of crime. Examines criminal behavior, criminal law, the police, the courts and corrections, as well as selected issues in criminal justice.

CRIU 120 ILICIT DRUG USE IN AMERICA 3 
The nature and extent of illicit drug use in the United States and the sociocultural context. The history and effects of the major drugs of abuse and the social issues since the 1950s that contributed to the increased use of illicit drugs.

CRIU 201 PROBLEMS OF LAW ENFORCEMENT 3 
Introduction to a range of historical, political, philosophical and sociological problems in institutions vested with the responsibility to enforce laws and/or preserve order.

CRIU 202 PROBLEMS OF CRIMINAL JUDICIARY 3 
Focuses on problems and issues found in the American criminal court system. Includes judicial procedure, organization, judicial personnel and basic criminal law.

CRIU 203 PROBLEMS OF CORRECTIONS 3 
General overview of the American corrections system and a survey of the most pressing correctional problems of the twenty-first century. Philosophy of punishment extensively discussed. Major emphasis on the nature of the prison experience, alternatives to incarceration, judicial intervention in correctional affairs and the controversy over the efficacy of rehabilitation programs.

CRIU 301 INTRODUCTION TO LEGAL STUDIES 3 
Introduces legal studies as a multidisciplinary field. Crosslisted with LEGT301.

CRIU 302 SOCIAL DEVIAENCE 3 
Defining deviance, research on deviance and explaining deviance. Crosslisted with SOC302.
CRJU 303 Juvenile Delinquency 3
Historical definition of delinquency, abuse and neglect, research in delinquency, causes and treatment of delinquents. Crosslisted with SOCI303. PREREQ: SOCI201 or SOCI209

CRJU 304 Criminology 3
The nature, kinds and causes of crime. Criminal liability, criminal careers and organized racketeering. Crosslisted with SOCI304. PREREQ: SOCI201 or SOCI209.

CRJU 311 Capital Punishment and the Law 3
Overview of the law of capital punishment. Emphasizes the U. S. Supreme Court’s major death-penalty decisions and the effects of these decisions. PREREQ: CRJU110 or CRJU203

CRJU 312 History of Crime and Criminal Justice 3
Examines changing perceptions of criminal and deviant behavior and development of laws, institutions, and social policies to counteract crime from seventeenth century to present. May be crosslisted with HIST312.

CRJU 320 Introduction to Criminal Law 3
An analysis of the evolution of criminal law within the larger societal context, and an overview of the basic structure and administration of criminal law in the United States. PREREQ: CRJU110

CRJU 322 Crowds, Cults and Revolutions 3
Analysis of forms of behavior in relatively unstructured situations such as crowds, panics, riots and demonstrations; and processes of interaction: susceptibility, contagion, polarization and communication. Crosslisted with SOCI322. PREREQ: SOCI201

CRJU 324 American Constitutional History 3
A survey of the development of judicial review since Reconstruction, emphasizing the Supreme Court’s response to urbanization and industrialization, the growth of executive authority, and the extension of civil rights and civil liberties in the twentieth century. May be crosslisted with HIST324.

CRJU 332 Criminal Violence in America 3
Investigates the patterns and causes of violence in America, including crimes such as homicide, rape, assault, and domestic abuse and collective violence such as terrorism. Examines social control of violence, including adjudication within the criminal justice system. Places trends of violence in cross-national perspective.

CRJU 333 Crime and Justice in Film and Literature 3
Examines the issues and ideologies found in noteworthy American and international films and writings that emphasize themes of justice, punishment, and social control. Contrasts cinematic and literary depictions of these themes with empirical research on criminality, violence, victimization, and the practices of criminal justice institutions.

CRJU 336 The Detective in Film and Fiction 3
Study of detective fiction and film has applications to a liberal arts approach to crime and justice. Blends literary analysis with the insights of social science research on the work of private and police detectives. May be crosslisted with ENGL330, SOCI336.

CRJU 340 The Juvenile Justice System 3
An in-depth view of the juvenile justice system in the United States focusing on crime patterns, police-juvenile relations, juvenile courts and correctional practices.

CRJU 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. Crosslisted with SOCI345.

CRJU 350 Gender and Criminal Justice 3
Reviews historical and contemporary explanations for women’s participation in crime and evaluates these explanations in light of current research on gender. Other topics include treatment of women offenders by judicial and correctional systems, women as victims of crime and women as criminal justice personnel. May be crosslisted with WMAS350.

CRJU 351 Comparative Criminal Justice Systems 3
Study of different criminal justice systems across the world including discussions of their approaches to law, policing, courts, and corrections, common law, civil law, Islamic traditions as well as others.

CRJU 352 International Criminal Justice 3
Introduction to basic structures of international criminal justice systems including international and transnational crime, international courts, transnational policing, and international criminal law.

CRJU 355 Inequality, Crime and Justice 3
Introduction to challenges in addressing crime in multiracial, multiethnic, class-stratified society. This context serves as backdrop for inquiry into crime causation, operations of the criminal justice system, and experiences of relevant actors. May be crosslisted with BMAS355, SOCJ356.

CRJU 357 Seminar on the Police 3
Teaches students to criticize and analyze research and theory in the scholarly literature on policing.

CRJU 366 Independent Study 1-6
Independent study under the supervision of a faculty member. Requires inclusion 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.

CRJU 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.

CRJU 369 Alcohol, Drugs and Crime 3
Examines the relationship between alcohol, drugs and crime, including societal response to offenders who commit alcohol/drug related offenses and offenders who engage in crime over drug markets. May be crosslisted with SOCI369. PREREQ: CRJU110 or SOCI201

CRJU 370 Prison and Prison Subcultures 3
Provides an intensive examination of the social organization of prisons. Mainly examines how the prisoner subculture shapes and is shaped by social institutions. Special emphasis on how gender and race contribute to differential patterns of adjustment to incarceration. May be crosslisted with SOCJ370, WMAS370.

CRJU 375 Criminal Procedure 3
Intensive analysis of criminal court procedures that occur once a case is actually brought against an accused. Emphasis on trial tactics and procedures.

CRJU 401 Senior Seminar 3
Culminates the legal studies minor by requiring an independent research project resulting in a term paper. Seminar focuses on a specific substantive issue, provides guidance from professor and chance to share ideas and problems with fellow students. Crosslisted with LEST401.

CRJU 408 Domestic Violence Policy and Prevention 3
Reflects the current state of policy and practice among policy makers and practitioners in the field of domestic violence including legal issues, policy development, primary prevention, and models of best practice. Addresses the role of the federal and state law. May include economic justice, mental health and trauma, and alternative models. Crosslisted with WMAS408. PREREQ: Any 200-level Women’s Studies course.

CRJU 409 Domestic Violence Services 3
Examines issues in providing services to families in which domestic violence is occurring. Multiple service systems are explored, with emphasis on service coordination, service gaps, and public policy. Crosslisted with HDF5401. RESTRICTIONS: Open to juniors and seniors only.

CRJU 417 Sex Crimes and Punishments 3
Discuss controversial topics surrounding sex crimes and punishments to develop students’ abilities to think critically about connections between three areas: how we as a society respond to crime through our criminal justice systems; what we believe about crime and punishment; and what empirical research tells us. May be crosslisted with SOCI417, WMAS417.

CRJU 420 Criminal Justice Administration 3
Aids those planning a career as an administrator in the criminal justice system. Topics typically include basic administrative policy and budgetary matters. PREREQ: CRJU110

CRJU 425 Criminal Law and Social Policy 3
Analyzes the role of the American judiciary in making social policy and examines the manner in which the courts have adjudicated controversial socio-legal issues. Topics typically include capital punishment, abortion, the right to privacy, search and seizure, the Miranda rule, and freedom of speech and press.
CRJU 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. Crosslisted with SOCI428.

CRJU 432 HIV/AIDS AND CRIME IN SOUTH AFRICA 3
Examines two major social problems in South Africa: crime and HIV/AIDS. Explores the problems historically, as well as their current prevalence and implications for the country. Examines sociological theories to broaden our understanding of the social problems which are compared with the US. Crosslisted with SOCI432.

CRJU 435 PUNISHING SPEECH 3
Examines the use of the criminal law and other regulatory sanctions to punish certain types of speech and the efforts of courts to determine which speech is deserving of constitutional protection and therefore beyond governmental control.

CRJU 437 SEMINAR ON CORRECTIONS 3
An in-depth examination of current research and practice on selected topics in corrections. Emphasis will vary by semester but may cover topics such as philosophies of punishment, mass incarceration, prisoner re-entry, alternatives to incarceration, and restorative justice.

CRJU 450 PRISONERS AND THE LAW 3
An examination of the legal rights available to prisoners seeking to challenge their convictions or their conditions of confinement. Emphasis on analyzing the capacity of courts to spur prison reform and the impact of court decisions on American penal practices.

CRJU 452 DRUGS AND THE CRIMINAL JUSTICE SYSTEM 3
Covers both drug and criminal justice issues, focusing on the drugs-crime nexus and the criminal justice system response. Examines issues of race, gender, victimization, international policy, and new policy responses including drug treatment, harm reduction, and restorative justice. Class is held at a local correctional facility, and half the students are inmates. May be crosslisted with SOCI452. RESTRICTIONS: Permission of instructor.

CRJU 455 YOUTH STREET OUTREACH 4
Implements an outreach program to youth in a low income, urbanized community in Wilmington. Students trained and monitored as outreach workers by their professor and by community volunteers. Outreach workers trained to approach youth hanging out on the street, engage them (through conversation and recreational activities), identify their needs, and direct them to resources. Students keep journals to record their observations and feelings. The goal of the class is to increase social capital among youth by encouraging and facilitating youth participation in community educational, recreational, and social support services/activities. Crosslisted with SOCI455.

CRJU 457 CRIMINAL EVIDENCE 3
The study of the laws of evidence, how they are used in the criminal courts, and their effect on the administration of justice.

CRJU 460 CRIMINAL JUSTICE POLICY 3
A critical examination of criminal justice policy in the United States over the past thirty years, with emphasis on the major theoretical positions that have dominated criminal justice policy making during that period.

CRJU 466 INDEPENDENT STUDY 1-6

CRJU 475 SOCIAL SCIENCE AND THE LAW 3
Examines the relationship of social science to law and the legal process, how social science has contributed to our understanding of law, and how social science has been employed in litigation. May be crosslisted with LEST475.

CRJU 480 CIVIL LIABILITY IN CRIMINAL JUSTICE 3
Examines the circumstances under which the law provides remedies for individuals harmed by agents of the government. May also include discussion of the use of civil remedies, such as asset forfeiture, to complement criminal prosecutions.

CRJU 489 CRIME VICTIMS AND VICTIMS’ RIGHTS 3
Examines victim-offender relationships, interactions between victims and the criminal justice system, and the connections between victims and other social groups and institutions (such as the media, social movements, advocacy groups, legislatures and the state). Explores victims’ rights and compensation, fear of crime, measurement of victimization and the impact of victimization on the individual.

CRJU 495 FIELD EXPERIENCE IN CRIMINAL JUSTICE 4 PF
Practicum involving actual field experience in a criminal justice agency; e.g., law enforcement, courts or correctional agencies. Emphasis on relating the field experience to academic work. May be crosslisted with SOCI495. RESTRICTIONS: Requires permission of instructor. Not for major credit.

COMMUNICATION SCIENCES AND DISORDERS

CSCD 610 FDNF OF CLINICAL PRACTICE I 2
Basic concepts of clinical practice, including models of diagnosis, fundamentals of clinical data collection and measurement, treatment planning, professional writing, principles and procedures underlying assessment, remediation and documentation activities.
RESTRICTIONS: Open only to SLP majors.

CSCD 611 LANG DISORDERS IN CHILDREN (BIRTH TO 5) 3
Assessment and intervention strategies for children ages birth to 5 years with semantic, pragmatic, and morphosyntactic receptive and expressive problems. Deficits Language differences and disorders in various populations are covered, as well as means of assessment and intervention.
RESTRICTIONS: Open to SLP majors.

CSCD 612 NEUROGENIC DISORDERS: FOUNDATION 3
Overview of acquired neurogenic language disorders and the ways in which these disorders have historically been described and explained. Course provides a review of the neural basis for communicative behaviors. Approaches to diagnosis and treatment of adult language disorders from structural to functional models are discussed.

CSCD 613 PHONOLOGICAL DISORDERS 3
Current theoretical approaches to phonological analysis and typical phonological acquisition applied to assessment and intervention with children who have phonological disorders. Practice with formal and informal phonological analysis procedures.

CSCD 620 FOUNDATIONS OF CLINICAL PRACTICE II 2
Advanced concepts of clinical practice, including principles of human behavior change, generalization, transfer and maintenance, ethical practice, insurance and reimbursement of services, ethics, and counseling techniques as they relate to individuals with speech, language, and hearing disorders, federal and state legislative acts and practices. Students address practical and current issues necessary for ethical and informed professional services in the field of speech-language pathology.

CSCD 621 FLUENCY DISORDERS 2
Theoretical perspectives on the nature of stuttering, including onset and development, and maintenance of disfluent speech; differentiation of normal vs. stuttered disfluencies; approaches to assessment and intervention across age range, settings, and severity levels; familial considerations, counseling, and environmental modifications; treatment principles.

CSCD 622 LANG DISORDERS IN CHILDREN-SCHOOL AGE 3
A review of research in oral and written language development of school-age children; and contemporary literature on management of language disorders of school age children and adolescents. Emphasis on assessment and service delivery models; classroom management; and teaching, adaption, and implementation of IEPs.

CSCD 623 NEUROGENIC DIS OF LANGUAGE: MANAGEMENT 3
Overview of communication disorders secondary to acquired brain damage in adults; focus on aphasia, communication disorders arising from dementia, right hemisphere stroke, traumatic brain injuries; general principles of diagnosis and intervention across a variety of settings, with consideration given to the present climate of health care and functional outcomes.
CSCD 624  DYSPHAGIA  2
Presents information on the anatomy, physiology, and neural bases of normal swallowing, the various diseases that can affect swallowing function, the nature of swallowing dysfunction and ways to assess it, and treatment options for patients with swallowing disorders.

CSCD 625  VOICE AND RESONANCE DISORDERS  2
Basic foundations for management of voice disorders. Techniques applicable to children and adults with disorders of voice, both functional and organic in origin.

CSCD 626  AUGMENTATIVE AND ALTERNATIVE COMM  1
Approaches to development of alternate modes of communication for individuals with significant motor, cognitive, and/or perceptual disabilities. System design (hardware and software) useful in building augmentative and alternative communication devices for the profoundly impaired.

CSCD 627  COMM IN AUTISM SPECTRUM DISORDERS  1
Basic theories and principles associated with communication assessment and intervention for individuals with Autism Spectrum Disorders are addressed.

CSCD 628  AURAL REHABILITATION  3
Theory, procedures for assessment, (re)habilitation of speech, hearing, and language deficits of people with hearing impairment.

CSCD 650  CLINICAL PRACTICUM SEMINAR  0 PF
Course is taken concurrently with CSCD651 and is intended to provide a forum for peer discussion of theoretical and clinical issues related to the management of patients seen in the clinic. Emphasis on evidence-based practice, clinical writing, and ethical/professional issues.
COREQ: CSCD651. RESTRICTIONS: Open to SLP majors. May be repeated up to nine credits.

CSCD 651  CLINICAL PRACTICUM  1-3 PF
Student clinicians provide intervention to communicatively impaired clients, under supervision of a certified speech language pathologist at the university speech-language-hearing clinic. Focus on planning, staffing, implementation, modification, and outcomes assessment of evaluation and intervention procedures with clients and their families.
COREQ: CSCD650. RESTRICTIONS: Open only to SLP majors. May be repeated up to nine credits.

CSCD 710  FOUNDATIONS OF CLINICAL PRACTICE III  3
A continuation of Foundations I and II and will expand students knowledge and understanding of research methods in communication sciences. Focus is on scientific principles, ethical use of human participants, animal subjects and responsible conduct of research principles, and evaluation of scientific evidence. Student will begin developing their evidence-brief.
PREREQ: CSCD610 and CSCD620.

CSCD 711  NEUROGENIC DISORDERS OF SPEECH  3
Review of neuroanatomy and neurophysiology of brain motor systems. Characteristics of the dysarthrias and apraxia in children and adults due to congenital or acquired etiologies, including degenerative diseases. Focus on diagnosis and prognosis, and development of treatment goals.

CSCD 712  MNGMT OF LINGUISTICALLY DIVERSE POP.  3
Intended for students who intend to practice as bilingual speech-language pathologists. Fluency in language other than English is required. Course will review linguistic and cultural variations in language acquisition and child socialization across cultural and linguistically diverse populations. Course focus is on assessment and treatment of communication disorders in individuals from culturally and linguistically diverse groups.

CSCD 713  SEMINAR: SPECIAL TOPICS  2
Lecture-discussion with or without laboratory component on current topics in normal aspects of communication or identification, treatment and research in speech-language pathology and audiology.
RESTRICTIONS: May be repeated for eight credits.

CSCD 714  DIRECTED RESEARCH  1-3 PF
Supervised laboratory experience in conducting research in communication sciences and disorders.
RESTRICTIONS: May be repeated for three credits.

CSCD 715  PROSEMINAR  1 PF
Presentation of research ideas, results by faculty, students. Variable content. Speakers from the SLP program, other areas of the university and the general professional community present issues of concern to speech-language pathologists. Objectives 1. Student will demonstrate knowledge of basic human communication and swallowing processes, including their biological, neurological, acoustic, psychological, developmental, and linguistic and cultural bases. 2. Student will demonstrate knowledge of the nature of speech, language, hearing, and communication disorders and differences and swallowing disorders, including their etiologies, characteristics, anatomical/physiological, acoustic, psychological, developmental, and linguistic and cultural correlates. 3. Student will demonstrate knowledge of the process used in research and the integration of research principles into evidence-based practice.
RESTRICTIONS: May be repeated for two credits.

CSCD 750  ADV CLINICAL PRACTICUM SEM  0 PF
Course is taken concurrently with CSCD751 and is intended to provide a forum for peer discussion of theoretical and clinical issues related to the management of patients seen in schools or health facilities. Emphasis on evidence-based practice, clinical writing, and ethical/professional issues.
COREQ: CSCD751. RESTRICTIONS: Open to graduate students in MA program in SLP.

CSCD 751  ADVANCED CLINICAL PRACTICUM  4 PF
Supervised practicum in health care facility or school setting.
COREQ: CSCD750. RESTRICTIONS: Restricted to students in the MA in SLP. May be repeated for eight credits.

CSCD 780  COMP ACADEMIC-CLINICAL PROJ  1 PF
Comprehensive evidence-based project.

CSCD 869  THESIS.  1-3 PF
Thesis course.
RESTRICTIONS: SLP MAJOR.

DANCE

DANC 101  INTRODUCTION TO THE ART OF DANCE  3
Provide the basis for understanding, appreciating, and participating in dance as an art form, cultivated through lectures, films, live performances, and/or studio experiences.

DANC 201  CAREERS IN DANCE  1
Dance Minor students and others interested in a career in dance will gain knowledge of the wide range of options in the dance field. Careers including performer, choreographer, educator, writer, critic, studio owner, and scientist will be explored in this survey course.

DANC 202  BEGINNING BALLET  3
Designed for students who have not previously studied ballet. Students develop technical facility in basic ballet steps, knowledge of ballet class structure, an understanding of ballet class etiquette, and an understanding of the body as an instrument of expression.

DANC 203  BEGINNING MODERN DANCE  3
Designed for students without prior dance experience. Introduction to the fundamentals of modern dance technique and vocabulary through a varied range of movement experiences. Contraction/release and fall/recovery discussed so as to increase the strength and mobility of the spine, and to find the full use of the breath in movement.

DANC 204  BEGINNING JAZZ DANCE  3
Designed for students without prior dance experience. Introductory experience in movement vocabularies of the American dance form of jazz, demonstrating its evolution as both an art form and vehicle for individual and group expression. Emphasis on rhythm and style.

DANC 206  DANCE IN CULTURE AND SOCIETY  3
Explores the world of dance. Through video observation, readings, writings, and dancing, students are exposed to many facets of dance as an expression of cultural values. Dance as art, religion, social custom, and political action examined as evidenced in many human societies.
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

DANC 207  DANCE IMPROVISATION  3
Dance improvisation provides the student opportunities to explore the processes of discovering, creating, and performing movement spontaneously with an emphasis on freedom of self expression and creative awareness. Through these processes, students develop an understanding of the artistic foundations necessary for performance, choreography, and teaching.
PREREQ: One course from the following: DANC202, DANC203, DANC204, DANC302, DANC303, DANC304, or permission of instructor.

DANC 208  DANCE COMPOSITION I  3
Introduction to elements of dance (time, space, energy) and to principles of composing movement for the solo performer. Develops a foundation of knowledge, skills, and processes for choreography appropriate to dance performance in any dance genre.
PREREQ: One course from the following: DANC202, DANC203, DANC204, DANC302, DANC303, DANC304, or permission of instructor.

DANC 209  DANCE IN FILM  3
View and discuss dance and movement in silent film, MGM movie musicals, dance featured cinema, reality TV shows and dance choreographed specifically for the camera.

DANC 266  INDEPENDENT STUDY  1-6

DANC 302  INTERMEDIATE BALLET  3
Designed for students who have a prior knowledge of basic ballet steps. Development of their technical skills in the ballet movement vocabulary through increasing speed, complexity, and duration of exercises. Development of stability and agility as a dancer emphasized.
PREREQ: DANC202, or permission of instructor.

DANC 303  INTERMEDIATE MODERN DANCE  3
Designed for students with prior dance experience. A continuation of DANC 203 with added emphasis on increased technical accuracy, extension of range and control, and clarity of performance for more complex dance sequences.
PREREQ: DANC203, or permission of instructor.

DANC 304  INTERMEDIATE JAZZ DANCE  3
Designed for students with prior dance experience. A continuation of DANC 204 with added emphasis on increased technical accuracy, extension of range and control, and clarity of performance for more complex dance sequences.
PREREQ: DANC204, or permission of instructor.

DANC 305  HIP HOP  3
Studies the development, history, communication style, dance form, and processes of creation through the urban expressive cultural phenomenon of hip-hop dance.

DANC 306  MUSICAL THEATRE STYLES  3
Designed for students with prior dance experience. An experiential historical overview of musical theatre dance styles from 20th century America to the present. Explores the roots and reinventions of vernacular dance in America as it revealed itself on the musical theatre stage.
PREREQ: One course from the following: DANC202, DANC203, DANC204, DANC302, DANC303, DANC304, or permission of instructor.

DANC 307  ETHNIC DANCE STYLES  3
Variable topics course from an array of cultural dance forms. Topics include dance forms of Africa, India, Hawaii, Brazil, among others.

DANC 308  DANCE COMPOSITION II  3
Develop knowledge of the basic elements begun in Dance Composition I. Simple compositional forms for the solo performer are developed into small group composition. Develop knowledge of relationship of choreography and performance.
PREREQ: DANC208 or permission of instructor.

DANC 309  REPERTORY  3
Rehearsal and performance of repertoire from established choreographers. Development of dance performance skills through restaging, rehearsal, and informal and formal presentation of choreography.
PREREQ: One course from the following: DANC202, DANC203, DANC204, DANC302, DANC303, DANC304, or permission of instructor.

DANC 310  METHODS OF TEACHING DANCE  3
Introduction to teaching dance in educational setting with emphasis on designing and delivering developmentally appropriate units of instruction and pedagogical analysis of effective teaching behaviors. Includes classroom management, teaching strategies, and performance-based assessment of pupil achievement.
PREREQ: One course from the following: DANC202, DANC203, DANC204, DANC302, DANC303, DANC304, or permission of instructor.

DANC 311  DANCE, DRAMA, AND LEARNING  3
Creative dance and drama develop the creative, physical, mental, and artistic aspects of an individual in a non-performance setting. Designed to provide an overview of approaches for integrating creative movement, dance, and drama into the classroom. Minimum of 10 hours of service learning is required.

DANC 312  THE BODY AND MOTION IN DANCE  3
Study of the body and movement as relevant to dance. Emphasis on anatomical and kinesiological principles, alignment, somatics, prevention and care of injuries, motor learning, and motor development with applications relevant to performance, choreography, and pedagogy.
PREREQ: One course from the following: DANC202, DANC203, DANC204, DANC302, DANC303, DANC304, or permission of instructor.

DANC 366  INDEPENDENT STUDY  1-6

DANC 400  DANCE IN SCHOOL AND COMMUNITY SETTINGS  1-3
Practical experience in an approved dance or dance-related setting. Each credit earned requires a minimum of 30 clock hours.
PREREQ: DANC310 and Junior or Senior standing, or permission of instructor.

DANC 401  DANCE CAPSTONE EXPERIENCE  1-3
Interdisciplinary project that combines interest of student’s major with the dance minor. Projects may include research, outreach, technology, or original choreographic works.
PREREQ: Junior or Senior standing, or permission of instructor.

---

**DISASTER SCIENCE AND MANAGEMENT**

DISA 650  OVERVIEW OF DISASTER SCIENCE AND MANAGEMENT  3
Overview of disaster science and management including an historical overview of disasters. Required for all students entering the MS program in Disaster Science and Management. Topics include anatomy of a disaster, government, non-government and private sector actors, and policy and regulation.

DISA 666  SPECIAL PROBLEM  1-12

DISA 670  ISSUES IN DISASTER RESPONSE  3
Focus on problems that arise before, during, and after emergencies and disasters. These include warnings response and risk perception, emergency response organization, developing Emergency Operations Centers, assessing and providing behavioral health needs, managing volunteers and NGOs, and the particular challenges of facilities.

DISA 680  DISASTER SCIENCE AND MANAGEMENT SEMINAR  1
Structured forum for the discussion and analysis of issues and problems in research and professional practice. Students will present their work and learn about professional practice. Discussions enable the participants to learn from their own and each others’ experience, create a spirit of collegiality and community.

DISA 857  PRACTICUM  1-3
Internship in organization or agency responsible for emergency or environmental management. Assigned to an organization to become familiar with issues, policies and practices pertaining to disasters. Under direct supervision of agency personnel while in the placement position. In addition to internship, students will meet weekly with the area coordinator and other students to discuss issues and experiences.
PREREQ: DISA650

DISA 866  SPECIAL PROBLEM  1-12

DISA 868  RESEARCH  1-9

DISA 869  MASTER’S THESIS  1-6

DISA 964  PRE-CANDIDACY  3-12 PF
Research and reading in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISA 969</td>
<td>DOCTORAL DISSERTATION</td>
<td>1-12 PF</td>
<td></td>
</tr>
<tr>
<td>DIST 100</td>
<td>INTRODUCTORY SEMINAR</td>
<td>1</td>
<td>Designed for freshmen and transfer students in the CHEP College, and provides students an opportunity to gain a greater understanding of the University and the CHEP College. Students learn practical skills helpful in mastering the freshman year or first year for transfer students. Attention given to time management and study skills, academic resources, and out-of-classroom opportunities. Other helpful tips to ease the transition into college area also be covered. Fulfills the First Year Experience (FYE) requirement for freshmen students.</td>
</tr>
<tr>
<td>DIST 400</td>
<td>SERVICE LEARNING PRACTICUM</td>
<td>3-6</td>
<td>Structured experience in a public or private, business, educational or non-profit setting as part of the Human Services, Education and Public Policy major. Requires written documentation of the experience by the student through various means such as a paper, portfolio, report, journal, etc.</td>
</tr>
<tr>
<td>DIST 433</td>
<td>INTERNET LITERACY</td>
<td>3</td>
<td>Provides the conceptual background and the online skills needed to become Internet literate. Includes a hands-on tutorial on creating Web pages and using search engines to conduct research. Reflects on the impact of emerging technologies on the future of schooling and communications.</td>
</tr>
<tr>
<td>DIST 465</td>
<td>SENIOR SEMINAR IN DISABILITIES STUDIES</td>
<td>3</td>
<td>Culminates the Disabilities Studies minor. Focuses on community access, independence, inclusion, and productivity of people with disabilities. Examines national disability policy frameworks and applications, person-centered perspectives on delivery of services and supports, and methods of facilitating change. Requires completion of an applied local advocacy project. PREREQ: HDFS270 OR EDUC230.</td>
</tr>
<tr>
<td>DIST 533</td>
<td>INTERNET LITERACY</td>
<td>3</td>
<td>Provides the conceptual background and the online skills needed to become Internet literate. Includes a hands-on tutorial on creating Web pages and using search engines to conduct research. Reflects on the impact of emerging technologies on the future of schooling and communications.</td>
</tr>
<tr>
<td>EAMC 607</td>
<td>ENGLISH DESIGN HISTORY, 1530-1930</td>
<td>3</td>
<td>Examines influence of English Design History on global culture, beginning with destruction of the monasteries and continuing to the beginning of the Great Depression. During this era, England became a world power. It made lasting contributions to architecture, art, landscape design, decorative arts, industrialization, and world navigation that were disseminated through exports, emigrating craftsmen, and design books. Course begins at Winterthur Museum and includes two weeks of field-based learning in London, England. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EAMC 608</td>
<td>DECORATIVE ARTS AND DESIGN, 1860-PRESENT</td>
<td>3</td>
<td>Examines decorative arts and design from 1860 to the present. Topics include Victorian Culture and Aesthetics, the Arts and Crafts Movement, the Colonial Revival, Art Nouveau and Art Deco, Industrial Design, Modernism and Mass Production, and Contemporary Craft. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EAMC 609</td>
<td>PREINDUSTRIAL CRAFTSMANSHIP IN AMERICA</td>
<td>3</td>
<td>Examines the world of preindustrial artisans in Colonial British America and Early Republic. Topics include elements of art, business, labor, social and technological history, and material culture. Examines original artifacts in the collections of Winterthur Museum and includes a 3-day field trip to Colonial Williamsburg to work in and study historic trades. Field-based learning complements an intensive examination of rare books and period manuscripts. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EAMC 671</td>
<td>CONNOISSEURSHIP OF THE DECORATIVE ARTS IN AMERICA I</td>
<td>1-3</td>
<td>Furniture with one additional subject within the decorative arts to be presented by a specialist on the Winterthur Museum staff. Emphasis on close analytical examination of objects stressing identification and evaluation. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EAMC 672</td>
<td>CONNOISSEURSHIP OF THE DECORATIVE ARTS IN AMERICA II</td>
<td>1-3</td>
<td>Three subject areas within the decorative arts, each presented by a specialist on the Winterthur Museum staff. Emphasis on close analytical examination of objects stressing identification and evaluation. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EAMC 673</td>
<td>CONNOISSEURSHIP OF THE DECORATIVE ARTS IN AMERICA III</td>
<td>1-3</td>
<td>One or two subject areas within the decorative arts in which students work closely with a specialist on the Winterthur faculty. Emphasis on close analytical examination of objects stressing identification and evaluation. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>EAMC 869</td>
<td>MASTER’S THESIS</td>
<td>3-6</td>
<td></td>
</tr>
<tr>
<td>EAST 136</td>
<td>TOPICS IN EAST ASIA IN FILM</td>
<td>1-3</td>
<td>Explores East Asian cinema and society via readings, discussion and viewing of films by and/or about East Asians. Topics vary. May be crosslisted with HIST136. RESTRICTIONS: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>EAST 266</td>
<td>SPECIAL PROBLEM</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>EAST 386</td>
<td>ASIAN AMERICA: CULTURE AND HISTORY</td>
<td>3</td>
<td>Explores the literature, culture and history of Asian Americans and immigrants to the United States variously using fiction, drama, poetry, documentary, photography, narrative film, drama, court cases, primary and secondary historical materials. Patterns of Asian immigration, anti-Asian violence and interment, Asian American resistance in litigation, legislation, and cultural activities, from Gold Rush to globalization. Crosslisted with ENGL386.</td>
</tr>
<tr>
<td>ECON 100</td>
<td>ECONOMIC ISSUES AND POLICIES</td>
<td>3</td>
<td>Takes a nontechnical approach to basic economics. Applies economic concepts to contemporary issues, problems and policies. Covers both macro and micro topics. RESTRICTIONS: May not be taken for credit after taking ECON151 or ECON152. No majors within accounting, business administration, economics, finance, HRIM or MIS may receive credit for this course.</td>
</tr>
<tr>
<td>ECON 101</td>
<td>INTRODUCTION TO MICROECONOMICS</td>
<td>3</td>
<td>Introduces supply and demand concepts with basic economic graphs. Examines models of perfect and imperfect competition and determinants of production price and quantity. Covers microeconomic issues such as the effect of government regulation and environmental problems. COREQ: One of the following: MATH114, MATH115, MATH117, MATH221, MATH241, MATH242, or MATH243.</td>
</tr>
</tbody>
</table>
ECON 102 Civics and Economics for Teachers 3
Provides teacher candidates with an understanding of the fundamental content and concepts embedded within the core social studies subjects of civics and economics as they relate to K-8 standards-based instruction. Focuses on developing an understanding of the content in the two subject areas and how that content might be taught effectively. Crosslisted with POSC102. RESTRICTIONS: Elementary teacher education majors only. Cannot be taken for credit toward economics major or minor or political science major or minor.

ECON 103 Introduction to Macroeconomics 3
Analyzes the determinants of unemployment, inflation, national income and policy issues related to how the government alters unemployment and inflation through government spending, taxes and the money supply. PREREQ: ECON101.

ECON 251 Managerial Economics 3
Applies economic theory to business and managerial decision making. Includes analysis of consumer demand, theory of production and supply and the effects of different market structures and pricing strategies. PREREQ: ECON101. RESTRICTIONS: Credit can be earned for only one among ECON251, ECON255, ECON300 or ECON301.

ECON 255 Intermediate Microeconomics Public Policy 3
Microeconomic theory of consumers, producers, and markets with special application to public policy issues and analysis. PREREQ: ECON101. RESTRICTIONS: Credit can be earned for only one of ECON251, ECON255, ECON300, and ECON301.

ECON 300 Intermediate Microeconomic Theory 3
Price determination and income distribution in a market economy; the behavior of firms and industry under conditions of pure and imperfect competition. PREREQ: ECON101. RESTRICTIONS: Credit can be earned for only one among ECON251, ECON255, ECON300 and ECON301. BS majors must take ECON301. ECON300 cannot be used to satisfy Economics BS major requirements.

ECON 301 Quantitative Microeconomic Theory 3
Uses calculus to study price determination and income distribution in a market economy; and the behavior of firms and industry under conditions of pure and imperfect competition. PREREQ: ECON101 and either MATH221 or MATH242. RESTRICTIONS: Credit can be earned for only one among ECON251, ECON255, ECON300 or ECON301. BS majors must take ECON301.

ECON 303 Intermediate Macroeconomic Theory 3
Determinants of national income and employment and inflation; theoretical problem of short-run fluctuations and secular growth; relative merits of monetary and fiscal policy. PREREQ: ECON103 and one of ECON251, ECON255, ECON300 or ECON301; or permission of instructor.

ECON 308 Banking and Monetary Policy 3
Nature and economic significance of money, credit and the banking system; the origin and management of the money supply; and effects of monetary changes on price levels, output and employment. PREREQ: ECON103.

ECON 311 Economics of Developing Countries 3
Surveys policy issues related to economic growth and development. Special emphasis on problems facing contemporary developing countries. PREREQ: ECON101 and ECON103.

ECON 315 Economic History of Colonial America 3
Simple economic models and quantitative evidence used to explain colonial American history. Includes migration, servant and slave markets, government financing and the creation of paper money, causes of the Revolution, colonial growth, foreign trade, education and witchcraft. PREREQ: ECON101 and ECON103.

ECON 316 Economic History of the United States 3
Examines the record of economic change in the United States from the colonial period to the present. Emphasis on using economic theory and measurement for interpreting the past. PREREQ: ECON101 and ECON103.

ECON 317 Latin American Economics 3
Examination of the challenges facing the economies of Latin America, including financial crises, inflation, labor markets, social protection, and trade. The role of institutions and public policy in specific Latin American economies is studied. PREREQ: ECON101 or ECON103.

ECON 320 Energy Economics 3
Uses economic theory to examine the operation and efficiency of energy markets. Topics include regulation, energy efficiency and emission control, and public policies affecting energy markets. PREREQ: ECON101.

ECON 321 Economics for the Elementary Classroom 3
Seniors in the University's Milford Professional Development School are required to take this course as part of their internship experience. Provides future elementary teachers enough economics to feel comfortable teaching the required economics standards for grades K-4. Literature selections and lesson activities reinforce the economic concepts. PREREQ: ECON101 or ECON103.

ECON 332 Economics of Government Spending and Taxation 3
Microeconomic and macroeconomic analysis of public expenditure, borrowing and taxation. Introduction to stabilization, efficiency and distributional features of public finance. PREREQ: ECON101. RESTRICTIONS: ECON332 and ECON433 cannot both count for degree credit.

ECON 333 Current Readings in Economics 3
Books on controversial economic topics such as the Asian financial crisis, income distribution in America, environmental regulation, economic aid to developing countries, healthcare reform, privatizing Social Security and education vouchers are studied. Student papers and discussion form the essence of class sessions. PREREQ: ECON101.

ECON 340 International Economics 3
Theory, problems and policy in international trade and finance with emphasis on developments since World War II. PREREQ: ECON101 and ECON202. RESTRICTIONS: ECON340 cannot be taken for credit after ECON441 and/or ECON443.

ECON 341 Environment of Multinational Corporations 3
Interdisciplinary approach explores the multinational corporation: its political and economic environment; current attitude of policy makers; and techniques used to earn profits. Material supplemented by practicing economists, financial experts, business executives and political analysts. PREREQ: ECON103.

ECON 342 Studies in Int'l Economics 3
Analysis of selected topics in International Economic, including international trade, international finance and the analysis of non-U.S. economies. PREREQ: ECON101 and ECON103. RESTRICTIONS: May be repeated once for credit.

ECON 343 Environmental Economics 3
Analyzes benefits and costs of environmental policy; reviews valuation techniques; assesses efficiency of decentralized, regulatory, tax and marketable permit policies to protect the environment. Uses graphical (non-calculus) economic analysis. Crosslisted with APEC343. PREREQ: ECON101 or APEC150. RESTRICTIONS: Credit cannot be received for both APEC343 and APEC444.

ECON 350 Economics of Entrepreneurship 3
Analyzes impact of economic environment on behavior and development of new businesses. Reviews economic forces that influence new and developing businesses, including role of public policy. Requires development of a business plan which carefully considers economic factors most relevant to proposed business. PREREQ: ECON101.

ECON 360 Government Regulation of Business 3
Normative, economic and legal foundations of government intervention in business, particularly antitrust and regulation; and the process and the effects of government policies. PREREQ: ECON101. RESTRICTIONS: ECON360 and ECON463 cannot both count for degree credit.

ECON 364 Economics in Practice 3
Requires completion of at least 120 hours of an economics-related internship with verification by the hiring company. Term paper relating the real-world duties and experiences of the internship to principles learned in standard economics courses also required. PREREQ: ECON300 or ECON301 or ECON303. RESTRICTIONS: Requires permission of instructor.

ECON 366 Independent Study 1-6

ECON 381 Economics of Human Resources 3
Analysis of labor markets and of the family. Topics include labor supply and demand, human capital, labor market discrimination, the distribution of income and theories of fertility and family structure. Public policy applications stressed. PREREQ: ECON101. RESTRICTIONS: ECON381 and ECON483 cannot both count for degree credit.
ECON 385  WOMEN AND THE ECONOMY  3
Examines a wide range of economic issues relating to women’s lives, with special emphasis on family, work and income. Public policy applications and international comparisons are stressed.
May be crosslisted with WOMS385. PREREQ: ECON101.

ECON 390  ECONOMICS OF HEALTHCARE  3
Introduction to the United States healthcare system. Analysis of existing policies and proposals. Examines the roles of markets and government. Topics include costs, quantity and quality of healthcare systems, managed care and alternative delivery systems.
PREREQ: ECON101. RESTRICTIONS: ECON390 and ECON490 cannot both count for degree credit.

ECON 393  URBAN ECONOMICS  3
Uses simple microeconomic analysis to explain why cities exist, where they develop, how they grow, and how different activities are arranged within cities. Explores the economics of urban problems and policies related to local governments, land rent and land use patterns, poverty, housing, transportation, education, and crime.
PREREQ: ECON101.

ECON 406  ECONOMICS OF INFORMATION AND UNCERTAINTY  3
Investigates impact of costly information on behavior of individuals and markets. Topics include decision making under risk and uncertainty, insurance, consumer-employer search behavior, product liability, industrial safety, futures markets and problems of contract enforcement.
PREREQ: One of ECON251, ECON255, OR ECON300 or ECON301.

ECON 408  ECONOMICS OF LAW  3
Effect of legal rules on resource allocation both in and between the public and private sectors. Considers common law, regulation and constitutional rules. May be crosslisted with LEST408. PREREQ: One of ECON251, ECON255, or ECON300 or ECON301.

ECON 410  ECONOMICS OF FINANCIAL MARKETS  3
Utilizes microeconomic theory to analyze and evaluate the operation of financial markets. Topics include portfolio allocation under certainty and uncertainty, asymmetric information, market efficiency, risk allocation, and behavioral finance.
PREREQ: One of ECON251, ECON255, or ECON300 or ECON301 and either MATH221, MATH241, MATH242, or MATH243.

ECON 415  ECONOMIC FORECASTING  3
A practically oriented introduction to the art of managerial forecasting. Includes an integration of microeconomic and macroeconomic theory with statistical and econometric techniques to provide meaningful forecasts of the future values of series such as prices, sales, inventory levels and costs.
PREREQ: ECON101, ECON103 and MATH202.

ECON 418  ECONOMIC HISTORY OF AMERICAN LABOR MARKETS  3
Economic models used to explain the evolution of various American labor markets, including: immigrant labor, female labor markets, slavery, labor unions, internal labor migration, southern labor institutions, and the impact of human capital on industrial expansion and productivity.
PREREQ: One of ECON251, ECON255, ECON300 or ECON301.

ECON 419  ECONOMICS OF THE GREAT DEPRESSION  3
Analysis of modern theoretical explanations of the economic downturn of 1929-1933, with implications for understanding current economic problems. Theories considered include those based on monetary contractions, consumption and investment instability and international disturbances.
PREREQ: ECON303.

ECON 422  ECONOMETRIC METHODS AND MODELS I  3
Uses statistical methods, especially multiple regression, to quantify economic models, including situations when the assumptions of classical statistics do not hold.
PREREQ: ECON103; and MATH221 or MATH241; and either MATH202, MATH205, MATH350 or MATH450.

ECON 423  ECONOMETRIC METHODS AND MODELS II  3
Class discussion and research in advanced economic statistics and applied econometrics.
PREREQ: ECON422.

ECON 426  MATHEMATICAL ECONOMIC ANALYSIS  3
Introduction to the mathematical approach and methods used in advanced economic theory.
PREREQ: One of ECON251, ECON255, ECON300 or ECON301; and either MATH222, MATH242, or MATH243.

ECON 430  TOPICS IN MACROECONOMIC THEORY  3
Continuation of intermediate macroeconomic theory, including recent developments in the macroeconomic theory.
PREREQ: ECON303.
ECON 483  ECONOMICS OF LABOR MARKETS  3
Analyzes economic models of labor market topics - sex and race discrimination, determination of wages and fringe benefits, labor unions, individual and firm investments in education and training, geographical mobility, labor supply, and professional sports.
PREREQ: One of ECON251, ECON255, ECON300 or ECON301. RESTRICTIONS: ECON381 and ECON483 cannot both count for degree credit.

ECON 490  ECONOMICS OF HEALTH POLICY  3
Theoretical analysis of healthcare issues and policies. Examination of changing relationships between patients, providers, hospitals, insurers, employers, communities and government. Analysis of spending policies, cost containment, hospital competition, care of the elderly, Medicare, Medicaid, managed care regulation, medical malpractice and provider (physician) manpower planning.
PREREQ: One of ECON251, ECON255, ECON300 or ECON301. RESTRICTIONS: ECON390 and ECON490 cannot both count for degree credit.

ECON 503  ECONOMIC ANALYSIS FOR BUSINESS POLICY  3
Business-oriented overview of microeconomic and macroeconomic theory. Approximately two-thirds of the course will focus on microeconomics and one-third on macroeconomics.
RESTRICTIONS: Cannot be taken for credit toward undergraduate or graduate economics degrees. Not open to ECON graduate students in the MA, MS, or PhD program. Open to all MBA, Pathways and business graduate students who are not in the Economics undergraduate or graduate program

ECON 530  APPLICATION OF MATHEMATICS IN ECONOMICS  3
Provides students with experience in the application of mathematics in economics. Applications may vary from semester to semester. Mathematical topics may include applications of ordinary and partial differential equations, game theory, linear programming, dynamic programming, stochastic programming and calculus of variations.
Crosslisted with MATH330. PREREQ: MATH302, MATH 349, ECON301 and ECON330.

ECON 540  INTERNATIONAL ECONOMICS FOR MANAGERS  3
Survey of international economic issues relevant to managers operating in a global context. 
PREREQ: ECON503 or permission of instructor. RESTRICTIONS: Cannot be taken for undergraduate or graduate economics credit.

ECON 601  MONEY TALKS INSTITUTE  3 PF
Presents personal finance content and curriculum materials appropriate for the K-12 classroom. Requires implementation of lessons, completion of lesson studies, and analysis of student assessments.
RESTRICTIONS: Restricted to K-12 teachers.

ECON 602  MINI-SOCIETY  1 PF
Presents the research base and the procedures for implementing and maintaining an experienced-based learning system, the Mini-Society, to teach economics, entrepreneurship, and citizenship in grades 3-6. 
RESTRICTIONS: Restricted to teachers of grades 3-6.

ECON 604  MAKING SENSE OF MONEY AND BANKING  2 PF
Presents an in-depth look at the money and banking system in the United States and analyzes instructional materials appropriate for teaching the content to students in grades 3-12.
RESTRICTIONS: Restricted to teachers of grades 3-12.

ECON 606  MICROECONOMICS FOR SECONDARY EDUCATORS  3
Covers the economics of how markets operate including basics of supply, demand, market failure and the role of government in the economy. Includes methods, strategies, and lessons for the delivery of this content to students in grades 7-12.
RESTRICTIONS: Restricted to teachers of grades 7-12.

ECON 607  MACROECONOMICS FOR SECONDARY EDUCATORS  3
Covers how an economy functions as a whole, the business cycle, inflation and unemployment. Presents the tools of monetary and fiscal policy and their implementation on an economy. Includes methods, strategies, and lessons for the delivery of this content to students in grades 7-12.
RESTRICTIONS: Restricted to teachers of grades 7-12.

ECON 609  ECONOMICS AND CHILDREN'S LITERATURE  1 PF
Uses children's literature to teach basic economic concepts appropriate for grades K-3. Develops skills for identify economic concepts and creating appropriate instructional materials to integrate economics into reading, language arts and mathematics.
RESTRICTIONS: Restricted to teachers of grades K-3.

ECON 612  ECONOMICS FOR THE ELEMENTARY EDUCATOR  3
Covers basic economic content appropriate for the elementary classroom. Presents instructional strategies appropriate for elementary teaching of economics. Provides instructional materials that integrate economics with reading, language arts, and mathematics.
RESTRICTIONS: Restricted to teachers of grades K-6.

ECON 614  ECONOMICS SYSTEMS/INTERNATIONAL TRADE  3
Covers how different nations organize their economic systems and how each pursues economic goals for their society including issues surrounding international trade and globalization. Includes methods, strategies, and lessons for the delivery of this content to students in grades 7-12.
RESTRICTIONS: Restricted to teachers of grades 7-12.

ECON 654  APPLICATIONS IN ENVIRONMENTAL ECONOMICS  3
Nonmarket valuation and other empirical methods used in the application of the theory of environmental economics to policy issues pertaining to water and air quality, climate change, and other relative environmental resources.
Crosslisted with MAST654.

ECON 668  RESEARCH  1-3

ECON 670  BENEFIT-COST 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.
Crosslisted with MAST672. PREREQ: ECON300 or ECON301.

ECON 671  MICROECONOMICS FOR ECONOMIC EDUCATORS  3
Studies supply and demand, theory of price determination in perfectly and imperfectly competitive markets and role of government in the economy. Emphasizes applications such as industrial regulation antitrust policy, the environment and taxation.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 672  MACROECONOMICS FOR ECONOMIC EDUCATORS  3
Includes national income accounting, theory of income determination, monetary and fiscal policies, budget deficits and surpluses, and national debt.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 673  CURRICULUM STRATEGIES FOR ELEMENTARY ECONOMIC EDUCATORS  3
Curriculum applications incorporating proper treatment of economic concepts at elementary level. Strategies include techniques of motivation, training and reinforcement.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 674  CURRICULUM STRATEGIES FOR SECONDARY ECONOMIC EDUCATORS  3
Curriculum applications incorporating proper treatment of economic concepts at secondary level. Strategies include techniques of motivation, training and reinforcement.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 675  ECONOMICS OF NATURAL RESOURCES  3
Study of the allocation of natural resources, especially marine and coastal zone resources, in modern economics. Application of economic theory to the problems of misallocations and the means of correction, under both free and planned markets.
Crosslisted with MAST675.

ECON 676  ENVIRONMENTAL ECONOMICS  3
Study of the choice of policies to protect the environment, including land, air and water resources. Theory of market failure and externalities, use of economic incentives in policy design, valuation of environmental resources and examination of inefficiencies in existing U.S. environmental policies.
Crosslisted with MAST676.

ECON 677  PRACTICUM IN ECONOMIC EDUCATION  1-6
Research and analysis of public policy issues. Projects must demonstrate applicability to economic education. 
RESTRICTIONS: Requires enrollment in Master of Arts in Economic Education.

ECON 678  MONETARY AND INTERNATIONAL TRADE THEORIES FOR ECONOMIC EDUCATORS  3
Studies international trade, free trade vs. protectionism, cartels, balance of trade and payments, role of the financial sector, and monetary policy. 
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 679  CONTEMPORARY ISSUES FOR ECONOMIC EDUCATORS  3
Emphasizes contemporary economic issues, problems and controversies. 
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 801  MICROECONOMICS  3
Analyzes consumer behavior and market demand, production, costs and the theory of the firm; market structures and competition in open and closed markets, general equilibrium theory and welfare economics. 
RESTRICTIONS: Cannot be taken for MS or PhD credit.
ECON 802 MACROECONOMICS 3
Studies the determination of output, employment, and the price level within classical, neoclassical, and contemporary frameworks; analyzes the effects of fiscal and monetary policy within these alternative frameworks, and examines the determinants of economic growth.

ECON 803 APPLIED ECONOMETRICS I 3
Applies and modifies statistical techniques to economic data; presents the essentials of econometric theory. PREREQ: MATH202 or STAT2471 or equivalent. RESTRICTIONS: Cannot be taken for credit for MS or PhD degree in Economics.

ECON 804 APPLIED ECONOMETRICS II 3
Econometric techniques and data management using SAS. Emphasizes applications of econometric methods, rather than econometric theory. PREREQ: ECONB03 or ECONB22.

ECON 805 GAME THEORY FOR ECONOMISTS 3
Study of the theory of games with complete and incomplete information in both static and dynamic contexts with applications to economic problems, primarily in the areas of labor economics, economics of information and uncertainty, international trade and macroeconomics. PREREQ: ECONB01 or ECONB11.

ECON 810 MATHEMATICS FOR ECONOMISTS 3
Introduces fundamental mathematical tools utilized in theoretical economic analysis. Topics include basic set theory and real analysis, optimization in both static and dynamic environments, linear algebra, difference and differential equations and probability theory. The use of these tools in constructing and analyzing economic models is emphasized.

ECON 811 MICROECONOMIC THEORY I 3
Covers foundations of microeconomics with emphasis on consumer and producer theory and market equilibrium. Extends the analysis to incorporate uncertainty. Introduces non-cooperative games in static and dynamic settings with full information, as well as general equilibrium theory and welfare analysis. COREQ: ECON810.

ECON 812 MACROECONOMIC THEORY I 3
Examines the role of dynamic general equilibrium models in macroeconomic theory. Topics include capital accumulation, overlapping generations, economic growth, business cycle, unemployment, inflation, macroeconomic impact of fiscal and monetary policies. Emphasis is placed on tools such as dynamic programming, difference equations, and Markov chains. PREREQ: ECON810.

ECON 813 MICROECONOMIC THEORY II 3
Emphasizes models of strategic behavior, particularly in settings with imperfect information, such as adverse selection, screening and signaling, principal-agent models, mechanism design and auctions. Extends general equilibrium models to include uncertainty and introduces social choice theory. This course is intended for doctoral students. PREREQ: ECON810 and ECON811.

ECON 814 MACROECONOMIC THEORY II 3
Topics include capital accumulation and economic growth, unemployment, inflation, financial stability, the open economy and international monetary economics, economic fluctuations, stabilization policy, fiscal policy, monetary and banking policy. This course is intended for doctoral students. PREREQ: ECON810 and ECON812.

ECON 820 ECONOMICS OF EDUCATION POLICY 3
Survey of theory, policy and practice of the field of Economic Education, including human capital, educational financing, and production of education. PREREQ: ECONB01 or ECONB11, ECONB03 or ECONB22.

ECON 822 ECONOMETRIC THEORY I 3
Statistical basis for econometric analysis, which includes general linear model, discrete and continuous distributions, methods of estimation, properties of estimators, nested and non-nested hypothesis testing, asymptotic theory. All topics will be illustrated using the General Linear Model. PREREQ: MATH202 or STAT2471 or equivalent.

ECON 823 ECONOMETRIC THEORY II 3
Extensions of the General linear model, including heteroskedasticity, autocorrelation, identification and estimation of simultaneous equations, and error in measurement. PREREQ: ECON822.

ECON 824 ECONOMETRICS OF CROSS-SECTION AND PANEL DATA 3
Econometric techniques used in applied microeconomic analysis. Cross-section techniques, limited dependent variables, panel data analysis. Additional topics may also be covered. PREREQ: ECONB22 and ECONB23.

ECON 825 TIME-SERIES ECONOMETRICS 3
Introduction to time-series methods, including modeling multivariate systems. Development of methods to test and insure goodness-of-fit of time-series models. Additional topics may also be covered. Intended for doctoral students. PREREQ: ECONB22 and ECONB23.

ECON 827 ADVANCED PRODUCTION ECONOMICS 3
Specification, identification and estimation of dual models for use in the evaluation, hypothesis testing and control of firm-level technological and production problems. Crosslisted with APEC827. PREREQ: ECONB01 and an econometrics/statistics course. RESTRICTIONS: Requires permission of instructor.

ECON 829 ECONOMIC EDUCATION CURRICULA 2
Survey of educational materials and methods in Economic Education and of related assessment studies, especially at the K-12 levels. PREREQ: EDUCB05 or EDUCB06. RESTRICTIONS: Cannot be taken for credit by MA and PhD students in Economics.

ECON 832 PUBLIC FINANCE 3
Examines recent research and literature in public finance. Topics include public goods, public choice, externalities and environmental policy, expenditure programs for the poor, social insurance, social security, health insurance, unemployment insurance, cost-benefit analysis, tax incidence, optimal taxation. COREQ: ECON801 or ECON811.

ECON 841 INTERNATIONAL TRADE AND DEVELOPMENT 3
Covers the basis of exchange, trade policy, international factor movements and integration. Applies to both historical and current economic development. PREREQ: ECONB01 or ECONB11, ECONB03 or ECONB22.

ECON 842 INTERNATIONAL FINANCE AND DEVELOPMENT 3
Continues ECON841. Covers foreign exchange markets, balance of payments, exchange rate systems and international economic policy. PREREQ: ECONB02 or equivalent.

ECON 845 DEVELOPMENT ECONOMICS 3
Analyzes topics of current interest in developing countries, such as labor markets, population, human capital and the distribution of income. PREREQ: ECONB01 or ECONB11 and ECONB03 or ECONB22.

ECON 846 TOPICS IN DEVELOPMENT ECONOMICS 3
Covers advanced topics in development economics using advanced theoretical and empirical tools. Possible topics include anti-poverty programs in rich and poor countries, migration, child labor, human capital investment, credit and insurance markets, gender, and the design of labor contracts. PREREQ: ECON811 and ECON823.

ECON 850 DISSERTATION WORKSHOP 1
Designed to help PhD students further develop the writing and research skills necessary to complete a successful dissertation. Goal of the class is a completed dissertation proposal. Students will normally register for this course during their third year in the PhD program after completion of all required theory and econometric classes. PREREQ: Requires permission of instructor.

ECON 852 MONETARY ECONOMICS 3
Compares the role of money in various macroeconomic models: transactions demand for money, long term effects of inflation and government deficit finance decisions in intertemporal models, capital theory and the pricing of financial securities as well as theories of the term structure of interest rates. PREREQ: ECONB02 or ECONB12.

ECON 853 TOPICS IN INTERNATIONAL MACROECONOMICS 3
Advanced topics in International Macroeconomics, including arbitrage and pricing relationships in foreign exchange markets, exchange rate forecasting, capital and trade flows as long run determinants of exchange rates, debt sustainability, fixed versus flexible exchange rate regimes, and currency unions and currency crises. PREREQ: ECONB12 and ECONB23.

ECON 861 INDUSTRIAL ORGANIZATION AND REGULATION 3
Uses microeconomic theory and game theory to analyze the strategic interaction among firms. Topics include vertical and horizontal integration, vertical restrictions, cartels and collusion, pricing practices, entry deterrence, diffusion of technology, product differentiation, and government regulation of industry. PREREQ: ECONB01 or ECONB11 and ECONB03 or ECONB22. ECONB05 highly recommended.

ECON 862 TOPICS IN INDUSTRIAL ORGANIZATION AND REGULATION 3
Advanced topics including a wide range of issues in Industrial Organization and Regulation, such as: the regulation of specific industries and industrial practices, property rights, contracts, congestion pricing, the relative efficiencies of alternative modes of transport, market failures, and intermediation versus direct financing. PREREQ: ECONB11 and ECONB23.
EDLM 621  REFERENCE SERVICES AND RESOURCES  3
Explores and evaluates the role of information in our society and the range of reference materials supporting the school library media program. Includes the use of print and electronic systems, reference procedures, and instructional role of information in the school curriculum.

EDLM 622  INTRODUCTION TO CATALOGING AND CLASSIFICATION  3
Explores and evaluates standardized cataloging and classification systems with special emphasis on the organization of the school library media center. Topics include: Anglo-American Cataloging Rules; Library of Congress Subject Headings; and Dewey Decimal Classification.

EDLM 625  SCHOOL LIBRARY MEDIA PROGRAM ADMINISTRATION  3
Explores and evaluates administration and management of school library media center. Topics include: planning and evaluation; policy making; personnel; budget; facilities; standards; research trends in area.

EDLM 628  SCHOOL LIBRARY MEDIA PROGRAM CURRICULUM  3
Explores the role of the school library media program in meeting information literacy and other education standards. Topics include information literacy, state education standards, advocacy, instructional technology and collaboration.

EDUC 100  INTRODUCTION TO ELEMENTARY AND MIDDLE SCHOOL EDUCATION  1
First year seminar covers issues in K-8 learning and instruction. Topics include overviews of discipline options within the ETE major and examinations of K-8 education practices.

EDUC 166  SPECIAL PROBLEM  1-3

EDUC 205  HUMAN DEVELOPMENT: GRADES K-8  3
Explores theories of child and early adolescent development pertaining to education. Topics include biological, cognitive, linguistic, and social-emotional development and are taught through problem-based learning, large- and small-group discussion, case studies and lecture. Requires a service learning field placement in after-school sites.

EDUC 210  BEGINNING LITERACY INSTRUCTION  3
Introduces research-based perspectives on literacy acquisition during kindergarten and first-grade years and emphasizes the integration of basic literacy skills, reading, writing, oral language and literature during instruction. Takes a cognitive orientation and highlights the influence of vocabulary development, phonemic awareness, and establishment of the alphabetic principle on literacy learning. Includes field experience.

EDUC 230  INTRODUCTION TO EXCEPTIONAL CHILDREN  3
Historical and philosophical basis for special education; physical and psychological characteristics of exceptional children; study and discussion of past and emerging educational practices for exceptional children with emphasis on pedagogical commonalities. Systematic observation of a cross section of special education classes required. Emphasis on the school-age child.

EDUC 240  LEGAL AND ETHICAL ISSUES IN AMERICAN EDUCATION  3
Explores ethical and legal controversies in school discipline, intellectual freedom, students' rights, moral and citizenship education, and other professional concerns.

EDUC 247  THE HISTORY OF EDUCATION IN AMERICA  3
American elementary and secondary schools from the colonial era to the 1980s, with particular attention to issues of expansion, diversity, reform, and the law.

EDUC 258  CULTURAL DIVERSITY, SCHOOLING AND THE TEACHER  3
Examines roles and responsibilities of the classroom teacher vis-a-vis the demographic changes occurring in United States society and the public school student population. Topics include race, ethnicity, gender, sexual orientation, social class, poverty and language.

EDUC 259  CULTURAL DIVERSITY IN COMMUNITY CONTEXTS  3
Examines roles and responsibilities of the classroom teacher through critical examination of field placement experiences in diverse community contexts. Topics include race, ethnicity, gender, sexual orientation, social class, poverty and language.

EDUC 266  SPECIAL PROBLEM  1-6

EDUC 286  EDUCATIONAL TECHNOLOGY: PROFESSIONAL TOOLS  1
Topics include educational resources and communication on the internet, word processing, authoring for the web, electronic grade books, statistics, presentation technology and assessment tools.

EDUC 297  INTRODUCTION TO PSYCHOLOGY IN SCHOOLS  3
Examines the ways in which psychology is applied in educational settings, including the role of schools in mental health service delivery to youth, an overview of mental health challenges that manifest in schools, and effective interventions to address these challenges.

EDUC 310  READING AND WRITING IN ELEMENTARY SCHOOL  3
Focuses on literacy development of second through sixth grade children. Explores relevant research and developmentally appropriate practices. Includes a field experience in a second through sixth grade classroom.

EDUC 320  READING AND WRITING IN THE MIDDLE GRADES  3
Focuses on methods and materials for developing literacy from grades four through eight. Explores practices suited to adolescent development. Includes a practicum in a fourth through eighth grade classroom.

EDUC 335  ELEMENTARY CURRICULUM: MATHEMATICS  3
Selection and use of appropriate methods and curriculum for teaching arithmetic in grades K-6. Focuses on curriculum materials, teaching strategies, lesson planning and implementation and the appraisal of pupil achievement. Practicum included.

EDUC 868  RESEARCH  1-9
EDUC 869  MASTER'S THESIS  1-6
EDUC 875  ADVANCED FISHERY ECONOMICS  3
Theoretical and applied study of the optimal utilization and management of commercial and recreational fisheries with emphasis on equity issues and the difficulty of deriving regulations which are biologically effective and which provide incentives for economic efficiency at reasonable costs. Crosslisted with MAST875. PREREQ: MAST875 or ECON875
EDUC 880  LABOR ECONOMICS  3
Covers topics in labor economics, including labor demand, labor supply, investment in human capital, wage determination, and labor market discrimination. Applications to public policy issues will be stressed throughout. PREREQ: ECON801 or ECON811 and ECON803 or ECON822.
EDUC 890  COLLOQUIUM: ECONOMICS SEMINARY SERIES  0 PF
Regularly-scheduled lectures by faculty and visiting researchers providing exposure to current research in economics.

EDUC 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.

EDUC 969  DOCTORAL DISSERTATION  1-12 PF
EDUC 341 ELEMENTARY CURRICULUM: SCIENCE 3
Introduction to teaching science in the elementary school. Includes the study of current elementary school programs, instructional materials, teaching strategies, lesson planning and implementation and the appraisal of pupil achievement. Practicum included.

EDUC 345 MENTORING STUDENTS: INT & DEV DISAB 1-3
Through classroom and field experiences, students learn the role of a mentor for youth and adults who have intellectual and developmental disabilities and how to facilitate their academic, social and business relationships in higher education settings, the surrounding campus community, and at local work sites. May be crosslisted with HDF345. RESTRICTIONS: Permission of instructor.

EDUC 346 ELEMENTARY CURRICULUM: SOCIAL STUDIES 3
Introduction to teaching social studies in the elementary school. Includes the study of current elementary school programs, instructional materials, teaching strategies, lesson planning and implementation and the appraisal of pupil achievement. Practicum included.

EDUC 348 INVESTIGATING SOCIAL STUDIES IN MIDDLE SCHOOL COMMUNITIES 3
Encourages and supports professional development as a social studies teacher. Students investigate teaching, learning and assessing at the middle school level and consider their roles as educators in diverse classrooms and communities. Field experience is required. PREREQ: EDUC346.

EDUC 360 LEARNING IN COMMUNITY CONTEXTS 3
Study of the educational process in institutions and organizations with a focus on non-profit groups oriented toward community service. Emphasis upon the relation of these groups’ educational practices to their overall public service mission. May be crosslisted with HDF360.

EDUC 366 INDEPENDENT STUDY 1-6
Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member. RESTRICTIONS: Requires permission of instructor and approval of the Coordinator of Undergraduate Research. May not fulfill course requirements in a major curriculum except by departmental permission.

EDUC 387 INTEGRATING TECHNOLOGY IN EDUCATION 2
Introduces prospective teachers to technology available for use in classroom content areas. Enables students to evaluate technology use and identify and create classroom lessons that demonstrate effective use of technology integration. Concludes with development of a teaching project incorporating the use of technology. PREREQ: EDUC286. RESTRICTIONS: Open to ETE majors only.

EDUC 390 CLASSROOM MANAGEMENT FOR SOCIAL AND EMOTIONAL LEARNING 3
Focuses on creation of positive classroom learning environments by fostering children’s social and emotional development, infusing behavior supports in academic instruction, enhancing motivation for learning, and establishing well-organized and respectful classrooms. Emphasis placed on learning core concepts and practical research-based strategies. Field experience included. RESTRICTIONS: Open to ETE majors only.

EDUC 391 HONORS COLLOQUIUM 3
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

EDUC 395 BUILDING COMMUNITIES OF LEARNERS IN URBAN CONTEXTS 3
Designing educational communal environments sensitive to diverse needs of urban school children: academic, emotional, moral, and relational. Holistic integration of instruction, classroom management, and students’ whole person growth guided by mutual respect, caring, self-reflection, problem-solving, educational philosophies, and professional collaboration. Field experience included. RESTRICTIONS: Open only to students in the Elementary Teacher Education and Human Services majors and the Urban Education minor.

EDUC 400 STUDENT TEACHING 3-12 PF
Full-time extended student teaching experience in pre-kindergarten through 12th grade schools. Students are under the guidance and supervision of cooperating teacher(s) in the classroom and a University of Delaware supervisor. RESTRICTIONS: Students must show evidence of passing a basic competency test and must show evidence of taking content knowledge test(s) in their area(s) of certification as required by the University Council on Teacher Education. In addition, students must submit a com

EDUC 401 LANGUAGE DEVELOPMENT IN THE CLASSROOM 3
Applies knowledge about language development in school-age children to the development of language processes and the assessment of language performance for first and second-language speakers of English. Explores language processes that provide a foundation for reading, speaking and listening. This course is delivered online.

EDUC 403 LITERATURE FOR ADOLESCENTS: MULTIMEDIA TEXTS 3
Explores classic and contemporary reading materials and non-print texts pervasive in lives of adolescents. Addresses selection of texts for middle school classes as well as techniques for developing and promoting critical reading and informed interpretation of non-print texts. May be crosslisted with ENGL403.

EDUC 404 TEACHING SCIENCE IN THE MIDDLE SCHOOL 3
Introduction of curriculum and appropriate methods for teaching science concepts to middle school students. Activities include review, development and evaluation of curriculum materials, teaching strategies, research on student thinking and assessment of student learning. Clinical experience required. PREREQ: EDUC431. COREQ: SCEDN650.

EDUC 406 TEACHING MATH IN THE MIDDLE SCHOOL 3
Introduction of curriculum and appropriate methods for teaching mathematical concepts to middle school students. Activities include review, development and evaluation of curriculum materials, teaching strategies, research on student thinking and assessment of student learning. Clinical experience required. PREREQ: EDUC435.

EDUC 410 ASSISTIVE TECHNOLOGY 1
Prepares special education teachers to identify, evaluate, and use assistive and augmentative technologies to support the education of exceptional learners. Focuses on promoting academic learning and accommodating academic, physical, and sensory disabilities. Field placement required. PREREQ: EDUC230, EDUC387. COREQ: EDUC400.

EDUC 411 INTRODUCTION TO EDUCATIONAL TECHNOLOGY 3
Comprehensive overview of the field of educational technology. Aligns the principles of how people learn with technological tools proven effective across the disciplines. Identifies and compares national and international standards frameworks and introduces the educational technology knowledge base of researched best practices for improving results.

EDUC 413 ADOLESCENT DEVELOPMENT AND EDUCATIONAL PSYCHOLOGY 4
Examines socio-emotional and cognitive development of adolescent learners; psychological processes underlying learning, motivation, and classroom behaviors; and teacher-student and group processes. Addresses implications for creating learning environments that encourage positive social interaction, active engagement in learning, and self-motivation. Field experience in a high school included. RESTRICTIONS: Open only to sophomore, junior, and senior secondary education majors.

EDUC 414 TEACHING EXCEPTIONAL ADOLESCENTS 3
Examines characteristics of exceptional adolescents and the historical, legal and philosophical bases for special education. Focuses on teaching students with special needs within general education settings using research-based instructional strategies, classroom management, and related services. RESTRICTIONS: Open only to students in secondary education majors, the Health Behavior Science major, the Disabilities Studies minor, and the Educational Studies minor.

EDUC 415 PRACTICUM IN SECONDARY SPECIAL EDUCATION 1-2
Practicum field experience in a Professional Development School that incorporates observation of teachers’ strategies to differentiate instruction and opportunities to tutor a student with special needs.

EDUC 419 DIVERSITY IN SECONDARY EDUCATION 3
Examines aspects of diversity (e.g., gender, class, language) in secondary schools and classrooms. Reviews the foundations of multicultural education and considers implications for curriculum, instruction and classroom management. Field experience included. RESTRICTIONS: Open only to students in secondary education majors, the Educational Studies minor, and the Urban Education minor.

EDUC 420 READING IN THE CONTENT AREAS 1-3
Overview of reading comprehension issues at middle and high school levels based primarily upon task analyses of content-area materials (math, social studies and science). Students apply current theories of reading comprehension to texts in their areas of interest.
EDUC 421  INTERNET TECHNOLOGIES  3
Presents the Internet from a dynamic workplace perspective. Reflects on how emerging technologies will empower society to do more with the Internet. Covers core Internet technologies, Web page design and authoring, networking fundamentals, and technology planning. Provides a rich array of labs and optional assignments.

EDUC 422  TEACHING READING IN SECONDARY ENGLISH  3
Focuses on reading comprehension issues and differentiated reading instruction for secondary English teachers. Students learn how to determine the reading level of adolescents and the readability of text, integrate contextualized vocabulary instruction and word study, develop adolescents’ orality, and use strategies that develop independent reading.
PREREQ: ENGL110. RESTRICTIONS: Enrollment limited to English Education students.

EDUC 429  METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS  3
Familiarizes students with appropriate teaching methods and techniques for the elementary foreign language classroom. Includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials and course design. Crosslisted with FLIT429.

EDUC 431  APPLIED BEHAVIOR ANALYSIS  3
Prepares special education teachers to understand and apply the principles of behavior analysis in classroom settings. Focuses on conducting functional behavior assessments and designing behavior support plans for exceptional learners. Field placement required.
PREREQ: EDUC230. RESTRICTIONS: Restricted to juniors and seniors in the Elementary Teacher Education major, students in the Health and Physical Education Major who are also in the Health, Physical Activity and Disability minor, or permission of instructor.

EDUC 432  CURRICULUM AND INSTRUCTION FOR EXCEPTIONAL LEARNERS  3
Prepares special education teachers to understand and analyze the instructional needs of exceptional learners. Focuses on designing and implementing evidence-based interventions to support students' access to general education curriculum. Includes development of Individual Education Plans and collaboration with parents and professionals. Field placement required.
PREREQ: EDUC230, EDUC310. COREQ: EDUC400.

EDUC 433  STUDENT TEACHING SEMINAR: ELEMENTARY ED  1-2 PF
Provides student teachers with the knowledge and tools to support student learning. Addresses educational issues to prepare student teachers for future professional learning and self-development.
COREQ: EDUC400.

EDUC 435  EDUCATIONAL EVALUATION FOR EXCEPTIONAL LEARNERS  3
Prepares special education teachers to participate in the evaluation of students with disabilities. Examines legal, ethical, and professional requirements. Includes administration, scoring, and interpretation of informal and formal academic tests, including screening and progress monitoring tools. Field placement required.

EDUC 436  DIFFERENTIATED LITERACY INSTRUCTION  3
Prepares elementary teacher education majors to identify, administer and analyze informal assessments and to use data to develop and implement differentiated literacy instruction.
PREREQ: EDUC310.

EDUC 437  DIAGNOSIS AND INSTRUCTION FOR LITERACY PROBLEMS  3
Prepares special education teachers to meet the needs of students with significant problems in reading and writing. Emphasis is placed on assessment of literacy problems and selection and implementation of interventions in reading and writing. Field experience required.
PREREQ: EDUC310. COREQ: EDUC400.

EDUC 438  LEARNING TECHNOLOGIES ACROSS CURRICULA  3
Develops a deep understanding of technology integration across the various content areas. Defines the concept of technological pedagogical content knowledge (TPACK) and negotiates the relationships between technology, pedagogy, and content. Builds an understanding of how technology can support active and constructive learning.

EDUC 439  EDUCATIONAL TECHNOLOGY TOPICS  3
In-depth study of a major problem in educational technology. Problems to be studied will vary with each offering.

EDUC 440  LITERACY INSTRUCTION FOR ENGLISH LANGUAGE LEARNERS  3
Focuses on effective literacy instruction for English Language Learners in elementary and middle school levels in the following areas: language development, vocabulary instruction, decoding, reading fluency, comprehension strategy instruction, and motivation and engagement.

EDUC 447  ADVANCED METHODS IN TEACHING ESL  3
Examines the application of evidence-based methods for building the English listening, speaking, reading and writing skills of school-aged individuals whose first language is not English. Topics include assessment, instruction, grouping, and intervention.
PREREQ: EDUC472. COREQ: EDUC400. RESTRICTIONS: Open to students in the Elementary Teacher Education major.

EDUC 450  TECHNOLOGY AND COGNITION  3
Presents major theories of learning and instruction and discusses their relationship to the use of computers in education. Emphasizes learning sciences theories, such as cognitive and socio-cognitive theories, and considers their role in the design and use of educational technology in real world settings.

EDUC 451  EDUCATIONAL ASSESSMENT FOR CLASSROOM TEACHERS  3
Explores principles and methods for construction and evaluation of student learning assessments, including knowledge, understanding and skills. Presents methods to enhance teacher inquiry into student learning. Considers strengths and limitations of each method in regard to informing teachers' judgments. Discusses implications of assessment policy.

EDUC 456  ELEARNING  3
Surveys the field of eLearning, identifies the leading learning management systems, and reviews the major trends and issues related to using eLearning to improve educational results. Reflects on the role of eLearning in the National Education Technology Plan.

EDUC 459  URBAN SCHOOLS IN URBAN LANDSCAPES  3
Examines historical, sociocultural, economic, and political perspectives on the urban education experience. Includes consideration of ability, language, race/ethnicity, immigration, and power dynamics. Explores creation of socially just educational environments that address issues of equity and draw upon the resources, opportunities, and challenges in urban contexts.

EDUC 462  LANGUAGE ACQUISITION  4
The factors which distinguish human language from animal communication, as well as the development of many facets of language (semantics, syntax and phonology). To supplement reading and discussion, students gain research experience by working approximately eight hours per week on the on-going language acquisition projects.
May be crosslisted with LING462, PSYC462.

EDUC 466  INDEPENDENT STUDY  1-6
Research internship with faculty mentor.

EDUC 469  RESEARCH INTERNSHIP EXPERIENCE  1-3
Research internship with faculty mentor.

EDUC 470  TOPICS IN EDUCATION  3
Examines selected education controversies in their broader philosophical and/or historical contexts. Draws upon and connects ideas from other education courses.
RESTRICTIONS: Juniors and seniors only.

EDUC 472  TEACHING ENGLISH AS A SECOND LANGUAGE  3
Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English; and devising and presenting lesson plans.
May be crosslisted with LING472. RESTRICTIONS: Open only to students in the cognitive science major, Elementary Teacher Education major, Linguistics major, or by permission of instructor.

EDUC 473  SCHOOL-TO-ADULT LIFE TRANSITIONS AND DISABILITY  3
Examines legislation, research and practices relating to school-to-adult life transition for children and youth with disabilities. Topics include post-school outcomes and transition service models related to further education, employment and independent living; self-determination; family and community agency collaboration; transition assessment and planning.
RESTRICTIONS: Requires permission of instructor.

EDUC 475  SENIOR THESIS  3
Substantial research paper directed by faculty mentor.
EDUC 476 SECOND LANGUAGE ACQUISITION AND BILINGUALISM 3

EDUC 477 THE STRUCTURE OF ENGLISH 3
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). Crosslisted with LING477. PREREQ: LING101.

EDUC 485 MULTIMEDIA LITERACY 3
Defines multimedia and discusses its impact on society. Surveys applications across the curriculum and reflects on the effects of multimedia on current teaching practice. Provides a multimedia toolbox and shows how to use it to create and publish multimedia applications on the Internet. Discusses multimedia frontiers, emerging technology and societal issues including human impact, regulation, copyright, fair use, equity, cost and universal access. May be crosslisted with COMM486.

EDUC 492 EDUCATIONAL TECHNOLOGY CAPSTONE 3
A service learning practicum in which participants form teams to design and develop an educational technology solution in an actual school or workplace. Models meta-cognitive assessment through a learning community where participants create a shared knowledge base of best practices and tools of Web design. PREREQ: Requires permission of instructor.

EDUC 566 SPECIAL PROBLEM 1-12

EDUC 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. Crosslisted with MATH588.

EDUC 600 TEACHER AS RESEARCHER 3
Helps develop strategies to be used by teachers and administrators to bridge the gap between theory and practice. Assists teachers and administrators in initiating research on classroom problems related to teacher and student behavior and assessment.

EDUC 601 LANGUAGE DEVELOPMENT IN THE CLASSROOM 3
 Applies knowledge about language development in school-age children to the development of language programs and the assessment of language performance for first and second-language speakers of English. Explores language processes that provide a foundation for reading, speaking and listening. This course is delivered online.

EDUC 602 CHILDHOOD LITERATURE 3

EDUC 603 LITERATURE FOR ADOLESCENTS 3
Evaluation of classic and contemporary reading materials and their application to the junior-senior high school curriculum. Study of criteria, methods and tools for selection of books. Techniques for developing and promoting reading.

EDUC 604 TEACHING WRITING IN THE ELEMENTARY AND MIDDLE SCHOOL 3
Focuses on the development of appropriate instructional programs for elementary and middle school children. Provides information on the writing process, exemplary programs, evaluation of children's writing and functions/forms of writing. This course is delivered online.

EDUC 605 MEASUREMENT APPLICATIONS IN EDUCATION 3
Focuses on educational measurement strategies and processes that teachers use to assess student learning. Emphasis is on assessment skills and knowledge that can enhance professional practice and promote student learning.

EDUC 606 METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS 3
Appropriate teaching methods and techniques for the elementary foreign language classroom. Includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials and course design. Crosslisted with FLIT629.

EDUC 607 EDUCATIONAL RESEARCH PROCEDURES 3
An introduction to quantitative methods and procedures in education through the study of the logic and procedures of educational and social research. Provides information about the various stages of the research process with attention on measurement, sampling, design, data analysis and application.

EDUC 608 LITERACY ASSESSMENT AND INSTRUCTION I 3
The course focuses on effective literacy assessment and instruction in phonemic awareness, phonics and fluency. This course is delivered online.

EDUC 609 LITERACY ASSESSMENT AND INSTRUCTION II 3
The course focuses on effective literacy assessment and instruction in comprehension, vocabulary, and writing. This course is delivered online.

EDUC 610 BLACK COMMUNITY STUDIES 3-6
Investigation and analysis of various topics and developments of interest and significance to the Black community. Crosslisted with BAM5650. RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 611 INTRODUCTION TO EDUCATIONAL TECHNOLOGY 3
Comprehensive overview of the field of educational technology. Aligns the principles of how people learn with technological tools proven effective across the disciplines. Identifies and compares national and international standards frameworks and introduces the educational technology knowledge base of researched best practices for improving results.

EDUC 613 ADOLESCENT DEVELOPMENT AND EDUCATIONAL PSYCHOLOGY 3
Examines socio-emotional and cognitive development of adolescent learners; psychological processes underlying learning, motivation, and classroom behaviors; and teacher-student and group processes. Addresses implications for creating learning environments that encourage positive social interaction, active engagement in learning, and self-motivation. Field experience in a high school included. RESTRICTIONS: Open only to secondary education majors/certification candidates only.

EDUC 614 TEACHING EXCEPTIONAL ADOLESCENTS 3
Examines characteristics of exceptional adolescents and the historical, legal and philosophical bases for special education. Focuses on teaching students with special needs within general education settings using research-based instructional strategies, classroom management, and related services. RESTRICTIONS: Open to secondary education majors/certification candidates only.

EDUC 617 DELAWARE READING PROJECT SUMMER INSTITUTE 6
The Delaware Reading Project (DRP) focuses on research, theory, and practice in literacy instruction for grades K-12. DRP's central purpose is for students to become familiar with and evaluate best practices in literacy instruction in order to develop a workshop for other teachers. PREREQ: EDUC608, EDUC622 or equivalent. RESTRICTIONS: Requires permission of instructor.

EDUC 618 INTRODUCTION TO SCHOOL PSYCHOLOGY 3
Explores roles and functions of school psychologists and current issues pertaining to assessment, education, and prevention/intervention for children with disabilities. Professional standards in school psychology, the history of school psychology, special services in the schools, and legal and ethical issues pertaining to school psychology and special education also are examined.

EDUC 619 DIVERSITY IN SECONDARY EDUCATION 3
Examines aspects of diversity (e.g., ethnicity, gender, class, language) in secondary schools and classrooms. Reviews the foundations of multicultural education and considers implications for curriculum, instruction, and classroom management. Field experience included. RESTRICTIONS: Open to secondary education majors/certification candidates only.
EDUC 620 Foundations of Reading Instruction 3
Psychology and pedagogy of reading instruction. Lectures and demonstrations covering the following areas: psychology of the reading process, recent trends in reading instruction, initial reading procedures, directing reading activities, developing word recognition competence, developing efficient comprehension and differentiating instruction.

EDUC 621 Internet Technologies 3
Presents the Internet from a dynamic workplace perspective. Reflects on how emerging technologies will empower society to do more with the Internet. Covers core Internet technologies, Web page design and authoring, networking fundamentals, and technology planning. Provides a rich array of labs and optional assignments.

EDUC 622 The Role of Literacy in Content Areas 3
Explores contributions of literacy research for content learning (e.g., math, science, social studies, language arts). Underscores benefits of linking reading, writing, listening, speaking and viewing for acquisition of content area knowledge. Provides instructional frameworks for supporting student learning from texts. This course is delivered online.

EDUC 623 Applied Human Development in the Schools 3
Research and theory in child adolescent development are studied with an emphasis on applications in the schools. Designed primarily for school psychologists, school counselors and other educators. Examines the social, moral, affective, cognitive and biological bases of behavior within the school setting.

EDUC 624 Introduction to Autism and Severe Disabilities 3
An introduction to issues related to the identification and assessment of students with autism or severe disabilities. Presents methods aimed at enhancing functional skill development in the major life domains, with emphasis on community-based training. Includes lesson planning, implementing and evaluating instruction, and monitoring progress on Individualized Education Programs.

EDUC 625 Special Education Instruction/Curriculum: Autism/Severe 3
Reviews behaviorally-based educational models for students with autism and other severe disabilities. Presents methods aimed at enhancing functional skill development in the major life domains, with emphasis on community-based training. Includes lesson planning, implementing and evaluating instruction, and monitoring progress on Individualized Education Programs.

EDUC 626 Functional Communication for Individuals with Autism and Severe Disabilities 3
Reviews appropriate functionally relevant communication objectives for students with autism and severe disabilities. Highlights the impact of functional communication upon social skills and behavior management. Presents a variety of alternative communication methods and modalities.

EDUC 627 Models of Instruction 3
Study of alternative models of instruction as applied to differing instructional objectives, content and settings.

EDUC 629 Psychology of Teaching 3
A study of the research on teacher characteristics, teaching style and method, and teaching.

EDUC 630 Supervised Reading Clinic: Elementary 3
Supervised practice and lecture in assessing and instructing students who struggle with reading and writing. Participants will have opportunities to implement and discuss a wide range of instructional approaches, methods, and materials as they work closely with elementary students. This course is delivered online. PREREQ: EDUC608 and EDUC609 or permission of instructor.

EDUC 631 Organization and Supervision of Literacy Programs 3
Contextualizes assessment and instruction for reading in the whole-school context. Designed to introduce the leadership roles currently held by Reading Specialists and Literacy Coaches and includes an extensive school-level case study. This course is delivered online.

EDUC 634 Mathematics Curriculum and Instruction 3
Intended for students enrolled in the Mathematics concentration of the MAT in Secondary Education, this course focuses on the basic elements of lesson planning, classroom practices and evaluation in the students chosen field. The course includes a mandatory field placement in a secondary education classroom. RESTRICTIONS: Open only to students in the Math Concentration of the MAT in Secondary Education Program.

EDUC 635 Methods for Teaching Secondary Mathematics 3
Intended for students enrolled in the Mathematics concentration of the MAT in Secondary Education, this course focuses on the basic elements of lesson planning, classroom practices and evaluation in the students chosen field. The course includes a mandatory field placement in a secondary education classroom. RESTRICTIONS: Open only to students in the Mathematics Concentration of the MAT in Secondary Education Program.

EDUC 636 Advanced Methods for Teaching Secondary Math 3
Intended for students enrolled in the Mathematics concentration of the MAT in Secondary Education. Focus on unit planning, lesson evaluation, long-term reflection, and professional practices to enable long-term growth as a teacher. PREREQ: EDUC635. RESTRICTIONS: Open only to students in the Mathematics Concentration of the MAT in Secondary Education Program.

EDUC 638 Learning Technologies Across Curricula 3
Develops a deep understanding of technology integration across the various content areas. Defines the concept of technological pedagogical content knowledge (TPACK) and negotiates the relationships between technology, pedagogy, and content. Builds an understanding of how technology can support active and constructive learning.

EDUC 639 Educational Technology Topics 3
In-depth study of a major problem in educational technology. Problems to be studied will vary with each offering. RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 640 Introduction to Curriculum 3
Focuses on the curriculum that actually makes a difference – the curriculum that finds its way into the classroom. The three main topics are: a) major goals of education and their influence on curriculum policy and teacher planning; b) operational curriculum (what happens in the classroom); and c) strategies suitable for evaluating the operational curriculum.

EDUC 641 Science Curriculum and Instruction 3
Examination of the goals of science education and their relation to science curricula. Examination of theories of learning and motivation as they relate to how individuals develop scientific concepts. Discussion and development of science instructional materials and strategies that are consistent with current learning theories.

EDUC 642 Topics in Science Education 3
In-depth study of a major problem in science education. RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 643 Environmental Education 3
Survey of and practice with existing environmental education materials and programs; the development of lessons in environmental education; and practical experiences with curriculum development and teaching procedures.

EDUC 646 Assistive Technology for Secondary Schools and Work 3
Emphasizes strategies for assessing and augmenting performance of persons with disabilities in secondary schools and work settings. Includes discussion of principles of environmental modification, vocational preparation and rehabilitation, use of electronic networks and funding for technology resources.

EDUC 647 Advanced Methods in Teaching ESL 3
Examines the application of evidence-based methods for building the English listening, speaking, reading and writing skills of school-aged individuals whose first language is not English. Topics include assessment, instruction, grouping, and intervention. PREREQ: EDUC672.

EDUC 649 Delaware Writing Project Summer Institute 6
Provides teachers opportunities to read and write professionally and create workshops on the teaching of writing. Develops knowledge of best teaching of writing practices. PREREQ: At least three years in the classroom. Must be nominated and invited.

EDUC 650 Technology and Cognition 3
Presents major theories of learning and instruction and discusses their relationship to the use of computers in education. Emphasizes learning sciences theories, such as cognitive and socio-cognitive theories, and considers their role in the design and use of educational technology in real world settings.
EDUC 651 DIVERSITY AND FAMILY SCHOOL COLLABORATION 3
Provides an ecological view of children in families and the relationships between families and the school system. Topics include family as a system, diverse family shapes in contemporary society, special families in special circumstances and models of intervention. RESTRICTIONS: Requires permission of instructor.

EDUC 652 INTRODUCTION TO TECHNOLOGY IN SPECIAL EDUCATION AND REHABILITATION 3
Introduction to concepts and skills in special education technology including instructional software, augmentative communication systems, assistive devices, interactive video, robotics, artificial intelligence, electronic networks and productivity aids.

EDUC 653 ASSISTIVE TECHNOLOGY: HIGH INCIDENCE DISABILITIES 3
Focuses on assistive technology for students with high incidence disabilities, K-12. Includes design principles, practical applications, legal requirements, and ethical considerations. Considers user-centered frameworks for assessment, planning, delivery, and utilization of technologies.

EDUC 654 AUGMENTATIVE AND ALTERNATIVE COMMUNICATION 3
Focuses on augmentative and alternative communication systems for persons with disabilities, especially in the elementary, secondary and post-secondary school setting. Topics include assessment of functional communication needs, matching those needs to communication strategies and devices, and evaluation and generalization of communication skills.

EDUC 655 ASSISTIVE TECHNOLOGY: AUTISM/SEVERE DISABILITIES 3
Focuses on assistive technology for students with autism/severe disabilities, K-12. Includes design principles, practical applications, legal requirements, and ethical considerations. Considers user-centered frameworks for assessment, planning, delivery, and utilization of technologies.

EDUC 656 ELEARNING 3
Surveys the field of eLearning, identifies the leading learning management systems, and reviews the major trends and issues related to using eLearning to improve educational results. Reflects on the role of eLearning in the National Education Technology Plan.

EDUC 657 CHILDREN, TELEVISION AND EDUCATION 3
Issues relating to education, academic achievement, and the development of critical viewing skills; media and comprehension; content of children’s television programming and advertising directed toward children; and the media’s contribution to social values and roles; development of critical viewing skills curriculum. Crosslisted with COMM657. RESTRICTIONS: Open to graduate students only.

EDUC 658 DISCIPLINE AND CLASSROOM MANAGEMENT 3
A review of discipline procedures, sources of assistance, legal implications, parental roles, management techniques and strategies for developing school discipline policies.

EDUC 659 URBAN SCHOOLS IN URBAN LANDSCAPES 3
Examines historical, sociocultural, economic, and political perspectives on the urban education experience. Includes consideration of ability, language, race/ethnicity, immigration, and power dynamics. Explores creation of socially just educational environments that address issues of equity and draw upon the resources, opportunities, and challenges in urban contexts.

EDUC 661 SCHOOL SITE FINANCES AND RESOURCE MGT 3
Focuses on the management and allocation of financial resources in PK-12 schools and school districts. Students will learn about school funding, budget management, and the larger state/district finance framework. RESTRICTIONS: Restricted to students in the School Leadership M.Ed. program.

EDUC 663 COUNSELING SKILLS LAB FOR COUNSELORS AND PSYCHOLOGISTS 3
Provides students the opportunity to develop skills necessary for facilitating counseling relationships. Students observe, participate in and critique a variety of role playing exercises and actual counseling sessions as a means of mastering particular skills.

EDUC 664 LAW AND ETHICS IN SCHOOL LEADERSHIP 3
Examines legal and ethical aspects of school leadership in PK-12 schools and school districts. Focuses on schoolings legal framework and moral perspectives informing ethically defensible decisions. RESTRICTIONS: Restricted to students in the M.Ed. School Leadership program.

EDUC 665 ELEMENTARY STATISTICS 3
Provides a conceptual understanding of some useful statistical techniques along with practical computer and statistical skills which will enable the student to answer realistic research questions. Topics include descriptive statistics, regression, exploratory data analysis and hypothesis testing.

EDUC 666 SPECIAL PROBLEM 1-12

EDUC 669 ENGAGEMENT IN THE GENERAL CURRICULUM FOR STUDENTS WITH SEVERE DISABILITIES 3
Engage in critical analysis, and problem solving exercises through which they will discover instructional strategies designed to engage students with severe disabilities in the general curriculum. Addresses curriculum development and adaptations aligned to the Common Core Curriculum Standards. Research-based instructional strategies and curriculum considerations for teaching students with severe disabilities are included. Participants will use a variety of tools, strategies, and approaches to meet the individual needs of students while engaging in the general curriculum.

EDUC 671 PRACTICUM IN SCHOOL PSYCHOLOGY 3-6
Closely supervised experiences in various school and clinical settings. Students have the opportunity to develop and practice skills that must be mastered prior to starting the internship in school psychology. RESTRICTIONS: Requires permission of instructor.

EDUC 672 TEACHING ENGLISH AS A SECOND LANGUAGE 3
Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English; and devising and presenting lesson plans. May be crosslisted with LING672.

EDUC 673 SCHOOL-TO-ADULT LIFE TRANSITIONS & DISABILITY 3
Examines legislation, research and practices relating to school-to-adult life transition for children and youth with disabilities. Topics include post-school outcomes and transition service models related to further education, employment and independent living; self-determination; family and community agency collaboration; transition assessment and planning.

EDUC 674 SPECIAL EDUCATION INSTRUCTION & CURRICULUM: SECONDARY 3
Special education instruction and curriculum focused at the 6-12 levels, including lesson and unit planning, implementing and evaluating instruction and monitoring progress on Individualized Education Programs. Mathematics and content area instruction (social studies, science) are included (6-12).

EDUC 675 LANGUAGE ACQUISITION 4
Examines the factors which distinguish human language from animal communication as well as the development of many facets of language (semantics, syntax and phonology). Main emphasis on how children in the first three years acquire language. May be crosslisted with LING675, PSYC675.

EDUC 676 SECOND LANGUAGE ACQUISITION AND BILINGUALISM 3

EDUC 677 THE STRUCTURE OF ENGLISH 3
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). Crosslisted with LING677.

EDUC 678 HUMAN RESOURCE MANAGEMENT 3
Considers the ways in which organizations accommodate and utilize their human resources. Focuses on personnel management functions such as selection, maintenance and development.

EDUC 679 SPECIAL EDUCATION INSTRUCTION & CURRICULUM: ADVANCED 3
Special education principles and practices associated with effective, evidence- based instruction, assessment, and educational programming for students with high incidence disabilities across K-12. Examines multi-tiered interventions, accommodations, modifications, and services that support access to general education curriculum and inclusive settings, including related IEP considerations.
EXAMINES Designed

Focuses Models

EDUC

emphasis
dimensions

leadership

RESTRICTIONS:

691

680

EDUC

681

TECHNIQUES

for Behavior Change and Positive Behavior Support

3

Focuses on behavioral principles and procedures for creating positive learning environments. Participants will conduct functional behavioral assessments of problem behaviors, implement behavior support plans to strengthen appropriate behaviors, and analyze their effectiveness in educational settings. Participants also will evaluate the ethics of behavioral interventions.

EDUC 682

SPECIAL ISSUES IN SPECIAL EDUCATION

3

Examines the current context for research, policy, and practice in special education, and reviews methods for analyzing and interpreting empirical research studies. Through a combination of collaborative inquiry and debate, literature reviews, and discussions, become knowledgeable about public controversies affecting the education of students with disabilities.

RESTRICTIONS: Restricted to students in M.Ed. in Exceptional Children, or permission of instructor.

EDUC 684

VOCATIONAL TRAINING AND ASSESSMENT: SEVERE DISABILITIES

3

Focuses on designing and implementing vocational assessments and task modifications for students with multiple and severe disabilities. Participants learn hands-on training techniques.

EDUC 685

MULTIMEDIA LITERACY

3

Defines multimedia and discusses the impact it is having on society. Surveys applications across the curriculum and reflects on the effects of multimedia on current teaching practice. Provides a multimedia toolbox and shows how to use it to create and publish multimedia applications on the Internet. Discusses multimedia frontiers, emerging technology, and societal issues including human impact, regulation, copyright, fair use, equity, cost and universal access. May be crosslisted with COMM686.

EDUC 688

INTERNSHIP IN SCHOOL PSYCHOLOGY

3-6

Supervised experience in school psychology. Provides experience in a variety of areas, including consultation, psychological and educational assessment, counseling and intervention.

RESTRICTIONS: Requires completion of all courses in the school psychology program. Requires permission of instructor.

EDUC 689

ADMINISTRATION OF ELEMENTARY AND MIDDLE SCHOOLS

3

Study of administrative practices and procedures in the elementary schools with emphasis on the role of the elementary school principal.

EDUC 690

ADMINISTRATION OF SECONDARY SCHOOLS

3

A study of administrative practices and procedures in secondary school with emphasis on the senior high school administrator.

EDUC 691

APPLIED STATISTICS AND RESEARCH DESIGN

3

Designed to develop student's skills in statistics and research for use in educational practice, and designing and implementing program evaluation projects in educational settings.

EDUC 692

EDUCATIONAL TECHNOLOGY CAPSTONE

3

A service learning practicum in which participants form teams to design and develop an educational technology solution in an actual school or workplace. Models metacognitive assessment through a learning community where participants create a shared knowledge base of best practices and tools of Web design.

RESTRICTIONS: Requires permission of instructor.

EDUC 693

SUPERVISION AND PROFESSIONAL DEVELOPMENT OF EDUCATORS

3

Examines the intellectual, moral, and practical dimensions of supervisory leadership in PK-12 school settings; connects theory and practice related to performance appraisal; and promotes the professional learning of educators.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership program.

EDUC 694

ORGANIZATIONAL MANAGEMENT

3

An introduction to the function and structure of educational organizations. Emphasis on the sociopsychological foundations of management principles dealing with organizational theory and development, decision making, planned change, group process and leadership styles.

EDUC 695

INTRODUCTION TO LEADERSHIP THEORY

3

Studies current applications of leadership research to educational administration. Includes some history of leadership studies. Focuses on instructional leadership, leadership style and the development of leadership skills.

EDUC 696

METHODS OF TEACHING SECONDARY SCIENCE

3-4

Teaching science, science standards, design of curriculum, instructional strategies and assessment of student learning. Includes classroom-based practice in middle or high school.

EDUC 697

EDUCATION OF EXCEPTIONAL CHILDREN

3

Historical and philosophical basis for special education; legislative mandates and litigation that establish the right to a free, appropriate, public education; physical, psychological and educational characteristics of exceptional children; study of past and emerging education practices for exceptional children with emphasis on pedagogical commonalities.

EDUC 704

TEACHING SCIENCE IN MIDDLE SCHOOL

3

Introduction of curriculum and appropriate methods for teaching science concepts to middle school students. Activities include review, development and evaluation of curriculum materials, teaching strategies, research on student thinking and assessment of student learning. Clinical experience required.

RESTRICTIONS: Restricted to students in the Master’s of Arts in Teaching (MAT) program who are pursuing secondary science education teacher certification.

EDUC 706

TEACHING MATH IN MIDDLE SCHOOL

3

Introduction of curriculum and appropriate methods for teaching mathematical concepts to middle school students. Activities include review, development and evaluation of curriculum materials, teaching strategies, research on student thinking and assessment of student learning. Clinical experience required.

RESTRICTIONS: Restricted to students in the Master’s of Arts in Teaching (MAT) program who are pursuing secondary mathematics education teacher certification.

EDUC 722

TEACHING READING IN SECONDARY ENGLISH

3

Focuses on reading comprehension issues and differentiated reading instruction for secondary English teachers. Students learn how to determine the reading level of adolescents and the readability of texts, integrate contextualized vocabulary instruction and word study, develop adolescents’ orality, and use strategies that develop independent reading.

RESTRICTIONS: Restricted to students in the Master’s of Arts in Teaching (MAT) program who are pursuing secondary English education teacher certification.

EDUC 729

BEHAVIORALLY BASED TEACHING PRACTICUM

3

Supervised practicum involves instructional activities in a classroom serving students with autism and other severe disabilities and serves as the capstone of the autism certification.

PREREQ: EDUC624, EDUC625, EDUC626 and EDUC681. RESTRICTIONS: Only available to those students in the Autism/Severe Disabilities concentration within the M.Ed. in Exceptional Children and Youth program or students pursuing Autism certification through Professional and Continuing Studies.

EDUC 731

TEACHING MATHEMATICS TO SPECIAL NEEDS STUDENTS: K-12

Explores current learning theories in mathematics education and pedagogy for special needs students based on these theories. Topics include number and operations, algebra, geometry, and data analysis. Examines how school math curricula develop these topics and differentiation in math classroom.

RESTRICTIONS: Open to students in the certification track of the MEd in Exceptional Children and Youth program or with permission of instructor.

EDUC 732

COMMUNITY BASED PRACTICUM

1-3

Provides graduate students with a community based field experience working with children and adolescents in a variety of non-school settings such as after-school programs, community centers, and residential facilities. Sociocultural approaches to conducting research in these settings is examined.

RESTRICTIONS: Requires permission of department.

EDUC 733

LEADING THE INSTRUCTIONAL PROGRAM I

3

Understanding the characteristics of effective instruction and classroom management across the content areas at the classroom level in PK-12 schools. First of a two-course sequence.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.

EDUC 734

LEADING THE INSTRUCTIONAL PROGRAM II

3

PK-12 instructional leadership at the program, departmental, and school level. Second in a two-course sequence. Topics include theory and practice of standards-based curriculum, including concepts of curriculum scope, sequence, coherence, and integration. Lead and collaborate to develop, implement, and monitor standards-based curriculum.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.
EDUC 735 DATA BASED DECISION MAKING AND ASSESSMENT 3  
Prepares aspiring PK-12 leaders to understand, manage, and use data for student assessment, instructional planning, and school improvement. Online course.

EDUC 736 PRACTICUM: DATA ANALYSIS PROJECT 3  
Second of a two-course sequence. Builds on concepts and methods of data management and analysis from EDUC 735 and requires field-based projects. 
RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership program.

EDUC 737 ORGANIZATIONAL CULTURE AND COMMUNITY RELATIONS 3  
Focuses on building a cohesive, improvement-oriented organizational culture in PK-12 schools, on developing a shared program vision among school and community stakeholders, and on maintaining positive school-community relations.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.

EDUC 738 SCHOOL MANAGEMENT AND IMPROVEMENT PLANNING 3  
Organizational management and effective planning and decision-making for PK-12 school improvement. Tasks and responsibilities of school management, challenges of implementing change, and best practice models of program design and school improvement will be covered.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.

EDUC 739 INTERNSHIP IN SCHOOL LEADERSHIP 2-4 PF  
Engage in leadership-related field experiences in approved school settings. 2 credits of internship over 3 consecutive academic terms for total of 6 credits.

RESTRICTIONS: Open to students in the M.Ed. in School Leadership program. 24 credits of required coursework in School Leadership program. Must take and submit scores from the School Leadership Licensure Assessment (found at www.ets.org) prior to enrollment.

EDUC 740 LITERACY INSTRUCTION FOR ENGLISH LANGUAGE LEARNERS 3  
Focuses on effective literacy instruction for English Language Learners in the elementary and middle school levels in the following areas: language development, vocabulary instruction, decoding, reading fluency, comprehension strategy instruction, and motivation and engagement.

RESTRICTIONS: Restricted to students in the MA-TEL or MI Literacy program.

EDUC 741 DIVERSITY IN ESL CLASSROOMS 3  
Focuses on pedagogical strategies to address the needs of English Language Learners at K-12 and higher education levels. Examines linguistic and cultural skills that optimize learning, cross-cultural communication, student participation, and conflict resolution within diverse classrooms. Field experience included.

EDUC 742 PRACTICUM IN TEACHING ENGLISH AS A SECOND LANGUAGE 3-6  
Closely supervised experiences in various school and community settings. Provides the opportunity to develop and practice skills in teaching English as a Second Language to non-native English speakers.

RESTRICTIONS: Requires permission of instructor.

EDUC 744 EDUCATIONAL ASSESSMENT AND PROGRESS MONITORING 3  
Course addresses measurement issues related to academic assessment such as norms, reliability and validity. Administer and interpret standardized and curriculum-based assessments of academic skills. Curriculum-based measurement for progress monitoring is taught within a response to intervention model.

RESTRICTIONS: Requires permission of instructor.

EDUC 745 COLLABORATIVE TEACHING IN SPECIAL EDUCATION 3  
Examines key components of successful teams serving students with special education needs. Skills to be developed include setting common goals, identifying and solving problems creatively, communicating effectively, and implementing and evaluating education plans that address student, family, and system needs.

EDUC 746 INTERNSHIP IN SCHOOL LIBRARY MEDIA 3 PF  
Capstone experience for candidates pursuing the School Library Media Course of Study. Ten hours and complete directed assignments in three school library placements: an elementary, a middle, and a high school.

PREREQ: EDM621, EDM622, EDM625, EDM628, EDUC602, EDUC603.

EDUC 747 TEACHING FOR BETTER THINKING 3  
Explores how teachers can enhance the caring, critical and creative thinking dimensions of their classrooms by using appropriate methods and anticipating key challenges. Models the process of building a classroom community of inquiry.

EDUC 749 TEACHING METHODS FOR SECONDARY CLASSROOM 3  
Students will examine research-supported best practices in secondary classroom pedagogy from a number of published sources. They will design learning activities for their own classrooms, evaluate them, and reflect on the student responses. 
RESTRICTIONS: Open only to ARTC candidates.

EDUC 750 GRADUATE TEACHING INTERNSHIP 3-9 PF  
Full-time extended teaching internship in a classroom setting. Students are under the guidance and supervision of a mentor teacher in the classroom and a University of Delaware supervisor.

PREREQ: Must show evidence of passing Praxis I and complete all other prerequisite coursework specified in the student's program requirements. Evidence of passing Praxis II for content area may be required in some programs.

RESTRICTIONS: Requires permission of department. Students must apply for this internship during the academic year prior to their enrollment in the internship. May be repeated for up to a total of 9 credits.

EDUC 751 ADV METHODS TCH SECONDARY SCIENCE 3  
Intended for students enrolled in the Science concentration of the MAT in Secondary Education, this course focuses on unit planning, lesson evaluation, long-term reflection, and professional practices to enable long-term growth as a teacher.

PREREQ: EDUC606, EDUC641. COREQ: EDUC750. RESTRICTIONS: Open only to students in the MAT in Secondary Education Program.

EDUC 752 ADVANCE MDTS/TCH SECONDARY ENGLISH 3  
Focuses on unit planning, lesson evaluation, long-term reflection, and professional practices to enable long-term growth as a teacher.

PREREQ: EDUC603 and EDUC604. COREQ: EDUC750. RESTRICTIONS: Open only to students in the MAT in Secondary Education Program.

EDUC 753 SPECIAL EDUCATION INSTRUCTION AND CURRICULUM: INTRODUCTION 3  
Foundations of special education instruction and curriculum across the grade levels, including models of instruction, lesson planning, setting instructional goals and objectives, implementing education Programs and instructional adaptations. Introduction to IEPs and literacy instruction (reading and writing curriculum [K-3] and methods) is included.

RESTRICTIONS: Open only to students in the Masters Plus Certification Program (MPCP) track within the M.Ed. in Exceptional Children & Youth.

EDUC 754 SPECIAL EDUCATION INSTRUCTION AND CURRICULUM: ELEMENTARY 3  
Special education instruction and curriculum focused at the K-5 levels, including lesson and unit planning, implementing and evaluating instruction and monitoring progress on Individualized Education Programs. Mathematics and content area instruction (social studies, science) are included (K-5).

EDUC 755 EVALUATION MODELS AND APPROACHES 3  
Using a case-based approach, the course covers major evaluation models and approaches and their implications for evaluation planning, design, and use. Provides a foundation for thoughtful, credible, and ethical evaluation practice. Crosslisted with EVAL755. PREREQ: HDF5637 or permission of instructor.

EDUC 756 ADVANCED SEMINAR IN EVALUATION 3  
The seminar provides the opportunity to study selected areas of evaluation theory and practice in depth. Potential topics include mixed-method evaluation, culturally-responsive evaluation, systems theory for evaluation, evaluation in different sectors (public, private, nonprofit), and others. Crosslisted with EVAL756. PREREQ: EVAL755 or permission of instructor.

EDUC 757 DIAGNOSIS & INSTRUCTION IN LITERACY: GRADES 4-12 3  
Focuses on teaching reading and writing to upper elementary and secondary students with disabilities. Reviews foundational concepts about literacy development and problems. Addresses methods of diagnosing literacy problems and instructional methods for decoding, comprehension, and writing, including in content areas the use of assistive technology.

EDUC 761 LITERATURE IN 21ST CENTURY CLASSROOMS 3  
Survey of print and digital literature for children and adolescents. Participants will study genre, multimodality, elements, and devices in print-based and digital texts, discuss selection of appropriate texts, and examine techniques for using texts to promote reading. This course is delivered online.

EDUC 762 EXAMINING MULTIMODAL LITERACY 3  
Critically examines complex multimodal digital environments by comparing traditionally printed and digital texts. Students will develop their own multimodal presentations utilizing web-based tools. Strategies for preparing K-12 students to read and write multimodal texts will be explored. This course is delivered online.

EDUC 763 SUPERVISED READING CLINIC: MIDDLE/HIGH 3  
Supervised practice in assessing and instructing middle/high school students who struggle with reading and writing. Participants will have opportunities to implement and discuss a wide range of instructional approaches, methods, and materials as they work closely with middle/high school students. This course is delivered online. 
PREREQ: EDUC608 and EDUC609 or permission of instructor.
EDUC 765  WRITING STRATEGY INSTRUCTION  3
Theory and research on writing strategy instruction will be explored. The
overriding goal will be to learn to use and to develop specific writing strategies to
meet individual classroom needs. This course is delivered online.

EDUC 768  COACHING TEACHERS  3
Consistent with IRA standards, introduces teacher study group formats for
knowledge building and coaching cycles for formative coaching. Compares and
contrasts prominent coaching models and provides tools for building a site-based
hybrid model. Includes a practicum project. This course is delivered online.

EDUC 771  DIAG/INSTRUCTION FOR LITERACY PROBS II  3
Second in a two-course sequence designed to prepare teachers to teach reading
and writing to students in the elementary and middle grades with a special
emphasis on special education students and others with significant literacy
problems. Focuses primary attention on vocabulary, comprehension, and
composition. A practicum assignment is required.
PREREQ: EDUC 770.

EDUC 772  UNDERSTANDING TEACHER LEADERSHIP  3
Promotes understanding of education standards and self as a leader. Familiarizes
candidates with existing literature and research base for teacher leadership.

EDUC 773  ACTION RESEARCH  3
Explores the major tenets of action research and prepares candidates to conduct
school-based and classroom-based action research and communicate findings of
research to multiple stakeholders.

EDUC 774  DESIGNING PROFESSIONAL DEVELOPMENT  3
Contributes to the understanding of professional development and its impact on
pupil learning. Supports monitoring and assessment of professional development
impact.

EDUC 775  FOUND SKILLS AND COMMON CORE STANDARDS  3
Addresses the foundational skills portion of the Common Core State Standards.
This essential knowledge is important for teacher leaders in elementary school
curriculum design and for tiered instruction in middle school and high school.

EDUC 776  PROMOTING EQUITABLE SCHOOLS  3
Explores how schooling structures, practices and policies produce or resist
educational equity for diverse families, cultures and communities. Identifies
challenges and opportunities at the classroom and school-wide levels to engage
families and communities in efforts to provide equitable opportunities and
outcomes for all students.

EDUC 777  FOSTERING TECHNOLOGY BASED COLLABORATION  3
Uses knowledge of existing and emerging technologies to guide colleagues in
helping students skilfully and appropriately navigate the universe of knowledge
available on the Internet, use social media to promote collaborative learning,
and connect with people and resources around the globe.

EDUC 802  READING DEVELOPMENT AND INSTRUCTION  3
Seminar designed to develop broad understanding of theory and research in
reading relevant to educational settings. Addresses cognitive development,
learning, motivation, assessment, and instruction with a special focus on
struggling learners.

EDUC 804  FOUNDATION OF LEARNING SCIENCES  3
The contributions of different theoretical perspectives and research paradigms
that characterize the interdisciplinary Learning Sciences field are addressed.
Research on learning and thinking in different content areas, cultures, and
contexts and the practical and pedagogical implications of evidence-based claims
about how people learn are explored.

EDUC 805  PROSEMINAR IN EDUCATION I  3
Required first-year seminar introduces PhD students to key domains of education
research examined from the perspective of qualitative data collection methods
and analyses. Topics include school reform, social contexts of education, teacher
education, learning and development, and curriculum and instruction.
COREQ: EDUC850. RESTRICTIONS: For first year PhD students only.

EDUC 806  PROSEMINAR IN EDUCATION II  3
Required first-year seminar presents PhD students with key domains of education
research and dominant quantitative research designs and statistical procedures
used to investigate these domains. Topics include curriculum and instruction,
social contexts of education, school reform, learning, development, and
psychological foundations of education.
PREREQ; EDUC805. COREQ; EDUC856. RESTRICTIONS: For first year PhD students only.

EDUC 807  WRITING DEVELOPMENT AND INSTRUCTION  3
Seminar designed to develop broad understanding of theory and research in
writing relevant to educational settings. Addresses cognitive development,
learning, motivation, assessment, and instruction with a special focus on
struggling learners.

EDUC 808  INTERNSHIP IN EDUCATION  3-9
RESTRICTIONS: Requires permission of department. Credit during any semester
varies according to the percentage of time spent in internship. May be repeated
up to nine credits.

EDUC 809  POLITICS AND PUBLIC RELATIONS WITHIN SCHOOL SYSTEMS  3
Focuses on communications, politics, and public relations among schools, district,
and community constituencies.
RESTRICTIONS: Open only to Ed.D majors in ADPO concentration; or permission of
instructor.

EDUC 810  MODELS AND PRACTICES OF INSTRUCTIONAL LEADERSHIP: PK-12  3
Intended for PK-12 educators in leadership positions, including teachers in
leadership roles. Develops knowledge and skills for planning, managing, improving
and evaluating PK-12 instructional programs.
RESTRICTIONS: Ed.D. majors only.

EDUC 811  TOPICS IN EDUCATIONAL POLICY  3
In depth examination of select topics that reflect the expertise of the instructor,and
build on the themes introduced in EDUC875, Introduction to Educational
Policy.

EDUC 812  REGRESSION AND STRUCTURAL EQUATION MODELING  3
Introduces theory and application of regression and structural equation modeling.
Topics include: regression, logistic regression, path analysis, confirmatory factor
analysis, structural regression models, and latent growth models.
RESTRICTIONS: Graduate level general statistics course.

EDUC 813  CHILDHOOD PSYCHOPATHOLOGY  3
Survey of various developmental and behavioral disorders in childhood. Seminar
will examine the issues of diagnosis and treatment theoretical perspectives.
Special emphasis on current major psychological research.
May be crosslisted with PSYC845. RESTRICTIONS: Requires permission of
instructor.

EDUC 814  PSYCHOLOGICAL ASSESSMENT OF CHILDREN  3
Assessment techniques used to evaluate the social, emotional and behavioral
well-being of children and adolescents. Provides instruction and experience in
selecting, administering and interpreting psychological tests; the use of
classification systems for defining learning, behavioral, and emotional problems in
public schools; training in report writing and the development of educational
recommendations.
RESTRICTIONS: Requires permission of instructor and program area.

EDUC 815  DESIGN OF LEARNING ENVIRONMENTS  3
Issues in designing and evaluating learning environments, including those that are
technological in nature, that foster deep learning, thinking, and reasoning for a
variety of learners (e.g., teachers, P-16 learners, nurses, medical residents) in
formal and informal settings.

EDUC 816  SEMINAR: LITERACY PROBLEMS  3
Addresses the complex process of literacy development and explores the range
of problems that can occur. Special attention devoted to how literacy development
is affected by instructional methods, biological factors, and demographic factors
such as poverty, ethnicity, and school location.
PREREQ; EDUC809 or equivalent. RESTRICTIONS: Open only to doctoral level and
advanced master’s students.

EDUC 817  INDIVIDUAL INTELLIGENCE TESTING  3
Administration and interpretation of major individually administered intelligence
tests used in school and child clinical psychology. Five tests will be highlighted: the
Stanford Binet, EISC-R, WPPSI, WAIS-R and K-ABC.
RESTRICTIONS: Requires permission of instructor.
EDUC 818 EDUCATIONAL TECHNOLOGY FOUNDATIONS 3
Overview of the following topics related to planning and using educational technology: instructional technology models; internet resources; web design; networking and database fundamentals; educational technology standards; technology integration strategies; assessment and evaluation; societal, legal and ethical issues; and collaborative planning of technology programs.

EDUC 819 DISCIPLINARY KNOWLEDGE/LEARNING SCIENCES 3
The structure of the discipline (e.g., language and literacy, reading, math, science) is used to consider how instruction should be designed in the disciplines in light of the theories and the learning environments we create.

EDUC 820 CONTEXTS FOR LEARNING 3
Course considers how contexts shape learning in informal and formal education settings. Implications for cognition and instructional design will be evaluated from a cross-disciplinary perspective.

EDUC 821 COGNITION AND INSTRUCTION 3
Current approaches to the analysis of instruction and schooling. Topics include teacher decision making and effectiveness, classroom processes, instructional methods and design, models for schooling and theories of school-based learning. RESTRICTIONS: Open only to Ph.D. students in education. Requires permission of instructor.

EDUC 822 CRITICAL ISSUES IN LITERACY DEVELOPMENT 3
Explores current issues regarding policy, curriculum and instruction, assessment, professional development, and theory in literacy and special education. Examines literacy policy, readings, and current controversies. Includes a focus on federal legislation (both in general and special education) and national reform efforts.

EDUC 823 LEARNING AND DEVELOPMENT 3
The study of contemporary theory and research in human development, with an emphasis on issues of educational significance, and mechanisms that affect development. May be crosslisted with PSY823.

EDUC 824 EFFECTIVE COMMUNICATION FOR LEADERSHIP IN EDUCATION 3
Focuses on improving communication skills in the exercise of leadership in administrative and policy settings in education. RESTRICTIONS: Open only to Ed.D. majors.

EDUC 825 PROSEMINAR: SOCIAL AND URBAN POLICY 3
Social policy attempts to promote the well-being of individuals, families and communities through public action. Explores efforts to address social and economic problems in urban society. Considers differential policy impacts by social class, race/ethnicity, gender and age. Topics: welfare, housing, social security, health, education, criminal justice and employment. Crosslisted with UAPP825.

EDUC 826 MIXED METHODS IN SOCIAL SCIENCE RESEARCH 3
Explores the theoretical, conceptual and procedural issues in mixed methods approaches to research in education and the social sciences. Emphasis is placed on students’ application of mixed methods to real research and evaluation problems.

EDUC 827 ANALYSIS OF SECONDARY DATA FOR DECISION MAKING 3
Emphasizes the analysis of secondary data sources using quantitative methods for planning and decision-making in educational contexts.

EDUC 828 RESEARCH IN EDUCATIONAL DECISION MAKING 3
Focuses on the research methods used for the purpose of evaluating educational research and the use of research in educational decision-making.

EDUC 829 RESEARCH ON TEACHING 3
A survey of scientific studies of classroom teaching. Teacher characteristics, teaching methods, learning environments, models of teaching, research methods and results of recent research.

EDUC 830 CONSULTATION AND INTERVENTION: SCHOOL DISCIPLINE 3
Surveys the major theoretical approaches and research related to consultation and intervention involving the school-age child. Provides skills in consultation and intervention techniques employed by school psychologists, counselors and other professionals working with teachers, parents and administrators. RESTRICTIONS: Restricted to School Psychology students.

EDUC 831 ADVANCED COUNSELING TECHNIQUES WITH CHILDREN AND ADOLESCENTS 3
The application of brief therapy techniques with children and adolescents from diverse backgrounds. Attention is given to a solution-focused perspective and specific intervention strategies for frequently encountered school problems. PREREQ: EDUC663. COREQ: EDUC671. RESTRICTIONS: Requires permission of instructor.

EDUC 832 ADVANCED PRACTICUM IN SCHOOL PSYCHOLOGY 3-12
Students will work in school, clinic or community settings under supervision to further develop their applied skills. RESTRICTIONS: Permission of instructor; enrollment limited to PhD students in school psychology or closely related field of study.

EDUC 833 RESEARCH/THEORY OF MATH LEARNING 3
Examines research and theories of mathematics learning. Traces development of mathematical thinking from grades K to 12. Examines factors that influence the nature of what and how mathematics is learned.

EDUC 834 RESEARCH/THEORY OF MATH TEACHING 3
Examines research and theories of mathematics teaching in grades K-12. Explores components of classroom teaching, relationships between methods of teaching and students’ learning, and the factors that influence the selection of teaching methods. PREREQ: EDUC833 or permission of instructor.

EDUC 835 RESEARCH/THEORY OF MATH CURRICULUM 3
Examines research and theories of mathematics curricula, grades K-12. Analyzes features of traditional and reform curricula, and issues of curricula design and implementation.

EDUC 836 RESEARCH/THEORY OF MATH TEACHER EDUCATION AND SCHOOL IMPROVEMENT 3
Examines research and theories of mathematics teacher education and school improvement, grades K-12. Studies factors that influence the effectiveness of mathematics teacher education programs and factors that support teacher learning in schools. PREREQ: EDUC835 or permission of instructor.

EDUC 838 RESEARCH ISSUES IN MATH EDUCATION 1 PF
Examines current issues in mathematics education from methodological and conceptual perspectives. Design and critique local research projects. PREREQ: Admission to doctoral program.

EDUC 839 EDUCATION POLICY AND GOVERNANCE 3
Focuses on the structure of educational policy, governance, and law, with emphasis on the policy process, politics of education, and policy implementation.

EDUC 840 RESEARCH COLLOQUIUM IN EDUCATION 1-3 PF
A detailed analysis of the research currently under way at the University of Delaware and other institutions, including doctoral dissertations, that has application to human learning in an educational environment. RESTRICTIONS: Open to Ph.D. and advanced master’s students.

EDUC 841 CONSULTATION AND INTERVENTION: MENTAL HEALTH 3
Advanced theories of consultation (e.g. Mental Health, Conjoint Behavioral Consultation) through discussion and application in the schools. Crisis intervention and conducting a school needs assessment with emphasis on individual and systems level consultation and intervention. PREREQ: EDUC830. RESTRICTIONS: Requires permission of instructor.

EDUC 842 ASSESSMENT OF SPECIAL POPULATIONS 3
Methods of assessing the needs and strengths of young children, ages birth to 5, and children with low incidence disabilities (including physical, cognitive, and sensory). Planning interventions that include progress monitoring within a response to intervention model. RESTRICTIONS: Requires permission of instructor.

EDUC 843 PROSEMINAR IN SCIENCE EDUCATION 3
Covers critical issues in curriculum, research on learning and teaching. RESTRICTIONS: Topics vary. May be repeated for credit.

EDUC 846 COLLECTION & ANALYSIS OF DATA FOR DECISION MAKING 3
Emphasizes the collection and analysis of qualitative and survey data for planning and decision-making in educational contexts.

EDUC 847 POSTSECONDARY STUDENT AFFAIRS ISSUES AND MANAGEMENT 3
Intended for higher education professionals in leadership positions. Covers student affairs issues, co-curricular programming, and related public relations. RESTRICTIONS: Open only to Ed.D. majors.
EDUC 848 SEMINAR IN LANGUAGE DEVELOPMENT 3
Covers aspects of semantic, syntactic and phonological development through examination of current research and theory in the field. Treats educational implications of language development. May be crosslisted with CGS848, LING848.

EDUC 849 GOVERNANCE, PLANNING, AND FINANCE IN HIGHER EDUCATION 3
Program development, planning, budgeting, and management in higher education settings; resource acquisition; alumni/trustee relations.
RESTRICTIONS: Open only to Ed.D majors.

EDUC 850 QUALITATIVE RESEARCH IN EDUCATIONAL SETTINGS 3
Theory and practice are combined as students critique exemplary qualitative studies, explore theoretical frameworks and conduct short-term field research activities designed to develop students’ capacity to collect and analyze qualitative data. First part of a two-semester introduction to qualitative research.

EDUC 852 CRITICAL AND INTERPRETIVE METHODS IN EDUCATION RESEARCH 3
Introduction to non-social science approaches to educational inquiry such as philosophy, history, legal studies and others. Stresses epistemological and normative assumptions underlying education research programs. Selected relevant controversies are examined.

EDUC 853 TOPICS: CULTURALLY RELEVANT PEDAGOGIES 3
Focuses on diverse theories and practices and investigates the role of multiple communities and cultures in establishing relevant and responsive pedagogies. Specific topics change each semester/year.

EDUC 854 TOPICS: EQUITY IN EDUCATION 3
Examines the complex ways that educational inequity is produced, negotiated, and contested across educational settings and within broader political, economic, social and historical contexts. Specific topics change each semester/year.

EDUC 855 TOPICS: SOCIOCULTURAL THEORIES OF EDUCATION 3
Provides theoretical frameworks for examining the complex ways in which cultural, societal, community, and institutional practices and policies continually shape the processes of teaching and learning across a variety of formal and nonformal educational settings. Specific topics change each semester/year.

EDUC 856 INTRODUCTION TO STATISTICAL INFERENCE 3
Quantitative analysis topics include describing univariate and bivariate data distributions, calculating and interpreting summary statistics, the logic of least squares estimation, the rudiments of probability theory, selected probability models and their interrelationships, the logic of null hypothesis testing, interval estimation and selected inferential techniques.
PREREQ: EDUC665 or equivalent RESTRICTIONS: Requires admission to doctoral program.

EDUC 857 PREPARING TO TEACH EDUCATION OR RELATED COURSES IN ACADEMIA 3
Designed for graduate students planning on becoming university professors who must meet the SOE teaching requirement. Design or redesign a course, teach lessons from the course in form of micro-teaching, and discuss issues pertaining to academic life.
RESTRICTIONS: Open to doctoral students in CEHD; otherwise instructor permission required.

EDUC 858 ADVANCED QUALITATIVE RESEARCH METHODS 3
Designed for advanced graduate students who plan to use qualitative methods in their dissertation. Focus on theoretical frameworks, computerized data analysis strategies, and writing techniques. Students are expected to come to class already having completed some data collection.
PREREQ: Successful completion of a graduate level introductory qualitative research course. RESTRICTIONS: Doctoral students or advanced master’s students only.

EDUC 859 ETHNOGRAPHIC RESEARCH 3
Ethnographies provide descriptive and interpretive analyses of cultural practices and social organization in everyday settings. Students in this course learn how to conduct ethnographic fieldwork. Students formulate research questions act as participant-obervers, write field notes, interview participants and conduct rudimentary data analysis. Students also discuss dilemmas faced by ethnographic researchers.

EDUC 860 CURRICULUM THEORY 3
Introduces curriculum theory and the history of curriculum as a field of study. Topics include societal forces influencing curriculum, assumptions underlying curriculum decisions and conflicting views of curriculum.

EDUC 862 DESIGN AND ANALYSIS OF EXPERIMENTS 3
Intermediate topics in the design of experiments and quasi-experiments, including analysis of variance, factorial designs, analysis of covariance, repeated measures, non-parametric statistics and selected multivariate techniques. Organized by the Campbell-Stanley framework for planning and critiquing experimental efforts.
PREREQ: EDUC665 or equivalent. RESTRICTIONS: Requires admission to doctoral program. Offered once every two years.

EDUC 863 PROGRAM EVALUATION IN EDUCATION 3
Focuses on models, theories and practice of program evaluation and applied research in education. Topics include experimental and quasi-experimental designs, validity, political and ethical issues of evaluation and the implementation and practice of process and outcome program evaluation.
PREREQ: EDUC827, EDUC665, or equivalent introductory statistics course; and EDUC846, EDUC850 or equivalent introductory qualitative methods course.

EDUC 865 EDUCATIONAL MEASUREMENT THEORY 3
Focuses on both classical and modern test theory including scaling, scoring, reliability, validity, generalizability theory, bias, item analysis, item response theory and equating with applications to norm-referenced and criterion-referenced assessment frameworks.
PREREQ: EDUC665 or equivalent

EDUC 868 RESEARCH 1-6

EDUC 869 MASTER’S THESIS 1-6

EDUC 870 CHILD NEUROPSYCHOLOGY 3
Examines approaches to neuropsychological assessment and application to childhood learning and neurodevelopmental disorders.
RESTRICTIONS: Requires permission of instructor.

EDUC 872 ADVANCED EDUCATIONAL MEASUREMENT 3
Focuses on theories of measurement with special emphasis on item response theory. The first two classes will be devoted to classical test theory and remaining class sessions will emphasize item response theory.
PREREQ: EDUC856 and EDUC865

EDUC 873 MULTILEVEL MODELS IN EDUCATION 3
Introduction to multilevel modeling. Considers the analysis of growth and change as a special case of multilevel modeling.
PREREQ: EDUC812 and EDUC856, or equivalent.

EDUC 874 APPLIED MULTIVARIATE DATA ANALYSIS 3
Introduces applied use of multivariate models of data analysis. Topics include multiple regression, logistic regression, discriminant function analysis, MANOVA, and exploratory factor analysis.
PREREQ: Graduate level general statistics course.

EDUC 876 LATENT VARIABLES FOR EDUCATIONAL RESEARCH 3
Introduces models for latent variables with applications to educational and social science research. Topics divided into models for continuous and categorical latent variables. Continuous latent variables models include confirmatory factor analysis, structural equation modeling, and growth curve modeling. Models for categorical latent variables include latent class analysis and latent Markov chain modeling. Advanced methods such as latent transition analysis and general growth mixture modeling are also covered.
PREREQ: EDUC812 or equivalent.

EDUC 879 INTERNSHIP IN EDUCATION 3-9
Supervised, on-the-job experience in one specific area of education (i.e., administration, guidance, etc.), in which such internships are required as a part of graduate degree programs.
RESTRICTIONS: Credit during any semester varies according to the time spent in internship.

EDUC 880 EDUCATION LEADERSHIP PORTFOLIO I 4 PF
Focuses on identifying focus of inquiry of the portfolio, including a problem statement and set of artifacts that reflect different approaches to addressing the problem.
PREREQ: Completion of all required Ed.D. core courses and electives.
RESTRICTIONS: Restricted to Ed.D. students.

EDUC 881 EDUCATION LEADERSHIP PORTFOLIO II 4 PF
Focuses on completing a set of artifacts that reflect different approaches to addressing the focus of inquiry.
PREREQ: Completion of all required Ed.D. core courses and electives and successful completion of EDUC 864 (880). RESTRICTIONS: Restricted to students in the Ed.D. program.
EDUC 882  EDUCATION LEADERSHIP PORTFOLIO III  4 PF
Focuses on completing a set of artifacts that reflect different approaches to addressing the focus of inquiry and a final reflection essay. PREREQ: Completion of all required Ed.D. core courses and electives and successful completion of EDUC 864 (880) and EDUC 871 (881). RESTRICTIONS: Restricted to students in the Ed.D. program.

EDUC 883  ADMINISTRATION OF ADULT AND SECONDARY EDUCATION PROGRAMS  3
Considers the administration, design and implementation, and evaluation of programs for postsecondary students in formal and informal training, degree or nondegree programs. Will consider factors influencing the administration and design of programs such as institutional demands.

EDUC 885  EDUCATIONAL TECHNOLOGY TOPICS  3-6
In-depth study of a major problem in educational technology. RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 888  DOCTORAL INTERNSHIP IN SCHOOL PSYCHOLOGY  3-6
Full-time internship in school settings under supervision. Final field-based experience for doctoral students in which they integrate and apply skills learned throughout their course of study. RESTRICTIONS: By permission of instructor only; enrollment limited to school psychology PhD students who have completed their course work.

EDUC 890  LEADERSHIP: THEORY AND RESEARCH  3
Theories and research relating to leadership and management style. Fundamental principles of leadership as viewed from the fields of philosophy, sociology, psychology and applied behavioral science are discussed. Emphasis on analysis of personal style.

EDUC 891  ORGANIZATIONAL PROBLEM ANALYSIS AND PLANNING IN EDUCATION  3
Focuses on the theory, research, and practice of organizational change and problem-solving in educational contexts.

EDUC 897  CURRICULUM PLANNING AND DESIGN  3
Focuses on the planning, design, and delivery of curriculum in diverse educational settings.

EDUC 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.

EDUC 969  DOCTORAL DISSERTATION  1-12 PF

---

ENGINEERING GRAPHICS & GENERAL

EGG 101  INTRODUCTION TO ENGINEERING  2
Introduction to profession, including disciplines of chemical, civil, computer, electrical, environmental, and mechanical engineering. Prepares students for success through integration of: technical problem solving and engineering design, ethical decision making, teamwork, and communicating to diverse audiences.

EGG 288  NANOTECH IN THE NEWS  3
Provides an exposure to nanotechnology and engineering as it impacts daily life. Based on current topics in the news, we discuss the underlying science in an approachable manner and consider the relevant societal, economic, and ethical issues. Students will leave with a greater understanding of the emerging technologies that shape our society. Cross listed with MSEG288.

---

ELECTRICAL ENGINEERING

ELEG 205  ANALOG CIRCUITS I  4
Laws of the electric circuit, analysis of DC and AC circuits, network equations and network theorems. PREREQ: MATH242 and PHYS207

ELEG 302  INTRODUCTION TO DEVICES AND MATERIALS  3
Emphasizes concepts and properties of materials important in modern solid state electronics; topics include structure and processing of electrical materials, band structure, carrier concentration and dynamics, junction phenomena and optical and magnetic phenomena. PREREQ: MATH243 and PHYS208

ELEG 303  ELECTRICITY FROM SUNLIGHT  3
Introduction to generating electricity with solar energy, such as the photovoltaic system on the University Field House. Course content is directed to non-electrical engineering undergraduate students. Students pursuing degrees in the basic sciences, business, accounting, education and other engineering fields would all benefit. PREREQ: MATH221 or MATH241.

ELEG 305  SIGNALS AND SYSTEMS  3
Introduction to signals and systems, with an emphasis on time and frequency characterization of linear, time-invariant systems. Covers discrete and continuous time systems, sampling, and Fourier, Laplace, and Z transforms. Application examples include medical imaging, radar, audio and image processing, virus detection protocols, and biological networks. PREREQ: MATH242.

ELEG 306  DIGITAL SIGNAL PROCESSING  3
Course topics include z-transforms, the discrete Fourier transforms (DFT), the fast Fourier transform (FFT), signal and linear time invariant (LTI) system frequency analysis, sampling and reconstruction of signals, implementation of discrete-time systems, digital filter design, and multirate signal processing. PREREQ: ELEG305

ELEG 309  ELECTRONIC CIRCUIT ANALYSIS I  4
Introduction to physical principles of solid state electronic devices. Quantitative study of elementary circuits including biasing, linear power amplifiers, low-frequency small signal analysis, multiple transistor circuits and feedback. PREREQ: ELEG205

ELEG 310  RANDOM SIGNALS AND NOISE  3
Introduction to probability and estimation as applied to random signals and noise. Includes random variables, densities, distributions, random processes, spectral representations and statistics.

ELEG 312  ELECTRONIC CIRCUIT ANALYSIS II  4
Low-frequency and high-frequency response of RC-coupled amplifiers, Class A tuned amplifiers, tuned power amplifiers, frequency response and stability of feedback amplifiers, oscillators, modulation and demodulation circuits. PREREQ: ELEG309

ELEG 320  FIELD THEORY I  4
Study of theory and problems in electrostatic and magnetostatic fields. Maxwell’s equations. PREREQ: PHYS208; ELEG205 and MATH243. COREQ: MATH351.

ELEG 340  SOLID STATE ELECTRONICS  3
Introduction to concepts necessary to establish electronic phenomena in solids. Application to electronic devices such as diodes, transistors, FETS and integrated circuits. Emphasis on reduction of physical device to circuit model. COREQ: MATH342

ELEG 366  INDEPENDENT STUDY  1-6

ELEG 403  COMMUNICATION SYSTEMS ENGINEERING  3
Examines the basics of modern communications systems, including analog modulation, digital data transmission, random processes and spectral analysis, and the performance of these systems in the presence of noise. PREREQ: ELEG305 and ELEG310, or permission of instructor.

ELEG 404  DIGITAL IMAGE AND AUDIO SIGNAL PROCESSING  3
Introduction to digital image and audio signal processing. Sensor devices capturing energy across the electromagnetic spectrum provide a rich gamut of images that can be processed digitally for a myriad of applications including medical, surveillance, remote sensing, hyperspectral imaging, and consumer electronics. Provides the fundamental mathematical tools for Image analysis covering topics in sampling, visual perception, color spaces, Fourier analysis and representation, unitary transforms, wavelet transforms, noise reduction and restoration, computer tomography, compression. Introduction to the analysis and processing of audio and music signals. PREREQ: ELEG305.

ELEG 413  FIELD THEORY II  3

ELEG 414  BASIC ELECTRICAL MACHINES AND POWER  1
Provides a basic understanding of electrical machines, including motors and generators, and electrical power, to a non-electrical engineer, starting from basic physical principles, Knowledge of elementary calculus and vectors is required. RESTRICTIONS: No ELEG or CPEG majors may take this course.
ELEG 415  ELECTRIC POWER AND RENEWABLE ENERGY SYSTEMS  3
Introduction to electric power systems and interfaces with renewable energy sources. Covers electric power generation, transmission, distribution; residential, commercial, and industrial systems; components, operation, losses, metering and load management.

ELEG 417  THE SMART GRID  3
This course will examine not just the smart grid technologies, but the transformational impacts of the smart grid on the industry. Students in this course will learn the fundamentals of the smart grid: its purpose and objectives, its technologies, its architectures, and its management.

ELEG 418  DIGITAL CONTROL SYSTEMS  3
Study of closed-loop analog and digital control systems. Stability and performance analysis in time and frequency domains. Frequency and state-space design methods, including root-locus methods, Bode and Nyquist methods, and pole placement using Ackermann's formula. Computer-aided simulation and design uses MATLAB and SIMULINK. PREREQ: ELEG305 or permission of instructor.

ELEG 419  MULTIMEDIA COMMUNICATIONS  3
The theory and principles of multimedia communications, including data compression, CD-ROMs, multimedia networking and standards (JPEG, MPEG, H261, H263, RTP, etc.).

ELEG 420  SEMICONDUCTOR MATERIALS PROCESSING  3
The basic goals, principles and techniques of semiconductor materials processing are discussed. Emphasis is on physical explanations of how devices and processes work rather than on elaborate mathematical models.

ELEG 421  ELECTRICAL PROPERTIES OF MATTER  3
Provides basic understanding of electronic behavior in materials used for fabricating semiconductor devices. Introduces fundamentals of electron theory; elementary quantum mechanics (as applied to semiconductors); concept of energy bands; electronic behavior in crystals; electrical conduction in metals, alloys, semiconductors and insulators; metal-semiconductor contacts and metallization. PREREQ: ELEG340.

ELEG 423  QUANTUM MECHANICS I  3
First in a sequence with PHYS425 that provides introduction to basic principles and applications of quantum mechanics. Emphasis on formalism of quantum mechanics. Schrodinger equation is solved for simple cases such as free-particle motion, simple harmonic oscillator and hydrogen atom, with a basic treatment of angular momentum. Topic of identical particles also considered. Crosslisted with PHYS424. PREREQ: MATH341 or MATH302 or MATH349.

ELEG 425  CHARACTERIZATION OF ELECTRONIC MAT AND DEV  3
Focus on the fundamentals and practical considerations of the myriad techniques which are used to characterize electronic materials. Explore the theoretical underpinnings of the techniques and discuss applicability and limitations. Crosslisted with MSEG422.

ELEG 426  PHOTONIC CRYSTAL DEVICES  3
Introduces design and fabrication tools required for photonic crystal structures. Begins with working knowledge of basic operation physics and introduces mathematical and computational methods for their design. Various fabrication methods discussed such as lithographic and self-assembly methods. PREREQ: ELEG320.

ELEG 427  TERAHERTZ AND MILLIMETER-WAVE LIGHT GENERATION AND DETECTION  3
Light is treated as an antenna phenomenon at radio wavelengths and a quantum effect near the visible. At terahertz frequencies and millimeter-wavelengths, these distinctions are blurred and both technologies exist. These technologies are described and a unified view of their principles is provided. RESTRICTIONS: Students should be knowledgeable of electronic circuit theory and have some electromagnetics background.

ELEG 427  ENERGY SYSTEMS  3
Energy flows are examined in our society including all sources, conversions and conversion efficiencies, and end uses. Both existing and alternative energy sources are presented, especially with regard to total resource availability. Thermodynamics of conversion efficiency is covered, as well as efficiency measures available in end use. PREREQ: MATH241.

ELEG 428  THEORY AND DESIGN OF DIFFRACTIVE OPTICS  4
Applications of Fourier analysis to diffraction, imaging optical data processing and holography. Major design project required. PREREQ: ELEG305.

ELEG 440  OPTO-ELECTRONICS  3
Provides an introduction to the operating principles of optoelectronic devices used in various digital transmission and information processing systems. Emphasis is on the generation (via lasers) and detection of optical signals. PREREQ: Senior standing with completion of all core physics and math courses required or permission of instructor.

ELEG 441  ANTENNA THEORY AND DESIGN  3
The radiation characteristics of antennas, numerical and analytical antenna analysis methods and design techniques for many types of antenna. Topics include wire antennas, antenna arrays, broadband antennas and microstrip antennas. PREREQ: ELEG320.

ELEG 445  OPTICAL COMMUNICATION SYSTEMS  3
Studies the components and system design issues of fiber optic based communications systems. Topics include the propagation of lightwaves in fibers, the coupling of light into fibers, a review of sources and detectors used in fiber-based systems, link analysis, and overall architecture issues. PREREQ: ELEG440 or permission of instructor.

ELEG 446  NANO-ELECTRONIC DEVICE PRINCIPLES  3
Introduction to the operating principles of nanoscale optical and electronic devices, with emphasis on how nanotechnology and quantum mechanics affect devices with reduced sizes and dimensions. Develops the performance and limitations of devices based on quantum wells, wires, dots, and nanophase materials.

ELEG 447  OPTICAL PROPERTIES OF SOLIDS  3
Techniques for the design of optical filters and optoelectronic devices with thin films and the fundamental electromagnetic and solid state physics that determine the optical properties of solids. RESTRICTIONS: Students should have some electromagnetics and solid state physics background.

ELEG 450  SEMICONDUCTOR DEVICE DESIGN AND FABRICATION  4
Instruction in design and fabrication of semiconductor devices and circuits. Specific topics include photolithography and mask design, diffusion, etching, metallization, metrology, and device testing. The laboratory component of this course will focus on the design, fabrication, testing, and reporting of basic devices in silicon and/or compound semiconductors. Students will work in small teams.

ELEG 454  MOBILE NETWORKING AND COMPUTING  3
Contemporary topics in mobile networking and computing are covered. Topics vary and can include ad hoc networking, sensor networking, localization, mobile + cloud computing, multimedia, user behavior, mobile + social applications, energy-aware computing, and mobile application APIs on Android systems. Project-based course and requires students to develop programs for platforms such as Android-based devices. PREREQ: CSC220 or CSC181 or similar course in C++ or Java. ELEG458 is a complementary class that students might find useful to take at the same time as this course.

ELEG 455  HIGH-PERFORMANCE COMPUTING WITH COMMODITY HARDWARE  3
New commodity computing devices, e.g., GPUs, bring the originally elite high performance computing into the reach of general public. Principles of program optimization, GPU and IBM Cell architecture, along with concepts and techniques for optimizing general purpose computing on the new hardware. May be crosslisted with CPEG455.

ELEG 456  ELECTRIC POWER II  3
This is the second course in electric power systems. This course covers the construction materials and design principals of indoor and underground three phase low and high voltage electric power systems, system economics, reliability, load characteristics, load management, and metering. PREREQ: ELEG415.

ELEG 457  SEARCH AND DATA MINING  3
With the increasing amount of textual information, it is important to develop effective search engines, such as Google, to help users manage and exploit the information. Examine the underlying technologies of search engines and get hands-on project experience. Requires good programming skills. May be crosslisted with CPEG457.

ELEG 458  ADVANCED MOBILE SERVICES  3
Foundations for the creation of successful advanced mobile services, including the interplay of business and technology evolution, methodologies, architectures and paradigm shifts that accompany the development of converged user centric intelligent telecommunication services from location sensitive and navigation services, to social networking and remote sensing.
ELEG 460 HIGH TECHNOLOGY ENTREPRENEURSHIP 3
Focuses on critical financial, legal, scientific and engineering issues confronted during initial planning stages of a start-up enterprise. Students work in teams to develop a real world business product offering. Crosslisted with ENTR460. RESTRICTIONS: Senior status, permission of instructor.

ELEG 465 INTRODUCTION TO CYBERSECURITY 3
This cybersecurity course is an introduction to computer and network security and covers the foundation security policies and methods to provide confidentiality, integrity, and availability, as well as cryptography, auditing, and user security. Topics are reinforced with hands-on exercises run in a virtual machine environment. Crosslisted with CPEG465.

ELEG 466 INDEPENDENT STUDY 1-6

ELEG 471 MATHEMATICAL PHYSIOLOGY 3
Mathematical models in Human Physiology, covering cellular, tissue, organ, and integrated systems. Dynamic modeling of homeostasis, endocrine regulatory systems, immune response dynamics, mutation and selection. Mathematical methods covered include linear and nonlinear differential equations, Lyapunov analysis, mass action, Hamming spaces, reaction-diffusion equations, and simulation. Crosslisted with BMEG471. RESTRICTIONS: Seniors only. Requires permission of instructor.

ELEG 475 IMAGE PROCESSING WITH BIOMEDICAL APPLICATIONS 3
Fundamentals of digital image processing, including image formation, acquisition, transforms, enhancement, restoration, coding, and reconstruction from projections. Attention is to biomedical imaging modalities, including X-ray, computed tomography (CT), magnetic resonance (MR) imaging, and ultrasound. PREREQ: ELEG305.

ELEG 477 BIOSIGNAL PROCESSING 3
Biomedical signal characteristics, biomedical systems and models, applications of Fourier transform, wavelet transforms, and joint-time frequency analysis of biomedical signals. Systems studies include ultrasounds, EKG's, CAT scans, MRI's, X-rays, and others. PREREQ: ELEG305, ELEG310, or equivalent

ELEG 478 INTRODUCTION TO NANO AND BIOPHOTONICS 3
Multidisciplinary approach covers fundamentals of light-matter interactions and nano-scaled materials and discusses their use in understanding, characterizing and manipulating biological systems. Covers several applications including laser manipulation and dissection, bio-imaging, flow cytometry and biosensors, optical biopsy and spectroscopy and photodynamic therapy.

ELEG 479 INTRODUCTION TO MEDICAL IMAGING SYSTEMS 3
Physics, instrumentation, system design, and image reconstruction algorithms will be covered for the following modalities: radiography, x-ray computed tomography (CT), single photon emission computed tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), and real-time ultrasound. Crosslisted with BMEG479. PREREQ: Requires permission of instructor.

ELEG 482 OPTICS AND PHOTONICS 3
Principles of classical optics and their applications. Topics include wave optics, material dispersion, geometrical optics, ray tracing, ABCD matrices, birefringence and Jones' formalism, Gaussian optics, coherence, interference, diffraction, pulse propagation and non-linear optics. Specific applications including optical components and instrumentation, imaging techniques, resonators and Fourier optics. Apply fundamental principles of optics and interaction between light and matter (photonics).

ELEG 484 ELECTRIC VEHICLES AND THE GRID 3
This seminar covers design of electric vehicles and charging infrastructure, existing and needed policies, consumer perspective on electric vehicles, and the use of electric vehicles for grid services, including leveling variable generation. Crosslisted with MAST484. PREREQ: Students must have had basic physics or engineering in order to understand relationships among voltage, current, resistance, and power.

ELEG 491 ETHICS/IMPACTS OF ENGINEERING 3
A survey of ethical and political issues that arise with computers and information technology: privacy, free speech, intellectual property, cybercrime, safety and risk, and professional ethics. Engineering solutions are explored from the standpoint of design and implementation, with a focus on global impact. RESTRICTIONS: Open to engineering seniors, or others by permission of instructor.

ELEG 492 RADAR SYSTEMS AND TECHNOLOGY 3
Introduction of basic RADAR concepts and operational scenarios. The RADAR range is developed as are concepts related to RADAR cross-section, waveform design, antennas, transmitter and receivers. PREREQ: ELEG 320, ELEG 305.

ELEG 493 ELECTRIC MOTORS AND GENERATORS 3
This is a basic course in motor and generator performance and application. Students will learn about electric power and energy, mechanical power and energy, and the torque, speed, efficiency, and economics of the various motor and generator designs.

ELEG 494 SYSTEM HARDENING AND PROTECTION 3
Practical treatment of the defensive techniques used to harden computer systems to make them less vulnerable to cyber-attacks. Defect management, configuration/hardening, account control, logs/auditing, and risk assessment are covered and reinforced with hands-on exercises run in a virtual machine environment. Crosslisted with CPEG494.

ELEG 495 DIGITAL FORENSICS 3
Introduction to digital forensics as used to analyze criminal evidence in computer systems and digital media. Forensic tools and techniques for storage and memory analysis of windows/linux, network traffic, documentation are covered and reinforced with hands-on exercises run in a virtual machine environment. Crosslisted with CPEG495.

ELEG 496 TOPICS IN CYBERSECURITY 3
Explore varied topics in cybersecurity to coincide with the interests of students and current faculty. Potential topics include: (1) applications, web or cloud security, (2) risk management and incident response, (3) malware and reverse engineering, or (4) wireless, smartphone, or SCADA security. Crosslisted with CPEG496.

ELEG 498 SENIOR DESIGN I 3
Students apply their accumulated classroom knowledge to an electrical and computer engineering design problem. Students work in small teams and must present their finished designs at the end of the term. May be crosslisted with CPEG498.

ELEG 499 SENIOR DESIGN II 3
Students apply their accumulated classroom knowledge to an electrical and computer engineering design problem. Students work in small teams and must present their finished designs at the end of the term. May be crosslisted with CPEG499.

ELEG 604 DIGITAL IMAGE AND AUDIO SIGNAL PROCESSING 3
Introduction to digital image and audio signal processing. Sensor devices capturing energy across the electromagnetic spectrum provide a rich gamut of images that can be processed digitally for a myriad of applications including medical, surveillance, remote sensing, hyperspectral imaging, and consumer electronics. Provides the fundamental mathematical tools for image analysis covering topics in sampling, visual perception, color spaces, Fourier analysis and representation, unitary transforms, wavelet transforms, noise reduction and restoration, computer tomography, compression. Introduction to the analysis and processing of audio signals. PREREQ: ELEG305 ELEG310.

ELEG 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. Crosslisted with MAST606.

ELEG 614 BASIC ELECTRICAL MACHINES AND POWER 1
Provides a basic understanding of electrical machines, including motors and generators, and electrical power, to a non-electrical engineer, starting from basic physical principles. Knowledge of elementary calculus and vectors is required. RESTRICTIONS: No ELEG or CPEG majors may take the course.

ELEG 615 ELECTRIC POWER AND RENEWABLE ENERGY SYSTEMS 3
Introduction to electric power systems and interfaces with renewable energy sources. Covers electric power generation, transmission, distribution; residential, commercial, and industrial systems; components, operation, losses, metering and load management.
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

ELEG 616  STATISTICAL PHYSICS AND THERMODYNAMICS  3

ELEG 617  THE SMART GRID  3
This course will examine not just the smart grid technologies, but the transformational impacts of the smart grid on the industry. Students in this course will learn the fundamentals of the smart grid: its purpose and objectives, its technologies, its architectures, and its management.

ELEG 620  PHOTOVOLTAIC MATERIALS AND DEVICES  3
Progression using solar resource, together with photovoltaic effect, through to modern photovoltaic (PV) modules. Solar cell operation at device level will be covered in detail. The various PV technologies (flat plate, thin film, concentrators, multi-junction, thermal PV) will be briefly surveyed.
PREREQ: ELEG430 or equivalent.

ELEG 622  ELECTRONIC MATERIALS PROCESSING  3
Theory and current technology of semiconductor fabrication processes, including crystal growth, wafer preparation, lithography, liquid and vapor phase epitaxy, molecular-beam epitaxy of ultra-thin layers and superlattices, oxide growth, thin-film deposition, diffusion, ion implantation, etching and metallization.

ELEG 624  CONTROL OF DYNAMIC SYSTEMS  3
Crosslisted with MEE6624. PREREQ: MATH349 or MATH351 or graduate status.

ELEG 625  CHARACTERIZATION OF ELECTRONIC MAT & DEV  3
Focus on the fundamentals and practical considerations of the myriad techniques which are used to characterize electronic materials. Explore the theoretical underpinnings of the techniques and discuss applicability and limitations. Crosslisted with MSEE622.

ELEG 626  PHOTONIC CRYSTAL DEVICES  3
Introduces design and fabrication tools required for photonic crystal structures. It begins with a working knowledge of their basic operation principles and then introduces mathematical and computational methods for their design. Various fabrication methods are discussed such as lithographic and self-assembly methods.
PREREQ: ELEG448

ELEG 627  TERAHERTZ AND MILLIMETER-WAVE LIGHT GENERATION AND DETECTION  3
Light is treated as an antenna phenomenon at radio wavelengths and a quantum effect near the visible. At terahertz frequencies and millimeter-wavelengths, these distinctions are blurred and both technologies exist. These technologies are described and a unified view of their principles is provided.
RESTRICTIONS: Students should be knowledgeable of electronic circuit theory and have some electromagnetics background.

ELEG 628  SOLAR ENERGY TECHNOLOGY AND APPLICATION  3
Introduces basics of solar cell technology, applications, and systems. Presents critical issues in research, manufacturing, cost and performance. Compares Si wafer and thin film solar technology. Analyzes off-grid, residential, building integrated, centralized power systems. Discusses other solar energy concepts.

ELEG 630  INFORMATION THEORY  3
Information theory establishes the theoretical limits that can be achieved in communications systems, and provides insights about how to achieve these limits in practical systems. Covers lossless and lossy compression, and studies the maximum information rate achievable in communications over noisy channels.
PREREQ: Undergraduate course in probability.

ELEG 631  DIGITAL SIGNAL PROCESSING  3
Theory of discrete-time signals and systems with emphasis on the frequency domain description of digital filtering and discrete spectrum analysis, fast Fourier transform, z-transform, digital filter design, relationship to analog signal processing.
PREREQ: ELEG305 or equivalent

ELEG 632  MATHEMATICAL METHODS FOR SIGNAL PROCESSING  3
The application of mathematics to signal processing. Topics include, among others, applications of linear and matrix algebra, iterative and recursive methods, and optimization methods. Example applications include: Karhunen-Loeve approximation, subspace techniques, steepest descent, expectation maximization and Hidden Markov Models, and Viterbi algorithm.
PREREQ: Linear and matrix algebra and digital signal processing. RESTRICTIONS: Undergraduates need permission of the instructor.

ELEG 633  IMAGE PROCESSING  3
Review of concepts of linear systems and spectral analysis, human visual response, scanning and display of images, Fourier optics, image enhancement and feature extraction, design of digital filters for image processing, 2D fast Fourier transform algorithms and computed tomography.
RESTRICTIONS: Requires permission of instructor.

ELEG 634  SIGNALS AND SYSTEMS  3
Reviews basic concepts of discrete and continuous time signals, control systems, and linear algebra. Transforms, sampling, aliasing, linear algebra and systems of equations, matrix factorizations, eigenvalues and eigenvectors, least squares, and the Cayley-Hamilton theorem are studied.
PREREQ: ELEG305 and MATH342 or MATH349 or equivalents.

ELEG 635  DIGITAL COMMUNICATION  3
The theory and applications of digital communications including modulation, pulse shaping, and optimum receiver design for additive white gaussian noise and bandlimited channels.
PREREQ: Undergraduate course in probability, signals and linear systems.

ELEG 636  STATISTICAL SIGNAL PROCESSING  3
PREREQ: Undergraduate courses in probability and signals and linear systems.

ELEG 637  ENERGY SYSTEMS  3
Energy flows are examined in our society including all sources, conversions and conversion efficiencies, and end uses. Both existing and alternative energy sources are presented, especially with regard to total resource availability. Thermodynamics of conversion efficiency is covered, as well as efficiency measures available in end use.
RESTRICTIONS: Freshman level calculus.

ELEG 638  THEORY AND DESIGN OF DIFRACTIVE OPTICS  4
Applications of fourier analysis to diffraction, imaging, optical data processing and holography. Major design project required.
PREREQ: ELEG 305 and ELEG 320.

ELEG 640  OPTOELECTRONICS  3
Provides an introduction to the operating principles of optoelectronic devices used in various digital transmission and information processing systems. Emphasis is on the generation (via lasers) and detection of optical signals.

ELEG 641  ANTENNA THEORY AND DESIGN  3
The radiation characteristics of antennas, numerical and analytical antenna analysis methods and design techniques for many types of antenna. Topics include wire antennas, antenna arrays, broadband antennas and microstrip antennas.
PREREQ: ELEG320 or ELEG413.

ELEG 645  OPTICAL COMMUNICATION SYSTEMS  3
Studies the components and system design issues of fiber optic based communication systems. Topics include the propagation of lightwaves in fibers, the coupling of light into fibers, a review of sources and detectors used in fiber-based systems, link analysis, and overall architecture issues.
PREREQ: ELEG640 or permission of instructor.

ELEG 646  NANOELECTRONIC DEVICE PRINCIPLES  3
Introduction to the operating principles of nanoscale optical and electronic devices, with emphasis on how nanotechnology and quantum mechanics affect devices with reduced sizes and dimensions. Develops the performance and limitations of devices based on quantum wells, wires, dots, and nanophase materials.

ELEG 647  OPTICAL PROPERTIES OF SOLIDS  3
Techniques for the design of optical filters and optoelectronic devices with thin films and the fundamental electromagnetic and solid state physics that determine the optical properties of solids.
RESTRICTIONS: Students should have some electromagnetics and solid state physics background.
ELEG 648 ADVANCED ENGINEERING ELECTROMAGNETICS 3
Development and application of Maxwell's equations as they apply to the analysis of guided wave, radiation, and scattering problems. Topics include wave propagation, reflection and transmission, vector potentials, transmission lines and cavities, and special emphasis on antennas and scattering structures.

ELEG 650 SEMICONDUCTOR DEVICE DESIGN AND FABRICATION 3
Instruction in design and fabrication of simple bi-polar and MOS integrated circuits. Specific topics include semiconductor device and integrated circuit design, photolithographic mask design and fabrication, photolithography, N-diffusion and P-diffusion, P-MOS, metallization, and device and integrated circuit testing. PREREQ: ELEG 340

ELEG 651 COMPUTER NETWORKS II 3
Foundation principles, architectures, and techniques employed in computer and communication networks. Focuses on mechanisms used in TCP/IP protocol suite. Topics include connection management, end-to-end reliable data transfer, sliding window protocol, congestion control, transmission control, LANs, framing, error control, analog versus digital transmission, packet versus circuit switching, multiplexing. Crosslisted with CISC 650. PREREQ: An undergraduate level course in computer architecture and operating systems. RESTRICTIONS: Knowledge of probability and statistics recommended. Credit cannot be received for CISC 650 and any of the following courses: CS 250, CPEG 419, CS 450, ELEG 651.

ELEG 652 PRINCIPLES OF PARALLEL COMPUTER ARCHITECTURES 3
Provides an introduction to the principles of parallel computer architecture. Begins at a level that assumes experience in introductory undergraduate courses such as digital system design, computer architecture, and microprocessor based systems. May be crosslisted with CPEG 652.

ELEG 653 COMPUTER SYSTEM SECURITY 3
Surveys current topics in computer network security, including technology to protect networks, protocols and applications from intrusion and theft. Topics include techniques for authentication, privacy, denial of service and non-repudiation. PREREQ: ELEG 651 or CISC 650 or permission from the instructor

ELEG 654 MOBILE NETWORKING AND COMPUTING 3
Contemporary topics in mobile networking and computing are covered. Topics vary and can include ad hoc networking, sensor networking, localization, mobile + cloud computing, multimedia, user behavior, mobile + social applications, energy-aware computing, and mobile application APIs on Android systems. This course is a project-based course and requires students to develop programs for platforms such as Android-based devices. PREREQ: CISC 220 or CISC 181 or similar course in C++ or Java. ELEG 458/658 is a complementary class that many find useful to take at the same time as this course.

ELEG 655 HIGH-PERFORMANCE COMPUTING WITH COMMODITY HARDWARE 3
New commodity computing devices, e.g., GPUs, bring the originally elite high performance computing into the reach of general public. Principles of program optimization, GPU and IBM Cell architecture, along with concepts and techniques for optimizing general purpose computing on the new hardware. May be crosslisted with CPEG 655.

ELEG 656 ELECTRIC POWER II 3
This is the second course in electric power systems which covers the construction materials and design principals of indoor and underground three phase low and high voltage electric power systems, system economics, reliability, load characteristics, load management, and metering. PREREQ: ELEG 6615.

ELEG 657 SEARCH AND DATA MINING 3
With the increasing amount of textual information, it is important to develop effective search engines, such as Google, to help users manage and exploit the information. Examine the underlying technologies of search engines and get hands-on project experience. Requires good programming skills. Crosslisted with CPEG 657.

ELEG 658 ADVANCED MOBILE SERVICES 3
Foundations for the creation of successful advanced mobile services, including the interplay of business and technology evolution, methodologies, architectures and paradigm shifts that accompany the development of converged user centric intelligent telecommunication services from location sensitive and navigation services, to social networking and remote sensing.

ELEG 660 HIGH TECHNOLOGY ENTREPRENEURSHIP 3
Focuses on the critical financial, legal, scientific and engineering issues that must be confronted during the initial planning stages of a start-up enterprise. Students work in teams to develop a business plan for a real world/business product offering.

ELEG 661 MATERIALS AND DEVICES SEMINAR 0 PF
Lectures and discussions by guest speakers, faculty and students on specialized topics in materials and devices.

ELEG 662 DIGITAL SYSTEMS SEMINAR 0 PF
Lectures and discussions by guest speakers, faculty and students on specialized topics in digital systems.

ELEG 663 SIGNAL PROCESSING & COMMUNICATIONS SEMINAR 0 PF
Lectures and discussions by guest speakers, faculty and students on specialized topics in signal processing and communications.

ELEG 664 BIOMEDICAL ENGINEERING SEMINAR 0
Lectures and discussions by guest speakers, faculty, and students on specialized topics in biomedical engineering.

ELEG 665 INTRODUCTION TO CYBERSECURITY 3
Introduction to computer and network security and covers the foundation security policies and methods to provide confidentiality, integrity, and availability, as well as cryptography, auditing, and user security. Topics are reinforced with hands-on exercises run in a virtual machine environment. Crosslisted with CPEG 665.

ELEG 666 DETECTION AND ESTIMATION 3
This course covers the fundamentals of detection and estimation theory for statistical signal processing. Topics include hypothesis testing theory, signal detection theory for both deterministic and random signals, signal estimation theory with various optimal estimators for both deterministic and random parameters, and their properties and performance analysis. PREREQ: ELEG 305, ELEG 306, ELEG 310 or equivalent courses. RESTRICTIONS: Knowledge of material covered in ELEG 305, ELEG 306, ELEG 310 or equivalent courses.

ELEG 671 MATHEMATICAL PHYSIOLOGY 3
Mathematical methods in Human Physiology, covering cellular, tissue, organ, and integrated systems. Dynamic modeling of homeostasis, endocrine regulatory systems, immune response dynamics, mutation and selection. Mathematical methods covered include linear and nonlinear differential equations, Lyapunov analysis, mass action, and reaction-diffusion equations, and simulation. Crosslisted with BMEG 671. RESTRICTIONS: Seniors, graduate students only.

ELEG 675 IMAGE PROCESSING WITH BIOMEDICAL APPLICATIONS 3
Fundamentals of digital image processing, including image formation, acquisition, transforms, enhancement, restoration, coding, and reconstruction from projections. Attention given to biomedical imaging modalities, including X-ray, computed tomography (CT), magnetic resonance (MR) imaging, and ultrasound. PREREQ: ELEG 305 or equivalent

ELEG 677 BIOSIGNAL PROCESSING 3
Biomedical signal characteristics, biomedical systems and models, applications of Fourier transform, wavelet transforms, and joint-time frequency analysis of biomedical signals. Systems studies include ultrasound, EKG’s, CAT scans, MRI’s, X-rays, and others. PREREQ: ELEG 305, ELEG 310, or equivalent

ELEG 678 INTRODUCTION TO NANO AND BIOPHOTONICS 3
Multidisciplinary approach covers fundamentals of light-matter interactions and nano-scaled materials and discusses their use in understanding, characterizing and manipulating biological systems. Covers several applications including laser manipulation and dissection, bio-imaging, flow cytometry and biosensors, optical biopsy and spectroscopy and photodynamic therapy.

ELEG 679 INTRODUCTION TO MEDICAL IMAGING SYSTEMS 3
Physics, instrumentation, system design, and image reconstruction algorithms will be covered for the following modalities: radiography, x-ray computed tomography (CT), single photon emission computed tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), and real-time ultrasound. Crosslisted with BMEG 679. PREREQ: Requires permission of instructor.
ELEG 680  IMMUNOLOGY FOR ENGINEERS  3
Human adaptive immune response to viruses, both cellular and humoral.
Generation of the immune response cells and response to types of immunogen as well as basic nonlinear differential model analysis, basic mathematical models of their interactions and predictions of these models for the treatment of disease. Access significant amount of current literature. No prior knowledge of biology required.

ELEG 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 multispacial and spatial analysis techniques and correlation with ground/spatial data. Application to oceanography, coastal processes, geology, land use, geography, agriculture, climate and pollution studies. Includes hands-on image analysis in GIS laboratory. Crosslisted with MAST681.  RESTRICTIONS: Requires permission of instructor.

ELEG 682  OPTICS AND PHOTONICS  3
Principles of classical optics and their applications. Topics include wave optics, material dispersion, geometrical optics, ray tracing, ABCD matrices, birefringence and Jones' formalism, Gaussian optics, coherence, interference, diffraction, pulse propagation and non-linear optics. Specific applications including optical components and instrumentation, imaging techniques, resonators and Fourier optics. Apply fundamental principles of optics and interaction between light and matter (photons).

ELEG 684  ELECTRIC VEHICLES AND THE GRID  3
This seminar covers design of electric vehicles and charging infrastructure, existing and needed policies, consumer perspective on electric vehicles, and the use of electric vehicles for grid services, including leveling variable generation. Crosslisted with MAST684.  PREREQ: Enough physics or engineering to understand relationships among voltage, current, resistance and power.

ELEG 692  RADAR SYSTEMS AND TECHNOLOGY  3
Introduction of basic RADAR concepts and operational scenarios. The RADAR range is developed as are concepts related to RADAR cross-section, waveform design, antennas, transmitter and receivers.  PREREQ: ELEG 320, ELEG 305.

ELEG 693  ELECTRIC MOTORS AND GENERATORS  3
This is a basic course in motor and generator performance and application. Students will learn about electric power and energy, mechanical power and energy, and the torque, speed, efficiency, and economics of the various motor and generator designs.

ELEG 694  SYSTEM HARDENING AND PROTECTION  3
Practical treatment of the defensive techniques used to harden computer systems to make them less vulnerable to cyber-attacks. Defect management, configuration/hardening, account control, logs/auditing, and risk assessment are covered and reinforced with hands-on exercises run in a virtual machine environment. Crosslisted with CPEG694.

ELEG 695  DIGITAL FORENSICS  3
Introduction to digital forensics as used to analyze criminal evidence in computer systems and digital media. Forensic tools and techniques for storage and memory analysis of Windows/Linux, network traffic, documentation are covered and reinforced with hands-on exercises run in a virtual machine environment. Crosslisted with CPEG695.

ELEG 696  TOPICS IN CYBERSECURITY  3
Examine varied topics in cybersecurity to coincide with the interests of students and current faculty. Potential topics include: (1) applications, web or cloud security, (2) risk management and incident response, (3) malware and reverse engineering, or (4) wireless, smartphone, or SCADA security. Crosslisted with CPEG696.

ELEG 697  COMPUTATIONAL SYSTEM BIOLOGY  3
Computational/mathematical techniques for modeling & analysis of biological systems. Includes properties of gene-regulatory and signaling networks; network reconstruction from data; stochastic modeling to study cellular variation & physiological meaning. Crosslisted with BINF695.

ELEG 801  ADVANCED TOPICS IN BIOMEDICAL ENGINEERING  3
Advanced topics in biomedical engineering. Applications of engineering techniques in biology and medicine drawn from current research literature. Assignments will include presentation of journal articles and programming assignments which illustrate ideas from the literature.  PREREQ: ELEG671 or permission of instructor.  RESTRICTIONS: May be repeated twice for credit.

ELEG 806  SYSTEMS BIOLOGY OF CELLS IN ENGINEERED ENVIRONMENTS  3
Provides a technical review of systems biology approaches including genomics, transcriptomics, proteomics, metabolomics, and bioinformatics as well as applications in tissue engineering, stem cell differentiation, and drug delivery. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF816.

ELEG 809  ELECTROMAGNETIC THEORY I  3
Electrostatics, boundary value problems, Green functions, orthogonal functions, multipole expansion, dielectric media, magnetostatics, Maxwell's equations, electromagnetic waves in vacuum and in dispersive media (plasmas, dielectrics, and conductors), MHD waves, electromagnetic radiation. Crosslisted with PHYS809.

ELEG 811  CHANNEL CODING THEORY AND PRACTICE  3
Standard and modern developments in channel coding. Reviews information theory topics, then introduces convolutional codes and trellis-coded modulation, iterative decoding, including turbo codes and low-density parity check codes.

ELEG 812  WIRELESS DIGITAL COMMUNICATIONS  3
Fundamentals and current techniques in wireless digital communications, including propagation, modem design, fading countermeasures, and multiple access techniques, such as FDMA, TDMA, and CDMA.  PREREQ: Probability and linear systems.

ELEG 813  QUANTUM STATISTICAL MECHANICS  3
Basic concepts of quantum statistical mechanics, density matrix, and quantum phase transition. Ideal Bose and Fermi gases; Bose–Einstein condensation. Mean field and Landau theories of phase transition; critical phenomena; introduction to renormalization group methods. Linear response theory and Boltzman equation. Interacting quantum many-particle systems. Crosslisted with PHYS813.  PREREQ: PHYS516.

ELEG 815  ANALYTICS I: STATISTICAL LEARNING  3
Introduction to the mathematics of data analysis. Bayes estimation, linear regression and classification methods. The singular value decomposition and the pseudo-inverse. Statistical models for inference and prediction in finance, marketing, and engineering applications. Regularization methods and principles of sparsity priors are applied. Streaming solutions and dimensional problems. Concepts reinforced in R programming experiments. May be crosslisted with FSA815.  PREREQ: First course in linear algebra. First course in probability and statistics (ELEG310 or equivalent). Basic programming skills.

ELEG 817  LARGE SCALE MACHINE LEARNING  3
Introduction to the analysis and processing of massive high-dimensional data. Massive data sets generally involve growth not only in the number of individuals represented but also in the number of descriptive parameters of the individuals, leading to exponential growth in the number of hypothesis considered. New approaches to address these problems exploit sparsity prior concepts from optimization theory, signal processing, statistics, and machine learning. May be crosslisted with FSA817.  PREREQ: ELEG815.

ELEG 819  TOPICS IN NETWORKING I  3
Examines standard routing protocols for wired networks such as OSPF and BGP, protocols for wireless mesh and ad hoc networks. Includes theoretical analysis of protocols and examination of data collected from networks. Topics such as load balancing, multicasting, and cross-layer interactions are covered. May be crosslisted with CPEG619.  PREREQ: CPEG419, CISC450, CISC650, or ELEG651 or equivalent.  RESTRICTIONS: May be repeated two times for credit.

ELEG 823  ULTRAFAST OPTICS  3
Techniques and applications involving femtosecond and picosecond lasers. Topics include: temporal and spectral properties of ultrashort pulses, linear propagation in bulk media, dispersion control, nonlinear optical propagation, active and passive modelocking, chirped pulse amplification, and pulse measurement techniques.

ELEG 832  WAVELETS AND FILTER BANKS  3
Systematically studies wavelets, wavelet transforms, multi rate filter bank theory and their applications in digital communications and signal and image processing. Applications considered include wavelet denoising and wavelet subband image/video compression.  PREREQ: ELEG631 and linear algebra.

ELEG 833  NONLINEAR SIGNAL PROCESSING  3
Fundamental theory and applications of nonlinear signal processing. Topics include stable random processes, order statistics, fractional lower order statistics, maximum likelihood estimation and the filtering problem, weighted order–statistic filters, medianization of linear FIR filters, myriad filters and adaptive optimization of nonlinear filters. Applications of nonlinear signal processing include digital imaging and video, digital communications and time-frequency analysis.  PREREQ: Statistical digital signal processing.
ELEG 834 ADV. TOPICS IN SIGNAL PROCESSING 3
Course focuses on emerging areas of signal processing and communications, or in more established but specialized areas, such as array signal processing, compressed sensing, computational imaging, MIMO communications.
RESTRICTIONS: May be repeated two times for credit.

ELEG 841 ADVANCED COMPUTATIONAL ELECTROMAGNETICS II 3
Introduces the major modern computational methods for the analysis of frequency domain electromagnetics problems. The finite element method and the method of moments are covered. Students will apply these techniques to radiation and scattering problems involving metal and dielectrics.
PREREQ: ELEG 648

ELEG 842 RADIO FREQUENCY AND MICROWAVE TECHNOLOGY 3
Modern telecommunications and datacom systems operate at frequencies in the radio frequency (RF) and microwave range. The basic concepts and technologies required to design RF and microwave devices and circuits are explained. Examples of applications to wireless and lightwave systems are discussed.
RESTRICTIONS: Undergraduates require permission from the instructor.

ELEG 843 FOURIER OPTICS 3
Provides an understanding of the basic principles underlying the field of optical information processing. Emphasis is on coherent optical image processing based on Fourier optics, holography, and acousto-optics.
PREREQ: ELEG 640 and ELEG 648 or permission of instructor

ELEG 846 MICROWAVE AND RF PHOTONICS 3
This class discusses RF photonic components, transmission systems, and signal generation/processing/detection techniques. In depth description of the fundamental physics of operation as well as the underlying limitations will be presented. Topics including RF efficiency, nonlinear distortion, noise figure, spurious frequency dynamic range, phase locked loops, electro-absorption, non-linear materials, electro-optic polymers, lithium niobate modulators, slot-waveguide structures and their design, and RF integration techniques.
PREREQ: ELEG 648, or equivalent ELEG 682, or equivalent.

ELEG 852 ADVANCED TOPICS IN COMPUTING SYSTEMS 3
Focus on the challenges and opportunities in parallel computing systems and on the design and implementation of future high-end computer systems from multiple peta-sicale up to exa-scale computers. Challenges are centered on the definition and specification of parallel program execution models that are sound, scalable and programable for the intended applications. RESTRICTIONS: May be repeated two times for credit.
CROSSTLISTED WITH EPEG852.

ELEG 853 INTEGRATED OPTICS 3
Explains basic goals, principles and techniques of integrated optics. Topics include optical wave guides, scattering and absorption, couplers, electro-optic modulators, acousto-optic modulators, semiconductor lasers, photonic crystals and optical detectors. Includes applications of optical integrated circuits. Emphasis on physical explanations of how devices and systems work rather than on elaborate mathematical models.

ELEG 855 MICROWAVE AND MILLIMETER-WAVE TECHNOLOGY 3
Principles of device operation and circuit characteristics for microwave/millimeter-wave FET, IMPATT, TRAPATT, Gunn diode, varactor diode, p-n diode, tunnel diode. Sub-millimeter-wave and terahertz-frequency devices also described. Covers both waveguide circuits and microwave integrated circuits. Emphasis on physical explanations of how devices and systems work rather than on elaborate mathematical models.

ELEG 860 EPITAXIAL GROWTH AND BAND ENGINEERING 3
Fundamentals and recent developments in the growth of epitaxial films of electronic/optical materials and devices. Topics include vacuum technology, growth thermodynamics, heterojunction physics, materials characterization, and practical considerations. Focus on molecular beam epitaxy, but discuss complementary techniques. Crosslisted with MSE460.

ELEG 868 RESEARCH 1-6

ELEG 869 MASTER'S THESIS 1-6
Laboratory study conducted for the purpose of contributing new data and theory in some fields of electrical engineering in which information is lacking. Although supervised, the work will be independent in character to encourage the development of initiative.

ELEG 960 ADVANCED TOPICS IN ELECTRONIC/OPTICAL INFORMATION TECHNOLOGY 3
Principles of electronic/optical information technology. Topics include optical wave guides, scattering and absorption, couplers, electro-optic modulators, acousto-optic modulators, semiconductor lasers, photonic crystals and optical detectors. Includes applications of optical integrated circuits. Emphasis on physical explanations of how devices and systems work rather than on elaborate mathematical models.

ELEG 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.

ELEG 969 DOCTORAL DISSERTATION 1-12 PF

ENERGY AND ENVIRONMENTAL POLICY

ENEP 117 SCIENCE, SOCIETY AND ENERGY 1
Basic science and societal issues related to energy production process and effects of their uses. Topics include ethics of energy production and uses, scientific principals that govern production and use of energy, environmental issues related to the use of energy, e.g., global warming, acid rain.

ENEP 166 INDEPENDENT STUDY 1-3
Independent Study.

ENEP 250 INTRODUCTION TO ENERGY POLICY 3
Introduces field of energy policy and provides a review of the role of social, economic, political, and environmental factors in shaping the energy sector. Surveys policy, technical and economic assessments of key energy options needed to achieve a more sustainable world and the appropriate policy mechanisms to implement these options.

ENEP 266 INDEPENDENT STUDY 1-3
Independent Study.

ENEP 364 RESEARCH INTERNSHIP 3
Offers integration of educational study and practical experience in the work place in a planned and supervised learning setting. The main emphasis is the student's development of a research paper that will contribute to an advanced understanding of the topic area in which the student intends to write his or her Senior Thesis. Field work requires 150-200 hours in an organization in the field of energy and environmental policy.
RESTRICTIONS: Open to energy and environmental policy majors.

ENEP 366 INDEPENDENT STUDY 1-3
Independent Study.

ENEP 402 ELECTRICITY POLICY AND PLANNING 3
Analyzes technological and regulatory policy evolution of electricity industry. Considers how technology innovations and policy regulatory actions have guided industry planning from its early days.

ENEP 410 ENVIRONMENTAL SUSTAINABILITY: ECONOMIC AND POLICY ANALYSIS 3
Reviews major theories developed over last half century to explain nature and society relationships. Policy case studies of environmental justice, trade and environment, global climate change, and sustainable development are used to evaluate current range of political-economic explanations of nature-society relationships. International, national and local responses to these problems analyzed.

ENEP 413 WILDLIFE POLICY AND ADMINISTRATION 3
This course is an introduction to policy issues that relate to wildlife management and natural resources. Students will gain an understanding of current laws, federal agencies, policy formation, and debate the policies of current hot topics. Crosslisted with ENWC413. PREREQ: ENWC201. RESTRICTIONS: Open to juniors and seniors only.

ENEP 420 WATER RESOURCES MANAGEMENT 3
Introduces and analyzes various aspects of water resources management and biorenewable resources. Topics include rainfall, runoff, water supply, groundwater, reservoirs, wastewater treatment and reuse, water quality, agricultural water management, drought management, water conservation, agricultural production systems for food and energy and the impacts of climate change on water resources and agriculture.
PREREQ: MATH114 or higher.

ENEP 425 ENERGY POLICY AND ADMINISTRATION 3
Analyzes energy use and energy policy with respect to politics, society, economics, political economy, technology, resources, and environment. Focuses on interrelationships among energy, environment, economy and equity (64). It considers the energy policy options needed to achieve a more sustainable world. May be crosslisted with UAPP425.
ENEP 426 CLIMATE CHANGE POLICY 3
Examines existing policy responses to climate change to achieve meaningful CO2 reductions. Specific attention given to possibilities and limits of scientific knowledge and technology in formulating policies to address climate risk.

ENEP 427 SUSTAINABLE ENERGY: ECONOMICS AND POLICY ANALYSIS 3
Examines existing policy responses to climate change, alongside opportunities for a redirected political economy to achieve energy and environmental conditions with meaningful CO2 reductions. Specific attention given to possibilities and limits of scientific knowledge and technology in galvanizing social change.

ENEP 466 SPECIAL PROBLEM 3-6
Independent Study.

ENEP 468 RESEARCH IN ENERGY AND ENVIRONMENT 3-6
Examines advanced research concepts, methods and findings in the fields of energy and environment. Explores topics in support of student research with a focus on sustainability issues in Northern and Southern countries.

ENEP 470 READINGS IN ENERGY AND ENVIRONMENT 3
Explores a range of concepts, issues and phenomena associated with energy and environmental policy. Allows student and instructor to interact dynamically in crafting a readings list building on the student’s interests in given topics. Successful completion of course should allow student to prepare a research paper summarizing key material and analyzing its substantive relevance to thematic concerns in the student’s plan of study.

ENEP 472 SENIOR THESIS 2-6
Advanced senior research in the the areas of energy and environmental policy under the direction and subject to approval of a faculty advisor. Requires original research and application of energy and environmental policy and analysis on an energy and environmental problem.

ENEP 613 WILDLIFE POLICY AND ADMINISTRATION 3
Introduction to policy issues that relate to wildlife management and natural resources. Students will gain an understanding of current laws, federal agencies, policy formation, and debate the policies of current hot topics. Crosslisted with ENWC613. RESTRICTIONS: Open to graduate students only or by permission of instructor.

ENEP 617 CONTEMPORARY ISSUES IN ENVIRONMENTAL AND ENERGY POLICY 1
Links students with leading energy and environmental policy scholars on a bi-weekly basis to debate key issues such as global warming, ozone layer deterioration, environmental justice, sustainable development and ecological democracy. International, national and community dimensions of these and other policy issues are explored through seminar discussion.
May be crosslisted with UAPP617.

ENEP 624 WATER RESOURCE MANAGEMENT 3
Introduces and analyses various aspects of water resources management and bioresources management. Topics include rainfall, runoff, water supply, groundwater, reservoirs, wastewater treatment and reuse water quality agricultural water management, drought management, water conservation, agricultural production systems for food and energy and the impacts of climate change on water resources and agriculture.

ENEP 625 ENERGY POLICY AND ADMINISTRATION 3
Analyzes energy use and energy policy with respect to politics, society, economics, political economy, technology, resources, and environment. Focuses on interrelationships among energy, environment, economy and equity (E4). It considers the energy policy options needed to achieve a more sustainable world. May be crosslisted with MAST620, UAPP625.

ENEP 626 CLIMATE CHANGE: SCIENCE, POLICIES & POLITICAL ECONOMY 3
Examines existing policy responses to climate change, alongside opportunities for a redirected political economy to achieve energy and environmental conditions with meaningful CO2 reductions. Specific attention given to possibilities and limits of scientific knowledge and technology in galvanizing social change.

ENEP 660 ENG. ECON ANALYSIS FOR SUST. ENERGY 3
Explores the economic evaluation approaches, metrics, and level of detail required for making sound economic decisions in sustainable energy project development.

ENEP 661 SUSTAINABLE ENERGY FINANCING 3
Analyzes the practical and cutting edge innovations in financing of sustainable energy projects and enterprises. Topics include sources and instruments of sustainable energy financing, identification and management of investment risks, and financial modeling. Explore key financial policies in federal and local governments and private sector roles in catalyzing transitions to a sustainable energy regime.

ENEP 666 SPECIAL PROBLEM 1-12

ENEP 820 INTERNATIONAL PERSPECTIVES ON ENERGY AND ENVIRONMENT 3
Policy analysis and political economy at international energy and environmental issues and problems. Encompasses international and multi-national government and private sector organizations, as well as non-governmental, non-profit organizations.
May be crosslisted with UAPP820.

ENEP 821 PROSEMINAR: TECHNOLOGY, ENVIRONMENT AND SOCIETY 3
Over the last two centuries, forces of industrialization and urbanization have transformed economic, social and political life and the natural environment. Examines theories that explain and assess these transformations, with the goal of fostering critical analysis of social and environmental transformation in international, national and local contexts.
May be crosslisted with UAPP821.

ENEP 824 SUSTAINABLE ENERGY POLICY AND PLANNING 3
Analyzes sustainable energy strategies in terms of their technology, economics, impacts on the environment and governance attributes. Also analyzes policy options to facilitate a sustainable energy future.
May be crosslisted with UAPP824. RESTRICTIONS: Graduate students with a background in policy, economics and/or technology. Senior-level undergraduate students only with permission of the instructor.

ENEP 862 TEACHING PRACTICUM 1-3
In consultation with ENEP faculty members and based on the student’s long-term goals and professional background, the student participates in the development (or revision) and teaching of a course. This activity exposes PhD students who anticipate teaching careers to the pedagogical issues involved, and introduces them to the planning and implementation of course instruction.

ENEP 863 DOCTORAL DISSERTATION PROPOSAL 3
Requirement for doctoral program. A “defensible dissertation proposal” must be developed for successful degree completion.
RESTRICTIONS: Restricted to ENEP PhD students.

ENEP 864 INTERNSHIP FIELDWORK 3
Three-month (or equivalent) compensated fieldwork, followed by submission of a reflective paper. Requires prior approval of the CEEP director, completion of work plan, and a professional performance evaluation by site supervisor.

ENEP 866 SPECIAL PROBLEM 1-12

ENEP 868 RESEARCH 1-6

ENEP 869 MASTER'S THESIS 6
Independent Research by the student and submission of a paper on the chosen topic of research within Energy and Environmental Policy and defense of the thesis in front of a committee of 3 faculty members.
RESTRICTIONS: Restricted to Master’s in Energy and Environmental Policy students.

ENEP 870 READINGS 3
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
<th>Restrictions / Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENEP 872</td>
<td>Analytical Paper</td>
<td>3</td>
<td>Demonstrate ability to analyze particular Energy and Environmental policy or problem and develop appropriate response.</td>
<td>RESTRICTIONS: Restricted to Master's in Energy and Environmental Policy students.</td>
</tr>
<tr>
<td>ENGL 964</td>
<td>Pre-Candidacy Study</td>
<td>3-12 PF</td>
<td>Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.</td>
<td>RESTRICTIONS: Restricted to ENEP PhD students. Not open to students who have been admitted to candidacy.</td>
</tr>
<tr>
<td>ENGL 969</td>
<td>Doctoral Dissertation</td>
<td>9 PF</td>
<td>Independent dissertation research after completion of applicable course work and examinations.</td>
<td>RESTRICTIONS: Restricted to ENEP PhD students.</td>
</tr>
<tr>
<td>ENGL 011</td>
<td>English Essentials</td>
<td>3 RP</td>
<td>Required of students whose admissions credentials indicate a need for additional training in the fundamentals of composition prior to enrollment in ENGL110. Individual (tutorial) conferences and small-group instruction.</td>
<td></td>
</tr>
<tr>
<td>ENGL 101</td>
<td>Tools of Textual Analysis</td>
<td>3</td>
<td>Gateway introduction to basic tools and strategies used in critical engagement with poetry fiction, drama, and nonfiction. Includes fundamental concepts of textual analysis.</td>
<td>RESTRICTIONS: Offered in two formats, one coupled with a section of ENGL110 and another that is writing intensive with an enrollment cap of 22 students.</td>
</tr>
<tr>
<td>ENGL 102</td>
<td>Texts in Time</td>
<td>3</td>
<td>How texts are shaped by social, political, scientific, technological, artistic, religious, and economic concerns of a given period and how texts, in turn, shape these concerns. Topics vary according to expertise of instructor.</td>
<td>PREREQ: ENGL101, 110.</td>
</tr>
<tr>
<td>ENGL 111</td>
<td>Critical Reading and Writing</td>
<td>3</td>
<td>Expository and argumentative composition through analysis of selected readings.</td>
<td>RESTRICTIONS: Required of all freshmen.</td>
</tr>
<tr>
<td>ENGL 150</td>
<td>Science Fiction and Fantasy</td>
<td>3</td>
<td>Study of the representative works of the genres of Science Fiction and Fantasy; variable content (e.g., historical survey, thematic emphasis, concentration on specific period).</td>
<td></td>
</tr>
<tr>
<td>ENGL 151</td>
<td>Studies in Popular Fiction</td>
<td>3</td>
<td>Study of popular fiction (literary, cinematic, and/or multi-media); may focus on period, theme, single author, etc.</td>
<td></td>
</tr>
<tr>
<td>ENGL 166</td>
<td>Special Problem</td>
<td>1-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 202</td>
<td>Biblical and Classical Literature</td>
<td>3</td>
<td>Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts. May be crosslisted with ARTH202, FLTT202, JWST202. PREREQ: ENGL110.</td>
<td></td>
</tr>
<tr>
<td>ENGL 204</td>
<td>American Literature</td>
<td>3</td>
<td>Study of representative American works from eighteenth century to present, set in their historical and cultural contexts, introducing appropriate critical concepts.</td>
<td>PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 205</td>
<td>British Literature to 1660</td>
<td>3</td>
<td>Study of representative Medieval and Renaissance British works, set in their historical and cultural contexts, introducing appropriate critical concepts.</td>
<td>PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 206</td>
<td>British Literature 1660 to Present</td>
<td>3</td>
<td>Study of representative British works from eighteenth century to the present, set in their historical and cultural contexts and introducing appropriate critical concepts.</td>
<td>PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 207</td>
<td>Introduction to Poetry</td>
<td>3</td>
<td>Representative masterworks of English, American and world verse.</td>
<td>PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 208</td>
<td>Introduction to Drama</td>
<td>3</td>
<td>Representative masterworks from the classical era to the present. May be crosslisted with CMLT218. PREREQ: ENGL110.</td>
<td></td>
</tr>
<tr>
<td>ENGL 209</td>
<td>Introduction to the Novel</td>
<td>3</td>
<td>Representative masterworks of fiction, emphasizing those of Europe and America. May be crosslisted with CMLT219. PREREQ: ENGL110.</td>
<td></td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Introduction to Short Story</td>
<td>3</td>
<td>Study of short story as a narrative form, with readings from American and foreign short story traditions.</td>
<td>PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 211</td>
<td>Great Writers of the Western World I: 1100-1700</td>
<td>3</td>
<td>Studies writers such as Dante, Chaucer, Rabelais and Cervantes, in translation. Crosslisted with CMLT207. PREREQ: ENGL110.</td>
<td></td>
</tr>
<tr>
<td>ENGL 212</td>
<td>Great Writers of the Western World II: 1650-1950</td>
<td>3</td>
<td>Studies writers such as Moliere, Voltaire, Goethe, Dostoevski, Thomas Mann and Herman Hesse, in translation. Crosslisted with CMLT208. PREREQ: ENGL110</td>
<td></td>
</tr>
<tr>
<td>ENGL 214</td>
<td>Literature and Gender</td>
<td>3</td>
<td>Specific concepts of gender in society, as manifested in the literature of writers of both sexes. PREREQ: ENGL110.</td>
<td></td>
</tr>
<tr>
<td>ENGL 215</td>
<td>Introduction to Ethnic and Cultural Studies</td>
<td>3</td>
<td>Representations of ethnicity, social class, race, gender, and other constructions of identity in primary texts (literature, film, visual arts, etc.). Secondary texts expose students to variety of methodologies for studying culture and identity to demystify the process by which scholarship is produced. Students entering the Ethnic &amp; Cultural Studies curriculum are encouraged to think about how scholars go about identifying research questions, laying the foundation for senior theses and collaborative research projects.</td>
<td></td>
</tr>
<tr>
<td>ENGL 216</td>
<td>African American Literature Survey</td>
<td>3</td>
<td>Literature by African American Writers from the eighteenth through twenty-first centuries. PREREQ: ENGL110.</td>
<td></td>
</tr>
<tr>
<td>ENGL 217</td>
<td>Introduction to Film</td>
<td>3</td>
<td>Focuses on different techniques of acting, mise-en-scene, cinematography, editing, sound and color to assess how films encourage audiences to respond in the ways they do. May be crosslisted with CMLT217. PREREQ: ENGL110</td>
<td></td>
</tr>
<tr>
<td>ENGL 222</td>
<td>Introduction to Professional Writing</td>
<td>3</td>
<td>Designed specifically for English majors who want to explore professional writing careers, this course introduces the rhetorical theory, genre studies, and practical writing skills that form the basis of numerous professional writing and editing disciplines. PREREQ: ENGL110.</td>
<td></td>
</tr>
<tr>
<td>ENGL 225</td>
<td>Introduction: Rhetoric and Writing Studies</td>
<td>3</td>
<td>For students interested in pursuing writing as a subject of intellectual inquiry in which to understand the roles writing plays in their lives, from work, to school, to civic engagement. Students will understand writing as a complex, cultural, historical, and rhetorical activity. PREREQ: ENGL110.</td>
<td></td>
</tr>
<tr>
<td>ENGL 227</td>
<td>Introduction to Creative Writing</td>
<td>3</td>
<td>This multi-genre creative writing course studies the craft, the formal building blocks, of effective writing. Creating both a strong foundation of terms and techniques, students will read and write in various creative genres. Students will cultivate writing habits and understand writing strategies in order to be both better readers and better writers. PREREQ: ENGL110.</td>
<td></td>
</tr>
<tr>
<td>ENGL 230</td>
<td>Introduction to Environmental Literature</td>
<td>3</td>
<td>Survey of literature engaging the relationship between people and the natural world. Texts will be drawn from a variety of genres, and from both American and global cultures. The course serves as one of three required core courses for a minor in Environmental Humanities.</td>
<td></td>
</tr>
<tr>
<td>ENGL 231</td>
<td>Studies in Environmental Literature</td>
<td>3</td>
<td>Study of selected topics in environmental literature with an emphasis on in-depth study beyond the genre survey course. May be repeated twice when topics vary.</td>
<td></td>
</tr>
<tr>
<td>ENGL 266</td>
<td>Special Problem</td>
<td>1-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 278</td>
<td>Studies in Diversity</td>
<td>3</td>
<td>Representations of ethnicity, race, social class, gender, and other constructions of difference in literature, arts, and folk culture. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
<td></td>
</tr>
</tbody>
</table>
ENGL 280  Approaches to Literature for Non-Majors  3
Dual emphasis on reading and writing. Offers an introduction to poetry, fiction, and drama, and provides extensive practice in writing about literary subjects. PREREQ: ENGL110.

ENGL 283  American Literature for Non-Majors  3
Study of representative works of American literature, set in their historical and cultural contexts, introducing appropriate critical concepts. PREREQ: ENGL110.

ENGL 284  Shakespeare for Non-Majors  3
Representative histories, comedies, and tragedies. PREREQ: ENGL110.

ENGL 290  Studies in Literature for Non-Majors  3
Allows for exploration of a particular aspect of the intersection of literature and culture, and enables in-depth study beyond the period survey course. Topics vary according to the expertise of the instructor. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

ENGL 294  English Language: Grammar and Usage  3
Descriptive study of patterns and structures of language use, with an emphasis on standard written and spoken English; attention to punctuation, mechanics, and style. PREREQ: ENGL110. RESTRICTIONS: Intended for prospective English teachers.

ENGL 295  Introduction to English Education  3
Provides an overview of the debates, theories, and promising practices that have shaped secondary English education. Students acquire fundamental professional skills by engaging in basic English teaching activities such as planning and assessing, and participate in a service learning project in a local English classroom.

ENGL 300  Introduction to Literary Criticism and Theory  3
Introduces students to a broad range of key concepts, movements, and figures associated with literary theory and criticism. PREREQ: ENGL110.

ENGL 301  Advanced Writing  3
Study and practice in writing non-fiction prose with special attention to rhetorical strategies, styles, and audiences. PREREQ: ENGL110.

ENGL 303  Script Writing  3
Instruction in script writing and preparation of a script. PREREQ: ENGL110.

ENGL 304  Poetry Writing  3
Practice in writing a variety of verse forms. PREREQ: ENGL110.

ENGL 305  Fiction Writing  3
Practice in writing the short story. PREREQ: ENGL110.

ENGL 306  Topics in Writing  3
Special topics in writing (for example, autobiography). Variable content. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

ENGL 307  News Writing and Editing  3
News judgment, news gathering, feature writing, libel problems, and ethics. Assignments include writing for the campus newspaper. PREREQ: ENGL110. RESTRICTIONS: Minimum grade of B required in ENGL110.

ENGL 308  Reporter's Practicum  3
Builds on ENGL307 with extensive reporting and writing for the campus newspaper. Attention to libel and privacy issues. PREREQ: ENGL307.

ENGL 309  Feature and Magazine Writing  3
All aspects of the newspaper and feature article. Developing ideas, researching, interviewing, writing, and marketing. PREREQ: ENGL307 or permission of instructor.

ENGL 310  Copy Editing and Layout  3
Newspaper copy editing, headline writing and layout, with emphasis on practical experience. Explores improvement or updating of news stories by rewriting. PREREQ: ENGL307.

ENGL 312  Written Communications in Business  3
Examines the role of written communication in corporate decision making. Students write memos, letters, proposals and reports that simulate on-the-job communication tasks, and are encouraged to use materials from their fields of specialization. PREREQ: ENGL110.

ENGL 316  Peer Tutoring/Advanced Composition  3
Trains a selected group of upper-division students in writing techniques by applying recent composition theories to students' own writing. Explores and evaluates fundamental theories of teaching writing. Crosslisted with ARSC316.

ENGL 317  Film History  3
History of American or various foreign national cinemas. May be crosslisted with CMLT317. PREREQ: ENGL110 RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 318  Studies in Film  3
Special topics such as film genres, major directors and Soviet cinema. May be crosslisted with CMLT321. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

ENGL 321  Medieval Literature and Culture  3
Study of selected topics in medieval literature (romance, Chaucer's contemporaries, drama). Texts usually read in English translations. Emphasis on medieval culture as a European phenomenon. Variable content. May be crosslisted with CMLT321. PREREQ: ENGL110.

ENGL 322  Chaucer  3
The Canterbury Tales (in part), Troilus and Criseyde, and some of the shorter poems. PREREQ: ENGL110.

ENGL 323  Studies in Medieval Literature  3
Allows for exploration of a particular aspect of medieval literature and culture, and enables a depth of study beyond the period survey course. Topics vary according to expertise of instructor. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

ENGL 324  Shakespeare  3
Representative histories, comedies and tragedies. PREREQ: ENGL110

ENGL 325  Renaissance Literature  3
Survey of varied literature written in England during the sixteenth and seventeenth centuries, from the age of the Reformation through the English Civil Wars. For example, selected works of Wyatt, Sidney, Spenser, Marlowe, Shakespeare, Jonson, Webster, Herbert, Vaughan, Marvell and Milton. PREREQ: ENGL110.

ENGL 326  Studies in Renaissance Literature  3
Allows for exploration of a particular aspect of Renaissance literature and culture, and enables a depth of study beyond the period survey course. Topics vary according to expertise of instructor. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

ENGL 328  Milton  3
Milton's major poetry and selected prose. PREREQ: ENGL110.

ENGL 330  The Detective in Film and Fiction  3
Study of detective fiction and film has applications to a liberal arts approach to crime and justice. Blends literary analysis with the insights of social science research on the work of private and police detectives. Crosslisted with CRJU336.

ENGL 331  The Age of Satire  3
Dryden, Pope, Swift and their contemporaries. PREREQ: ENGL110.

ENGL 332  Studies in Restoration and Eighteenth Century Literature  3
Studies of selected topics in Restoration and eighteenth century literature and culture, e.g., the epistolary novel, Restoration and eighteenth century drama and women in eighteenth century literature. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.

ENGL 333  British Romanticism  3
Poetry and prose of the British Romantic writers. PREREQ: ENGL110.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 338</td>
<td>STUDIES IN VICTORIAN LITERATURE</td>
<td>3</td>
<td>Studies of significant British texts from the nineteenth century, the social forces they shaped, and those by which they were shaped. Content varies by expertise of instructor. May be crosslisted with WOMS337. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 340</td>
<td>AMERICAN LITERATURE TO THE CIVIL WAR</td>
<td>3</td>
<td>PREREQ: ENGL110</td>
</tr>
<tr>
<td>ENGL 341</td>
<td>AMERICAN LITERATURE: CIVIL WAR TO WORLD WAR II</td>
<td>3</td>
<td>PREREQ: ENGL110</td>
</tr>
<tr>
<td>ENGL 342</td>
<td>AMERICAN LITERATURE SINCE WORLD WAR II</td>
<td>3</td>
<td>PREREQ: ENGL110</td>
</tr>
<tr>
<td>ENGL 344</td>
<td>AFRICAN AMERICAN LITERATURE I</td>
<td>3</td>
<td>Literature by African American writers from the eighteenth century to the Harlem Renaissance. May be crosslisted with BAMS313. PREREQ: ENGL110</td>
</tr>
<tr>
<td>ENGL 345</td>
<td>AFRICAN AMERICAN LITERATURE II</td>
<td>3</td>
<td>Literature by African American writers from the Harlem Renaissance to the present. May be crosslisted with BAMS345. PREREQ: ENGL110</td>
</tr>
<tr>
<td>ENGL 347</td>
<td>STUDIES IN AMERICAN LITERATURE</td>
<td>3</td>
<td>Special topics, ranging from the beginnings to contemporary American literature; may include studies in a single author or authors (e.g., the detective stories of Poe) or period and genre studies (e.g., the Harlem Renaissance or the humor of the old southwest). Variable content. May be crosslisted with BAMS347. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 348</td>
<td>CONTEMPORARY JEWISH-AMERICAN LITERATURE</td>
<td>3</td>
<td>Lectures and discussions of outstanding contemporary Jewish American novelists, short story writers, and others. May be crosslisted with JWST348. PREREQ: ENGL110</td>
</tr>
<tr>
<td>ENGL 349</td>
<td>INTRODUCTION TO JEWISH SOURCES: TEXT AND INTERPRETATION</td>
<td>3</td>
<td>Examines the central texts which form the basis of Jewish thought, religion and culture—the Torah, or Hebrew Bible (in translation) and the interpretive traditions which have evolved to understand it (e.g., Midrash, Rashi, contemporary theology) as sources of uniquely Jewish meanings. May be crosslisted with JWST349.</td>
</tr>
<tr>
<td>ENGL 350</td>
<td>STUDIES IN JEWISH LITERATURE</td>
<td>3</td>
<td>Focus on Jewish writers, stories, and/or culture from around the world. Course content will address issues, concepts, or problems such as: anti-Semitism, passing, secularism, Jewish-Christian and Jewish-Muslim relations, Diaspora, homeland, nation, race, ethnicity, and/or the Holocaust. May be crosslisted with JWST350. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 351</td>
<td>STUDIES IN IRISH LITERATURE</td>
<td>3</td>
<td>Studies of Irish literature from the earliest times to the present day. Content varies by expertise of instructor. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 352</td>
<td>STUDIES IN NINETEENTH CENTURY LITERATURE</td>
<td>3</td>
<td>Special topics in an author or authors, a genre, literary movement, or an idea. May be crosslisted with WOMS352. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 353</td>
<td>TWENTIETH CENTURY BRITISH LITERATURE</td>
<td>3</td>
<td>Broadly focused study of literature in several genres, including a variety of eras and movements such as turn-of-the-century realism, war poetry, modernism, and post-colonial writing. May be crosslisted with WOMS353. PREREQ: ENGL110</td>
</tr>
<tr>
<td>ENGL 356</td>
<td>STUDIES IN MODERN/CONTEMPORARY LITERATURE</td>
<td>3</td>
<td>Study of selected topics in 20th century British, American and world literature, e.g., the contemporary epic novel, post-colonial writing and politics. May be crosslisted with BAMS356. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 357</td>
<td>LITERATURE OF LONDON</td>
<td>3</td>
<td>The interaction between London and a variety of literary works. RESTRICTIONS: Offered only through the Semester in London Program.</td>
</tr>
<tr>
<td>ENGL 361</td>
<td>STUDIES IN LITERARY CRITICISM AND THEORY</td>
<td>3</td>
<td>Study of problems in textual interpretation and aesthetics from the ancient world through the present, with attention to both the principal movements in critical theory and the social and philosophical contexts of interpretation. Content varies by expertise of instructor. May be crosslisted with CMLT361. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 365</td>
<td>STUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS</td>
<td>3</td>
<td>PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 366</td>
<td>INDEPENDENT STUDY</td>
<td>1-6</td>
<td>PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 368</td>
<td>STUDIES IN LITERATURE AND SCIENCE</td>
<td>3</td>
<td>PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 371</td>
<td>STUDIES IN FICTION</td>
<td>3</td>
<td>Special topics in the novel and short story. Topics may emphasize an author or authors, a type or types of fiction, a period or theme. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 372</td>
<td>STUDIES IN DRAMA</td>
<td>3</td>
<td>Special topics in an author or authors, a type or types of drama, a period or theme. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 373</td>
<td>STUDIES IN POETRY</td>
<td>3</td>
<td>Special topics in a poet or poets, a type or movement, a period or theme. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 376</td>
<td>WORLD LITERATURE</td>
<td>3</td>
<td>Introduction to and appreciation for broad range of literatures written in English. Encompasses both Western and non-Western literature, with some emphasis on post-Colonial literature. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 378</td>
<td>CARIBBEAN LITERATURE</td>
<td>3</td>
<td>Multicultural survey of Anglophone, Francophone, and Hispanic Caribbean literature in its historical and cultural contexts. Emphasis on contemporary novels, short stories, drama, and poems. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 380</td>
<td>WOMEN WRITERS</td>
<td>3</td>
<td>Study of a variable set of women writers. Addresses such topics as the idea of a women’s tradition, formation of the canon, use of genre, language and form. May be crosslisted with WOMS380. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 381</td>
<td>WOMEN IN LITERATURE</td>
<td>3</td>
<td>Cultural representations of women by male as well as female writers. Variable in historical range, geography, and genre. May be crosslisted with WOMS381. PREREQ: ENGL110. RESTRICTIONS: May be taken up to two times when topics vary.</td>
</tr>
<tr>
<td>ENGL 382</td>
<td>STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH</td>
<td>3</td>
<td>Consideration of multiculturalism as it pertains to American culture or literature in English from Africa and other non-European societies. Variable in historical range, geography, and genre. May be crosslisted with BAMS382, JWST382, WOMS382. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 385</td>
<td>STUDIES IN LITERARY CRITICISM AND THEORY</td>
<td>3</td>
<td>Study in selected topics in literary criticism and critical theory. May be crosslisted with CMLT385. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 386</td>
<td>ASIAN AMERICA: CULTURE AND HISTORY</td>
<td>3</td>
<td>Explores the literature, culture and history of Asian Americans and immigrants to the United States variously using fiction, drama, poetry, documentary, photography, narrative film, drama, court cases, primary and secondary historical materials. Patterns of Asian immigration, anti-Asian violence and internment, Asian American resistance in litigation, legislation, and cultural activities, from Gold Rush to globalization. May be crosslisted with EAST386, HIST386.</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>---------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ENGL 390</td>
<td><strong>ENGLISH LINGUISTICS</strong></td>
<td>3</td>
<td>General introduction to the study of the English language, with emphasis on modern linguistic approaches. May be crosslisted with LING390. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 391</td>
<td><strong>HONORS COLLOQUIUM</strong></td>
<td>3</td>
<td>First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.</td>
</tr>
<tr>
<td>ENGL 392</td>
<td><strong>TEACHING WRITING ONE-TO-ONE</strong></td>
<td>3</td>
<td>A writing intensive course that trains students to be peer tutors in the University Writing Center. Introduces students to theories of composition as well as principles of rhetoric that inform writing and tutoring instruction. Students selected through an interview and screening process. PREREQ: ENGL110. RESTRICTIONS: Students selected through an interview and screening process.</td>
</tr>
<tr>
<td>ENGL 394</td>
<td><strong>ENGLISH LANGUAGE: RHETORICAL AND CULTURAL CONTEXTS</strong></td>
<td>3</td>
<td>Language variation over time and across geography, culture and dialect. Rhetorical analysis of written and spoken English, attending to style, situation and genre. Applications of grammatical knowledge to describing language use in various contexts. Intended for prospective English teachers.</td>
</tr>
<tr>
<td>ENGL 395</td>
<td><strong>LITERACY AND TECHNOLOGY</strong></td>
<td>3</td>
<td>Introduces students to the relationships between literacy practices and technology. Requires students to gain proficiency in multimodal practices and to apply their skills to solving a literacy-based problem in their intended field. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 396</td>
<td><strong>TEACHING COMPOSITION IN SECONDARY SCHOOL</strong></td>
<td>3</td>
<td>Emphasizes contemporary theories about helping adolescents learn to write effectively in various genres. Students assist local teachers in conducting writing workshops or assessing student work. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 397</td>
<td><strong>WRITING THE NEW MEDIA</strong></td>
<td>3</td>
<td>Writing for the various new media has created a wholly new landscape for writers. Explore rhetorical study the unique issues, problems and opportunities borne out of it. Students will write for these new mediums while practicing their idioms conceptual composing qualities. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 403</td>
<td><strong>LITERATURE FOR ADOLESCENTS: MULTIMEDIA TEXTS</strong></td>
<td>3</td>
<td>Explores classic and contemporary reading materials and non-print texts pervasive in lives of adolescents. Addresses selection of texts for middle school classes as well as techniques for developing and promoting critical reading and informed interpretation of non-print texts. Crosslisted with EDUC403.</td>
</tr>
<tr>
<td>ENGL 404</td>
<td><strong>ADVANCED POETRY WRITING</strong></td>
<td>3-6</td>
<td>Intensive practice in composition. Group discussion and individual conferences. Wide reference to professional poems as well as models. Emphasis on student competence in traditional prosody as well as exploring freer forms. PREREQ: ENGL304. RESTRICTIONS: May be repeated once for credit.</td>
</tr>
<tr>
<td>ENGL 405</td>
<td><strong>ADVANCED FICTION WRITING</strong></td>
<td>3</td>
<td>PREREQ: ENGL305. RESTRICTIONS: May be repeated once for credit.</td>
</tr>
<tr>
<td>ENGL 406</td>
<td><strong>NON-FICTION WORKSHOP</strong></td>
<td>3</td>
<td>Exploration of a variety of forms, including memoir, literary journalism and personal essay, through readings, exercises and substantial writing projects. PREREQ: ENGL305, ENGL309, or permission of instructor.</td>
</tr>
<tr>
<td>ENGL 407</td>
<td><strong>INVESTIGATIVE REPORTING</strong></td>
<td>3</td>
<td>In-depth reporting, research methods, ethics, and other topics. PREREQ: ENGL307. RESTRICTIONS: May be repeated once for credit.</td>
</tr>
<tr>
<td>ENGL 408</td>
<td><strong>SPORTS WRITING</strong></td>
<td>3</td>
<td>Training and covering all major sports including both women's and men's sports. Topics include keeping statistics, game coverage, player profiles, and sports columns. PREREQ: ENGL307 or permission of instructor.</td>
</tr>
<tr>
<td>ENGL 409</td>
<td><strong>TOPICS IN JOURNALISM</strong></td>
<td>3</td>
<td>Special studies and writing in selected kinds of journalism (opinion writing, science journalism) or in an aspect of the profession (history of American journalism, ethics of journalism). Variable content. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 410</td>
<td><strong>TECHNICAL WRITING</strong></td>
<td>3</td>
<td>Selected problems in technical communications, the preparation of reports and technical editing. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 411</td>
<td><strong>RHETORIC OF THE PROFESSIONS</strong></td>
<td>3</td>
<td>Study of rhetorical theories and strategies within professional contexts. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 412</td>
<td><strong>PUBLISHING PROJECTS</strong></td>
<td>3</td>
<td>Through projects and course readings, this course covers the entire publication process from writing and editing text, to designing a layout and working with visuals, to final printing. Topics include book history, aesthetic theory, information design, and visual rhetoric.</td>
</tr>
<tr>
<td>ENGL 413</td>
<td><strong>TOPICS IN PROFESSIONAL WRITING</strong></td>
<td>3</td>
<td>Studies of writing in professional settings: technical, business, legal, medical, scientific, environmental, governmental. Includes considerations of rhetoric, design, and use. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>ENGL 414</td>
<td><strong>EDITING</strong></td>
<td>3</td>
<td>Practical work and study of the editorial procedures essential in editing professional publications, both print and online. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 416</td>
<td><strong>DESIGNING ONLINE INFORMATION</strong></td>
<td>3</td>
<td>Focuses on the design of information displayed on websites including the theory of information design and its practical application. Lecture sessions cover such topics as user and task analysis, interface design, website navigation, information architecture, and usability. The lab sessions provide instruction on Dreamweaver and Fireworks, as well as some HTML.</td>
</tr>
<tr>
<td>ENGL 417</td>
<td><strong>FILM THEORY AND CRITICISM</strong></td>
<td>3</td>
<td>Survey of major theories of film. PREREQ: ENGL217.</td>
</tr>
<tr>
<td>ENGL 418</td>
<td><strong>WRITING IN THE SCIENCES</strong></td>
<td>3</td>
<td>Conventions of written communication in biomedical and scientific-related fields are explored. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 430</td>
<td><strong>LEGAL WRITING</strong></td>
<td>3</td>
<td>Focuses on the analytical skills necessary to address a wide range of legal audiences: clients, op-ponents, judges, regulatory agencies, and legislators. Emphasis on creating a streamlined prose style that is suitable for any legal writing task. PREREQ: ENGL110.</td>
</tr>
<tr>
<td>ENGL 450</td>
<td><strong>LEGAL ARGUMENT</strong></td>
<td>3</td>
<td>Focus on legal advocacy. By analyzing court opinions, legal briefs, law-review articles, and other sources, students will learn how attorneys arrange the language in logical steps that culminate in coherent arguments. Students will apply these techniques in a variety of legal scenarios.</td>
</tr>
<tr>
<td>ENGL 464</td>
<td><strong>INTERNSHIP IN PROFESSIONAL WRITING</strong></td>
<td>3</td>
<td>PF Students work on writing projects at local corporations, government divisions, or public agencies, under joint supervision of the Department of English and the sponsoring organization. The internship involves approximately ten hours of work a week. PREREQ: ENGL411 and ENGL412 or permission of instructor. RESTRICTIONS: Open to qualified students on the basis of a portfolio review by all concentration faculty.</td>
</tr>
<tr>
<td>ENGL 466</td>
<td><strong>INDEPENDENT STUDY</strong></td>
<td>1-9</td>
<td></td>
</tr>
<tr>
<td>ENGL 468</td>
<td><strong>UNDERGRADUATE RESEARCH</strong></td>
<td>1-3</td>
<td>Faculty sponsored research.</td>
</tr>
<tr>
<td>ENGL 469</td>
<td><strong>INTERNSHIP</strong></td>
<td>1-3</td>
<td>Internship experiences that have been arranged or are currently sponsored by an English Department faculty member.</td>
</tr>
<tr>
<td>ENGL 472</td>
<td><strong>STUDIES IN THE DRAMA</strong></td>
<td>3</td>
<td>Special topics in an author or authors, a type or types of drama, a period or theme. PREREQ: ENGL101, ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
</tbody>
</table>
ENGL 479  LITERACY AND LITERATURE  1-4
Explores the concept of literacy using a variety of perspectives: scientific, historical, cultural, sociological, political, and literary. Designed for teacher education students and incorporates field work and addresses the state standards that teachers are asked to have their students meet.
Restrictions: Offered for students in the Milford ETE program.

ENGL 480  LITERARY STUDIES SEMINAR  3
Intensive capstone seminar employs research presentations as the occasion for students to consolidate skills acquired in 100-, 200-, and 300-level coursework. Content varies by expertise of instructor.
May be crosslisted with JWSTAD, WOEMS480. Prereq: ENGL 110 and six ENGL credits at the 300 level or higher or by instructor consent. Restrictions: Can be repeated once when topics vary. Only counts toward major if taken as senior (after completing 90 credits). (Non-seniors are not excluded, but a student who completes the course before senior year must re-take the course as a senior for major credit.

ENGL 481  TEACHING ENGLISH IN SECONDARY SCHOOL  3 PF
Accompanies student teaching in secondary school English. Deals with classroom management and other professional issues.
Prereq: ENGL110 Coreq: EDUC400 Restrictions: Open only to student teachers in English.

ENGL 482  SEMINAR IN TEACHING ENGLISH I  3
Prepares English education seniors and graduate students to teach oral and written composition at the secondary school level.
Coreq: ENGL483 Restrictions: Enrollment limited to English education seniors.

ENGL 483  SEMINAR IN TEACHING ENGLISH II  3
Prepares English education seniors and graduate students to teach adolescent literature, classic literature and non-print literary expression at the secondary school level.
Coreq: ENGL482/682 Restrictions: Enrollment limited to English education seniors.

ENGL 491  METHODS IN TEACHING SECONDARY ENGLISH  3
Prepares students to design instruction that integrates all the English Language Arts, including reading, writing, speaking, listening, and viewing. Students gain instructional experience via a 45-hour practicum in their assigned student teaching classroom.
Prereq: ENGL110. Restrictions: Enrollment limited to English education seniors.

ENGL 492  SEMINAR IN TEACHING SECONDARY ENGLISH  3
Accompanies student teaching in secondary English. Addresses professional issues, including instructional design, assessment, classroom management, and building relationships with colleagues and students' families.
Prereq: ENGL110. Coreq: EDUC400. Restrictions: Enrollment limited to English education seniors.

ENGL 494  HISTORY OF THE ENGLISH LANGUAGE  3
The development of Modern English with emphasis on changes in sounds, inflections, spelling, and vocabulary. Attention also to usage, dialects, attitudes toward language, and cultural history.
Prereq: ENGL110

ENGL 600  INTRODUCTION TO GRADUATE STUDIES IN ENGLISH  1-3
Negotiate the modes and modes of authority encountered in academic work. Introduction to the library and other resources for graduate study in English. Acquire a better understanding of the genres of our profession, especially the academic article and monograph.

ENGL 621  MEDIEVAL LITERATURE AND CULTURE  3
Survey of medieval culture and ideas as expressed in literature (e.g., Beowulf, the Canterbury Tales, The Divine Comedy) and/or in history, philosophy, etc. (e.g., Boethius, Augustine, Thomas Aquinas), and topics (e.g., orality and literacy, epic and romance, genres).

ENGL 625  EARLY MODERN LITERATURE  3-6
Survey of a wide selection of authors (e.g., More, Wyatt, Sidney, Spenser, Marlowe, Donne, Herbert, Marvell, Jonson, Webster, Middleton, the Cavalier poets, Marvell, Milton); some of Shakespeare’s works may also be included. Restrictions: May be repeated once for credit when topics vary.

ENGL 631  EIGHTEENTH CENTURY LITERATURE  3-6
Topics may include (but are not restricted to) general survey (i.e., selected poetry, drama, fiction), genre survey, gender studies (e.g., women writers), or thematic issues (e.g., literature and politics).
Restrictions: May be repeated once for credit when topics vary.

ENGL 634  STUDIES IN NINETEENTH CENTURY LITERATURE  3
Survey of Romantic and/or Victorian Literature.
Restrictions: May be repeated once for credit when topics vary.

ENGL 636  TWENTIETH CENTURY LITERATURE  3
Broadly focused to include multiple genres and/or movements (e.g., turn-of-the-century realism, war poets, modernism, postmodern drama) from before and after World War II. May include American, European and post-colonial, in addition to British literature.

ENGL 639  STUDIES IN MODERN/CONTEMPORARY LITERATURE  3
Study of selected poetry, prose, and drama of the twentieth century, with an emphasis on the major texts of English and American literature during the period. Some attention given to other literary traditions and writings.
Restrictions: May be repeated for credit when topics vary.

ENGL 641  STUDIES IN AMERICAN LITERATURE  3
Study of particular themes, movements, or authors in American literature.
Restrictions: May be repeated for credit when topics vary.

ENGL 651  IRISH LITERATURE: PERIOD STUDIES  3
Study of particular themes, movements, or authors in Irish literature.
Restrictions: May be repeated for credit when topics vary.

ENGL 654  STUDIES IN ANGLOPHONE WORLD LITERATURE  3
Survey of representative examples of poetry, prose, and drama from world literature written in English. May be organized around genres, national or regional traditions, or broad thematic categories.

ENGL 671  STUDIES IN FICTION  3
Special topics in the novel, short story, or non-fiction prose works.
Restrictions: May be repeated for credit when topics vary.

ENGL 672  STUDIES IN DRAMA  3-9
Study of an author or authors, a type or types of drama, a period or theme.
Restrictions: May be repeated for credit when topics vary.

ENGL 673  STUDIES IN POETRY  3-9
Special topics on a poet or poets, a type or movement, a period or theme.
Restrictions: May be repeated for credit when topics vary.

ENGL 675  STUDIES IN FILM AND MEDIA  3
Survey of major periods, themes, or movements in film and media.

ENGL 677  THE STRUCTURE OF ENGLISH  3
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). Crosslisted with LING677.

ENGL 680  SEMINAR  3-12

ENGL 682  SEMINAR IN TEACHING ENGLISH I  3
Prepares English education seniors and graduate students to teach oral and written composition at the secondary school level.
Coreq: ENGL683 Restrictions: Enrollment limited to English education seniors and graduate students.

ENGL 683  SEMINAR IN TEACHING ENGLISH II  3
Prepares English education seniors and graduate students to teach adolescent literature, classic literature and non-print literary expression at the secondary school level.
Coreq: ENGL682 Restrictions: Enrollment limited to English education seniors and graduate students.

ENGL 684  LITERARY THEORY AND CRITICISM  3-6
Introduction to some of the leading problems in contemporary literary theory, with some attention to their historical precedents.
Restrictions: May be repeated once for credit when topics vary.

ENGL 685  CULTURAL THEORY AND CRITICISM  3
Topical introduction to one or more cultural theories, providing a survey of scholarship on such varied topics as semiotics, deconstructionism, feminism, material culture, race, ethnicity studies, postcolonial and global studies, and problems of representation and signification in literary and non-literary texts. May be crosslisted with ARTH685. Restrictions: May be repeated once for credit when topics vary.

ENGL 688  INTRODUCTION TO COMPOSITION THEORY AND THE TEACHING OF WRITING  3
Study of current composition theory, with emphasis on the relationship between theory and classroom practices.
ENGL 694  HISTORICAL PERSPECTIVES IN ENGLISH LITERATURE  3
Development of Modern English, with emphasis on changes in sounds, inflections, spelling, and vocabulary. Attention also given to usage, dialects, attitudes toward language, and cultural history.

ENGL 802  SPECIAL TOPICS IN OLD & MIDDLE ENGLISH  3
A study of the English language either from before 1100 or between 1100 and 1400 with selected readings in Old or Middle English poetry and prose. May be crosslisted with LING802. RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 804  SP TOPICS IN MEDIEVAL LITERATURE AND CULTURE  3
Intensive study of literature and language in Old English or Middle English, with attention to history and culture. Recent course titles: Chaucer, Beowulf, The Gawain-Poet, The Age of Langland, The Romance. RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 806  SPECIAL TOPICS IN EARLY MODERN LITERATURE  3
Focuses on one or two authors (e.g., Shakespeare or Spenser), genres (e.g., narrative verse and prose, the lyric, drama) or specific periods (Elizabethan, Jacobean, the Civil War).

ENGL 820  SPECIAL TOPICS IN EIGHTEENTH CENTURY LITERATURE  3
Variable content. Possible topics include: Restoration Theatre; English Neoclassicism; The Rise of the Novel; individual writers or groups of writers; applications of theory. RESTRICTIONS: May be repeated once when topics vary.

ENGL 830  SPECIAL TOPICS IN NINETEENTH CENTURY LITERATURE  3-9
Seminar in Romantic and/or Victorian literature with emphasis on selected writers, genres, and/or topics. Possible course topics: women and nature poetry; Dickens; religious doubt; the provincial novel.

ENGL 840  SPECIAL TOPICS IN TWENTIETH CENTURY LITERATURE  3
Variable content. Concentrated study of an aspect of twentieth century British, European, American and/or post-colonial literatures. Possible focuses: a genre, a set of writers, cultural issues (e.g., gender, race, the Holocaust, aesthetics vs. politics). RESTRICTIONS: May be repeated once when topics vary.

ENGL 844  SPECIAL TOPICS IN AMERICAN LITERATURE  3-12
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 846  SPECIAL TOPICS IN BRITISH LITERATURE  3
Concentrated study of particular genres, themes, periods, movements, or schools in British literature. RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 848  SPECIAL TOPICS IN COMPARATIVE LITERATURE  3
Variable content. Possible topics include: The Avant-Garde, Literature and Aesthetics, The Novel in a Global Context. RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 854  SPECIAL TOPICS IN ANGLOPHONE WORLD LIT  3
Study of particular themes, movements, or authors in Anglophone World literature. Topics may include, but are not limited to, transnational novel, postcolonial fiction, and poetry of the British diaspora.

ENGL 868  RESEARCH  3

ENGL 869  MASTER'S THESIS  1-6

ENGL 870  SPECIAL TOPICS IN LITERARY HISTORY  3
Concentrated study of a particular genre, period, movement, or school of literature.

ENGL 872  SPECIAL TOPICS IN RACE AND ETHNICITY  3
Variable content. Concentrated study of the ways ideas of race and ethnicity shape, and are shaped by, literature and culture. Will include discussion of theoretical and historical conceptualizations of race and ethnicity, and, when relevant, religion, diaspora, nations and nationalism, colonialism, and/or imperialism. RESTRICTIONS: May be repeated once when topics vary.

ENGL 874  SPEC. TOPICS IN PRINT & MATERIAL CULTURE  3
Variable content. Concentrated study of the major issues in print culture, the history of the book, material culture studies, and related areas. Will include discussion of methodologies and theoretical approaches. RESTRICTIONS: May be repeated once when topics vary.

ENGL 875  SPECIAL TOPICS IN TRANSLATIONAL STUDIES  3
Variable content. Concentrated study of Atlantic World or global flows of literature and culture. Will include discussion of methodological and theoretical issues related to the study of transnational cultural exchange.

ENGL 876  SPECIAL TOPICS IN FILM AND MEDIA  3
Variable content. Concentrated study of a particular genre, period, movement or school of film or other media.

ENGL 884  STUDIES IN LITERARY AND CULTURAL THEORY  3-9
Close examination of a single topic or a closely related group of topics (e.g., psychoanalysis and interpretation, genre theory, literary historiography, feminist critique) in textual study. RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 890  STUDIES IN LINGUISTICS  3-9
Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing. Crosslisted with LING890. RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 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.

ENGL 969  DOCTORAL DISSERTATION  1-12 PF
ENTR 150  BUSINESS BASICS FOR ENTREPRENEURS  4
This course introduces students to basic concepts from accounting, finance, management, and operations management that are pertinent to starting and running a new business. Topics are covered by subject matter experts. May be crosslisted with BUAD150. RESTRICTIONS: This course provides foundational knowledge for students who will not otherwise acquire business basics knowledge as part of their major degree program. This course is NOT required for students who complete a business core that includes FINC200 or higher.

ENTR 350  INTRODUCTION TO ENTREPRENEURSHIP  3
This course focuses on understanding the basic concepts, tools, and practices of entrepreneurship and the development of entrepreneurial skills. The entrepreneurial process (opportunity recognition, resource marshaling, and team building driven by communication, creativity, and leadership) and business planning are emphasized. May be crosslisted with BUAD350.

ENTR 351  ENTREPRENEURIAL MARKETING  3
This course covers basic and advanced marketing topics pertinent to bringing new innovations to market, including: product concept testing and the new product development process; customer behavior as it relates to the adoption of new products; characteristics of high technology and other types of entrepreneurial markets; test marketing; market segmentation, targeting, and positioning; the formulation of go-to-market strategies (including product, distribution, promotional, and pricing strategies); and entrepreneurial selling. May be crosslisted with BUAD351.

ENTR 352  BUSINESS LAUNCH PAD  3
This course introduces students to the lean startup concept, and focuses on the development of viable business models. Such models result from customer and other marketplace interactions, so students will be required to get out of the classroom by speaking with customers and others to test hypotheses about the product, the market, channels, revenue streams, costs, and other aspects of their business models. Students will be expected to use marketplace feedback to rapidly iterate/pivot until a viable model is created. Prerequisites: ENTR/BUAD350 and ENTR/BUAD351 or instructor's permission. May be crosslisted with BUAD352. PREQ: ENTR/BUAD350 or permission of instructor.

ENTR 353  ENTR APPRENTICE: LEADERSHIP & INFLUENCE  3
This course focuses on the development of entrepreneurial leadership and influence skills through the completion of hands-on tasks in actual business situations.

ENTR 364  ENTREPRENEURSHIP IN PRACTICE: INTERNSHIP  3
Emphasizes career development, reflection, and personal assessment. It is designed to accompany a minimum of 100 hours of employment in an entrepreneurial context. Restriction: Enrollment is limited to students who are participating in the E-Internship Program (through the Entrepreneurial Studies Program) or an internship that has been approved by the course instructor. May be crosslisted with BUAD363. PREQ: ENTR350 and ENTR351 or Permission of Instructor. RESTRICTIONS: None.

ENTR 420  SOCIAL ENTREPRENEURSHIP  3
This course focuses on developing creative, sustainable solutions to address societal problems. The course is designed to empower students to see social entrepreneurship as a force for social change and give them the knowledge, skills and connections needed to make an impact on the lives of others.

ENTR 450  BUSINESS ACCELERATOR FOR NEW VENTURES  1-6
This course focuses on helping students who have well-developed business ideas and/or existing businesses to accelerate the startup & growth of their companies. The course will begin with the conduct of a business model audit to determine appropriate goals/milestones for each business. Students will then be tasked with developing and implementing strategies to accomplish their goals/milestones. Whenever possible, students will be connected with providers of needed services, financial resources, and mentors. Prerequisites: Students must be licensees of the Venture Center; ENTR/BUAD350, ENTR/BUAD351 or instructor’s permission. Notes: This will be a variable credit course, allowing students to earn 1-3 credits per semester up to a total of 6 credits. May be crosslisted with BUAD450. PREQ: ENTR/BUAD 350 and ENTR/BUAD 351 OR PERMISSION OF INSTRUCTOR.
Entrepreneurship's introduction involves societal problems. The role of user-centered research, divergent thinking, and iteration to enhance innovation are emphasized. May be crosslisted with UAPP717.

**ENTR 620 SOCIAL ENTREPRENEURSHIP**

This course focuses on developing creative, sustainable solutions to address societal problems. The course is designed to empower students to see social entrepreneurship as a force for social change and give them the knowledge, skills, and connections needed to make an impact on the lives of others.

**ENTR 650 BUS ACCELERATOR FOR ENTR VENTURES 1-3**

Focus on helping students to accelerate the startup & growth of their companies. It begins with the conduct of a business model audit to determine appropriate goals/milestones. Students then develop and implement strategies to accomplish their goals/milestones.

**ENTR 651 SPECIAL TOPICS IN ENTREPRENEURSHIP 3**

This course focuses on one or more special topics in entrepreneurship. Examples include: entrepreneurial leadership, influence & team building, and startup funding.

**ENTR 654 INTRODUCTION TO ENTREPRENEURSHIP 3**

Introduction to a repeatable method for the development of viable business models. Entrepreneurial thinking, different types of startups, unique characteristics of technology markets, and business concepts germane to entrepreneurial contexts are emphasized.

**ENTR 655 STARTUP EXPERIENCE I 3**

Students work together in interdisciplinary teams to learn and utilize a repeatable method for developing viable business concepts. Core topics include: customer development, lean startup, types of businesses, opportunity recognition, ideation, validation of business model hypotheses, intellectual property, business strategy, team building, and venture capital.

**ENTR 656 STARTUP EXPERIENCE II 3**

Involves attempting to develop and launch a high growth potential business. Students work together in interdisciplinary teams to validate their business concepts, optimize business processes and strategies, and begin to acquire customers. Challenges associated with rapid growth are emphasized.

**ENTR 658 APP DEVELOPMENT FOR NEW TECHNOLOGY 3**

Introduces students to key issues associated with developing applications of new technologies. Students work together in teams to complete proof of concept testing that typically involves primary and secondary market research and an assessment of technological feasibility, value, and use for specific applications.

**ENTR 660 HIGH TECHNOLOGY ENTREPRENEURSHIP 3**

Focuses on critical financial, legal, scientific and engineering issues confronted during initial planning stages of a start-up enterprise. Students work in teams to develop a business plan for a real world business product offering.

**ENTR 815 ETHICS, BUSINESS AND COMMUNICATION 3**

Provides professional development in ethics, business and communication related to systems biology research applications in stem cell, tissue engineering, and drug delivery technologies. Intended for PHD students in interdisciplinary life science and engineering programs. Crosslisted with BINF815.

**ENVR 101 INTRODUCTION TO THE ENVIRONMENT 3**

Broad overview of the fields of environmental science and environmental studies. Introduction to the spectrum of science and policy that is associated with environmental work and explore specific issues, perspectives and approaches from these varied areas. Crosslisted with ENSC101. RESTRICTIONS: Open to Freshman ENSC or ENVR majors only.

**ENVR 300 EARTH SYSTEMS: SCIENCE AND POLICY 3**

Integrative framework necessary to understand the systems approach to environmental science and its intersection with environmental policy and management. Introduction to systems theory within environmental science and its relevance to environmental policy. Crosslisted with ENSC300. RESTRICTIONS: Environmental Science and Studies Majors only.

**ENVR 450 PROSEMINAR IN ENVIRONMENTAL SCIENCE 3**

Discussion of the history and state of environmental science as well as its relation to current environmental problems. Survey of research topics and methodologies in the current scientific literature. Crosslisted with ENSC450. RESTRICTIONS: Open to environmental science and studies majors only, or requires permission of instructor.

**ENVR 464 ENVIRONMENTAL INTERNSHIP 3-6**

Internship experience that integrates environmental science and/or studies learning goals in an experiential environment. To satisfy the Field Experience requirement, the internship MUST include data collection, analysis and interpretation and weekly reports/logs that include student reflection on the internship experience. Internship must be approved by the environmental science and studies program and include oversight by a faculty member. Crosslisted with ENSC464. RESTRICTIONS: May be repeated up to six credits.

**ENVR 468 HONORS: DIRECTED RESEARCH 3-6**

Constitutes a directed research experience for honors students. Topics of research will be in the realm of environmental science and/or studies, depending on the interests and expertise of the student and supervising faculty member. Crosslisted with ENSC468. RESTRICTIONS: Honors Only.

**ENTOMOLOGY AND WILDLIFE CONSERVATION**

**ENWC 103 LAND AND WATER MANAGEMENT 3**

Topics covered are land application of wastes, hazardous waste management, acid rain, nonpoint source pollution, water treatment, wetlands, rainfall, runoff, ground water, erosion control, irrigation and drainage.

**ENWC 165 NEW STUDENT SEMINAR 1**

Study and careers in entomology and wildlife conservation: opportunities, expectations, duties and preparation, including skills for success in college. Readings, discussions, written and oral assignments, speakers and field trips. RESTRICTIONS: First term majors.

**ENWC 166 SPECIAL PROBLEM 1-3**

**ENWC 201 WILDLIFE CONSERVATION AND ECOLOGY 3**

Basic principles of ecology. Ecological and sociological problems and solutions in the conservation of biodiversity (i.e., habitat, species, and genetic variety). RESTRICTIONS: Should precede BISC302.

**ENWC 205 INSECTS AND SOCIETY 3**

Examines insects up close and personal! Topics include insect life history, behavior, basic insect identification, relationships between structure and function, ecology, evolution, pest control, insect’s impact on human culture and society and historical information.

**ENWC 214 APOLOGY AND APICULTURE 2**

Scientific study of the life of honey bees, including their biology, behavior and communication; introduction to techniques of culturing and managing honey bees for honey production and crop pollination.

**ENWC 215 INSECTS AND SOCIETY LABORATORY 1**

Insect structure, physiology, behavior, taxonomy, evolution and ecology studied through field trips, dissection and experiments. Insect collection (with identification to orders) required. COREQ: ENWC205.

**ENWC 224 APOLOGY AND APICULTURE LABORATORY 1**

Laboratory and field course to complement topics in ENWC214. Bee identification and culture; hive management. Work with bees in an apiary to develop confidence in keeping bee colonies. COREQ: ENWC214.

**ENWC 300 PRINCIPLES OF ANIMAL AND PLANT GENETICS 3**

Introduction to the theory and application of genetics as related to the improvement of plants and animals. Crosslisted with ANF5300. PREREQ: PLSC101 or BISC207 or BISC208.
ENWC 310 PREREQ: ANFS310. CORC: ANFS300.

Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems.

ENWC 311 INSECTS IN AGRICULTURAL AND URBAN ENVIRONMENTS 3  
Impact of insects on crops, forests, structures, gardens, and yards. Emphasis is on how insects in the agricultural and urban environments affect the life and commerce of people including the problems they cause, how humans deal with these problems, and how a variety of the insects benefit us.  
PREREQ: ENWC205 or BISC208.

ENWC 312 FIELD ECOLOGY 3  
Laboratory and field exercises demonstrating basic ecological principles and quantitative techniques. Emphasis on population and community phenomena. Natural habitats studied include local fields, forests and streams.  
CROSSLISTED WITH INSECT 201.  
PREREQ: BISC312. CORC: BISC302.

ENWC 314 COMPARATIVE TERRESTRIAL AND MARINE ECOLOGY 3  
Comparative overview of similarities and dissimilarities of life in terrestrial and marine environments. Topics include geological history, subsistence, growth and development, life history, reproduction, dispersal, population regulation, and impact of humans.  
May be crosslisted with MAST314.  
PREREQ: BISC208.

ENWC 325 WILDLIFE MANAGEMENT 3  
Introduction to solving wildlife management problems. Development of management plan with consideration of habitat, human and animal population components.  
PREREQ: ENWC201. RESTRICTIONS: Requires junior status.

ENWC 346 INSECT ECOLOGY AND CONSERVATION 3  
A survey of the many ways insects interact with their biotic and abiotic environments; why such interactions determine terrestrial ecosystem diversity and function; and strategies for sustaining productive insect communities.

ENWC 351 NATURE AND WILDLIFE PHOTOGRAPHY 3  
Basic principles and techniques of nature and wildlife photography. Students execute projects that demonstrate their technical skill and knowledge of exposure, composition and content.  
RESTRICTIONS: Students must have own camera equipment. Usually offered as part of international or domestic trips in Winter or Summer Sessions.

ENWC 366 INDEPENDENT STUDY 1-6  

ENWC 405 INSECT ANATOMY AND PHYSIOLOGY 3  
Examines morphological and physiological adaptations of insects from an evolutionary perspective. Includes the functional anatomy of insects (both internal and external) and how organ systems carry out their physiological tasks. Considers the insect "groundplan" (in comparison to other arthropods), and reviews all the major organ systems, their functions, and how they carry out these functions. Laboratory emphasizes anatomical variation of internal and external systems of insects and techniques for their study.  
PREREQ: ENWC205, or equivalent. RESTRICTIONS: ENWC215 is recommended.

ENWC 406 INSECT IDENTIFICATION - TAXONOMY 3  
Lecture and laboratory; the collection, preservation and classification of common insect families.  
PREREQ: ENWC205.

ENWC 408 INSECT FIELD TAXONOMY 3  
Collection, preservation and classification of common insect families. Includes lecture and laboratory.  
PREREQ: ENWC406.

ENWC 410 MEDICAL, VETERINARY, AND FORENSIC ENTOMOLOGY 3  
Ecology, transmission, and control of diseases carried by insects, ticks and mites; interactions of vectors, animal hosts, and humans. Biting and stinging arthropods and forensic entomology, including evidence collection and species succession. Labs and field trips emphasize identification and field assessment of medically important arthropods.  
PREREQ: BISC208, ENWC205, or permission of instructor.

ENWC 411 INSECT PEST MANAGEMENT 3  
Principles of managing insect populations in an environmentally compatible manner to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human populations. Diagnostic recognition, control and habits of major pest species.  
PREREQ: ENWC205.

ENWC 413 WILDLIFE POLICY AND ADMINISTRATION 3  
This course is an introduction to policy issues that relate to wildlife management and natural resources. Students will gain an understanding of current laws, federal agencies, policy formation, and debate the policies of current hot topics.  
May be crosslisted with ENEP413. PREREQ: ENWC201. RESTRICTIONS: Open to juniors and seniors only.

ENWC 415 WILDLIFE RESEARCH TECHNIQUES 3  
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts.  
PREREQ: ENWC325. RESTRICTIONS: Open only to seniors.

ENWC 416 WILDLIFE HABITAT MANAGEMENT 3  
Students will be introduced to basic principles and methods of wildlife habitat management in forests, grasslands, wetlands, agriculture, and urban areas. Labs include field trips to visit various habitats and learn about habitat management directly from local wildlife professionals. Field clothes required.

ENWC 418 ORNITHOLOGY 3  
Avian biology: diversity, evolution, form and function, behavior and communication, reproduction and development, and conservation. Natural history and identification of taxa. Labs with frequent field trips.  
PREREQ: BISC208.

ENWC 419 BIOLOGICAL CONTROL 3  
The use of beneficial organisms to manage and control populations of other organisms. Theory, practices, and case histories for manipulation of natural enemies to minimize the impact of pests.  
PREREQ: ENWC205 or equivalent. RESTRICTIONS: Requires junior or senior status.

ENWC 424 HERPETOLOGY 3  
Biological and ecological studies of reptiles and amphibians. Evolution, feeding behavior, life history, reproduction, physiology, population structure and dynamics, migration and movements, and conservation.  
PREREQ: BISC302. RESTRICTIONS: Requires junior status.

ENWC 425 MAMMALOLOGY 3  
PREREQ: BISC208. RESTRICTIONS: Requires junior status.

ENWC 426 AQUATIC INSECTS 3  
Biological and systematical studies of aquatic insects with emphasis on the fauna of North America. Collection of immature aquatic insects required.  
PREREQ: ENWC215. RESTRICTIONS: Requires junior status.

ENWC 435 POPULATION ECOLOGY 3  
Understand population processes by combining a discussion of theory and practical applications. Includes exponential, logistic, and age-specific growth as well as predation, competition, disease, and metapopulations. Model-building exercises actively used to understand theoretical dynamics.  
May be crosslisted with BISC435. PREREQ: BISC302.

ENWC 444 CONSERVATION OF TROPICAL BIODIVERSITY 3  
A 3-week intensive, field-based experience in the mechanics of conserving tropical biodiversity. Focuses on group projects quantifying and comparing the diversity of montane cloud forests, lowland rainforests and tropical dry forests. May be crosslisted with BISC440. RESTRICTIONS: Winter or Summer Session only. Taught in Costa Rica or Peru.

ENWC 450 DEBATES IN CONSERVATION BIOLOGY 3  
Global debate about anthropogenic use and misuse of earth's biological and physical resources.

ENWC 451 ADVANCED NATURE AND WILDLIFE PHOTOGRAPHY 3  
Builds on basic principles and skills learned in ENWC351. Students develop a journal of technical aspects and intended outcome of each image and complete projects to demonstrate increased technical skill and knowledge of exposure, composition, content.  
PREREQ: ENWC351 RESTRICTIONS: Students must have own camera equipment. Usually offered as part of international and domestic trips in Winter and Summer Sessions.

ENWC 452 CONSERVATION OF AFRICAN WILDLIFE 3  
ENWC 453 COMMUNITY-BASED CONSERVATION 3
Basic philosophical, economic, and ecological aspects of the bottom-up approach to conservation. Students experience this form of conservation first-hand by living with aboriginal people and seeing how they conserve natural resources.
RESTRICTIONS: Offered only during Winter Session in Tanzania.

ENWC 456 CONSERVATION BIOLOGY 3
Biological principles to the conservation of biodiversity. Integrates topics, and theories from ecology, economics, genetics, biogeography, behavior, reproductive biology, sociology, and wildlife management. Divided into four parts; 1) describing patterns and scales of biological diversity, 2) examining threats 3) managing populations and ecosystems, 4) social aspects of conservation.
RESTRICTIONS: Requires junior status.

ENWC 464 FIELD EXPERIENCE 1-3 PF
Faculty-supervised employment (usually part-time) or volunteer service at an entomology, ecology, or wildlife conservation-related site such as a research laboratory, pest control firm, museum, government agency or nature center. A signed agreement with faculty sponsor prior to placement and a journal or written report are required.
RESTRICTIONS: Maximum of six credits may count toward degree. Only three credits among Independent Study, Research, ENWC464 and UNIV401 count toward entomology or wildlife conservation major requirements.

ENWC 465 SENIOR CAPSTONE EXPERIENCE 1
Preparation, presentation, and discussion, both oral and written, of an issue based topic in entomology, wildlife conservation, natural resource management, or a related area for peers in a manner similar to that in scientific communication. Preparation includes reading and assessment of research articles.
RESTRICTIONS: Must be taken as senior in last fall term.

ENWC 466 INDEPENDENT STUDY 1-6

ENWC 468 RESEARCH 1-6

ENWC 602 LARVAL TAXONOMY 3
Lecture-laboratory treating the collection, preservation and classification of immature stages of insects. Emphasis on holometabolous orders, with special attention to aquatic immature stages.
PREREQ: ENWC215 and ENWC406

ENWC 605 INSECT ANATOMY AND PHYSIOLOGY 3
Examines morphological and physiological adaptations of insects from an evolutionary perspective. Includes the functional anatomy of insects (both internal and external) and how organ systems carry out their physiological tasks. Considers the insect “groundplan” (in comparison to other arthropods), and reviews all the major organ systems, their functions, and how they carry out these functions. Laboratory emphasizes anatomical variation of external and internal systems of insects and techniques for their study.

ENWC 606 INSECT IDENTIFICATION - TAXONOMY 3
Collection, preservation and classification of common insect families. Includes lecture and laboratory.

ENWC 608 INSECT FIELD TAXONOMY 3
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENWC502

ENWC 610 MEDICAL, VETERINARY, AND FORENSIC ENTOMOLOGY 3
Ecology, transmission, and control of diseases carried by insects, ticks and mites; interactions of vectors, animal hosts, and humans. Biting and stinging arthropods and forensic entomology, including evidence collection and species succession. Labs and field trips emphasize identification and field assessment of medically important arthropods.
PREREQ: BISC208, ENWC205 or permission of instructor.

ENWC 611 INSECT PEST MANAGEMENT 3
Principles of managing insect populations in an environmentally compatible manner to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals, and human population. Diagnostic recognition, control and habits of major pest species.
PREREQ: ENWC205

ENWC 613 WILDLIFE POLICY AND ADMINISTRATION 3
Introduction to policy issues that relate to wildlife management and natural resources. Students will gain an understanding of current laws, federal agencies, policy formulation, and debate the policies of current hot topics.
May be crosslisted with ENEP613.
RESTRICTIONS: Open to graduate students only or by permission of instructor.

ENWC 615 WILDLIFE RESEARCH TECHNIQUES 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. Class and individually designed field projects focus on regional wildlife and their habitats.
PREREQ: ENWC325, FRECH6 or STAT200; and two courses from ENWC318, ENWC418, ENWC424, or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344

ENWC 616 WILDLIFE HABITAT MANAGEMENT 3
Students will be introduced to basic principles and methods of wildlife habitat management in forests, grasslands, wetlands, agriculture, and urban areas. Labs include field trips to various habitats and learn about habitat management directly from local wildlife professionals. Field clothes required.

ENWC 618 ORNITHOLOGY 3
Avian biology: diversity, evolution, form and function, behavior and communication, reproduction and development, and conservation. Natural history and identification of taxa. Labs with frequent field trips.
PREREQ: BISC208.

ENWC 619 BIOLOGICAL CONTROL 3
Use of beneficial organisms to manage and control populations of other organisms. Theory, practices, and case histories for manipulation of natural enemies to minimize the impact of pests.

ENWC 620 BEHAVIORAL ECOLOGY 3
Theoretical treatment of the factors that have dominated the evolution of animal behavior; hypothesis testing emphasized.
PREREQ: BISC302

ENWC 624 HERPETOLOGY 3
Biology and ecology of reptiles and amphibians. Evolution, feeding behavior, life history, reproduction, physiology, population structure and dynamics, migration and movements, and conservation.
PREREQ: BISC302

ENWC 625 MAMMALOLOGY 3
PREREQ: BISC208 RESTRICTIONS: Open to graduate students only or by permission of instructor.

ENWC 626 AQUATIC INSECTS 3
Biology and systematics of aquatic insects with emphasis on the fauna of North America. Collection of immature aquatic insects required.
PREREQ: ENWC215 RESTRICTIONS: Requires junior status.

ENWC 635 POPULATION ECOLOGY 3
Understand population processes by combining a discussion of theory and practical applications. Includes exponential, logistic, and age-specific growth as well as predation, competition, disease, and metapopulations. Model-building exercises actively used to understand theoretical dynamics.
May be crosslisted with BISC635.
RESTRICTIONS: Requires permission of instructor

ENWC 652 CONSERVATION OF AFRICAN WILDLIFE 3

RESTRICTIONS: Offered only during Winter Session in Tanzania.

ENWC 655 COMMUNITY-BASED CONSERVATION 3
Basic philosophical, economic, and ecological aspects of the bottom-up approach to conservation. Students experience this form of conservation first-hand by living with aboriginal people and seeing how they conserve natural resources.

RESTRICTIONS: Offered only during Winter Session in Tanzania.

ENWC 656 CONSERVATION BIOLOGY 3
Biological principles to the conservation of biological diversity. Integrates topics, and theories from ecology, economics, genetics, biogeography, behavior, reproductive biology, sociology, and wildlife management. Divided into four parts; 1) describing patterns and scales of biological diversity, 2) examining threats 3) managing populations and ecosystems, 4) social aspects of conservation.

RESTRICTIONS: Requires junior status.

ENWC 805 INSECT-PLANT CHEMICAL ECOLOGY 3
Chemically mediated interactions between insects and plants and other organisms involved in the relationship. Perceptual organs, behavioral and physiological response, plant-insect interactions, insect and plant defense, and intraspecific interactions that relate to natural chemicals produced by plants and insects.
Presentation-discussion format.
May be crosslisted with PLSC805.
ENWC 814 ADVANCED ECOLOGY 3
Interaction of animals with their environment as it influences their distribution, abundance, life history and evolution. Emphasis on primary research literature. PREREQ: BISC302 or equivalent

ENWC 815 READINGS IN ECOLOGY 1
Discussion-based seminar on a current text and/or topic in the ecological sciences.

ENWC 820 LANDSCAPE ECOLOGY 3
Topics include advanced theoretical principles and methods to explore spatial and temporal relationships among landscape elements, organisms, populations, and ecosystems; causes of landscape pattern; measuring landscape pattern using GIS software, and application of landscape ecological principles in conservation management.

ENWC 821 WILDLIFE SPATIAL ECOLOGY 3
Explore various methods to analyze wildlife spatial data, including advanced GIS techniques, Resource Selection Models and Species Distribution Models in R and WinBUGS, and the use of standalone programs like MAXENT and PRESENCE.

ENWC 868 RESEARCH 1-9

ENWC 869 MASTER’S THESIS 1-6

ENWC 870 GRADUATE RESEARCH SEMINAR 0 PF
Students give an oral scientific presentation that describes the theory and development of their individual research projects.

ENWC 888 TOPICS IN ENTOMOLOGY AND WILDLIFE ECOLOGY 0 PF
Seminar with lectures on a variety of topics related to entomology and wildlife ecology.

ENWC 964 PRE-CANDIDACY STUDY 1-12 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.

ENWC 969 DOCTORAL DISSERTATION 1-12 PF

FASH 114 FASHION, STYLE AND CULTURE 3
Introduces the concepts of fashion, style, and culture as they relate to how products are conceived and developed. The impact of cultural contexts and societal diversity on apparel industry practices are considered.

FASH 122 APPAREL PRODUCT ASSEMBLY 3
Basic clothing construction procedures, fitting techniques and methods of evaluation for apparel are addressed. Construction skills are developed through a set of seam samples and construction of a blouse and skirt using a commercial pattern.

FASH 133 FASHION ART STUDIO 3
Explore basic design elements and principles, develop creative design studio skills, and apply them to apparel design and merchandising specific solutions. A variety of traditional and digital art methods will be utilized.

FASH 165 FASHION AND APPAREL STUDIES SEMINAR 1 PF
Create awareness of career opportunities and develop techniques for success in the fields of fashion merchandising and apparel design.

FASH 180 APPAREL PRODUCT DEVELOPMENT 3
Course focuses on the concepts of apparel product development: The product development calendar, the components of a garment and how the garment is assembled, sizing, fit, costing, garment specifications, and the apparel production process.

FASH 210 SEMINAR ON FASHION AND SUSTAINABILITY 3
Introduction to emerging cannon of theory and practice regarding Sustainability as it relates to fashion. Centered on four components of Sustainability and Social Responsibility: Labor, Environment, Consumption and Body Image. RESTRICTIONS: Apparel design and fashion merchandising majors only.

FASH 213 TWENTIETH CENTURY DESIGN: ETHNIC INFLUENCE 3
Examines the culture and clothing practices of various ethnic groups and their influences on Western apparel fashion and textile arts during the 20th Century.

FASH 214 COSTUME HISTORY BEFORE 1600 3
Costume as a mirror of civilization in Western Europe and the Middle East from antiquity through the 16th century. Influence of societal, economic and aesthetic factors upon the development of costume.

FASH 215 FUNDAMENTALS OF TEXTILES I 3
Science principles are the basis for understanding fibers. Relationships between the chemical and physical characteristics of fibers and properties such as tensile strength, flammability, elasticity, moisture absorption, dye affinity, and recyclability are explored. Understanding science principles in relation to textile properties provides basis for evaluation of textile products. PREREQ: CHEM101. RESTRICTIONS: Limited to majors only.

FASH 218 INTRODUCTION TO FASHION BUSINESS 3
An overview of the fashion business by examining the fundamental concepts and strategies related to merchandising and retailing of fashion and apparel products. Current practices and trends in the fashion industry are examined.

FASH 220 FUNDAMENTALS OF TEXTILES II 3
Fundamental concepts related to yarns, fabric, structures, coloration and finishes. Emphasis placed upon structural properties as they related to end-use characteristics and finishing processes. Discusses environmental problems related to textile production, dyeing and finishing. PREREQ: FASH215 RESTRICTIONS: Fashion merchandising and apparel design majors only.

FASH 221 APPAREL STRUCTURES 3
Comparative study of foundation principles and processes of apparel design and production utilizing draping, flat pattern, drafting and computer-aided design techniques. Includes development of master patterns, execution of advanced garment assembly processes, and communication of design plans using effective layout and presentation skills. Apparel design problems introduce the interplay among functional, aesthetic, social, technical, and sustainable factors. PREREQ: FASH122.

FASH 224 CLOTHING DESIGN AND PRODUCTION: 1600 TO THE EDWARDIAN PERIOD 3
Clothing design and production in America and Western Europe since 1600. Study of craft skills, growth of ready-to-wear industry, and Haute Couture.

FASH 233 FASHION DRAWING AND RENDERING 3
Drawing from the fashion model; emphasis on rendering clothing character, fabrics and fashion details using various media; introduction to flat sketching via computer; translation of drawings to finished fashion illustrations. PREREQ: FASH133.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>FASH 314</td>
<td>Apparel Design by Flat Pattern</td>
<td>3</td>
<td>Advanced flat pattern and drafting using the torso block to design tailored jackets and coats through the lenses of aesthetics, function/fit, sustainability, and marketability. Design projects require research of a design concept for a target market, consideration of sustainable design solutions, sketching, development of presentation boards, patternmaking, and construction of a complete garment.</td>
<td>PREREQ: FASH221.</td>
</tr>
<tr>
<td>FASH 319</td>
<td>Dress and Culture</td>
<td>3</td>
<td>Examination of similarities and differences in the dress of culturally distinct groups: analysis of functions served by dress and factors influencing changes in cultural forms of dress.</td>
<td>PREREQ: PSYC100 and/or SOC1201.</td>
</tr>
<tr>
<td>FASH 320</td>
<td>Fashion and Apparel Internship</td>
<td>1-12</td>
<td>An off-campus supervised and coordinated field study program in fashion/apparel related areas.</td>
<td>PREREQ: FASH218. REQUISTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>FASH 321</td>
<td>Travel Study Program</td>
<td>1-6</td>
<td>Study of the domestic and/or international textiles and apparel and allied fashion industries through a variety of instructional methods including industry visits, research projects and service learning activities. Instructional methods vary by countries visited and courses offered.</td>
<td>REQUISTIONS: Requires FASH faculty approval through an application process. Offered at regular intervals.</td>
</tr>
<tr>
<td>FASH 324</td>
<td>Apparel Design by Draping</td>
<td>3</td>
<td>Exploration of three dimensional methods of apparel design. Focuses on design and execution of draped garment structures. Design projects require research of a design concept for a target market, consideration of sustainable design solutions, sketching, development of presentation boards, patternmaking, and construction of a complete garment.</td>
<td>PREREQ: FASH233, FASH314. COREQ: FASH220.</td>
</tr>
<tr>
<td>FASH 325</td>
<td>Multimedia Fashion Presentations</td>
<td>3</td>
<td>Development of oral, written, and graphic presentation skills used for communication in the fashion industry. Multimedia presentation applications are utilized.</td>
<td></td>
</tr>
<tr>
<td>FASH 330</td>
<td>Merchandise Planning</td>
<td>3</td>
<td>Focuses on computer applications related to mathematical concepts and calculations used in developing merchandising budgets. Spreadsheets are used to develop merchandise plans for sales, inventories, markups, shrinkage, receipts, open-to-buy and gross margin. Other industry-related planning systems are examined.</td>
<td>PREREQ: FASH218, ACCT207 or ACCT200, and MATH160.</td>
</tr>
<tr>
<td>FASH 333</td>
<td>Fashion Forecasting and Design</td>
<td>3</td>
<td>Introduction to trend research, analysis, and translation to original textile and apparel collections targeting varied consumer markets. Advanced computer graphics for the fashion industry, emphasizing concept development (textiles, apparel, sustainable design, etc.) visualization, and design presentation.</td>
<td>PREREQ: FASH233 and FASH220.</td>
</tr>
<tr>
<td>FASH 335</td>
<td>Intl Fashion Consumer and Retailers</td>
<td>3</td>
<td>Global and country specific factors that impact distribution systems for and consumption of fashion related products. Understanding consumers of fashion products within a global context and motivations for pursuing a global marketing and retailing strategy, including store-level sustainability practices.</td>
<td>PREREQ: FASH218 or BUAD301.</td>
</tr>
<tr>
<td>FASH 366</td>
<td>Independent Study</td>
<td>1-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FASH 380</td>
<td>Advanced Apparel Product Development</td>
<td>3</td>
<td>The product development process as applied in the apparel industry. Focuses on business planning, marketing, market research, distribution, the product development calendar, and challenges relating to apparel business situations. Evaluates how product development activities supports sustainability. Builds on basic information learned in FASH180.</td>
<td>PREREQ: FASH218, FASH180, FASH220.</td>
</tr>
<tr>
<td>FASH 419</td>
<td>Social Psychological Aspects of Clothing</td>
<td>3</td>
<td>Study of clothing and appearance as contributors to human interactions; consideration of the importance of clothing in individual and collective behavior. Analysis of how dress reflects self-feelings, establishes social identities and affects interpersonal encounters. May be crosslisted with WOMS419.</td>
<td>PREREQ: PSYC100 and SOC1201, or permission of instructor.</td>
</tr>
<tr>
<td>FASH 420</td>
<td>Assortment Planning, Sourcing and Buying</td>
<td>3</td>
<td>A continuation of FASH330. A merchandise budget developed in FASH330 is translated into an inventory unit plan. Emphasis is on assortment planning, and responsible sourcing and purchasing. Computer applications are involved. PREREQ: FASH330.</td>
<td></td>
</tr>
<tr>
<td>FASH 421</td>
<td>Professional Portfolio Development</td>
<td>3</td>
<td>Conceptualization and development of a professional portfolio of design work. Refinement of visual presentation skills and professional development emphasized. Includes critique by apparel industry professionals. PREREQ: FASH333.</td>
<td></td>
</tr>
<tr>
<td>FASH 426</td>
<td>Historic Textiles &amp; Clothing Collection Management</td>
<td>3</td>
<td>Practicum at the University of Delaware Historic Costume and Textiles Collection. Learn proper care, storage and exhibition techniques for flat textiles, apparel and accessories. Experiences may include museum education, object accession, and database management.</td>
<td></td>
</tr>
<tr>
<td>FASH 430</td>
<td>Apparel Brand Management &amp; Marketing</td>
<td>3</td>
<td>A study of the significance of brand management for fashion companies as a competitive strategy for building sales and customer base. Introduction to the essential elements of branding, the course covers major activities of brand management and marketing with a focus on apparel firms. Apparel branding examined in global context due to the global nature of industry and its impact on consumers around the world.</td>
<td>PREREQ: FASH218 and BUAD301.</td>
</tr>
<tr>
<td>FASH 433</td>
<td>Product Development and Management Studio</td>
<td>3</td>
<td>Focuses on all phases of apparel product development for a targeted market from conceptualization through execution of sample garments for sustainable mass production. Further develops skills in computer-aided pattern designing, grading, marker making and data management (e.g., sizing, specifications, operations and costing). Includes a cooperative project with an apparel firm to provide hands-on industry experience. Includes field trip.</td>
<td>PREREQ: FASH314, FASH333.</td>
</tr>
<tr>
<td>FASH 455</td>
<td>Global Apparel and Textile Trade and Sourcing</td>
<td>3</td>
<td>Global interdependencies that influence production, distribution, and consumer consumption. Study of the roles of government, industry, and consumers in the global economy with a focus on the apparel industry. Analyzes practices to improve sustainability in production of apparel.</td>
<td>PREREQ: ECON151 or ECON152.</td>
</tr>
<tr>
<td>FASH 466</td>
<td>Independent Study</td>
<td>1-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FASH 484</td>
<td>Design Expressions</td>
<td>3</td>
<td>Integrates advanced apparel design techniques and experiences as students design a collection of ensembles based on a theme incorporating social, cultural, and environmental sustainability. Articulating the design process through oral, written, and visual methods is emphasized. PREREQ: FASH220, FASH324, FASH333. REQUISTIONS: Apparel Design Seniors only.</td>
<td></td>
</tr>
<tr>
<td>FASH 490</td>
<td>Strategic Fashion Management</td>
<td>3</td>
<td>A capstone course that integrates product planning and development, distribution, marketing, sourcing, and sustainability. Students will work on case studies and industry projects that require analysis, synthesis and application of knowledge and skills within the global apparel industry. PREREQ: FASH330, FASH355, and FASH380.</td>
<td></td>
</tr>
<tr>
<td>FASH 619</td>
<td>Social Psychological Aspects of Clothing</td>
<td>3</td>
<td>Study of clothing and appearance as contributors to human interactions; consideration of the importance of clothing in individual and collective behavior. Analysis of how dress reflects self-feelings, establishes social identities and affects interpersonal encounters.</td>
<td></td>
</tr>
<tr>
<td>FASH 626</td>
<td>Historic Textiles &amp; Clothing Collection Management1-3</td>
<td>3</td>
<td>Practicum at the University of Delaware Historic Costume and Textiles Collection. Learn proper care, storage and display techniques for flat textiles, apparel and accessories. Experiences may include museum education, object accession, and database management.</td>
<td></td>
</tr>
<tr>
<td>FASH 630</td>
<td>Apparel Brand Management &amp; Marketing</td>
<td>3</td>
<td>A study of the significance of brand management for fashion companies as a competitive strategy for building sales and customer base. Introduction to essential elements of branding. Examines major activities of brand management and marketing with a focus on apparel firms. Apparel branding examined in the global context due to global nature of industry and its impact on consumers around the world.</td>
<td>PREREQ: Graduate standing. REQUISTIONS: Not open to students with credit for FASH430.</td>
</tr>
</tbody>
</table>

University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015
FASH 633  PRODUCT DEVELOPMENT AND MANAGEMENT STUDIO  3  
Apparel product development for a targeted market from conceptualization through execution of sample garments for mass production. Develops skills in computer-aided pattern designing, grading, marker making and data management (e.g., sizing, specifications, operations and costing). Includes field trip.  PREREQ: Requires permission of instructor.

FASH 655  GLOBAL APPAREL AND TEXTILE TRADE AND SOURCING  3  
Analyzes the global apparel and textile industries, the supply chains and the economic, political, socio-cultural, geographical and technological factors that influence global sourcing and buying decisions. Considers the importance of both financial and social goals, and strategies for social responsibility and labor compliance, and strategies for sourcing apparel.  PREREQ: Graduate standing. RESTRICTIONS: Not open to students with credit for FASH455.

FASH 665  FASHION STUDIES GRADUATE SEMINAR  1 PF  
Exploration of current research and industry needs in the field.  RESTRICTIONS: Must be taken during the final semester of the master's degree.

FASH 666  SPECIAL PROBLEM  1-6  
Individual study, individual service learning project, group experiential learning (e.g., travel, internship, service learning), research that allows students to synthesize learnings across courses.

FASH 689  APPAREL SUPPLY CHAINS AND SOCIAL RESPONSIBILITY  1  
Challenges for social responsibility in context of structure, relationships and long-standing practices and methods in apparel business. Analyzes structural and competitive issues of supply chains such as ownership, globalization, and outsourcing.

FASH 691  SOCALLY RESPONSIBLE APPAREL: GLOBAL POLICY  1  
Political and profit interests that influence socially responsible decisions and policy for the global textile and apparel industry are considered. Factors analyzed include ethics, economics, government policies, international labor standards, environmental regulations, and company priorities.

FASH 692  SUSTAINING GLOBAL APPAREL SUPPLY CHAINS  1  
Examines responsibility of businesses for sustaining economic/social development in global apparel industry. An historical perspective of the role of the industry in economic development provides a context for evaluating current issues concerning sustainable development.

FASH 693  CULTURE AND WORK IN THE APPAREL INDUSTRY  1  
Examines interrelationships between cultural characteristics, employment/work practices and social responsibility. Examples of industry practices that reflect effects of culture on business practices are addressed.

FASH 694  APPAREL CONSUMERS AND SOCIAL RESPONSIBILITY  1  
Examines role of consumers in improving working conditions, labor standards, and environmental stewardship in apparel factories worldwide. Factors and groups motivating consumer action are explored, including influence of personal characteristics, market opportunities, and activist and other pressure groups.

FASH 695  BRINGING SOCIAL RESPONSIBILITY TO APPAREL CORPORATE CULTURE  1  
Importance of leadership, the role of inspirational leadership, and the opportunities for making a difference are explored, analyzed and applied. Emphasis on social change - how individuals can help build a socially responsible workplace.

FASH 696  CURRENT INITIATIVES FOR APPAREL INDUSTRY LABOR COMPLIANCE  1  
Evaluates effectiveness of current initiatives for improving working conditions and labor standards in factories around the world. Explores codes of conduct and new trends for achieving long-term improvements in compliance to internationally recognized labor standards.

FASH 697  WORKER-CENTRIC SOCIAL RESPONSIBILITY FOR APPAREL INDUSTRY  1  
Examines the rights of workers. Explores obstacles in meeting and methods for assuring worker rights, including freedom of association. Consideration is given to how to effectively engage with workers.

FASH 698  REDESIGNING GREEN APPAREL: DESIGN, SOURCING AND PACKAGING  1  
Examines challenges to environmental stewardship in the design, sourcing, and packaging of apparel, textiles, and footwear products. Explores innovative practices, visionary leadership, and social change strategies for redesigning 'green' in the context of the design and sourcing roles of apparel business.

FASH 699  PRODUCING ENVIRONMENTALLY RESPONSIBLE APPAREL  1  
Examines environmentally responsible apparel production and practices as philosophy, process, and competitive business strategy. Analyzes sustainable production in the context of a business' physical plant, materials, and resource use.

FASH 800  RESEARCH ANALYSIS IN FASHION STUDIES  3  
Analysis and interpretation of research in fashion and apparel studies. Examination of qualitative and quantitative research methodologies. Emphasis is placed on theory development and research design.

FASH 822  GLOBAL FASHION CONSUMERS  3  
Study of consumer behavior toward fashion products in a global context. Theories will be investigated from the context of the required readings.

FASH 824  CREATIVE DESIGN FOR EXHIBITION  3  
Use of advanced apparel design techniques in the development and execution of a collection of garments for juried design exhibition.

FASH 825  INTERDISCIPLINARY APPROACHES TO CREATIVE PROBLEM SOLVING  3  
Interdisciplinary approaches to collaborative thinking and problem solving, implementing variety of methods (e.g., environmental scanning, concept/knowledge mapping, scenario building, futuring/forecasting, visioning, scenario building, strategic planning) to the sustainable resolution of global contemporary issues challenging the textile/apparel/retail complex.

FASH 868  SUPERVISED RESEARCH IN FASHION STUDIES  1-3  
Exploration of the academic research process, encompassing its conceptualization, design, execution, and dissemination phases.

FASH 869  THESIS  1-6  
Engage in all phases of original scholarship under the guidance of their graduate committee and document the results in written form, including the process.

FINANCE

FINC 100  INTRODUCTION TO INVESTMENTS  3  
Provides non-business majors with an overview of financial markets and the principles and theory of investments. Topics include the operation of US equity, bond, and mortgage markets; taxes; retirement planning; and an analysis of the risks and rewards of various investment opportunities and portfolios.

FINC 120  INVESTMENT CLUB  1  
Prepares students interested in joining Blue Hen Investment Club(BHIC). Objective is to educate future members of BHIC to make better informed investment decisions. Students get hands-on experience learning.

FINC 200  FUNDAMENTALS OF FINANCE  3  
Provides non-business majors with an overview of the role of finance within a business organization. Topics include financial statement analysis, time value of money, capital budgeting, valuation and the cost of capital. RESTRICTIONS: No majors within business administration, finance or accounting, HRIM or MIS degree candidates may receive credit for this course.

FINC 201  INTRODUCTION TO INVESTMENTS  3  
Provides non-business majors with an overview of the principles and theory of investments and financial markets. Topics include the analysis of investment opportunities and the management of investment portfolios. RESTRICTIONS: No majors within business administration, finance or accounting, HRIM or MIS degree candidates may receive credit for this course.

FINC 266  SPECIAL PROBLEM  1-3  

FINC 311  PRINCIPLES OF FINANCE  3
Introduces fundamental techniques and concepts related to the financial management of business firms. Topics include the time value of money, valuation, capital budgeting, working capital management, cost of capital, capital structure analysis, short and long term financing.
PREREQ: ACCT207. RESTRICTIONS: Open to Sophomores, Juniors, and Seniors only. Open to students whose major requires this course.

FINC 312  INTERMEDIATE FINANCIAL MANAGEMENT  3
Focuses on the role of the corporate financial manager in shareholder wealth maximization. Enhances the understanding of material covered in FINC311 through the application of analytical methods, cases, and the effective use of information technology in a contemporary financial environment.
PREREQ: FINC311. RESTRICTIONS: Requires a grade of C- or better in FINC311. Open to Junior and Senior Finance and Accounting majors only.

FINC 313  FINANCIAL MARKETS  3
Analyses domestic and international financial markets and examines the characteristics of market makers such as investment bankers, brokers, and dealers. The focus is on the fixed income financial instruments used in money and capital markets with emphasis on relevant risk, liquidity, and risk-return trade-offs.
PREREQ: FINC311. RESTRICTIONS: Requires a grade of C- or better in FINC311. Open to Junior and Senior Finance and Accounting majors only.

FINC 314  INVESTMENTS  3
Examines the valuation of securities, the functioning of securities markets and the theory and practice of modern portfolio management. Topics include advanced techniques in security valuation, standards and practices in investment management, portfolio evaluation standards and applications using real-time data.
PREREQ: MATH201, MATH202 and FINC311. RESTRICTIONS: Grade of C- or better required in MATH201, MATH202 and FINC311.

FINC 320  PRINCIPLES OF FINANCIAL PLANNING  3
Introduces the financial planning process and provides an overview of the specific areas of risk management and insurance, retirement, and investments. Topics include personal financial statements, cash flow and debt management, asset acquisition, education planning, the regulatory environment, the business of financial planning and ethics.
PREREQ: FINC311 with a C- or better. RESTRICTIONS: Open to Financial Planning Majors only.

FINC 321  INSURANCE PLANNING  3
Examines insurance and risk management decisions in personal financial planning. Topics include life, medical, disability, property, casualty, homeowners, liability, and auto insurance. Other topics include tax issues, annuities, group life insurance, long term care, and business insurance.
PREREQ: FINC311 with a C- or better. RESTRICTIONS: Open to Financial Planning majors only.

FINC 322  RETIREMENT PLANNING  3
Focuses on public (Social Security, Medicare, and Medicaid) and private (defined benefit and defined contribution plans) retirement plans and discusses issues that individuals face in retirement such as lifestyle choices and medical issues.
PREREQ: FINC311 with a C- or better. RESTRICTIONS: Open to Financial Planning Majors only.

FINC 364  FINANCE IN PRACTICE  3
Requires completion of at least 120 hours of finance-related internship with verification by the hiring company. Term paper relating the real-world duties and experiences of the internship to principles learned in the classroom also required.
PREREQ: FINC311. RESTRICTIONS: Registration by permission of the instructor only.

FINC 366  INDEPENDENT STUDY  1-6

FINC 392  SEMINAR ON INTERNATIONAL FINANCIAL MANAGEMENT  3
Seminar at an overseas location on selected topics in international financial management. Combines lectures and visits to local organizations. Research paper.
PREREQ: FINC311 RESTRICTIONS: Used only as a professional elective for finance majors. Taught abroad.

FINC 412  FINANCIAL INSTITUTIONS  3
Examines various types of financial institutions. Topics include structure, performance, asset/liability management, regulation and current issues that impact operational structures.
PREREQ: FINC314 and ECON302.

FINC 413  ADVANCED CORPORATE FINANCE  3
This capstone seminar course studies three different intersections of topics in global corporate finance: the intersections of a) currency and interest rate risk management, b) capital raising and securities market trading, and c) strategy and international financial management. The course emphasizes reports, exercises, cases, discussions, presentations, and analysis of financial news.
PREREQ: FINC311, FINC312, FINC314.

FINC 414  BANK MANAGEMENT  3
Examines the management of commercial banks and similar institutions. Topics include funds and capital management, liquidity and credit standards, and lending and trust operations.
PREREQ: FINC412. RESTRICTIONS: Open to Junior and Senior Finance Majors only.

FINC 415  INTERNATIONAL FINANCE  3
Examines the international monetary environment and its impact on financial planning for the firm. Topics include exchange rates, currency restrictions, tax regulations, direct investment theory, capital budgeting, financing, risk management, and working capital management.
PREREQ: ECON302. RESTRICTIONS: Open to students whose major or minor requires this course.

FINC 416  DERIVATIVE SECURITIES AND RISK MANAGEMENT  3
Examines the trading, valuation and theory of pricing futures and forward contracts, options, swaps and other derivative securities. Emphasis is placed on the use of derivatives for hedging and risk management.
PREREQ: FINC314.

FINC 417  REAL ESTATE FINANCE  3
Introduces real estate theory and management. Topics include financing, evaluation and property management, housing policy, and governmental regulation and participation.
PREREQ: FINC314. None.

FINC 418  SEMINAR IN CORPORATE GOVERNANCE  3
Examines current issues in corporate governance. Topics include executive compensation, shareholder resolutions and board of director ownership and accountability.
PREREQ: FINC311. RESTRICTIONS: Open to Junior and Senior Finance Majors only.

FINC 419  FINANCIAL MODELING AND VALUATION  3
Applies economic principles and financial modelling techniques to value seasoned equity, initial public offerings, mergers, private equity transactions, and leveraged buyouts.
PREREQ: FINC312 and FINC314.

FINC 420  MEET THE MARKET  1
Prepares students intending to pursue careers in finance markets about the latest innovations in the practice of finance. Course primarily consists of seminars delivered by leading finance professionals. RESTRICTIONS: Open to FINC, ECON, and ACCT seniors, MSF students, MBA students, ECON Master and PhD students, and any student interested in pursuing a career in Finance only.

FINC 425  FINANCIAL PLAN DEVELOPMENT  3
The capstone experience engages students in critical thinking and decision making about personal financial management topics, integrating the knowledge gained in previous courses into a cohesive, inclusive understanding of the financial planning process. A key component of this module will be to develop a comprehensive financial plan.
PREREQ: FINC320. RESTRICTIONS: Open to senior Financial Planning majors only.

FINC 466  INDEPENDENT STUDY  1-6

FINC 620  MEET THE MARKET  0
Prepares students intending to pursue careers in finance markets about the latest innovations in the practice of finance. Course primarily consists of seminars delivered by leading finance professionals.
RESTRICTIONS: Open to FINC, ECON, and ACCT seniors, MSF students, MBA students, ECON Master and PhD students, and any student interested in pursuing a career in Finance.

FINC 841  FINANCIAL SERVICES MARKETS  3
Focuses on the economic roles and interactions of the units in each sector of the financial services industry. Overview of the current and changing layout of institutions, products, and practices. May be crosslisted with FSAN841.
FINC 842 FINANCIAL SERVICES RISK ANALYTICS 3
Develops the theoretical and practical foundations of resource allocation across time and risky assets, and of credit risk and systemic considerations. Topics include allocation of resources across time; allocation of resources across risks and credit risk and systemic considerations. May be crosslisted with FSAN842.

FINC 843 FINANCIAL SERVICES REGULATION 3
Examines the regulatory environment of financial services industry, including policy choices, goals and costs/benefits. We will consider how companies and individuals, using people, processes and technology, meet their ethics, compliance and control objectives in a global environment. May be crosslisted with FSAN843.

FINC 850 FINANCIAL MANAGEMENT 3
Provides an introduction to the fundamental concepts of the finance function with an emphasis on the decision-making techniques relevant to financial and nonfinancial managers. Topics include valuation, risk and return, capital budgeting, cost of capital, financial analysis and planning, and working capital management.
PREREQ: ACCT800.

FINC 851 CORPORATE FINANCIAL ANALYSIS 3
Examines major policy-making areas in corporate finance and the impact of alternative policies on the value of the firm. Emphasis is placed on strengthening financial decision-making skills. Advanced topics include capital investment policy, financing and capital structure policies, dividend policy, and corporate control.
PREREQ: FINC850.

FINC 852 INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT 3
Examines the role and functioning of securities markets, valuation techniques, and the theory and practice of portfolio management. Topics include portfolio construction and evaluation metrics, relative valuation techniques and an introduction to derivative securities pricing.
PREREQ: FINC850.

FINC 853 INTERNATIONAL FINANCIAL MANAGEMENT 3
Examines the financial management of multinational firms and the interrelationships between financial planning and the international economic environment. Topics include direct investment theory, capital budgeting, financing trade and investments, risk management and working capital management.
PREREQ: FINC850.

FINC 854 SPECIAL TOPICS IN FINANCE 1-3
Examines selected topics of current interest in various areas of finance, including corporate financial management, investment analysis and portfolio management, or financial institutions and markets.
PREREQ: FINC850.

FINC 855 FINANCIAL INSTITUTIONS AND MARKETS 3
Examines the nature, purpose, and management of financial institutions and markets.
PREREQ: FINC850.

FINC 856 FINANCIAL ENGINEERING AND RISK MANAGEMENT 3
Introduces the pricing, trading and use of derivative securities (forwards, futures, swaps and options contracts), emphasizing the management of risk arising from the volatility of exchange rates, interest rates and commodity and equity prices.
PREREQ: FINC850.

FINC 857 PRIVATE EQUITY & VENTURE FINANCE 3
Understanding of economic role of private equity and venture capital, the structure of the industry, and the forces that shape its development. Develop analytical deal-structuring techniques, interact with private equity professionals, and learn about unique risks of private equity investing.
May be crosslisted with ACCT857. PREREQ: ACCT800 and FINC850 or equivalent.

FINC 858 CORPORATE GOVERNANCE 3
Introduces issues pertaining to corporate governance and oversight, and examines topics of current interest concerning the relationships between corporate boards, company management, and shareholders.
PREREQ: FINC850.

FINC 859 SEMINAR IN FINANCE 3
Emphasis is on financial research and the application of alternative research methods to a project or current interest. Involves individual inquiry, written communication of results, and presentation of findings by each student.
PREREQ: FINC850. RESTRICTIONS: Requires 24 M.B.A. credit hours.

FINC 861 FINANCIAL MODELING AND VALUATION 3
Financial modeling techniques to value IPOs, mergers, private equity transactions, and leveraged buyouts. Explore the economic principles supporting these techniques and apply them to various transaction types using real financial data. Focus is on bridging the gap between theory and practice.
PREREQ: FINC850.
FLLT 309    POLITICAL CULTURE BY COUNTRY  3
Introduction to the political and civic cultures underpinning and supporting
different political systems. Topics may vary depending on host country.
Crosslisted with POLSC309. RESTRICTIONS: Offered only in conjunction with travel
abroad programs. May be taken twice for credit when countries vary.

FLLT 316    CLASSICAL MYTHOLOGY: GODS, HEROES, AND MONSTERS  3
Cosmological myths and heroic sagas in the literature and art of Greece and
Rome. The influence of the mythology in later art and literature.
May be crosslisted with CMLT316.

FLLT 319    TOPICS: FRENCH LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme.
Taught in English. Topics vary and are announced prior to the registration period.
May be crosslisted with WOMS319.

FLLT 320    VARYING AUTHORS AND GENRES  3
Cultural, especially cross-cultural and/or interdisciplinary studies with primary
emphasis in the aesthetic context of the announced topic, e.g., Nordic Saga and
Myth; Courtly Love; and the European Postwar Novel.
May be crosslisted with CMLT320, WOMS320. RESTRICTIONS: May be repeated for credit
when topics vary.

FLLT 321    TOPICS: CHINESE LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme.
Taught in English. See http://primus.nss.udel.edu/CoursesSearch/ for topics.
May be crosslisted with WOMS321. RESTRICTIONS: May be repeated for credit
when topics vary.

FLLT 322    TOPICS: CLASSICAL LITERATURE IN TRANSLATION  3
Special topics in Greek and Roman culture and civilization. Particular areas and
writers to be announced, e.g., ancient epic, ancient drama, Greek literature in
translation. May be crosslisted with CMLT322, WOMS322. RESTRICTIONS: May be repeated for credit
when topics vary.

FLLT 325    TOPICS: GERMAN LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme.
Taught in English. See http://primus.nss.udel.edu/CoursesSearch/ for topics.
May be crosslisted with WOMS325. RESTRICTIONS: May be repeated for credit
when topics vary.

FLLT 326    TOPICS: HISPANIC LITERATURE IN TRANSLATION  3-12
Study of the works of one or more outstanding authors or of a special theme.
Taught in English. See http://primus.nss.udel.edu/CoursesSearch/ for topics.
May be crosslisted with WOMS326. RESTRICTIONS: May be repeated for credit
when topics vary.

FLLT 327    TOPICS: RUSSIAN LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme.
Taught in English. See http://primus.nss.udel.edu/CoursesSearch/ for topics.
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 328    TOPICS: JAPANESE LITERATURE IN TRANSLATION  3-6
Study of the works of one or more outstanding authors or of a special theme.
Taught in English. See http://primus.nss.udel.edu/CoursesSearch/ for topics.
May be crosslisted with WOMS328. RESTRICTIONS: May be repeated for credit
when topics vary.

FLLT 329    TOPICS: ITALIAN LITERATURE IN TRANSLATION  3
Study of the works of one or more outstanding authors or of a special theme.
Taught in English. May be crosslisted with WOMS329. RESTRICTIONS: May be repeated for credit
when topics vary.

FLLT 330    VARYING AUTHORS, THEMES, AND MOVEMENTS  3
Cultural, especially cross-cultural, study with primary emphasis on the historical
development of the announced area, e.g., The Faust Theme in Western Literature,
Dante Through the Ages, Don Juan, and the Transformation of a Myth. See
http://primus.nss.udel.edu/CoursesSearch/ for topics.
May be crosslisted with CMLT330, HIST399, WOMS330. RESTRICTIONS: May be repeated three times for credit when topics vary.

FLLT 331    INTRODUCTION TO CHINESE FILMS  3
Inquiry into Chinese films from the prewar period to the present. Both aesthetic
and technical elements of film production and reception featured. Discussion
intensive.

FLLT 332    TOPICS: ARABIC LITERATURE IN TRANSLATION  3
Explores special topics in Arabic literature, particular themes and writers to be
announced e.g., The Thousand and One Nights, Arab women writers, Iraqi
women’s fiction, war novels.

FLLT 333    ISRAELI FILM  3
Inquiry into Israeli films from the immediate postwar period to present. Historical
and societal changes emphasized. Aesthetic and technical elements of film
production and reception featured. Discussion intensive.
May be crosslisted with JWST333.

FLLT 337    BRAZIL THROUGH FILM  3
Examines Brazilian culture and history through film, film techniques and
movements. Other disciplines will help provide an understanding of Brazilian film,
including history, literature, gender studies, sociology, cultural studies, politics,
and ethnic studies. Topics include religion, gender issues, ethnicity, migration,
identity, music, and popular culture. Taught in English. Portuguese films have
English subtitles.

FLLT 338    LIGHT AND SHADOW—JAPANESE FILMS  3
Inquiry into Japanese films from the immediate postwar period to present. Both
aesthetic and technical elements of film production and reception featured.
Discussion intensive.

FLLT 345    MODERN ISRAEL: HISTORY AND CULTURE  3
Many factors contribute to a diverse and intriguing Israeli society. Topics include
the roots of Zionism, the concept of the Israeli Sabra, the effects of the Holocaust,
ethnic groups and the Arab-Israeli conflict, through history, film, literature and
music.
May be crosslisted with JWST345.

FLLT 351    VIDEOGAMES AND JAPANESE CULTURE  3
Examines Japanese videogames from both a ludological and narratological
perspective. Genres studies include the JRPG, stealth action, simulation and
fighting games.

FLLT 352    VIDEOGAMES AND LATIN AMERICAN CULTURE  3
Explores the relationship between videogames and culture by analyzing both in
game cultural representation and the real-life economic, political and societal
effects of games across Latin America.

FLLT 360    HUMANITIES COLLOQUIUM  3
Papers and discussion by faculty members and students participating in
Humanities Semester offerings. Interdisciplinary approach.

FLLT 366    INDEPENDENT STUDY  1-6

FLLT 375    TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION  3
Special topics in Russian and Soviet culture. Taught in English. See
http://primus.nss.udel.edu/CoursesSearch/ for topics.
May be crosslisted with WOMS375. RESTRICTIONS: May be repeated for credit
when topics vary.

FLLT 380    TOPICS: JAPANESE CULTURE IN TRANSLATION  3
Special topics in Japanese culture. Taught in English. See
http://primus.nss.udel.edu/CoursesSearch/ for topics.
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 383    CHINESE CULTURE IN TRANSLATION  3
Special topics in Chinese culture. Taught in English. See
http://primus.nss.udel.edu/CoursesSearch/ for topics.
May be crosslisted with WOMS383. RESTRICTIONS: May be repeated for credit
when topics vary.

FLLT 390    HONORS COLLOQUIUM  3
First year interdisciplinary Honors seminar. May be team taught. Specific topics
vary. RESTRICTIONS: Open to first year Honors students only.

FLLT 401    HISTORICAL LINGUISTICS  3
Examines how languages evolve over time and how present and past languages
are related to each other. Students learn techniques of historical analysis, such as
the comparative method, and what is known about the historical development of
major linguistic families like the Indo-European family of languages.
Crosslisted with LING401. PREREQ: LING101.

FLLT 421    METHODS OF TEACHING FOREIGN LANGUAGES  3
Description, discussion and analysis of techniques pertinent to the teaching and
learning of foreign languages. Emphasis on contributions of contemporary
linguistic science. Includes demonstrations and practical exercises.
May be crosslisted with LING421.
FREN 102 ELEMENTARY FRENCH II 3
Completion of basic French.
PREREQ: FREN101 or FREN105

FREN 105 FRENCH I - ELEMENTARY 4
Introduction to the French language and development of speaking, listening, reading and writing skills through the use of basic texts.

FREN 106 FRENCH II - ELEMENTARY/INTERMEDIATE 4
Completion of basic French. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: FREN105 RESTRICTIONS: Two to three years of high school French acceptable in lieu of prerequisite.

FREN 107 FRENCH III - INTERMEDIATE 4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: FREN106 RESTRICTIONS: Four years of high school French acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.

FREN 111 INTERMEDIATE FRENCH I 3
Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: FREN102 or FREN106. RESTRICTIONS: Three years of high school French acceptable in lieu of prerequisite.

FREN 112 INTERMEDIATE FRENCH II 3
Continued practice in speaking and writing, reading texts of average difficulty. Grammar review as needed. PREREQ: FREN111. RESTRICTIONS: Four years of high school French acceptable in lieu of prerequisite. Satisfies Arts and Sciences foreign language requirement.

FREN 200 GRAMMAR AND COMPOSITION 3
Intensive grammar review of all major verb tenses and grammatical concepts (such as object pronouns). Emphasis is on grammar improvement through reading and writing. PREREQ: FREN107 or FREN112

FREN 205 FRENCH CONVERSATION 3
Practical use of French by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work. PREREQ: FREN107 or FREN112 or one 200-level course RESTRICTIONS: Minimum grade of B required for prerequisites. Not intended for native speakers of French.

FREN 206 CULTURE THROUGH CONVERSATION 3
Discussion of topics drawn from contemporary French life. Designed for students who wish to broaden their knowledge of French culture while improving their oral and aural language skills. PREREQ: FREN107 or FREN112 RESTRICTIONS: Taught in France.

FREN 207 FRENCH CARIBBEAN PAST AND PRESENT 3
Introduction to contemporary French Caribbean, its history, its culture, its people, their way of life and the issues confronting them. Focuses on Martinique. RESTRICTIONS: Taught in English during Winter Session abroad. Not for minor credit.

FREN 208 CONTEMPORARY FRANCE I 3
An introduction to contemporary France, its culture, its people, their way of life and the issues confronting them. RESTRICTIONS: Not for major credit. Taught abroad only, in both English and French. Does not satisfy the foreign language requirement.

FREN 209 FRENCH CONVERSATION THROUGH FILM 3
Development of oral proficiency in French through discussion and analysis of major French films. Some written work and grammar review where appropriate. PREREQ: FREN107 or FREN112 or one 200-level French course RESTRICTIONS: Minimum grade of B required for prerequisites.

FREN 210 FRENCH CANADA PAST AND PRESENT 3
Examines the historical, economic, political, cultural, and literary evolution of Canada's Francophone province (1608 to the present). Explores strategies to preserve its unique cultural heritage including referenda on sovereignty and Law 101. Follows its transition from a post-Confederation, isolated region to an engaged player in global markets. COREREQ: FREN107 or FREN206. RESTRICTIONS: Taught abroad in French and English. Not for minor credit. Satisfies the following requirements: Arts and Sciences' Group B.

FREN 211 FRENCH READING AND COMPOSITION 3
Reading and discussion of French literature. Frequent compositions. Grammar review where appropriate. PREREQ: FREN200 with a minimum grade of C or FREN107 with a minimum grade of A- or FREN112 with a minimum grade of A-

FREN 250 INTRODUCTION TO BUSINESS FRENCH 3
Familiarizes students with characteristics of business French (terminology, syntactical patterns, etc.) and policies and practices of the French business community.
PREREQ: Any 200-level course taught in the French language

FREN 301 INTRODUCTION TO FRENCH LITERATURE: PROSE 3
Selected readings, with discussion and analysis, of the various genres of prose fiction (contes, nouvelles, romans) and nonfiction (essais) from the middle ages to the present. PREREQ: FREN211 and any 200-level course taught in the French language

FREN 302 INTRODUCTION TO FRENCH LITERATURE: POETRY AND THEATRE 3
Selected readings, with discussion and analysis, of the various genres of poetry (lyrical, epic, narrative) and theatre (comedy, tragedy, drama) from the middle ages to the present. PREREQ: FREN211 and any 200-level course taught in the French language

FREN 305 FRENCH CONVERSATION AND COMPOSITION 3
Discussion of cultural, social and political topics in French-speaking countries. Vocabulary building, grammar exercises and compositions. PREREQ: FREN211 and one other 200-level FREN course taught in French. RESTRICTIONS: Not intended for native speakers of French.

FREN 306 PRACTICAL ORAL/WRITTEN EXPRESSION 3
Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exposes, discussion of articles and videos, textual analysis and compositions. PREREQ: Any two 200-level French courses conducted in French RESTRICTIONS: Taught abroad only.

FREN 307 PRACTICAL ORAL EXPRESSION 3
Strengthens grammar and vocabulary skills in preparation for advanced courses, as well as everyday oral communication situations. Class exercises include oral exposes, skits, discussion of articles and videos. PREREQ: Any two 200-level FREN courses conducted in French. RESTRICTIONS: Taught abroad only.

FREN 308 CONTEMPORARY FRANCE 3
Discussion and study of issues related to contemporary cultural, political and social developments in France, including its people in today's European community. PREREQ: Any two 200-level French courses taught in the French language RESTRICTIONS: Taught abroad only and in French.

FREN 309 PRACTICAL WRITTEN EXPRESSION 3
Strengthens grammar and vocabulary skills through regular writing practice. Class exercises include compositions, analysis of literary texts, and study of authentic documents. PREREQ: FREN211 and any other 200-level FREN course taught in French. RESTRICTIONS: Taught abroad only.

FREN 314 FRENCH PHONETICS 3
Studies the sounds of the French language (both individual phonemes and items of connected speech, such as liaison, linking, intonation, etc.). Helps improve pronunciation of the language. PREREQ: Any two 200-level French courses RESTRICTIONS: Not intended for native speakers of French.

FREN 325 FRENCH CIVILIZATION I 3
A study of French cultural history from Gaul to the French Revolution. PREREQ: Any two 200-level French courses

FREN 326 FRENCH CIVILIZATION II 3
A study of French cultural history from the French Revolution to 1945. PREREQ: Any two 200-level French courses

FREN 350 ADVANCED BUSINESS FRENCH 3
Development of strategies to initiate and maintain oral and written communication in the world of business. Acquisition of commercial vocabulary, practice in speaking French in business situations, letter writing and article reading. Functional and cultural approach. PREREQ: Any two 200-level French courses, one preferably being FREN250

FREN 355 SPECIAL TOPICS: 3
Explores an area of special interest in French literature or culture studies.

FREN 366 INDEPENDENT STUDY 1-3
FREN 403 STRUCTURE OF FRENCH 3
Study of the sounds, morphology and syntax of the French language, as well as of discursive phenomena. Introduces students to the science of linguistics as applied to French. Taught in French. PREREQ: Two 300-level French courses, one of which should be FREN314.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREN 404</td>
<td><strong>ADVANCED COMPOSITION AND GRAMMAR</strong></td>
<td>3</td>
<td>Intensive writing practice in French (seven compositions, all to be revised), with systematic grammar review: past tenses, articles, adjectives, participles, passive voice, the conditional, the subjunctive, concordance of verb tenses, demonstrative pronouns.</td>
<td>PREREQ: Two 300-level French courses</td>
</tr>
<tr>
<td>FREN 405</td>
<td><strong>TRANSLATION AND STYLISTICS</strong></td>
<td>3</td>
<td>Focuses on vocabulary and translation skills (from French into English and vice-versa).</td>
<td>PREREQ: Two 300-level French courses with a minimum grade of B+.</td>
</tr>
<tr>
<td>FREN 406</td>
<td><strong>ADVANCED FRENCH LANGUAGE</strong></td>
<td>3</td>
<td>Grammatical structure and stylistics with special attention given to technical vocabulary and discourse.</td>
<td>PREREQ: Any 300-level French course RESTRICTIONS: Course taught abroad only.</td>
</tr>
<tr>
<td>FREN 407</td>
<td><strong>ADVANCED ORAL FRENCH</strong></td>
<td>3</td>
<td>Varied activities help students develop their oral expression and comprehension and gain confidence in oral communication situations. Class exercises include oral exposes, skits, discussion of articles and videos.</td>
<td>RESTRICTIONS: Only taught abroad.</td>
</tr>
<tr>
<td>FREN 409</td>
<td><strong>ADVANCED WRITTEN FRENCH</strong></td>
<td>3</td>
<td>Strengthens grammar and vocabulary skills through regular writing practice. Class exercises include compositions, analysis of literary texts, and study of authentic documents. Study of grammar and stylistics, with special attention given to technical vocabulary and discourse.</td>
<td>RESTRICTIONS: Taught abroad only.</td>
</tr>
<tr>
<td>FREN 411</td>
<td><strong>GREAT AUTHORS I: 1100-1750</strong></td>
<td>3</td>
<td>Selected readings of master authors and works from the Middle Ages to the Age of Enlightenment. Authors may include Voltaire, Machault, Moliere, Corneille, Mme. de Lafayette, Montesquieu, Voltaire and others.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 412</td>
<td><strong>GREAT AUTHORS II: 1750-PRESENT</strong></td>
<td>3</td>
<td>Selected readings of master authors and works from the dawn of Romanticism to the present. Authors may include Prevost, Rousseau, Hugo, Flaubert, Baudelaire, Gide, Proust, Camus, Sartre, Ionesco, Beckett, Duras and others.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 423</td>
<td><strong>FRENCH MEDIEVAL LITERATURE</strong></td>
<td>3</td>
<td>Survey of French literature to 1500.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 424</td>
<td><strong>FRENCH RENAISSANCE LITERATURE</strong></td>
<td>3</td>
<td>Selected works by Rabelais, the poets of the Pleiade, Montaigne and others.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 437</td>
<td><strong>SEVENTEENTH CENTURY FRENCH THEATRE</strong></td>
<td>3</td>
<td>Growth of French dramatic literature before 1715 and analysis of the principal plays of Corneille, Racine and Moliere.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 438</td>
<td><strong>SEVENTEENTH CENTURY FRENCH POETRY AND PROSE</strong></td>
<td>3</td>
<td>Representative novelists, poets, critics and moralists from Descartes and Pascal to La Fontaine, Boileau, Mme. de Lafayette and others.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 441</td>
<td><strong>THE EIGHTEENTH CENTURY: THE AGE OF VOLTAIRE</strong></td>
<td>3</td>
<td>Novels, plays, essays and poetry of such authors as Montesquieu, Marivaux, Prevost and Voltaire.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 442</td>
<td><strong>THE EIGHTEENTH CENTURY: THE AGE OF ROUSSEAU</strong></td>
<td>3</td>
<td>Novels, plays, essays and poetry of such authors as Diderot, Rousseau, Beaumarchais and Chenier.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 445</td>
<td><strong>NINETEENTH CENTURY FRENCH NOVEL</strong></td>
<td>3</td>
<td>The novel from Romanticism to Naturalism. Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 446</td>
<td><strong>NINETEENTH CENTURY FRENCH POETRY AND THEATRE</strong></td>
<td>3</td>
<td>Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 451</td>
<td><strong>TWENTIETH CENTURY FRENCH LITERATURE: THE AGE OF ANXIETY AND THE ABSURD</strong></td>
<td>3</td>
<td>Main trends from Gide, Celine and Malraux to Camus, Sartre and Beckett, including Surrealism, Existentialism and the Theatre of the Absurd.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 452</td>
<td><strong>ASPECTS OF CONTEMPORARY FRENCH LITERATURE</strong></td>
<td>3</td>
<td>A study of contemporary French literature, including novels, plays, essays and poetry of such authors as Robbe-Grillet, Sarrate, Perec, Tournier, Duras, Ponge, Bonnefoy, Jaccottet and Barthes.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 454</td>
<td><strong>FRENCH CINEMA</strong></td>
<td>3</td>
<td>Study of modern French cultural history through the films of such masters as Vigo, Gance, Pagnol, Renoir, Bresson, Resnais, Malle and others.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 455</td>
<td><strong>SELECTED AUTHORS, WORKS AND THEMES</strong></td>
<td>3-12</td>
<td>Works of one or more outstanding authors or on a special theme. RESTRICTIONS: May be repeated for credit when topics vary.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 456</td>
<td><strong>FRENCH THEATER WORKSHOP</strong></td>
<td>3</td>
<td>Study of French theater of different periods and genres, with an emphasis on staging and performance. Class activities include dramatic readings, improvisation, and exercises to improve diction. Culminates in a public presentation of students' work.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 457</td>
<td><strong>THE FRANCOPHONE WORLD</strong></td>
<td>3</td>
<td>Examines the social, cultural, political and historical aspects of various regions of the Francophone world (the Maghreb, Sub-Saharan Africa, the Caribbean, South East Asia (Vietnam and Lebanon) as well ad the Beur (descendants of the first generation of Maghrebi immigrants) phenomenon in the French banlieue (suburbs). Texts and films serve as points of entry into these multicultural communities.</td>
<td>PREREQ: Any two 300-level French courses</td>
</tr>
<tr>
<td>FREN 458</td>
<td><strong>TOPICS IN FRANCOPHONE LITERATURE</strong></td>
<td>3</td>
<td>Varying aspects of Francophone studies, such as women's writing, literature of Quebec, colonial literature, African literature and cinema, literature of immigration.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 459</td>
<td><strong>NEGRI'TUD, ANTILLANITE, CREOLITÉ</strong></td>
<td>3</td>
<td>Focuses on the literary movements of Negritude, Antillanite, and Creolite, and their relation to Caribbean identity, culture and history, as well as to the field of Francophone postcolonial studies.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 460</td>
<td><strong>LITTÉRATURE FRANCOPHONE ISSUE DE L’IMMIGRATION</strong></td>
<td>3</td>
<td>Introduction to literary productions by African, Caribbean and Asian immigrants in France. Acquire a understanding of relevant strands of current theoretical thinking through close analysis of texts. Examine recurrent themes and forms in immigrant literature, including: representation of identity; concepts of origins; intersection of race, class and gender; and textual strategies underpinning these considerations. Examine different ways these authors are redefining French literature.</td>
<td>PREREQ: Any two 300 level French literature courses</td>
</tr>
<tr>
<td>FREN 466</td>
<td><strong>INDEPENDENT STUDY</strong></td>
<td>1-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREN 533</td>
<td><strong>FRENCH READINGS FOR PH.D. CANDIDATES</strong></td>
<td>3</td>
<td>A basic course with emphasis on developing reading comprehension. RESTRICTIONS: Designed for graduate students in other disciplines who have had little or no previous experience with French.</td>
<td>PF</td>
</tr>
<tr>
<td>FREN 605</td>
<td><strong>TRANSLATION AND STYLISTICS</strong></td>
<td>3</td>
<td>Focuses on vocabulary and translation skills (from French into English and vice versa). Literary, commercial and journalistic texts serve as stylistic models.</td>
<td></td>
</tr>
<tr>
<td>FREN 611</td>
<td><strong>GREAT FRENCH AUTHORS I: 1100-1750</strong></td>
<td>3</td>
<td>Selected readings of master authors and works from the Middle Ages to the Age of Enlightenment. Authors may include Voltaire, Rabelais, Montaigne, Moliere, Corneille, Mme. de Lafayette, Montesquieu, Voltaire and others.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 612</td>
<td><strong>GREAT FRENCH AUTHORS II: 1750-PRESENT</strong></td>
<td>3</td>
<td>Selected readings of master authors and works from the dawn of Romanticism to the present. Authors may include Prevost, Rousseau, Hugo, Flaubert, Baudelaire, Gide, Proust, Camus, Sartre, Ionesco, Beckett, Duras and others.</td>
<td>PREREQ: Any two 300-level French literature courses</td>
</tr>
<tr>
<td>FREN 623</td>
<td><strong>FRENCH MEDIEVAL LITERATURE</strong></td>
<td>3</td>
<td>Survey of French literature to 1500.</td>
<td></td>
</tr>
</tbody>
</table>
FREN 624 FRENCH RENAISSANCE LITERATURE  3
Selected works by Rabelais, the poets of the Pleiad, Montaigne and others.

FREN 637 SEVENTEENTH CENTURY FRENCH THEATRE  3
Growth of French dramatic literature before 1715 and analysis of the principal plays of Corneille, Racine and Moliere.

FREN 638 SEVENTEENTH CENTURY FRENCH POETRY AND PROSE  3
Representative novelists, poets, critics and moralists from Descartes and Pascal to La Fontaine, Boileau, Mme. de La Fayette and others.

FREN 641 THE EIGHTEENTH CENTURY: THE AGE OF VOLTAIRE  3
Novels, plays, essays and poetry of such authors as Montesquieu, Marivaux, Prevost and Voltaire.

FREN 642 THE EIGHTEENTH CENTURY: THE AGE OF ROUSSEAU  3
Novels, plays, essays and poetry of such authors as Diderot, Rousseau, Beaumarchais and Chenier.

FREN 645 NINETEENTH CENTURY FRENCH NOVEL  3
The novel from Romanticism to Naturalism. Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.

FREN 646 NINETEENTH CENTURY FRENCH POETRY AND THEATRE  3
Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.

FREN 651 TWENTIETH CENTURY FRENCH LITERATURE: THE AGE OF ANXIETY AND THE ABSURD  3
Main trends from Gide, Celine and Malraux to Camus and Beckett, including Surrealism, Existentialism and the Theater of the Absurd.

FREN 652 ASPECTS OF CONTEMPORARY FRENCH LITERATURE  3
A study of contemporary French literature, including novels, plays, essays and poetry of such authors as Robbe-Grillet, Sarraute, Perea, Tournier, Duras, Ponel, Montale, Jaccottet and Barthes.

FREN 655 SELECTED AUTHORS, WORKS AND THEMES  3-12
Works of one or more outstanding authors or on a special theme. RESTRICTIONS: May be repeated for credit when topics vary.

FREN 658 TOPICS IN FRANCOPHONE LITERATURE  3
Varying aspects of Francophone studies, such as women's writing, literature of Quebec, colonial literature, African literature and cinema, literature of immigration.

FREN 659 NEGRITUDE, ANTILIANITE, CREOLITE  3
Focuses on the literary movements of Negritude, Antiliane, and Creolite, and their relation to Caribbean identity, culture and history, as well as to the field of Francophone postcolonial studies.

FREN 869 MASTER'S THESIS  1-6

FREN 875 TOPICS: FRENCH LITERATURE  3
Study of selected topics, authors and works in the various fields of French literature. Emphasizes preparation of seminar presentations and term paper. RESTRICTIONS: May be repeated for credit when topics vary.

FSAN 817 LARGE SCALE MACHINE LEARNING  3
Introduction to the analysis and processing of massive high-dimensional data. Massive data sets generally involve growth not in the number of individuals represented but also in the number of descriptive parameters of the individuals, leading to exponential growth in the number of hypothesis considered. New approaches to address these problems exploit sparsity prior concepts from optimization theory, signal processing, statistics, and machine learning. Crosslisted with ELEG817. PREREQ: ELEG815.

FSAN 820 FOUNDATION OF OPTIMIZATION  3
Concept of optimization, convex set, convex function, unconstrained optimization, convex optimization problems, including least-squares, linear, and quadratic optimization, duality theory, sensitivity analysis. Modeling of more advanced optimization techniques including integer programming, geometric and semi-definite programming, and convex relaxations. PREREQ: First course on linear algebra and calculus.

FSAN 853 BUSINESS PROCESS MANAGEMENT INNOV  3
Employs a data-driven approach to designing, managing, and improving the business processes that execute a firm's strategy. Exploring the linkage between strategy and business process design and quickly moves into identifying key process metrics which have greatest leverage on improving performance at both the process and firm-wide levels. Planning and controlling for variability in business processes is discussed with applications drawn from diverse settings. Become proficient in improving processes based on leveraging data and learning to deploy resources and information to achieve consistently good outcomes.

FSAN 831 ENTERPRISE INFORMATION SYSTEMS  3
Focus on the various technologies and implementation issues of enterprise information system (EIS). Students will learn the critical role of EIS in business organizations, the interplay between business processes and EIS, how to use and configure an EIS, and the best practices in managing an EIS. (Primary designation MISY; secondary designation FSAN. Crosslisted with MISY831.

FSAN 841 FINANCIAL SERVICES MARKETS  3
Focuses on the economic roles and interactions of the units in each sector of the financial services industry. Overview of the current and changing layout of institutions, products, and practices. Crosslisted with FINC841.

FSAN 842 FINANCIAL SERVICES RISK ANALYTICS  3
Develops the theoretical and practical foundations of resource allocation across time and risky assets, and of credit risk and systemic considerations. Topics include allocation of resources across time, allocation of resources across risks and credit risk and systemic considerations. Crosslisted with FINC842.

FSAN 843 FINANCIAL SERVICES REGULATION  3
Examines the regulatory environment of financial services industry, including the New York, London, and Paris, and regulatory bodies. The role of government and individuals, using people, processes and technology, meet their ethics, compliance and control objectives in a global environment. Crosslisted with FINC843.

FSAN 850 FINANCIAL SERVICES ANALYTICS SEMINAR  3
Concentrated study on selected areas in Financial Services Analytics. RESTRICTIONS: 6 credits of this class is required in the Financial Services Analytics PhD program.

FSAN 860 CURRENT RESEARCH TOPICS  1-9 PF
Upper-level graduate research oriented toward the student's potential Doctoral Dissertation.

FSAN 869 DOCTORAL DISSERTATION  9 PF
Independent dissertation research after completion of applicable coursework and examinations.

FINANCIAL SERVICES ANALYTICS

FSAN 815 ANALYTICS I: STATISTICAL LEARNING  3

GEOG 101 PHYSICAL GEOGRAPHY: CLIMATIC PROCESSES  3
Introduction to processes responsible for weather, climate and climatic change. Implications of climate for ecosystems and human activities. Earth-sun relations, geographic coordinate systems and map interpretation. Together GEOG101 and 106 form a comprehensive introduction to physical geography and its tools.

GEOG 102 HUMAN GEOGRAPHY  3
Examination of the spatial distribution of human activities worldwide. Particular attention is given to those factors and processes that have led to spatial inequality and locational conflict from the international scale to the neighborhood scale.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 106</td>
<td>Physical Geography: Land Surface Processes</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 111</td>
<td>Climatic Processes Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 120</td>
<td>World Regional Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 152</td>
<td>Climate and Life</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 166</td>
<td>Special Problem</td>
<td>1-3</td>
</tr>
<tr>
<td>GEOL 203</td>
<td>Introduction to Cultural Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 210</td>
<td>Economic Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 215</td>
<td>Full of Hot Air Understand Climate CHG</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 219</td>
<td>Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 220</td>
<td>Meteorology Lab</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 225</td>
<td>Historical Geography of the United States</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 226</td>
<td>Geography of Latin America</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 228</td>
<td>Geography of China</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 230</td>
<td>Human Impact on the Environment</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 235</td>
<td>Conservation of Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 236</td>
<td>Conservation: Global Issues</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 240</td>
<td>Environment and Behavior</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 250</td>
<td>Computer Methods for Geographic and Environmental Sciences</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 255</td>
<td>Applied Climatology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 260</td>
<td>Digital Geography 1</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 271</td>
<td>Introduction to Geographic Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 279</td>
<td>Geography of Central and Western Europe</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 310</td>
<td>Social Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 315</td>
<td>People, Politics and Place</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 320</td>
<td>Water and Society</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 325</td>
<td>Urban Geography</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 329</td>
<td>International Migration</td>
<td>3</td>
</tr>
</tbody>
</table>

University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

**GEOL 106 Physical Geography: Land Surface Processes**
Introduction to processes responsible for the development, modification, distribution and variety of landforms and soils. Implications for human activities. Analysis of topographic maps and air photo interpretation. Together GEOL101 and 106 form a comprehensive introduction to physical geography and its tools.

**GEOL 111 Climatic Processes Laboratory**
Laboratory investigation of processes responsible for weather, climate and climatic change. Implications of climate for ecosystems and human activities. Earth-sun relations, geographic coordinate systems and map interpretation. COREQ: GEOL101.

**GEOL 120 World Regional Geography**
Introduction to the geographic regions of the world and the changing relations between regions. Emphasis is on environmental, economic, and political geographic relationships between industrial and developing nations.

**GEOL 152 Climate and Life**
Introduction to those physical and biological processes that shape our climatic environment. Important themes include the exchanges of energy and mass between the atmosphere and both vegetation and built environments; and the influence of climate on humans and humans on climate.

**GEOL 166 Special Problem**
1-3

**GEOL 203 Introduction to Cultural Geography**
Introductory study of people, landscapes and cultures through time. Emphasis is on culture, ethics and aesthetics as contexts for human perceptions and the creation of varied human habitats.

**GEOL 210 Economic Geography**
Areal variation on the earth's surface of human activities related to producing, exchanging and consuming wealth. World distributional patterns of the major economic activities.

**GEOL 215 Full of Hot Air Understand Climate CHG**
Understanding climate and climate change is important for everyone. Explores climate change and its impacts at local, regional, and global levels. Policy and decision making, as well as adaptation and mitigation will be discussed with a focus on current events. Crosslisted with MAST215.

**GEOL 220 Meteorology**
Analysis of the atmosphere, weather elements, air masses, fronts and storms. Principles of weather forecasting, especially as it relates to severe weather.

**GEOL 221 Meteorology Lab**
Meteorology lab will introduce students to basic concepts in meteorology through the completion of experiments and mapping analysis exercises. COREQ: GEOL220.

**GEOL 225 Historical Geography of the United States**
Persistence and change of settlements, economic activities and social/cultural behavior in development of different geographical regions of the United States.

**GEOL 226 Geography of Latin America**
Physical, historical and cultural geography of Latin America.

**GEOL 228 Geography of China**
Introduces the physical, economic, cultural and political geography of China. Particular emphasis is placed on the diversity of physical environments, cultures, and economic activity within China.

**GEOL 230 Human Impact on the Environment**
Provides an introduction to the past, present, and future impacts of humans on Earth. Topics include anthropogenic impacts on vegetation, animals, soils, water, landforms, and the atmosphere, and possible future impacts as a result of global change. Particular attention is paid to the interconnections among environmental systems and the influence of human activities.

**GEOL 235 Conservation of Natural Resources**
Physical, social and economic problems involved in integrating resource management and maintaining environmental quality.

**GEOL 236 Conservation: Global Issues**
Introduces the global nature of resources management and discusses the relationships between population growth, the market economy, agricultural production and mineral and energy exploitation, worldwide.

**GEOL 240 Environment and Behavior**
Interdisciplinary introduction to individual and group behavior in relation to developed and natural environments. The implications of such human environment interactions for planning.

**GEOL 250 Computer Methods for Geographic and Environmental Sciences**
Modern Fortran programming for application to data analysis and modeling, with examples and applications from the geographical and environmental sciences. Topics include the basics of data reduction, numerical modeling, and design and use of scientific graphics. PREREQ: MATH115 or MATH 117.

**GEOL 255 Applied Climatology**
Application of climatic information to practical problems of agriculture, irrigation and crop scheduling, health, clothing, water resources, architecture and industry.

**GEOL 260 Digital Geography 1**
Introduction to media technology and digital storytelling techniques. Will learn how to communicate geographic information important to environmental and social problems. Emphasis is on hands-on multimedia production.

**GEOL 271 Introduction to Geographic Data Analysis**
A survey of computational, statistical, and graphical techniques used in scientific data analysis with particular emphasis on the special nature of geographic and spatial data. Includes scripting language programming.

**GEOL 309 Geography of Central and Western Europe**
Environments, cultures, utilization of resources, problems of development and future opportunities in central and western European countries. Field trips to see geographic features (alpine landscapes) specific to Austria.

**GEOL 310 Social Geography**
Some of the socio-economic, political, historical and cultural factors that have created and reinforced distinctively separate spaces for diverse groups of people in the United States are examined. Using films, novels, academic articles, media accounts, and census information about their own hometowns, students will examine attitudes and actions that socially and spatially relegate ethnic and socio-economic minorities to less-than-privileged places. Besides looking at the role of race/ethnicity in the creation of a distinctively American social geography we will address how religion, class, gender, and generational differences shape the ways that people imagine, design, regulate, defend and give meaning to the spaces that they inhabit.

RESTRICTIONS: Not open to first year students.

**GEOL 315 People, Politics and Place**
Course readings and off-campus fieldwork in this applied geography DLE course will address geopolitical issues faced by real people in real places. Topics and nearby fieldwork locations vary by semester, depending on community partnerships and project parameters set up by the instructor ahead of time. RESTRICTIONS: Not intended for freshmen.

**GEOL 320 Water and Society**
Study of the physical occurrence and distribution of water in all parts of the hydrologic cycle: introduces the nature of human demands for water, the possibilities of obtaining additional supplies and the difficult legal, economic and political questions of management of water resources.

**GEOL 325 Urban Geography**
Spatial relationships of urban areas, focusing on the structure of towns, the organization of urban space and the external relationships of cities.

**GEOL 329 International Migration**
Interdisciplinary introduction to alternative/complementary disciplinary approaches to the study of human movement between states. Offered on a rotational basis by faculty involved in the University of Delaware migration group. Crosslisted with POSC329.
GEOG 341 CLIMATE AND CLIMATE CHANGE 3
Understanding the Earth’s climate and how the climate is changing is a fundamental part of modern earth system science. Explores the scientific basis for the study of climate and climate change, including long-term and modern change, with a discussion of current topics. May be crosslisted with GEOL341, MAST341.

GEOG 342 BIOClimATOLOGY 3
Biosphere-atmosphere interactions and corresponding feedbacks are examined in detail. Emphasis also is placed on the influences of weather and climate on plants, animals, and humans.

GEOG 345 CULTURAL GEOGRAPHY 3
Broad principles of the field. Human mobility and stasis. Material and symbolic landscapes. Individual and group values in landscape formation and change.

GEOG 346 URBAN CULTURAL GEOGRAPHY 3
City landscapes as expressions of attitudes and ideals. Oriental and Western; classical, modern and future. Humanizing the urban landscape.

GEOG 351 FIELD METHODS IN METEOROLOGY 3
Sampling, instrumentation, measurement, analysis, and interpretation of data concerning properties and processes of the atmospheric environment. Use of field and laboratory equipment within the context of research and monitoring projects. Practical application of climatological and meteorological principles. Exploration of quality control methods and database techniques.

GEOG 360 DIGITAL GEOGRAPHY II 3
Builds on GEOG260 - Digital Geography I and introduces students to additional media technology and storytelling techniques. Other concurrent courses may be considered with permission of Instructor. External hard drive formatted for MAC required. PREREQ: GEOG260. COREQ: GEOG315 or GEOG372, or permission of instructor.

GEOG 366 INDEPENDENT STUDY 1-6

GEOG 372 INTRODUCTION TO GIS 3
Fundamental geographic concepts and principles necessary to effectively use GIS to examine geographic problems. Hands-on training is provided in the use of professional GIS software in the context of collecting, managing, processing, and presenting geographic data. Emphasis is placed on the nature of spatial data, modeling techniques, and cartographic design.

GEOG 390 HONORS colloquium 1

GEOG 405 COMPUTING FOR ENVIRONMENTAL RESEARCH 2
Using a mixture of guided self-study and lecture, students learn modern Fortran programming for application to environmental data analysis and atmospheric and geological modeling. Older language features and use of legacy codes are also covered lightly.

GEOG 408 HEAT AND LIGHT IN NATURE - RADIATIVE TRANSFER 3
The energetic interaction of sunlight with the atmosphere and oceans influences the entire earth system. Examines the theory of radiative transfer within the ocean and atmosphere, and then explores several areas of applicable research including climate modeling and remote sensing. Crosslisted with MAST408.

GEOG 409 THE OCEAN & CLIMATE VARIATION 3
Study of the ocean-atmosphere system; the fluxes of heat, water and energy in the ocean and interchanges with the atmosphere; budgets and mechanisms of exchange; and interannual and long-term climate variations as related to the ocean. Crosslisted with MAST409.

GEOG 411 FLuvIAL GEOMORPHOLOGY 3

GEOG 412 PHYSICAL CLIMATOLOGY 4
Investigates the nature of the Earth’s climate by examining the physical processes that maintain our climate system. Focuses primarily on the flow of energy and moisture in the global climate and its geographic variation on scales of hundreds to thousands of kilometers. Human-induced modifications to the climate system, such as urbanization, anthropogenic global warming, desertification, and tropical deforestation, are also discussed. The lab portion of the class teaches descriptive, analytical, programming and mapping skills to model our climate system and to illustrate the analyses of climate datasets. PREREQ: MATH241 and GEOG220.

GEOG 413 METEOROLOGICAL PROCESSES FOR WIND ENERGY 3
Explores the fundamental concepts of meteorology that are needed to understand onshore, offshore, and airborne wind energy. Topics include: forces affecting winds; terrain and land-use effects; air turbulence; numerical modeling; wind power and energy from turbines; and wind measurement technologies. Crosslisted with MAST413. PREREQ: MATH241, MATH242, and MATH243 or GEOG220; PHYS201 or PHYS207.

GEOG 415 METEOROLOGIC PROCESSES IN AIR POLLUTION 3
An introduction to meteorological processes that affect air pollution, such as diffusion, atmospheric stability, and turbulence, with a focus on the atmospheric boundary layer. Crosslisted with MAST415. PREREQ: MATH241 and MATH242; CHEM104 or CHEM112; PHYS201 or PHYS207.

GEOG 417 SEMINAR IN CLIMATE CHANGE 3
Examines facts and fallacies regarding global warming and climate science and assesses the current state of scientific understanding of and ability to forecast climate change. PREREQ: GEOG101 or GEOG152 or GEOG220 or equivalent.

GEOG 420 ATMOSPHERIC PHYSICS AND THERMODYNAMICS 3
Introduction to composition and structure of the atmosphere. Includes atmospheric thermodynamics through introductory cloud physics. PREREQ: GEOG220 and MATH241.

GEOG 421 PHYSICAL METEOROLOGY 3
Physics and thermodynamics of cloud particles and precipitation. Includes cloud droplet growth, aggregation, precipitation, ice crystal formation, atmospheric electricity, optics, cloud-radiation interactions, acoustics and weather radar. PREREQ: MATH242.

GEOG 422 RESOURCES, DEVELOPMENT AND THE ENVIRONMENT 3
Focuses on food, resources, energy and population issues in relationship to economic development and the global environment. The main objective is to engage students in discussion and debate on sustainable development policies.

GEOG 423 ATMOSPHERIC DYNAMICS 3
Investigates atmospheric motion in a quantitative manner. Expands basic conservation laws to derive the equations of atmospheric motion and to develop the concepts of vorticity and circulation. Discusses atmospheric wave motion and general circulation. PREREQ: MATH242 and GEOG220. COREQ: MATH243.

GEOG 424 WEATHER FORECASTING 3
Basic concepts behind weather and climate forecasting. Understanding numerical models and how to interpret their output. Application of satellite and radar products into weather forecasting. Involves operational weather forecasting and provides practice in forecasting and surface map analysis. PREREQ: GEOG220 or GEOG423. RESTRICTIONS: Requires permission of instructor.

GEOG 426 ADVANCED ATMOSPHERIC DYNAMICS 3
Part 2 of Atmospheric Dynamics (GEOG 423/623). Topics include Boussinesq approximation, Vorticity dynamics, Kelvin’s circulation theorem; Vorticity equation; Wave theory; Surface and internal gravity waves; and Geophysical fluid dynamics. May be crosslisted with MAST426. PREREQ: MATH243, MATH302, GEOG423.

GEOG 431 WATERSHED HYDRO-ECOLOGY 3
Examines key linkages between hydrology and ecosystem processes in natural and human impacted watersheds. Topics include water quantity and quality and material source, transport and fate in terrestrial and aquatic ecosystems, as affected by biotic and abiotic stressors, including changes in land-use and climate. PREREQ: MATH114 or MATH117; and GEOG432 or GEOG632.

GEOG 432 ENVIRONMENTAL HYDROLOGY 3
Introduction to hydrologic science. Topics include precipitation, snowmelt, evapotranspiration, infiltration, groundwater, runoff, streamflow, water resources management, and hydrologic applications of remote sensing and geographic information systems. Case studies illustrate hydrological response to changes in land-use and climate. Group studies include field measurements and computer simulations. PREREQ: MATH114 or MATH117.
GEOG 434  PLAN SUSTAINABLE COMMUNITIES & REGIONS  3
Examines theory and methods for planning for more sustainable communities and regions in a global context in the twenty-first century. Sustainable development is defined and theories of sustainable planning presented that meet goals in the areas of environment, economy, and equity (the Three Es). After discussion of issues central to sustainable planning, course looks at tools for sustainable planning and how current land use and regional planning is and can become more oriented to sustainability. The University of Delaware is featured as an example of sustainable planning. May be crosslisted with UAPP406.

GEOG 438  WORLD CITIES IN COMPARATIVE PERSPECTIVE  3
World city as a new and distinctive geographic urban form in the world economy. Case studies explore common features of internal structure and external relationships of world cities, their growing environmental problems and extent to which they have decoupled from national cultures and economies.

GEOG 445  METHOD AND THEORY IN GEOGRAPHY  3
The nature of geography, its history, methodology and applications in research and societal problems. A pre-professional course.

GEOG 446  POLITICAL ECOLOGY  3
Introduces students to the subfield of Political Ecology within Geography. Political ecology is concerned with the political and economic factors that shape the use of natural resources.

GEOG 449  ENVIRONMENT AND SOCIETY  3
Considers the relationships between environmental and social processes from the theoretical, philosophical and methodological perspectives of geography. Explores the ethical and contextual implications of framing environmental questions and posing solutions. Examines approaches to the geographical analysis of environmental problems.

GEOG 450  GLOBAL AT HOME  3
Impacts of global migration on immigrant-receiving and/or immigrant-sending communities are examined to understand the experience of home. Perceptions, policies and practices contributing to social-spatial exclusion/inclusion at multiple scales are addressed. Project-based fieldwork enables students to gain first-hand knowledge of the experiences of mobility and adjustment.

RESTRICTIONS: For juniors and seniors only.

GEOG 451  MICROCLIMATOLOGY  4
Introduction to instrumentation and techniques involved in micrometeorological monitoring and sampling. Students have the unique opportunity to collect field data through a semester-long research project. Research results are written to the specifications of a peer-reviewed scientific journal.

GEOG 452  SEMINAR IN CLIMATOLOGY  3
General theoretical and practical considerations of research in climatology. RESTRICTIONS: Requires permission of instructor.

GEOG 453  METEOROLOGICAL ANALYSIS I  3
The collection, visualization and application of meteorological data is emphasized in the context of diagnosing and forecasting atmospheric systems. The interpretation of meteorological observations and numerical models is a major focus of this class. PREREQ: GEOG220.

GEOG 454  METEOROLOGICAL ANALYSIS II  3
The application of theory and real-time observations in diagnosing present and predicting future weather. Focus is on application of quasi-geostrophic theory and isotropic analysis in weather forecasting. Analysis and interpretation of meteorological observations and numerical models will be emphasized and applied to jet streams, mid-latitude cyclones and fronts. PREREQ: GEOG453, MATH241.

GEOG 456  HYDROCLIMATOLOGY  3
Study of the hydrologic cycle as it relates to water in the atmosphere and in and on the earth's surface. Hydrologic processes including precipitation, soil moisture, evapotranspiration, runoff and streamflow are examined. PREREQ: MATH241.

GEOG 457  NUMERICAL WEATHER PREDICTION  3
Introduces students to the basic numerical techniques used in current models to predicting and/or simulating weather. Topics include: conservation equations of the atmosphere (momentum, energy, mass); numerical methods of solution (finite difference schemes, time splitting); boundary and initial conditions; coordinate systems (horizontal, vertical, staggering); parameterization schemes (turbulence, radiation, moist physics); and model application and evaluation. Particular emphasis will be placed on the Weather Research and Forecasting (WRF) model. Students will learn to run the WRF model and use it as a benchmark for testing and applying the techniques learned in class. May be crosslisted with MAST457. PREREQ: GEOG405, MATH243, MATH302, GEOG423.

GEOG 458  PALEOClimATOLOGY  3
Covers the factors that cause natural variations in Earth's climate on different time scales, focusing on biotic, geologic, and geochronologic records. Includes discussion of changing continental configurations, atmospheric greenhouse gas levels, and the Earth-Sun geometry on ocean circulation and climate change. May be crosslisted with GEOI458, MAST458.

GEOG 459  REGIONAL CLIMATOLOGY: TECH & APPL  3
Global change is impacting an increasing number of sectors in science, engineering and policy, creating a need for high-resolution regional climate data used in impact assessments and mitigation plans. The primary objective of this course is to understand regional climate processes, modeling techniques, and tools for analysis. PREREQ: GEOG220 and MATH241, or permission of instructor.

GEOG 464  INTERNSHIP IN GEOGRAPHY  1-6
On-the-job experience in governmental or private planning, consulting, environmental or engineering agencies.

GEOG 466  INDEPENDENT STUDY  1-6

GEOG 468  DIGITAL WORLDS  3
Investigates the ethics, limitations, and implications of how geographic information is gathered, digitized, analyzed, and communicated in the media-enriched and socially-networked world we live in. A digital geography project is completed to examine how digital technologies are transforming knowledge production in the sciences, social sciences and humanities. PREREQ: 9 credit hours of digital geography coursework or permission of instructor.

GEOG 470  COMPUTER CARTOGRAPHY  4
Introduction to cartographic theory and computational methods necessary for drawing maps with the aid of a digital computer. PREREQ: GEOG220.

GEOG 471  ADVANCED GIS  3
Advanced study of geographic information science and systems (GIS) including more complex spatial data models, editing and topology, data encoding, data quality, preprocessing techniques, spatial analysis, and cartography and visualization techniques. Hands-on experience using commercial and/or open source GIS package. PREREQ: GEOG372 or permission of instructor, and MATH114, MATH115, or MATH117.

GEOG 473  SELECT TECHNICAL TOPICS  1-3
Technical skills training focused on a specific aspect of the processing, analysis, modeling, and visualization of geographic data. The course content of each 1-3 credit course will vary to target a specialized technical topic using high end software such as ArcGIS and ENVI.

GEOG 474  INTRODUCTION TO ENVIRONMENTAL REMOTE SENSING  3
Introduces the fundamental characteristics of electromagnetic radiation, energy interactions, sensors, and ways to extract meaningful geophysical information from remote sensing data to solve geographical and environmental problems. Airphoto interpretation, photogrammetry, and digital image processing techniques are described through in-class demonstrations and hands on exercises using a professional grade image processing system. PREREQ: GEOG271, MATH115 or MATH117.

GEOG 475  SATELLITE CLIMATOLOGY  3
Use of satellite observations to study the climate system. Discussion considers the development of satellite climatology, sensors, platforms and methodologies used to estimate climate variables from radiation measurements. Aspects of climate that are emphasized include cloud climatologies, cloud systems, atmospheric moisture, radiation budget, land-surface conditions. PREREQ: GEOG412 or GEOG/MAST408, or permission of instructor.
GEOG 476 GIS REMOTE SENSING TECHNICAL CONSULTANT 3
Students with prior GIS/remote sensing experience serve as peer consultants for one of the introductory GIS/remote sensing courses (e.g., GeoG372, Freq480). The consultant assists a student team in formulating an assigned project into a logical sequence of analytic steps, develops his/her own solution to the GIS project, and presents a seminar on that project. This course is not strictly software-specific, and may offer consultants exposure to alternative software packages.
RESTRICTIONS: Permission of instructor.

GEOG 477 SPATIAL DATA ANALYSIS 3
Special approaches to analysis of data associated with points, lines and areas on the Earth's surface commonly encountered in environmental sciences. Introduces mapping, graphical and quantitative approaches to analyzing spatial data. Fortran programs developed and used.
PREREQ: GEOG271.

GEOG 482 PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS 3
Survey and analysis of land surface processes in polar and mountain environments. Emphasis on the ground thermal regime, permafrost, periglacial (cold climate, nonglacial) landforms and environmental problems in cold regions. May be crosslisted with GEOG482. PREREQ: GEOG406 or GEOG105/115 or GEOG107.

GEOG 485 GEOMORPHOLOGY 3
Survey of natural landforms and the processes that shape them. Topics include landscape evolution, dynamic equilibrium, rates of landform change, and the topographic response to tectonic and climatic forcing. May be crosslisted with GEOG485. PREREQ: GEOG107 or permission of the instructor.

GEOG 600 PRELUDE TO GEOGRAPHY 1
Introduction to contemporary American geography, especially its research and educational frontiers. Also emphasizes theoretical and practical considerations in formulating, carrying out and evaluating geographic research. Students additionally are required to attend (and then discuss) the Department's Friday afternoon guest lectures.
RESTRICTIONS: Open to graduate students in geography and climatology only.

GEOG 601 PROSEMINAR IN GEOGRAPHY I 2
Examines the contemporary structure of geography, as its theories and approaches to inquiry. Surveys the discipline's historical development, and introduces bibliographic and electronic literature searches, how to formulate a research question and organize research into that question.
RESTRICTIONS: Open to graduate students in geography and climatology.

GEOG 602 PROSEMINAR IN GEOGRAPHY II 2
Deepens ability to conduct research into a thesis or dissertation project. By the end of the course, students are expected to have a complete draft of the literature review chapter of their thesis or dissertation.
PREREQ: GEOG601

GEOG 604 GIS FOR ENVIRONMENTAL RESEARCH 3
Explores the application of GIS to environmental problems. Reviews current research in the field, and implements relevant techniques for analysis of a variety of environmental problems.

GEOG 605 COMPUTER PROGRAMMING FOR ENVIRONMENTAL RESEARCH 2
Using a mixture of guided self-study and lecture, students learn modern Fortran programming for application to environmental data analysis and atmospheric and geological modeling. Older language features and use of legacy codes are also covered lightly.

GEOG 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.
Crosslisted with MAST606.

GEOG 608 HEAT AND LIGHT IN NATURE - RADIATIVE TRANSFER 3
The energetic interaction of sunlight with the atmosphere and oceans influences the entire earth system. Examines the theory of radiative transfer within the ocean and atmosphere, and then explores several areas of applicable research including climate modeling and remote sensing.
Crosslisted with MAST608.

GEOG 609 THE OCEAN & CLIMATE VARIATION 3
Study of the ocean-atmosphere system; the fluxes of heat, water and energy in the ocean and interchanges with the atmosphere; budgets and mechanisms of exchange; and interannual and long-term climate variations as related to the ocean.
Crosslisted with MAST609.

GEOG 611 FLUVIAL GEOMORPHOLOGY 3
Crosslisted with GEOG611.

GEOG 612 PHYSICAL CLIMATOLOGY 4
Energy and moisture exchange between the atmosphere and land surface for characteristic natural and human-modified environments.
PREREQ: MATH241 and GEOG605.

GEOG 613 METEOROLOGICAL PROCESSES FOR WIND ENERGY 3
This course explores the fundamental concepts of meteorology that are needed to understand onshore, offshore, and airborne wind energy. Topics include: forces affecting winds; terrain and land-use effects; air turbulence; numerical modeling; wind power and energy from turbines; and wind measurement technologies.
Crosslisted with MAST613.

GEOG 615 METEOROLOGICAL PROCESSES IN AIR POLLUTION 3
An introduction to meteorological processes that affect air pollution, such as diffusion, atmospheric stability, and turbulence, with a focus on the atmospheric boundary layer.
Crosslisted with MAST615.
PREREQ: MATH 241 and MATH 242; CHEM104 or CHEM112; PHYS201 or PHYS207.

GEOG 617 SEMINAR IN CLIMATE CHANGE 3
Examines facts and fallacies regarding global warming and climate science and assesses the current state of scientific understanding of and ability to forecast climate change.
PREREQ: GEOG101 or GEOG152 or GEOG220 or equivalent.

GEOG 620 ATMOSPHERIC PHYSICS AND THERMODYNAMICS 3
Introduction to composition and structure of the atmosphere. Includes atmospheric thermodynamics through introductory cloud physics.
PREREQ: MATH241 and GEOG220.

GEOG 621 PHYSICAL METEOROLOGY 3
Physics and thermodynamics of cloud particles and precipitation. Includes cloud droplet growth, aggregation, precipitation, ice crystal formation, atmospheric electricity, optics, cloud-radiation interactions, acoustics and weather radar.

GEOG 622 RESOURCES, DEVELOPMENT AND THE ENVIRONMENT 3
Focuses on food, resources, energy and population issues in relationship to economic development and the global environment. Engages students in discussion and debate on sustainable development policies.
May be crosslisted with UAPP622.

GEOG 623 ATMOSPHERIC DYNAMICS 3
Investigates atmospheric motion in a quantitative manner. Expands basic conservation laws to derive the equations of atmospheric motion and to develop the concepts of vorticity and circulation. Discusses atmospheric wave motion and general circulation.
PREREQ: MATH242 and GEOG220. COREQ: MATH243.

GEOG 631 WATERSHED HYDRO-ECOLOGY 3
Examines key linkages between hydrology and ecosystem processes in natural and human-impacted watersheds. Topics include water quantity and quality and material source, transport and fate in terrestrial and aquatic ecosystems, as affected by biotic and abiotic stressors, including changes in land-use and climate.
PREREQ: MATH114 or MATH117; and GEOG432 or GEOG632.

GEOG 632 ENVIRONMENTAL HYDROLOGY 3
Introduction to hydrologic science. Topics include precipitation, snowmelt, evapotranspiration, infiltration, groundwater, runoff, streamflow, water resources management, and hydrologic applications of remote sensing and geographic information systems. Case studies illustrate hydrological response to changes in land-use and climate. Group studies include field measurements and computer simulations.
PREREQ: MATH114 or MATH117.

GEOG 634 PLAN SUSTAINABLE COMMUNITIES & REGIONS 3
Examines theory and methods for planning for more sustainable communities and regions in a global context in the twenty-first century. Sustainable development is defined and theories of sustainable planning presented that meet goals in the areas of environment, economy, and equity (the Three Es). After discussion of issues central to sustainable planning, course looks at tools for sustainable planning and how current land use and regional planning is and can become more oriented to sustainability. The University of Delaware is featured as an example of sustainable planning. May be crosslisted with UAPP706.
GEOG 636 RESEARCH TOPICS IN HISTORIC PRESERVATION 3
Seminar addresses a specific research issue 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. Crosslisted with UAPP636.

GEOG 638 WORLD CITIES IN COMPARATIVE PERSPECTIVE 3
World city as a new and distinctive geographic urban form in the world economy. Case studies explore common features of internal structure and external relationships of world cities, their growing environmental problems and extent to which they have decoupled from national cultures and economies. May be crosslisted with UAPP638.

GEOG 641 SUMMER INSTITUTE FOR GEOGRAPHY TEACHERS I 3
Explores the content, perspectives, and methods of geography, focusing on maps and spatial analysis (Delaware Geography Standard 1) and how humans interact with the physical environment (Delaware Standard 2). Content presented relates directly to the requirements of the K-12 Delaware Content Standards in Geography.

GEOG 644 ADVANCED SUMMER INSTITUTE FOR GEOGRAPHY TEACHERS 3
Designed as a summer institute for K-12 teachers of geography who desire additional instruction in specialized areas of geographical education. Topics include geographical information systems, transportation geography, climatic change, and Arctic Geography. PREREQ: GEOG641 and GEOG642.

GEOG 645 METHOD AND THEORY IN GEOGRAPHY 3
The nature of geography, its history, methodology and applications in research and societal problems. A preprofessional course.

GEOG 646 POLITICAL ECOLOGY 3
Introduces students to the subfield of Political Ecology within Geography. Political ecology is concerned with the political and economic factors that shape the use of natural resources.

GEOG 649 ENVIRONMENT AND SOCIETY 3
Considers the relationships between environmental and social processes from theoretical, philosophical, and methodological perspectives of geography. Explores the ethical and contextual implications implied in framing environmental questions and posing solutions. Examines approaches to the geographical analysis of environmental problems.

GEOG 650 GLOBAL AT HOME 3
Impacts of global migration on immigrant-receiving and/or immigrant-sending communities are examined to understand the experience of home. Perceptions, policies and practices contributing to social/spatial exclusion/inclusion at multiple scales are addressed. Project-based fieldwork enables students to gain first-hand knowledge of the experiences of mobility and adjustment.

GEOG 651 MICROCLIMATOLOGY 4
Introduction to instrumentation and techniques involved in microclimatic monitoring and sampling. Field observation carried out in varying environmental situations.

GEOG 652 SEMINAR IN CLIMATOLOGY 3-12
General theoretical and practical considerations of research in climatology. RESTRICTIONS: Requires permission of instructor.

GEOG 653 METEOROLOGICAL ANALYSIS I 3
The collection, visualization and application of meteorological data is emphasized in the context of diagnosing and forecasting atmospheric systems. The interpretation of meteorological observations and numerical models is a major focus of this class. PREREQ: GEOG420.

GEOG 654 METEOROLOGICAL ANALYSIS II 3
The application of theory and real-time observations in diagnosing present and predicting future weather. Focus is on application of quasi-geostrophic theory and isentropic analysis in weather forecasting. Analysis and interpretation of meteorological observations and numerical models will be emphasized and applied to jet streams, mid-latitude cyclones and fronts. PREREQ: GEOG653.

GEOG 655 HYDROCLIMATOLOGY 3
Study of the hydrologic cycle as it relates to water in the atmosphere and in and on the earth’s surface. Hydrologic processes including precipitation, soil moisture, evapotranspiration, runoff and streamflow will be examined. PREREQ: MATH241.

GEOG 657 CLIMATE DYNAMICS 3
Investigation of the physical processes controlling global climate, starting with the earth-sun relationship and adding additional processes to increase complexity and realism. Extensive use of models to explore the importance of each process. PREREQ: GEOG605 and MATH302.

GEOG 658 PALEOClimATOLOGY 3
Covers the factors that cause natural variations in Earth’s climate on different time scales, focusing on biotic, geologic, and geochemical records. Includes discussion of changing continental configurations, atmospheric greenhouse gas levels, and the Earth-Sun geometry on ocean circulation and climate change. May be crosslisted with GEO658, MAST658.

GEOG 659 REGIONAL CLIMATE MODELING: TECH & APPL 3
Global change is impacting an increasing number of sectors in science, engineering and policy, creating a need for high-resolution regional climate data used in impact assessments and mitigation plans. The primary objective is to understand regional climate processes, modeling techniques, and tools for analysis. May be crosslisted with MAST659. PREREQ: GEOG220 and MATH241.

GEOG 661 INTRODUCTION TO OCEAN MODELING 3
Introduction to numerical methods used to solve the equations of ocean motion. Topics range from basic numerical concepts with applications to general transport and shallow-water equations to an overview of turbulence and ocean circulation models that are employed to understand weather and climate. Crosslisted with MAST661. PREREQ: CIEG639, or permission from instructor.

GEOG 670 GEOGRAPHIC INFORMATION SYSTEMS AND SCIENCE 3
Introduces the principles and concepts of geographic information science to effectively use a professional level geographic information system. Practical hands-on exposure to “real” data and GIS software and hardware is provided through exercises and a final project.

GEOG 671 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS 3
Advanced study of geographic information science and systems (GIS) including more complex spatial data models, editing and topology, data encoding, data quality, preprocessing techniques, spatial analysis, and cartography and visualization techniques. Hands-on experience using commercial and/or open source GIS package. PREREQ: GEOG670 or permission of instructor.

GEOG 672 SEMINAR IN GEOGRAPHIC INFORMATION SYSTEMS 3
Principles underlying geographic information systems (GIS) are examined, and sample geographic problems are analyzed. Design and programming of modules for data acquisition and storage, map projection, map overlay, spatial data analyses, and graphic output are considered. Geographic themes and data vary each time the seminar is offered. PREREQ: GEOG470, GEOG670 or GEOG471.

GEOG 673 SELECT TECHNICAL TOPICS 1-3
Technical skills training focused on a specific aspect of the processing, analysis, modeling, and visualization of geographic data. The course content of each 1-3 credit course will vary to target a specialized technical topic using high end software such as ArcGIS and ENVI. May be repeated for a total of nine credits when topics vary.

GEOG 675 SATELLITE CLIMATOLOGY 3
Use of satellite observations to study the climate system. Discussions consider the development of satellite climatology, sensors, platforms and methodologies used to estimate climate variables from radiance measurements. Aspects of climate that are emphasized include cloud climatologies, cloud systems, atmospheric moisture, radiation budget, land-surface conditions. PREREQ: GEOG408 or GEOG412 or GEOG608 or GEOG612, or permission of instructor.
Geological processes and events that adversely affect humans and civilization. Methods for predicting and dealing with geological hazards. May be taken with a 1 credit lab, GEOL115.

Principles of physical geology and its application in interpreting earth processes. Laboratory covers identification of earth materials and the interpretation of topographic and geologic maps.

Violent geologic activity as illustrated by volcanoes and earthquakes. The nature, causes and origins of volcanic and earthquake activity, their interactions with humans and their potential control.

Composition, structure, surface features, origin, and evolution of the planets, satellites, asteroids, and comets. Also explores the possible connection between meteorite impacts and mass extinctions. Did an asteroid kill off the dinosaurs?

Introduction to the geologic setting of Delaware and neighboring states. Rocks and fossils of the region. Emphasis on formation and evolution of the region through geologic time. Studies Delaware's coastal zone and the effect of coastal processes on recent geologic history of Delaware.

Introduction to the geologic occurrence of resources including water, energy, metals and industrial minerals. Discussion of the geology, politics and economics of resource extraction and utilization. Environmental implications of resource use; methods of estimation of resource availability.

Earth materials, structure and the geologic phenomena that produce them. Physical and temporal aspects of earth history. Laboratory examination of rocks, minerals and fossils. Experiments in geological processes and interpretation of geologic maps.

Laboratory investigation of environmental geological processes and their impact on society: earthquakes, volcanoes, coastal hazards, rivers and streams, groundwater. Identification of earth materials and study of earth processes using topographical, geological and tectonic maps. COREQ: GEOL105

Introduction to the geologic occurrence of resources including water, energy, metals and industrial minerals. Discussion of the geology, politics and economics of resource extraction and utilization. Environmental implications of resource use; methods of estimation of resource availability.

Study of Earth materials including the chemistry, structure, and formation of Earth's minerals and rocks, in the context of major rock- and sediment-forming processes. PREREQ: GEOL107.

Processes and history of near-surface geologic environments of the Earth (potential areas of focus may include rivers, hillslopes, coastal environments, deltas, glaciers, periglacial environments, etc.). Human impacts on surficial environments. PREREQ: GEOL107.

Understanding climate and climate change is important for everyone. Explores climate change and its impacts at local, regional, and global levels. Policy and decision making, as well as adaptation and mitigation will be discussed with a focus on current events. Crosslisted with MAST215.

Systematics, identification, properties and associations of minerals and other raw materials of the earth. Economically significant minerals and their uses. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113

Identification, description, occurrences, origins and uses of rocks and ores. PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL300

Study of sediment focusing on how it is transported and deposited including fluid flow and sediment transport, sedimentary structures and textures. Environments of deposition with modern/ancient analogs. Description and correlation of stratigraphic units including facies analysis, basin analysis and concepts of time and methods of absolute dating. PREREQ: GEOL202 and GEOL203.
GEOL 305 Structural Geology and Plate Tectonics 4
The study of geologic structures, geologic stress and the responses of rocks to stress. Examines plate tectonics and the major structural and tectonic relations generated at plate boundaries.
PREREQ: GEOL202 and GEOL203.

GEOL 306 The Earth’s Lithosphere II: Field Geology 4
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL305

GEOL 307 The Earth’s History I: Paleobiology 4
Recognition, biology and paleobiology of major groups of invertebrates. Use of the fossil record in solving environmental and paleoenvironmental problems. Principles of stratigraphy and correlation and origin and development of the geologic time scale.
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113

GEOL 308 The Earth’s History II: Earth System Science 4
Interaction and evolution of the lithosphere, biosphere, hydrosphere and atmosphere. Examination of the geologic record as a test for hypotheses about earth system processes including climate change, paleoenvironments and tectonics. Integrative study of the history of the earth and its inhabitants.
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL307

GEOL 341 Climate and Climate Change 3
Understanding the earth’s climate and how the climate is changing is a fundamental part of modern earth system science. Explores the scientific basis for the study of climate and climate change, including long term and modern change, with a discussion of current topics. Crosslisted with GEOG341.

GEOL 366 Independent Study 1-3
Integrated examination of topics and concepts of current interest and importance in geoscience. Topics may vary.
PREREQ: Senior geology majors only, within 30 credits of graduation.

GEOL 401 Senior Seminar: Topics in Geoscience 3
Survey and analysis of land surface processes in polar and mountain environments. Emphasis on the ground thermal regime, permafrost, glacial (cold climate, nonglacial) landforms and environmental problems in cold regions. Crosslisted with GEOG482. PREREQ: GEOG106 or GEOL105/115 or GEOL107.

GEOL 405 Introduction to Research 1-3
Undergraduate research carried out under the supervision of the staff. Written report required.
RESTRICTIONS: May be repeated once if project warrants it.

GEOL 408 Geomicrobiology 3
Problem-based exploration of interface between geological and biological processes. Focus on effects of microorganisms and Earth’s chemistry. May include biomineralization, origin and evolution of life, microbial weathering and rock formation, environmental problems. 2-3 Saturday field trip req.

GEOL 411 Fluvial Geomorphology 3
Hydric and sediment transport processes in fluvial and palustrine systems. Depositional processes and evolution of floodplains. Structure and interpretation of fluvial deposits in the geologic record. May be crosslisted with GEOG411. PREREQ: GEOL107 or permission of the instructor.

GEOL 414 Quaternary Geology and Geochronology 3
Survey of the stratigraphy and chronology of marine and terrestrial records and theories of climatic change. Studies of the stratigraphy of significant Quaternary successions throughout the world and their correlation and absolute dating.
PREREQ: GEOL107 or permission of the instructor.

GEOL 416 Paleoseismology 3
Paleoenvironmental and stratigraphic interpretation of sediments and fossils. Basic statistics, bioturbation models, well-logging and sequence stratigraphy. Application to geologic problems.
PREREQ: GEOL107 or permission of the instructor.

GEOL 421 Environmental and Applied Geology 3
The application of geologic principles to matters of environmental concern. Discussion, examples, techniques and case histories in water supply, waste disposal, zoning and land use, mining, legislation, regulation and professionalism emphasizing the role of geologist and the educated citizen.
PREREQ: GEOL107 or permission of the instructor.

GEOL 422 OSHA 40-Hour Hazardous Materials Safety Training 3
OSHA 40-hour safety training certification hazardous waste operations health and safety training program. Includes material from environmental regulations, hazard recognition, toxicology, environmental monitoring, personal protective equipment, site characterization and analysis, site zone and control, health and safety plans, decontamination and spill response recovery.
RESTRICTIONS: GEOL422 cannot be applied toward the nine credits of 400-level geology electives required of BS geology majors.

GEOL 428 Hydrogeology 3
PREREQ: GEOL107 and MATH241 (MATH242 recommended) or permission of the instructor.

GEOL 434 Geology of Coasts 3
Erosional, depositional and tectonic processes; morphology and classification, and geologic history of the coastal areas of the world.
PREREQ: GEOL107 or permission of the instructor.

GEOL 453 Elementary Geophysics I 3
Fundamentals of seismology, wave propagation, refraction and reflection of seismic waves. Seismic and ground-penetration radar (GPR) exploration methods and interpretations, with emphasis on near-surface problems.
PREREQ: GEOL107 or GEOL105/115 or GEOL113; MATH 242; PHYS201 and PHYS202

GEOL 458 Paleoclimateology 3
Covers the factors that cause natural variations in Earth’s climate on different time scales, focusing on biotic, geologic, and geochemical records. Includes discussion of changing continental configurations, atmospheric greenhouse gas levels, and the Earth-Sun geometry on ocean circulation and climate change.
Crosslisted with GEOG458.

GEOL 466 Independent Study 1-3
Application of geologic principles to topics related to watersheds, ground and surface waters, topographic maps, point and non-point sources of pollution, the water cycle, and drinking water.
PREREQ: GEOL107 RESTRICTIONS: Restricted to in-service middle school teachers.

GEOL 501 Topics in Middle School Geology Education: Watersheds 3
Application of geologic principles to topics related to watersheds, ground and surface waters, topographic maps, point and non-point sources of pollution, the water cycle, and drinking water.
PREREQ: GEOL107 RESTRICTIONS: Restricted to in-service middle school teachers.

GEOL 502 Topics in Middle School Geology Education: Earth History 3
Application of geologic principles to topics related to Earth’s history including: the rock record, relative and absolute dating of rocks, the fossil record, correlation of rocks and fossils, the geologic time scale, and the history of geologic events in Delaware.
RESTRICTIONS: Restricted to in-service middle school science teachers.

GEOL 601 Geologic Sciences at Delaware 1 PF
Overview of the graduate program in geology at the University of Delaware. Research opportunities and current activities. Orientation in department practices and procedures. Guidelines for preparation of research proposals. Professional activities and career options.

GEOL 603 Groundwater Modeling 3
Introduction to groundwater flow and solute transport modeling. Begins with simple analytical models progressing to basic numerical methods and hands-on use of widely-used codes including MODFLOW, MT3DMS, SUTRA. Some MATLAB experience recommended.
PREREQ: GEOL429/GEOL628 or CIEG498/CIEG698.

GEOL 604 Writing in Geoscience 3
Approaches to writing in the geosciences. Students will write, edit, and prepare a paper for publication.
GEOL 605 STRATIGRAPHY 3
Principles of stratigraphy and application of stratigraphic methods (e.g., lithostratigraphy, biostratigraphy, chronostratigraphy, sequence stratigraphy and magnetic stratigraphy) for basin analysis. Interpretation of sedimentary facies. Application of sequence stratigraphy to the Quaternary Period.
RESTRICTIONS: Graduate students only.

GEOL 607 METHODS IN GEOMICROBIOLOGY 3
A seminar and laboratory-based course on various methods in geomicrobiology, with a focus on microscopy techniques, including fluorescence and electron microscopy. Students will be expected to perform some laboratory work outside of class periods. A prior course in geomicrobiology or environmental microbiology is highly recommended.

GEOL 608 GEOMICROBIOLOGY 3
Problem-based exploration of interface between geological and biological processes. Focus on effects of microorganisms and Earth’s chemistry. May include biomarker applications, origin and evolution of life, microbial weathering and rock formation, environmental problems. 2-3 Saturday field trip req.

GEOL 611 FLUVIAL GEOMORPHOLOGY 3

GEOL 614 QUATERNARY GEOLOGY AND GEOCHRONOLOGY 3
Survey of the stratigraphy and chronology of marine and terrestrial records and theories of climatic change. Studies of the stratigraphy of significant Quaternary successions throughout the world and their correlation and absolute dating.

GEOL 616 PALEOEOLGY 3
Paleoenvironmental and stratigraphic interpretation of sediments and fossils. Basic statistics, biostatistical models, well-logging, and sequence stratigraphy. Application to geology problems.

GEOL 621 ENVIRONMENTAL AND APPLIED GEOLOGY 3
The application of geologic principles to matters of environmental concern. Discussion, examples, techniques and case histories in water supply, waste disposal, zoning and land use, mining, legislation, regulation and professionalism emphasizing the role of the geologist and the educated citizen.

GEOL 622 OSHA 40-HOUR HAZARDOUS MATERIALS SAFETY TRAINING 3
OSHA 40-Hour safety training certification hazardous waste operations health and safety training program. Includes material from environmental regulations, hazard recognition, toxicology, environmental monitoring, personal protective equipment, site characterization & analysis, site zone & control, health & safety plans, decontamination, and spill response recovery.

GEOL 628 HYDROGEOLOGY 3

GEOL 630 HYDROGEOLOGY SEMINAR 3
Explore the foundations of modern Hydrogeology by analyzing classic papers that advanced the field toward its current state-of-the-art. Topics vary from physical hydrogeology to geochemical aspects, including groundwater age dating and tracers.
RESTRICTIONS: Previous background in Hydrogeology.

GEOL 634 GEOLOGY OF COASTS 3
Erosional, depositional and tectonic processes; morphology and classification; and geologic history of the coastal areas of the world.

GEOL 653 ELEMENTARY GEOPHYSICS I 3
Fundamentals of seismology, wave propagation, refraction and reflection of seismic waves. Seismic and ground-penetrations radar (GPR) exploration methods and interpretations, with emphasis on near-surface problems.

GEOL 657 STATISTICS FOR EARTH SCIENCES 3
Multiple regression and time series analysis; model validation; sampling; principal components; factor analysis; cluster analysis; discriminant analysis; and statistical software routines.
Crosslisted with STAT657. PREREQ: MATH201 or STAT 475 or STAT 200.
RESTRICTIONS: Cannot be taken for credit in the Statistics master’s degree program.

GEOL 658 PALEOClimATology 3
Covers the factors that cause natural variations in Earth’s climate on different time scales, focusing on biotic, geologic, and geochemical records. Includes discussion of changing continental configurations, atmospheric greenhouse gas levels, and the Earth-Sun geometry on ocean circulation and climate change.
Crosslisted with GEOG658.

GEOL 659 SPATIAL STATISTICS 3
Some research applications require inferences to be drawn from point, line, or areal data, rather than from the traditional univariate or multivariate framework. A number of such techniques have been developed including adaptations from classical statistical methods and novel approaches to account for the spatial nature of data. Explore the emerging literature on statistical methodologies that have been explicitly developed for the solution of spatial problems.
Crosslisted with STAT659. PREREQ: MATH201 or STAT475 or STAT200.
RESTRICTIONS: Can not be taken for credit in the Statistics Master’s Degree program.

GEOL 663 GEOLOGICAL ASPECTS OF OFFSHORE WIND 3
Investigation of the geological and geotechnical aspects of offshore wind projects. Emphasis on influence of geology and physical properties of sediments and rocks on offshore wind project site selection, design, construction, and operation.

GEOL 682 PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS 3
Survey and analysis of land surface processes in polar and mountain environments. Emphasis on the ground thermal regime, permafrost, periglacial (cold climate, non-glacial) landforms and environmental problems in cold regions. Crosslisted with GEOG682.

GEOL 685 ADVANCED GEOMORPHOLOGY 3
Survey of natural landforms and the processes that shape them. Topics include landscape evolution, dynamic equilibrium, rates of landform change, and the topographic response to tectonic and climatic forcing.
May be crosslisted with GEOG685.

GEOL 802 TOPICS IN GEOPHYSICS 1-3
Selected topics in geophysics. Topics vary according to instructor’s preference.
RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 803 TOPICS IN GEOMORPHOLOGY 1-3
Selected topics in geomorphology. Topics vary according to instructor preference. May be crosslisted with GEOG803. RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 804 TOPICS IN GEOCHEMISTRY 1-3
Selected topics in geochemistry. Topics vary according to instructor preference. RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 809 TOPICS IN SEDIMENTOLOGY AND STRATIGRAPHY 1-3
Selected topics in sedimentology and stratigraphy. Topics vary according to instructor’s preference.
RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 810 TOPICS IN COASTAL GEOSCIENCE 1-3
Selected topics in coastal geoscience. Topics vary according to instructor preference.
RESTRICTIONS: May be taken more than once for graduate credit.

GEOL 818 TOPICS IN PALEOBIOLOGY 1-3
Selected topics in paleobiology. Topics vary according to instructor’s preference.

GEOL 825 TOPICS IN HYDROGEOLOGY 1-3
Selected topics in hydrogeology. Topics vary according to instructor preference. May be taken more than once for graduate credit.
PREREQ: GEOL428/GEOL628 or CIEG498/CIEG698.

GEOL 828 TOPICS IN HYDROGEOLOGY 3-15
Selected topics in Hydrogeology. Topics vary according to instructor preference. May be taken more than once for graduate credit.
RESTRICTIONS: Graduate students only.

GEOL 840 TOPICS IN GEOMICROBIOLOGY 3-15
Topics vary according to instructor preference. May be taken more than once for graduate credit.
RESTRICTIONS: Graduate Students Only.
### GEOL 857: Paleocenography
- **Credit Hours:** 3
- **Description:** Focuses on processes related to climate change from tectonic to millennial timescales based on the marine sedimentary record of the past 65 million years. Topics include light stable isotopes and biogeochemical cycling of elements. Includes lectures and student-lead discussion of current literature.
- **Restrictions:** Requires permission of instructor.

### GEOL 868: Research
- **Credit Hours:** 1-9
- **Description:** Enables students to begin planning work and research before admission to dissertation candidacy and GEOL969.

### GEOL 869: Master's Thesis
- **Credit Hours:** 1-6

### GEOL 964: Pre-Candidacy Study
- **Credit Hours:** 3-12 PF
- **Description:** 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.

### GREK 101: Elementary Ancient Greek I
- **Credit Hours:** 3
- **Description:** Prepares students to read ancient Greek literary works in the original language. Emphasizes building a basic vocabulary and acquiring essential grammar. Includes discussion of ancient Greek culture and civilization.

### GREK 102: Elementary Ancient Greek II
- **Credit Hours:** 3
- **Prerequisite:** GREK101 or equivalent

### GREK 201: Ancient Prose: Intermediate Greek
- **Credit Hours:** 3
- **Prerequisite:** GREK102 or equivalent
- **Description:** Focuses on the works of one or more prose authors with particular attention to review of grammar and syntax. Readings will be drawn from the philosophical, historical, and oratorical works of authors such as Plato, Herodotus, Xenophon, Lydias, Demosthenes, and Isocrates in rotation or in combination.

### GREK 202: Ancient Poetry: Intermediate Greek
- **Credit Hours:** 3
- **Prerequisite:** GREK 201 or equivalent
- **Restrictions:** Satisfies College of Arts and Sciences language requirement.
- **Description:** Focuses on the works of one or more poets. Readings will be drawn from the epic, lyric, and dramatic (tragic and comic) works of authors such as Homer, Sappho, Pindar, Aeschylus, Sophocles, Euripides, and Aristophanes in rotation or in combination.

### GREK 301: Ancient Prose: Advanced Intermediate Greek
- **Credit Hours:** 3
- **Prerequisite:** GREK202 or equivalent
- **Restrictions:** May be repeated for credit four times.
- **Description:** Focuses on the works (in the original language) of one or more prose authors with particular attention to interpretative issues such as themes and contemporary intellectual and cultural milieu. Readings drawn from the philosophical, historical, and oratorical works of authors such as Plato, Herodotus, Xenophon, Lydias, Demosthenes, and Isocrates in rotation or in combination.

### GREK 302: Ancient Poetry: Advanced Intermediate Greek
- **Credit Hours:** 3
- **Prerequisite:** GREK202 or equivalent
- **Restrictions:** May be repeated for credit four times.

### GREK 366: Independent Study
- **Credit Hours:** 1-3

### GREK 466: Independent Study
- **Credit Hours:** 1-3

### GERM 105: German I - Elementary
- **Credit Hours:** 4
- **Description:** Introduction to the German language and development of speaking, listening, reading and writing skills through the use of basic texts.

### GERM 106: German II - Elementary/Intermediate
- **Credit Hours:** 4
- **Description:** Completion of basic German. Increasing mastery of the basic skills of speaking, listening, reading and writing.
- **Prerequisite:** GERM105
- **Restrictions:** Two to three years of high school German acceptable in lieu of prerequisite.

### GERM 107: German III - Intermediate
- **Credit Hours:** 4
- **Description:** Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty.
- **Prerequisite:** GERM106
- **Restrictions:** Four years of high school German acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.

### GERM 111: Intermediate German I
- **Credit Hours:** 3
- **Description:** Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing.
- **Prerequisite:** GERM102 or GERM106
- **Restrictions:** Three years of high school German acceptable in lieu of prerequisite.

### GERM 112: Intermediate German II
- **Credit Hours:** 3
- **Description:** Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed.
- **Prerequisite:** GERM111
- **Restrictions:** Four years of high school German acceptable in lieu of prerequisite. Satisfies Arts and Sciences foreign language requirement.

### GERM 200: German Grammar Review
- **Credit Hours:** 3
- **Description:** Systematic review of elementary and intermediate German grammar. Emphasis on grammar. Conversational practice.
- **Prerequisite:** GERM107
- **Restrictions:** Not intended for students who have already taken a 300 or 400-level course in German.

### GERM 205: German Conversation
- **Credit Hours:** 3
- **Description:** Practical use of German by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review and written work where appropriate.
- **Prerequisite:** GERM107 or one 200-level German course
- **Restrictions:** Not intended for students who have already taken a 300 or 400-level course in German.

### GERM 206: Culture Through Conversation
- **Credit Hours:** 3
- **Description:** Discussion of topics drawn from contemporary German life. Designed to broaden knowledge of German culture while improving oral and aural language skills.
- **Prerequisite:** GERM107
- **Restrictions:** Taught abroad only.

### GERM 208: Contemporary Germany I
- **Credit Hours:** 3
- **Description:** An introduction to contemporary Germany, its culture, its people, their way of life and the issues confronting them.
- **Restrictions:** Taught abroad only, in both English and German. Not for major credit. Does not satisfy foreign language requirement.

### GERM 211: German Reading and Writing
- **Credit Hours:** 3
- **Description:** Reading and discussion of 20th-century German short stories and novellas. Several short compositions. Grammar review where appropriate.
- **Prerequisite:** GERM107
- **Restrictions:** Not intended for students who have already taken a 300 or 400-level course in German.

### GERM 235: German Popular Culture
- **Credit Hours:** 3
- **Description:** Examines aspects of German popular culture, especially youth culture: customs, attitudes, pastimes, audio, video, and print media preferred by German young adults. Students exposed to colloquial German used within everyday contexts.
- **Prerequisite:** GERM107
- **Restrictions:** Not intended for students who have already taken a 300- or 400-level course in German.

### GERM 246: German Youth Culture
- **Credit Hours:** 3
- **Description:** Aspects of German youth culture, including customs, attitudes, and pastimes preferred by students in Germany. Focus on reading, writing, and audiovisual media. Topics include fashion, sports, socialization represented in variety of media, such as TV, film and print media. Taught in German.
- **Prerequisite:** GERM107
- **Restrictions:** Not intended for students who have already taken a 300- or 400-level course in German.

### GERM 255: Germany in the News
- **Credit Hours:** 3
- **Description:** Explores topics in contemporary German society, culture and politics as expressed in the news media. Emphasis on current events and issues of Germany. Focus of study is the German press: newspapers and magazines printed in the German language.
- **Prerequisite:** GERM107
- **Restrictions:** Not intended for students who have already taken a 300- or 400-level course in German.
GRMN 256  READING FOR CULTURAL AWARENESS  3
Introduction to German-speaking people's world view and way of life. Emphasis on
reading and discussing a variety of short texts, with opportunities to fine-tune
selected aspects of elementary/intermediate grammar.
PREREQ: GRMN107 or the equivalent.

GRMN 300  ADVANCED GERMAN COMPOSITION & GRAMMAR I  3
A thorough review and practice, targeting structure, essential vocabulary,
speaking, listening, and extensive writing.
PREREQ: Any two 200-level courses taught in German.

GRMN 305  GERMAN CONVERSATION AND PHONETICS  3
Discussion of current cultural, social and political topics in German-speaking
countries. Pronunciation exercises and vocabulary building.
PREREQ: Any two 200-level German courses

GRMN 306  PRACTICAL ORAL/WRITTEN EXPRESSION  3
Strengthens grammar and vocabulary skills in preparation for advanced courses.
Class exercises include oral-exposes, discussion of articles and videos, textual
analysis and compositions.
PREREQ: Any two 200-level German courses  RESTRICTIONS: Taught abroad only.

GRMN 307  CONTEMPORARY AUSTRALIA  3
Introduction to contemporary Austria, its people, their way of life and the issues
confronting them.
PREREQ: Any two 200-level courses taught in German. RESTRICTIONS: Taught
abroad only. Taught in German.

GRMN 308  CONTEMPORARY GERMANY II  3
Discussion and study of issues related to contemporary cultural, political and
social developments in Germany, including its place in today's European
community.
PREREQ: Any two 200-level German courses  RESTRICTIONS: Taught abroad only.
Taught in German.

GRMN 311  INTRODUCTION TO MODERN GERMAN LITERATURE  3
Masterpieces of poetry, narrative prose and drama from the 18th century to the present.
PREREQ: Any two 200-level German courses

GRMN 325  GERMAN CIVILIZATION AND CULTURE  3
A survey of the major cultural, social and political developments in Germany from
the mid-18th century to the present.
PREREQ: Any two 200-level German courses

GRMN 350  INTRODUCTION TO BUSINESS GERMAN  3
Familiarizes students with characteristics of business German (vocabulary,
terminology and syntactical patterns) and aspects of the German business
community.
PREREQ: Any two 200-level German courses

GRMN 355  SPECIAL TOPICS  3-12
Explores an area of special interest in German literature or culture studies. See
http://primus.nss.udel.edu/CoursesSearch/ for topics.
PREREQ: Any two 200-level German courses. RESTRICTIONS: May be repeated for
credit when topics vary.

GRMN 366  INDEPENDENT STUDY  1-3

GRMN 406  ADVANCED GERMAN LANGUAGE  3
Grammatical structure and stylistics with special attention given to technical
vocabulary and discourse, e.g., business, law, science and agriculture.
PREREQ: Two 300-level German courses, one of which may be taken concurrently
with the 400-level course. RESTRICTIONS: Taught abroad only.

GRMN 412  EARLY GERMAN LITERATURE  3
Representative authors and themes: 12th-17th centuries. "Courtly love" and
"knighthood" (Minnesang, Das Nibelungenlied); "bourgeoisie" vs. "peasantry"
during the Reformation (Sachs's Fastnachtspieler, Eulenspiegel), and the Baroque
themes of "carpe diem" and "memento mori" (Grimmelshausen's Simplexsimius,
Gryphius's plays, Baroque poetry).
PREREQ: Two 300-level German courses, one of which may be taken concurrently
with the 400-level course.

GRMN 422  AGE OF GOETHE  3
Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The
importance of the Enlightenment, the Storm and Stress movement, the Classical
period and early Romanticism.
PREREQ: Two 300-level German courses, one of which may be taken concurrently
with the 400-level course.

GRMN 433  NINETEENTH-CENTURY GERMAN LITERATURE  3
Studies major literary trends and figures from the end of Romanticism to
Naturalism.
PREREQ: Two 300-level German courses, one of which may be taken concurrently
with the 400-level course.

GRMN 442  FROM NATURALISM TO EXPRESSIONISM  3
Main literary currents from the 1880's to the 1920's.
PREREQ: Two 300-level German courses, one of which may be taken concurrently
with the 400-level course.

GRMN 453  GERMAN LITERATURE: 1945 TO 1989  3
Major authors and literary movements from the end of World War II until German
unification.
PREREQ: Two 300-level German courses, one of which may be taken concurrently
with the 400-level course.

GRMN 455  SELECTED AUTHOR'S WORKS AND THEMES  3
Works of one or more outstanding authors or a special theme.
PREREQ: Two 300-level German courses, one of which may be taken concurrently
with the 400-level course.  RESTRICTIONS: May be repeated for credit when
topics vary.

GRMN 465  POSTWALL GERMANY: LITERATURE AND CULTURE  3
Explores reunited Germany's cultural and literary landscape and examines how
reunification has affected East and West Germans. Focuses on how reunification
has (re)shaped German national identity, affecting the way Germans remember
the past and contribute to the formation of a multicultural society.
PREREQ: Two 300-level German courses, one of which may be taken concurrently
with the 400-level course.

GRMN 466  INDEPENDENT STUDY  1-3

GRMN 533  GERMAN READINGS FOR PH.D. CANDIDATES  3 PF
A basic course in German for graduate students in other disciplines who have had
little or no previous experience in the language. Emphasis on developing reading
comprehension.

GRMN 622  AGE OF GOETHE  3
Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The
importance of the Enlightenment, the Storm and Stress movement, the Classical
period and early Romanticism.

GRMN 633  NINETEENTH CENTURY GERMAN LITERATURE  3
A study of major literary trends and figures from the end of Romanticism to
Naturalism.

GRMN 642  NATURALISM TO EXPRESSIONISM  3
Main literary currents from the 1880's to the 1920's.

GRMN 653  GERMAN LITERATURE: 1945 TO 1989  3
Major authors and literary movements from the end of World War II until German
unification.

GRMN 655  SELECTED AUTHOR'S WORKS AND THEMES  3-12
Works of one or more outstanding authors or a special theme.
RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 665  POSTWALL GERMANY: LITERATURE AND CULTURE  3
Explores reunited Germany's cultural and literary landscape and examines how
reunification has affected East and West Germans. Focuses on how reunification
has (re)shaped German national identity, affecting the way Germans remember
the past and contribute to the formation of a multicultural society.

GRMN 869  MASTER'S THESIS  1-6

GRMN 875  SEMINAR: TOPICS IN GERMAN LITERATURE  3
Study of selected topics, authors and works in the various fields of German
literature. Variable content. Emphasizes preparation of seminar presentations and
term paper.
RESTRICTIONS: May be repeated for credit when topics vary.
HDFS 101 HUMAN SERVICES AND CULTURAL COMPETENCE 1
Provides an overview of human services and approaches to culturally competent practices; critical perspectives regarding diversity, society, race, class, gender and social policy are discussed.

HDFS 201 LIFE SPAN DEVELOPMENT 3
Exploration and understanding of the social, emotional, cognitive and physical development of the individual from infancy through old age in the context of the family.

HDFS 202 DIVERSITY AND FAMILIES 3
Examination of diverse families in the United States with a focus on issues of race, ethnicity, social class, and gender. Emphasis is on the accelerating effects of globalization and social change.

HDFS 210 INTRODUCTION TO CARING FOR YOUNG CHILDREN 3
Introduction of the core competencies needed in early care and education. Topics include a basic orientation to child development; understanding children’s behavior; developmental curriculum; family issues; health, safety, and nutrition; and professional issues.

HDFS 220 CHILD DEVELOPMENT I: PRENATAL TO AGE 3 3
Study of prenatal development and the physical, perceptual, social-emotional, and cognitive-language domains of children birth to three. Emphasis on nurturing relationships and understanding child development within cultural contexts of children’s families. Directed observation in infant/toddler settings.

HDFS 221 CHILD DEVELOPMENT II: 3 TO 10 3
Study of cognitive, social, emotional, and physical development of children three to ten years old. Variables that influence child development including family and school investigated. Directed observation of children.

HDFS 222 INCLUSIVE CURRICULUM: BIRTH - GRADE 2 3
Curriculum/programming for optimal development of children birth to second grade in inclusive settings. Focus on curriculum approaches and examination of the role of play, constructivist theories, developmentally appropriate/culturally responsive practice.
PREREQ: HDFS221. COREQ: HDFS224 for ECE majors only.

HDFS 224 PRACTICUM IN INCLUSIVE CURRICULUM: BIRTH - GRADE 2 3
Discussion and weekly practicum experience with children in early childhood settings. Focus on application of theory and reflective thinking. Experience in curriculum planning and guidance.
PREREQ: HDFS221. COREQ: HDFS222.

HDFS 230 FAMILIES AND THEIR COMMUNITIES 3
Discusses the community context of family life, and the interface of family with school, community and work settings. Community development, social capital, collaboration, family and community asset building, and opportunity structure analysis approaches are presented.

HDFS 235 SURVEY IN CHILD AND FAMILY SERVICES 3
Introduces the scope of human service agencies focusing on the needs of children and families.

HDFS 236 INFANTS AND TODDLERS: DEVELOPMENT AND PROGRAMS 3
Study of the infant and toddler with emphasis on interrelated growth patterns and processes, appropriate curriculum and stimulation, and the effects of prenatal and perinatal conditions on future development.
PREREQ: HDFS221.

HDFS 270 FAMILIES AND DEVELOPMENTAL DISABILITIES 3
Focuses on people with developmental disabilities in the context of their family and culture from a multidisciplinary perspective. Covers disabilities and their causes; changing needs across the lifespan, gender, cross-cultural and legal issues; and information about prevention/intervention, employment, inclusion, and empowerment.
May be crosslisted with SOC1270.

HDFS 271 ALCOHOL ISSUES & COLLEGE STUDENTS 1-3
Focus on alcohol-related issues for college students, including legal and health issues. Media messages about alcohol use, including prevention messages, are emphasized.

HDFS 275 HUMAN DEVELOPMENT THROUGH THE ARTS 3
Introduction to issues in Individual and Family Studies as viewed through literature, film and other media. Specific genre will vary. Content matched with current and/or classic readings from social sciences. Life span perspective.

HDFS 306 READING AND WRITING FROM BIRTH - GRADE 2 3
Covers development of language and literacy from birth to second grade. Explores instructional and assessment strategies for promoting growth in speaking, listening, reading, and writing.
PREREQ: LING101, HDFS222 and HDFS224. Students must pass Praxis I prior to taking this course. COREQ: HDFS350, HDFS412 and HDFS432.

HDFS 328 INTRODUCTION TO THE RESEARCH PROCESS 3
Exposure to the research process through attending and critiquing research presentations, reading and reviewing scholarly papers, and development of a variety of research skills, such as instrument design, coding and data entry. Students’ work will contribute to the development of a professional portfolio.
PREREQ: HDFS201 and HDFS202.

HDFS 329 ADOLESCENT DEVELOPMENT 3
Physical, intellectual and social-emotional development of adolescents and youth in the context of the family, peer groups and the community. Emphasis on theories, current research and the transition from adolescence to young adulthood.
PREREQ: EDUC205 or HDFS201.

HDFS 330 MENTOR & HELPING RELATIONSHIPS 3
Introduction to the core dimensions of mentoring and helping relationships: empathy, active listening, problem-solving, and cultural competence. Emphasis is on applying the skills in a variety of business, educational, medical, and community settings.

HDFS 331 YOUTH-AT-RISK 3
Explores diverse theories regarding the characteristics of youth-at-risk including an examination of individual, family, school, and societal factors. Risk behaviors identified as well as early identification and applying effective, research-based intervention programs.

HDFS 332 COUNSELING THEORIES 3
Examination of selected counseling theories from theoretical, personal, functional and philosophical points of view.

HDFS 333 DEVELOPMENT OF HUMAN RELATIONSHIPS 3
Developmental theory and research related to intrapersonal and interpersonal conditions, characteristics, attitudes and behaviors necessary for effective human relationships. Basic focus on the psychology of the individual, relationship skills, conflict management and intimacy.

HDFS 334 EXPERIENTIAL EDUCATION 3
Field experience combined with a seminar emphasizing professional issues in human services, including portfolio development and career planning. Students should arrange for a 50 hour field placement prior to first week of class (see instructor).
May be crosslisted with BAM5335. RESTRICTIONS: HMSV majors only or permission of instructor.

HDFS 335 CULTURE IN CONTEXT 1-3
Cross-cultural awareness and sensitivity enriches an individual’s life, helping him/her to better understand the actions of groups of peoples, their nationalities and uniqueness, their organizations and systems. Provides an option which can be used both internationally and domestically as long as it embraces the spirit of exposing students to the concept of development within diverse communities.
RESTRICTIONS: May be repeated up to six credits.

HDFS 338 SEXUALITY IN CONTEMPORARY SOCIETY 3
A multidisciplinary approach to controversial human sexuality issues which examines and addresses societal solutions to these controversies.

HDFS 339 ADULT DEVELOPMENT AND AGING 3
Examines developmental processes, lifespan changes, transitions and stage-related issues of early, middle and late adult life. Explores concepts, theories, historical trends and empirical studies during these life periods; integrates theories with practical applications.
PREREQ: HDFS201.
HDFS 340  EARLY CHILDHOOD CURRICULUM II 3

History, research and practical issues in the organization and operation of early childhood programs with emphasis on preschool and kindergarten settings; integrating and adapting the curriculum, facilities, equipment and instructional strategies to the needs of young children. Includes field experience.
PREREQ: HDFS222 and HDFS224.

HDFS 345  MENTORING STUDENTS: INT & DEV DISAB 1-3

Through classroom and field experiences, students learn the role of a mentor for youth and adults who have intellectual and developmental disabilities and how to facilitate their academic, social and business relationships in higher education settings, the surrounding campus community, and at local work sites. Crosslisted with EDUC345. RESTRICTIONS: Permission of instructor.

HDFS 346  COUNSELING IN HUMAN SERVICES 3

Presents approaches to interviewing and counseling individuals and families in a variety of community-based human service settings. Includes case management, advocacy and empowerment strategies of intervention. Explores professional and ethical issues in providing individual and family services. PREREQ: HDFS235 and HDFS334 or permission of instructor. COREQ: HDFS334 or permission of instructor.

HDFS 347  PROGRAM DEVELOPMENT AND EVALUATION 3

Focuses on program development, administrative procedures, and program evaluation. Basic skills required for the development, delivery and evaluation of a wide range of human service programs including preventive interventions for families and individuals. PREREQ: HDFS235 and HDFS334 or permission of instructor. COREQ: HDFS334 or permission of instructor.

HDFS 349  AGING & SOCIETY 3

Historical, social, and cultural context influence everything from the meaning of growing old, the rate of development and the rate of age-related decline, to the meaning and significance of death and dying. Introduces students to the nature and the study of human aging. Crosslisted with SOCI349.

HDFS 350  TECHNOLOGY & ASSISTIVE TECHNOLOGY IN EARLY CHILDHOOD ED 3

The study of the impact technology and assistive technology have on teaching and learning in early childhood settings. Focus on the effective use of technology to develop curriculum, gather assessment data, and interact with children and families. Basic operation and evaluation of technical tools. PREREQ: HDFS222.

HDFS 355  PROFESSIONAL ISSUES IN ECDE 3

Overview and analysis of topics and issues for professionals serving children birth through grade two and their families in inclusive settings. PREREQ: HDFS222 or HDFS235.

HDFS 360  LEARNING IN COMMUNITY CONTEXTS 3

Study of the educational process in institutions and organizations with a focus on non-profit groups oriented toward community service. Emphasis upon the relation of these groups’ educational practices to their overall public service mission. Crosslisted with EDUC360.

HDFS 364  FIELD EXPERIENCES IN ADMINISTRATION & FAMILY POLICY 1-9

Provides opportunities to work/participate in human service agencies, business and industry, as well as formal and non-formal educational settings. May be repeated for up to nine credit hours. PREREQ: HDFS235 and HDFS334. RESTRICTIONS: Requires permission of instructor. Students must have a GPA of 2.5 and major field index of 2.75.

HDFS 365  SEMINAR 1-3

HDFS 366  INDEPENDENT STUDY 1-12

HDFS 401  FOUNDATIONS OF HUMAN SEXUALITY 3

A multidisciplinary study of human sexuality focusing on the implications for individuals and society of the biological, psychological and sociocultural determinants of human sexuality. Deals with sexually explicit material. May be crosslisted with BIHAN401, WOMS401.

HDFS 402  CHILD AND FAMILY POLICY 3

Provides an historical overview of family and child policy in the United States, including policies toward children and families in poverty. The role of the economy, politics, race, class, gender, legal and advocacy issues are discussed. PREREQ: HDFS235 and HDFS202 or permission of instructor.

HDFS 403  ADULT DISABILITY ISSUES 3

Civil/human rights and social policy impact on adults with intellectual and developmental disabilities through the lifespan. Disability history, public policy, legislation, litigation and comtemporary issues. The full range of service types and ethical issues relevant to adults with ID/DD and their families will be discussed.

HDFS 405  AGING AND THE FAMILY 3

Explores developmental changes of older adults and impact on their family members. A major focus is on kinship and caregiving by family and decision making in selecting respite and institutional care when elders develop cognitive and physical disabilities.

HDFS 406  SUPPORTING LITERACY IN EARLY CHILDHOOD EDUCATION 3

Examines the research and theories to support language and literacy development in Early Childhood Education. Explores various instructional and assessment strategies to promote language and literacy of children from diverse background. PREREQ: HDFS222 or permission of instructor. RESTRICTIONS: Juniors and seniors only.

HDFS 407  SPEECH & LANGUAGE DISORDERS IN YOUNG CHILDREN 3

Examines disorders of speech and language understanding and use in children from birth to 8 years of age. Addresses assessment and intervention techniques, including the role of caregivers and service providers in the identification and remediation of communication difficulties.

HDFS 408  DOMESTIC VIOLENCE POLICY AND PREVENTION 3

Reflects the current state of policy and practice among policy makers and practitioners in the field of domestic violence including legal issues, policy development, primary prevention, and models of best practice. Addresses the role of federal and state law. May include economic justice, mental health and trauma, and alternative models. Crosslisted with WISM408. PREREQ: Any 200-level Women’s Studies course.

HDFS 409  DOMESTIC VIOLENCE SERVICES 3

Examines issues in providing services to families in which domestic violence is occurring. Multiple service systems are explored, with emphasis on service coordination, service gaps, and public policy. May be crosslisted with CRJU409, WISM409. RESTRICTIONS: Open to juniors and seniors only.

HDFS 410  THE HOSPITALIZED CHILD 3

The psychosocial needs of pediatric patients and their caregivers are examined. Emphasis on coping, preparation, medical terminology, play, assessment and family-centered care. Implications for nursing care, child life specialists, pre-medical students and others working with the pediatric population are studied. PREREQ: HDFS201. RESTRICTIONS: Open to juniors and seniors only.

HDFS 411  INCLUSIVE CURRICULUM AND ASSESSMENT: INFANTS AND TODDLERS 3

Curriculum/programming for optimal development of children birth-36 months in inclusive settings. Focus on primary caregiving and continuity of care, routines as a basis for curriculum, assessment process, environmental designs, building relationships with children and families, and the IFSP process. PREREQ: HDFS222 and HDFS224. COREQ: HDFS431 and HDFS470. RESTRICTIONS: Majors only or permission instructor.

HDFS 412  EARLY CHILDHOOD INCLUSIVE MATH CURRICULUM AND ASSESSMENT 3

Inclusive, integrated, interdisciplinary early childhood curriculum development and teaching with emphasis on early math development and learning, math content knowledge for teaching, and early math assessment for young children from birth through early primary grades. PREREQ: HDFS222 and HDFS224. ECE Students must pass a basic skills test as approved by the University Council of Teacher Education prior to taking this course. COREQ: HDFS432.

HDFS 413  EARLY CHILDHOOD INCLUSIVE SCIENCE CURRICULUM AND ASSESSMENT 3

Integrated early childhood curriculum development and teaching with emphasis on early science development and learning, science content knowledge and pedagogy for teaching, and early science assessment for young children from birth through early primary grades. PREREQ: HDFS222 and HDFS224. COREQ: HDFS433.
HDFS 414 GUIDANCE AND BEHAVIOR SUPPORT: BIRTH TO GRADE 2 3
Comparison of theoretical viewpoints underlying behavior. Provides an overview of positive behavior support (individual/schoolwide), including functional behavioral assessment. Emphasized is the importance of teaching socially acceptable responses to reduce and prevent problem behavior. Hands-on experiences address techniques and strategies including visual supports and increasing motivation.
PREREQ: HDFS222 and HDFS224 for ECE majors only. COREQ: HDFS431, 432, or 433 for ECE majors. RESTRICTIONS: Requires permission of instructor for non-ECE majors.

HDFS 416 BOOKS FOR EARLY CHILDHOOD (INFANCY TO 8) 3
An in-depth examination of children's books and the use of books for people who work with young children from infancy to age 8. Course topics include the study of developmentally and culturally appropriate books and application of children's books in early childhood programs, parent education, and other programs serving diverse populations of young children.

HDFS 422 CAPSTONE IN FAMILY RELATIONSHIPS 3
An integrative analysis of interpersonal relationships and problems in courtship, marriage and the family in contemporary society.
PREREQ: HDFS202, HDFS235, and HDFS334 or permission of instructor.

HDFS 424 PROFESSIONAL DEVELOPMENT SEMINAR I 3
Discussion-based and problem-centered seminar with emphasis on the role and contributions of the ECE professional; partnering with families in the development, care, and education of young children; building partnerships among families, agencies, schools, and communities; job search strategies; and professional portfolio development.
COREQ: EDUC400 and HDFS441. RESTRICTIONS: ECE majors only.

HDFS 425 PROFESSIONAL DEVELOPMENT SEMINAR II 3
Continuation of HDFS424. Discussion-oriented and problem-centered seminar with emphasis on the role and contributions of the ECE professional; partnering with families in the development, care, and education of young children; building partnerships among families, agencies, schools, and communities; job search strategies; and professional portfolio development.
COREQ: EDUC400 and HDFS442. RESTRICTIONS: Early Childhood Education majors only.

HDFS 427 PARENTING THROUGH THE LIFESPAN 3
Applied focus on parenting styles, roles, issues and goals through the lifespan. Parent diversity, intergenerational relationships, developmental and acquired disabilities, and needs of children, adult children, extended family members, and parents are examined. PREREQ: HDFS201 or PSYC350 or permission of instructor.

HDFS 428 EDUCATIONAL RESEARCH AND ISSUES IN HUMAN RESOURCES 3
Introduction to the research process through study of a problem identified by analysis of clinical experiences; an in-depth examination of selected current educational concerns.
RESTRICTIONS: Requires permission of instructor.

HDFS 430 FAMILY LIFE EDUCATION 3
Investigates curriculum and instructional strategies for use in support, prevention and empowerment-based programs across the lifespan. May be crosslisted with WOMS430. PREREQ: HDFS201 or HDFS202.

HDFS 431 FIELD EXPERIENCE: INFANTS AND TODDLERS 1 PF
Field-based experiences in a school, agency, or family setting with children. Collaboration with school, community and families in order to support ongoing work in the setting.
PREREQ: HDFS222 and HDFS224. COREQ: HDFS411.

HDFS 432 FIELD EXPERIENCE: PRESCHOOL - KINDERGARTEN 2 PF
Field-based experiences in a school, agency, or family setting with children ages three to six. Observation, instruction, and assessment of children. Collaboration with school, community and families in order to support ongoing work in the setting.
PREREQ: HDFS222 and HDFS224. COREQ: HDFS412.

HDFS 433 FIELD EXPERIENCE: KINDERGARTEN - GRADE 2 1 PF
Field-based experiences in a school, agency or family setting with children, kindergarten through second grade. Observation, instruction, and assessment of children. Collaboration with school, community, and families in order to support ongoing work in the setting.
PREREQ: HDFS222 and HDFS224. COREQ: HDFS413.

HDFS 435 PROGRAMS FOR CHILDREN WITH EXCEPTIONALITIES 3 Philosophy, organization, and operation of programs for children with exceptionalities. Focus on teaching in inclusive settings, and implementing developmentally appropriate practices. Addresses parent-professional partnerships, characteristics of specific disabilities and related interventions, IEP process, adaptation strategies, and positioning and handling techniques.
PREREQ: HDFS222. COREQ: HDFS432. RESTRICTIONS: Early Childhood Education majors only or with permission of instructor.

HDFS 438 LEADERSHIP DEVELOPMENT IN HUMAN SEXUALITY 1-3 Seminar/practicum for organizing and leading discussion groups in human sexuality. Trains group leaders to facilitate effective communication skills & responsible sexual decisions, integrating research & theories with individual relationships & family life experiences.
PREREQ: HDFS401. RESTRICTIONS: Requires permission of instructor. For undergraduate teaching assistants only.

HDFS 439 INSTRUCTION METHODS IN FAMILY CONSUM SCI 3 Identification, selection and evaluation of developmentally appropriate strategies and resources for instruction in Family and Consumer Sciences in middle school and secondary classrooms and as well as with adults in community settings.

HDFS 440 EARLY CHILDHOOD ADMINISTRATION 3
Organization, management and evaluation of early childhood programs including quality programming and continuous improvement, personnel, family partnerships, facilities, business management and program policies.

HDFS 441 ADV INCLUS CURRICULUM IN EARLY CHILDHOOD 1 3 Advanced study and application of child outcome assessment, using assessment to guide curriculum planning, using technology to support curriculum and teaching of English/Language Arts, Math, Science, Social Studies and the arts and social/emotional and fine and gross motor development.
COREQ: EDUC400 and HDFS424. RESTRICTIONS: ECE majors only.

HDFS 442 ADV INCL CURRICULUM IN EARLY CHILDHOOD II 3 Continuation of advanced study and application of child outcomes assessment, using assessment to guide curriculum planning, using technology to support curriculum and teaching of English/Language Arts, Math, Science, Social Studies and the arts and social/emotional, fine and gross motor development.
PREREQ: HDFS441. COREQ: EDUC400 and HDFS425. RESTRICTIONS: ECE Majors only.

HDFS 445 FAMILY, COMMUNITY AND SCHOOL PARTNERSHIPS 3
Explores the importance of families in the development, care, and education of young children. Building partnerships among families, agencies, schools, and communities is examined, including theory, research, case studies, program models, diversity in families, and community resources.
COREQ: HDFS334 or HDFS432, or permission of instructor.

HDFS 449 INTERNSHIP IN FAMILY AND COMMUNITY SERVICES 3-10 PF
On-the-job experience in a community and family service agency.
RESTRICTIONS: Requires permission of instructor.

HDFS 452 ASSESSMENT OF CHILDREN 3
Study of multiple roles of formal and informal assessment. Primary focus on integration of curriculum, assessment and programing. Strategies for family involvement will be identified.
PREREQ: HDFS220, HDFS221, HDFS222, and HDFS224. COREQ: HDFS431, HDFS432 or HDFS433 for ECE majors only.

HDFS 456 PROFESSIONAL DEVELOPMENT AND SUPERVISION 3
Theory and evidence-based practices in professional development and supervision in human services, school-age and early care and education settings. Emphasis on principles of adult development and learning and continuous growth through reflective practices and communities of practice.

HDFS 459 CHILD DEVELOPMENT PRACTICUM 1-9 PF
Supervised student teaching experience.
PREREQ: HDFS435, HDFS452 and HDFS470. RESTRICTIONS: Requires permission of instructor.

HDFS 463 ATYPICAL INFANT AND TODDLER 3 Sensory, motor, affective and psychosocial development in infancy and toddlerhood. Observation and participation with infants. Early diagnosis, assessment and treatment strategies for disabilities of the infant and toddler period.
PREREQ: HDFS221 and HDFS236.

HDFS 465 SEMINAR 1-3 Discusses professional issues in the delivery of human services. COREQ: HDFS449.
HDFS 466  INDIVIDUAL STUDY  1-12

HDFS 470  FAMILIES AND CHILDREN AT RISK  3
Study of social-emotional considerations of disabilities and risk factors upon
development of children and families. Theory, research, and practices discussed
with emphasis on family-professional collaboration, empowerment, family-
focused practice, and cultural sensitivity.
PREREQ: HDFS201 or HDFS220 or HDFS221 or PSYC232.

HDFS 472  SUBSTANCE ABUSE AND THE FAMILY  3
Provide an overview of substance abuse, with an emphasis on how it affects
the family. Topics include definitions and trends, the physiological effects of
substances, the psychological effects of substances, children of substance abusing
parents, prevention, and intervention.

HDFS 475  TOPICS IN HUMAN DEVELOPMENT AND FAMILY STUDIES  1-3
Selected topics focusing on current issues affecting families from an
interdisciplinary and global perspective.
May be crosslisted with BAMS476. PREREQ: Vary by Instructor and topic.
REQUIREMENTS: Vary by Instructor and topic.

HDFS 480  STUDENT TEACHING SEMINAR  2 PF
Discussion-oriented and problem-centered seminar on the role and
contributions of the early childhood education professional.
COREQ: EDUC400.

HDFS 481  HONORS CAPSTONE STUDENT TEACHING SEMINAR  3
Discussion-oriented and problem-solving seminar with emphasis on role and
contributions of the early childhood education professional. Includes introduction
to teachers as researchers and completion of public presentation.
COREQ: EDUC400. RESTRICTIONS: Permission of instructor. Honors students only.

HDFS 490  INSTRUCTIONAL METHODS IN FAMILY AND CONSUMER SCIENCES  3
Identification, selection and evaluation of developmentally appropriate strategies
and resources for instruction in Family and Consumer Sciences secondary
classrooms and community settings. School practicum required.

HDFS 491  CURRICULUM AND ASSESSMENT IN FAMILY AND CONSUMER
SCIENCES  3
Foundations of curriculum development and evaluation as applied to Family and
Consumer Sciences secondary classrooms and community settings. School
practicum required.
PREREQ: HDFS490.

HDFS 601  THEORIES OF HUMAN DEVELOPMENT  3
Overview and analysis of classic and contemporary theoretical approaches in
human development. Special emphasis on research and theory concerning
families as contexts of development.

HDFS 603  ADULT DISABILITY ISSUES  3
Public Policy and Contemporary Issues in the Provision of Services for Adults with
Intellectual and Developmental Disabilities.

HDFS 605  IMPACT OF AGING ON THE FAMILY  3
Psychological, physical and financial impact of aging persons on younger family
members; increased dependence; family adjustment, both positive and
conflicting.

HDFS 606  EARLY CHILD LITERACY SKILLS DEV  3
Examines advanced research and theories addressing literacy development in
Early Childhood education settings. Includes the application of instructional and
assessment strategies helpful in promoting language and literacy of children from
diverse backgrounds and/or learning needs.

HDFS 607  SEMINAR IN COMMUNITY DEVELOPMENT AND NONPROFIT
LEADERSHIP  1
Overview of the philosophical and conceptual foundations of Community
Development and the Nonprofit Sector, with a special focus on leadership
approaches that are utilized in both areas. Through a survey of policy topics such
as housing, family support and poverty, and social and economic development,
examines how each field approaches addressing these issues.
Crosslisted with UAPR607.

HDFS 608  POVERTY, NEIGHBORHOODS AND COMMUNITY DEVELOPMENT  3
Examines social science literature through which multidisciplinary analysts have
described and explained poverty, analyzed neighborhoods, and categorized
community development efforts. Focusing on the United States, particular
attention is paid to analyses from 1960 to the present.
Crosslisted with UAPR608.

HDFS 609  DOMESTIC VIOLENCE SERVICES  3
Examines issues in providing services to families in which domestic violence is
occurring. Multiple service systems are explored, with emphasis on service
coordination, service gaps, and public policy.

HDFS 614  EVALUATION PRACTICES  3
Techniques and methods for assessing professional growth of adults as well as
performances and learning of adolescents and special clientele; differentiates
evaluation and measurement; explores current issues in evaluation.

HDFS 615  RESEARCH METHODS  3
Evaluation of existing research reports, articles and monographs, development of
data collection techniques, analysis and presentation of data pertaining to child,
family and community populations, elements of statistical analysis, evaluation and
selection of research designs, preparation of a research project proposal.

HDFS 616  BOOKS FOR EARLY CHILDHOOD (INFANCY TO 8)  3
An in depth examination of children's books and strategies for selecting and using
books with children from infancy to age 8. Topics include ways to use books to
support children's emotional, social and language development, parent education
and culturally appropriate books to support development and to prevent early
learning difficulties.

HDFS 621  FAMILY STUDIES I: EMPIRICAL AND THEORETICAL PERSPECTIVES  3
Examines basic theories in family studies and trends affecting families at the
macro level. Includes a survey of the empirical base of the field and covers issues
relating to the interface of the family and society and trends in prevention,
treatment, education and therapy.

HDFS 624  INTRODUCTION TO LEADERSHIP & DISABILITIES  3
Focus is on the relationship between leadership skills, personal leadership traits
and the shift to person centered individualized services and supports for people
with intellectual and developmental disabilities and their families.

HDFS 627  PARENTING THROUGH THE LIFESPAN  3
Applied focus on parenting styles, roles, issues and goals through the lifespan.
Parent diversity, intergenerational relationships, developmental and acquired
disabilities, and needs of children, adult children, extended family members, and
parents are examined.

HDFS 630  FAMILY LIFE EDUCATION  3
Teaching methods to address family life education and issues in formal
educational and community settings and designing quality curricula and pedagogy
for support, prevention and empowerment-based experiences.

HDFS 637  PROGRAM PLANNING, ASSESSMENT AND EVALUATION  3
Methods of program planning, summative and formative evaluation and
assessment including models, rationales and evaluation techniques as they relate
to individual classrooms, educational programs and community settings.

HDFS 638  ADOLESCENCE AND YOUTH: THEORIES  3
A critical review of the theories pertaining to personal, physical and socio-
emotional development of the periods from early adolescence through youth by
an examination of significant research.

HDFS 639  CURRICULUM METHODS AND ASSESSMENT  3
Curriculum, instruction and methods of accountability as they relate to
educational programs in community and family service agencies. Includes
curriculum development, assessment and developmentally appropriate practices
with emphasis on integrating language and literacy, social science, mathematics,
science, the arts and Family and Consumer Sciences.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 640</td>
<td><strong>Early Childhood Administration, Leadership and Advocacy</strong></td>
<td>3</td>
<td>Organization, administration and evaluation of early childhood education programs including personnel, facilities, regulations, educational programming, curriculum, management and development. Includes strategies for leadership, professional development and advocacy.</td>
</tr>
<tr>
<td>HDFS 641</td>
<td><strong>Infants, Toddlers and Families: Development and Programming</strong></td>
<td>3</td>
<td>Cognitive, social, emotional and motor development for children from conception to 36 months, with implications for family support and early care and educational programming. Field placement required. PREREQ: HDFS601 and HDFS621.</td>
</tr>
<tr>
<td>HDFS 642</td>
<td><strong>Leadership in Human Services</strong></td>
<td>3</td>
<td>Examination of how leaders influence and control the direction and effectiveness of human service agencies and institutions. Focuses on trends, issues, theories and research on leadership with emphasis on the unique concerns of women.</td>
</tr>
<tr>
<td>HDFS 645</td>
<td><strong>Programming for Young Children with Special Needs</strong></td>
<td>3</td>
<td>Theories, philosophies, organization and evaluation of programs, both mainstreamed and self-contained for young exceptional children. Emphasis on the multidimensional role of teachers. Focuses on working with parents individually and in groups and on child advocacy.</td>
</tr>
<tr>
<td>HDFS 646</td>
<td><strong>Infant and Early Childhood Mental Health</strong></td>
<td>3</td>
<td>Early diagnosis, early intervention, risk and protective factors, and prevention are emphasized. Theories of social, emotional, cognitive, language, and family development, healthy functioning, and psychopathology in infants, young children, and their families are reviewed.</td>
</tr>
<tr>
<td>HDFS 647</td>
<td><strong>Family Partnerships in Early Childhood Care and Education</strong></td>
<td>3</td>
<td>Rationale and methods for developing partnerships between families and early care, education, and allied health professionals are examined. Collaboration between families and professionals is explored within the context of race, ethnicity, and diversity among families, and community/professional cultural and socio-political factors.</td>
</tr>
<tr>
<td>HDFS 651</td>
<td><strong>Advanced Child Development</strong></td>
<td>3</td>
<td>Theoretical approaches in psychosocial development in children; and influences on development of self-concept, sex-role behavior, moral development and prejudice.</td>
</tr>
<tr>
<td>HDFS 655</td>
<td><strong>Measurement Techniques for Children and Families</strong></td>
<td>3</td>
<td>Construction and analysis of developmental ratings, behavioral coding procedures, interviews, questionnaires, tests and sociometric measures appropriate for studying the behavioral development of children and families through the life cycle.</td>
</tr>
<tr>
<td>HDFS 656</td>
<td><strong>Adult Development and Learning</strong></td>
<td>3</td>
<td>Theory and current research on adult development and learning with emphasis on relationship-based, transformative and sustainable learning in early education, human services and higher education settings.</td>
</tr>
<tr>
<td>HDFS 658</td>
<td><strong>Readings in Individual and Family Studies</strong></td>
<td>3</td>
<td>Emphasis on either infancy, early and/or middle childhood, adolescence, adulthood, gerontology and/or specialized topics in family studies. Emphasis may vary by semester.</td>
</tr>
<tr>
<td>HDFS 660</td>
<td><strong>Teaching of Human Development and Family Studies</strong></td>
<td>1-6</td>
<td>Students acquire pedagogical strategies and techniques for effective teaching of human development and family studies at the post-secondary level, including observation, teaching opportunities and mentoring relationships with faculty. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>HDFS 662</td>
<td><strong>Curriculum Analysis in Early Childhood</strong></td>
<td>3</td>
<td>Examination and evaluation of curriculum in early childhood including theoretical analysis of pedagogy, curriculum content and child outcomes.</td>
</tr>
<tr>
<td>HDFS 663</td>
<td><strong>Atypical Infant and Toddler Development</strong></td>
<td>3</td>
<td>Detailed overview of atypical development of infants and toddlers including their sensory, motor, cognitive, communication, and psychosocial development. Family interactions, supports, and early intervention service systems are also addressed.</td>
</tr>
<tr>
<td>HDFS 665</td>
<td><strong>Professional Develop Seminar</strong></td>
<td>1-6</td>
<td>Focuses on professional development for Masters and Doctoral level students. Topics range from job search preparation skills, interviewing, time/stress management, networking and career opportunities, and grantmanship.</td>
</tr>
<tr>
<td>HDFS 668</td>
<td><strong>Research</strong></td>
<td>1-6</td>
<td></td>
</tr>
</tbody>
</table>
HDFS 855  FAMLY STUDIES II: ANALYSIS AND CRITICAL ISSUES  3
A critical analysis of topics central to understanding the field of family studies. Emphasis on issues facing contemporary families. Topics include the work-family balance, marriage, divorce, remarriage, parenting, domestic violence, pregnancy, sibling relationships, and the lifespan.
PREREQ: HDFS621 or permission of instructor.

HDFS 860  DIVERSITY IN FAMILIES AND HUMAN DEVELOPMENT  3
Examines the effects of factors such as sex, cohort, culture, gender and other components that influence diversity in families and variations in the context of human development. Surveys the impact of socioeconomic influences and demographic changes as they relate to varied family structures and relationships over the life course.
PREREQ: HDFS601 or HDFS621, or permission of instructor.

HDFS 865  ADVANCED SEMINAR IN FAMILY STUDIES  1-3
Varying special interest topics in family studies. Topics usually are presented from an interdisciplinary perspective.
RESTRICTIONS: Requires permission of instructor. May be repeated for credit as topic varies.

HDFS 868  RESEARCH  1-6

HDFS 869  MASTER’S THESIS  1-6

HDFS 870  PREVENTION INTERVENS AND POLICY  3
Foundations of family crisis prevention and early intervention, including parenting and family support, empowerment, and community development. Exemplary interventions and policies for optimizing development are highlighted.

HDFS 875  INTERGENERATIONAL RELATIONS AND DEVELOPMENT  3
Focused consideration of the role of intergenerational relationships in the development of individuals and families. Intensive study of theories and empirical data illustrating the contextually embedded interactions of individual and family development. Particular emphasis on developmental reciprocity in child-grandparent and extended family relationships.
PREREQ: permission of instructor.

HDFS 880  FAMILIES, DISABILITIES AND INSTITUTIONS  3
Focuses on how families and individuals with disabilities interface with a range of institutions such as the legal system, social services, educational and health care systems. Discusses effects of institutions on families and influence of family policies on institutional policies and processes.

HDFS 885  ADOLESCENT PROBLEM BEHAVIORS  3
Explores adolescent problem behaviors from a developmental perspective. Substance abuse, early pregnancy/childbearing, anxiety, depression, eating disorders and other issues will be examined. Discuss intervention and prevention programs targeting adolescent problem behaviors.

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

HDFS 969  DOCTORAL DISSERTATION  1-12 PF

HEBR 105  HEBREW I - ELEMENTARY  4
Introduction to the Hebrew alphabet and language, and development of basic speaking, listening, reading and writing skills. May be crosslisted with JWST105.

HEBR 106  HEBREW II - ELEMENTARY/INTERMEDIATE  4
Continuation of Elementary Hebrew. Increasing mastery of the basic skills of speaking, listening, reading, and writing through texts, conversations and songs. May be crosslisted with JWST106. PREREQ: HEBR105. Those with background other than HEBR105 should see instructor for appropriate placement.

HEBR 107  HEBREW III - INTERMEDIATE  4
Strengthening grammar skills, continued practice in speaking, listening, writing and reading through conversation, texts and songs. May be crosslisted with JWST107. PREREQ: HEBR106. Those with background other than HEBR106 should see instructor for appropriate placement
RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.

HEBR 205  HEBREW CONVERSATION  3
Practical use of Hebrew by means of discussions and oral reports on a variety of topics including family, school and work life. Emphasis on improvement of conversational skills for social situations, as well as grammatical competence and reading comprehension through multicultural themes including the revival of the Hebrew language and various issues related to Hebrew culture. May be crosslisted with JWST205. PREREQ: HEBR107 or equivalent.

HEBR 208  TEL AVIV AND JERUSALEM THROUGH TIME  3
A cultural comparison of Tel Aviv and Jerusalem. Tel Aviv and Jerusalem represent different aspects and faces of Israeli society. Our exploration of the two cities will unravel the histories of these cities, while at the same time, look at their present structural, cultural, and social components. May be crosslisted with JWST207.

HEBR 209  CONTEMPORARY ISRAEL THROUGH FILM  3
Development of oral and written proficiency in Hebrew through discussion and analysis of Israeli films pertaining to major issues in the development of the young state. Grammar review where needed. May be crosslisted with JWST209. PREREQ: HEBR107 or one 200-level Hebrew course or professor’s permission. RESTRICTIONS: Minimum grade of A- required for HEBR107 and minimum grade of B required for a 200-level course.

HEBR 366  INDEPENDENT STUDY  1-3

HEBR 466  INDEPENDENT STUDY  1-6

HISTORY

HIST 101  WESTERN CIVILIZATION TO 1648  3
Principal political, social, economic and cultural developments in Western civilization from late antiquity (3rd century A.D.) to middle of 17th century.

HIST 102  WESTERN CIVILIZATION: 1648 TO THE PRESENT  3
The principal political, social, economic and cultural developments in Western civilization since the middle of the 17th century.

HIST 103  WORLD HISTORY I  3
Principal political, economic, cultural and social developments in world history through the 16th century, relating the past to the present. Equal weight given to the history of Asia, Africa, the Americas and Europe.

HIST 104  WORLD HISTORY II  3
Principal political, economic, cultural and social developments in world history from the 16th century to the present, relating the past to the present. Equal weight given to the history of Asia, Africa, the Americas and Europe.

HIST 130  ISLAMIC NEAR EAST: 600-1500  3
Introduces the origins of Islam, its development as a religion and a culture, and the broad trends in Middle Eastern history until 1500.

HIST 131  ISLAMIC NEAR EAST: 1500-PRESENT  3
Considers the traditional make-up of the Middle East and charts the emergence of the region in its present form through the 19th and 20th centuries.

HIST 134  HISTORY OF AFRICA  3
Introduction to African history south of the Sahara, from the earliest times to 1914. Introduces major themes in African history: pre-colonial African political, social and economic institutions; diversity in African political organizations; slave trade and colonialism. May be crosslisted with BAMS134.

HIST 135  INTRODUCTION TO LATIN AMERICAN HISTORY  3
Introduction to Latin American history from preconquest period to present.

HIST 136  TOPICS IN EAST ASIA IN FILM  1-3
Explores East Asian cinema and society via readings, discussion and viewing of films by and/or about East Asians. Topics vary. Crosslisted with EAST136. RESTRICTIONS: May be repeated for credit when topics vary.

HIST 137  EAST ASIAN CIVILIZATION: CHINA  3
A survey of major aspects of Chinese civilization, relating the past to the present.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 138</td>
<td>EAST ASIAN CIVILIZATION: JAPAN</td>
<td>3</td>
<td>A survey of major aspects of Japanese civilization, relating the past to the present.</td>
</tr>
<tr>
<td>HIST 145</td>
<td>GANDHI'S INDIA</td>
<td>3</td>
<td>Introduction to Mohandas Gandhi's profound contribution to India's independence; to his strategies for peaceful struggle and to his criticism of &quot;modern society&quot;. Other prominent leaders and organizations that held radically different views about modern India will be examined.</td>
</tr>
<tr>
<td>HIST 200</td>
<td>HISTORY AND GOVERNMENT OF DELAWARE</td>
<td>3</td>
<td>A survey of the history of Delaware and its present government, with special attention to the needs of social studies teachers.</td>
</tr>
<tr>
<td>HIST 201</td>
<td>INTRODUCTION TO GLOBAL ISLAM</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>HIST 205</td>
<td>U.S. HISTORY TO 1865</td>
<td>3</td>
<td>An introductory survey of 17th, 18th, and 19th-century American history. Themes and approach vary with the instructor.</td>
</tr>
<tr>
<td>HIST 206</td>
<td>U.S. HISTORY SINCE 1865</td>
<td>3</td>
<td>An introductory survey of American history since 1865. Themes and approach vary with the instructor.</td>
</tr>
<tr>
<td>HIST 210</td>
<td>INTRODUCTION TO MILITARY HISTORY</td>
<td>3</td>
<td>Survey of the history of warfare from the ancient Greeks through World War I, with emphasis upon tactics, weapons, armor, strategy and the human factors that contributed to success or failure in war.</td>
</tr>
<tr>
<td>HIST 216</td>
<td>INTRODUCTION TO MATERIAL CULTURE STUDIES</td>
<td>3</td>
<td>Introduces students to material culture studies, broadly defined as study of all things people make and all the ways people have altered the physical world. Explores the approaches, concepts, and methods of numerous disciplines that investigate material culture. Crosslisted with ANTH216.</td>
</tr>
<tr>
<td>HIST 220</td>
<td>THE CIVIL RIGHTS MOVEMENT</td>
<td>3-4</td>
<td>This course examines African American struggles for freedom, equality, and citizenship from the 1940s to the present. May be crosslisted with BAMS220.</td>
</tr>
<tr>
<td>HIST 221</td>
<td>FILM AND AMERICAN SOCIETY</td>
<td>3</td>
<td>Examines how American political, social and cultural beliefs found expression in American feature films from World War II through the 1990s. Weekly lectures and classic films such as On the Waterfront, Dr. Strangelove, Bonnie and Clyde, others.</td>
</tr>
<tr>
<td>HIST 222</td>
<td>RELIGION IN MODERN AMERICA</td>
<td>3</td>
<td>Surveys major themes in American religious history since the Civil War, including religion and social reform, politics, popular culture, and everyday life. May be crosslisted with JWST222.</td>
</tr>
<tr>
<td>HIST 223</td>
<td>NATURE AND HISTORY</td>
<td>3</td>
<td>Survey of how people across the globe have related to the non-human world roughly in the last 10,000 years. Focuses on revolutionary changes in global environmental history as well as efforts in many times and places to solve environmental problems.</td>
</tr>
<tr>
<td>HIST 241</td>
<td>HISTORY OF CHRISTIANITY TO 1300</td>
<td>3</td>
<td>A survey of the evolution of Christianity from its origins to 1300.</td>
</tr>
<tr>
<td>HIST 243</td>
<td>ANCIENT RELIGION AND CIVILIZATION</td>
<td>3</td>
<td>Outlines religion in Europe and the Near East from the Paleolithic period to the rise of Islam. Covers religious beliefs, rituals, death and burial practices of ancient man and construction of and use of religious edifices.</td>
</tr>
<tr>
<td>HIST 250</td>
<td>COMPARATIVE GENOCIDE</td>
<td>3</td>
<td>Examines genocidal acts in the 20th century in a comparative framework. Cases include genocides of Armenians, Jews, Cambodians, Bosnians, and Rwandans. Topics include political and racial ideology, government institutions, perpetrator motivations, international responses, and genocide prevention. May be crosslisted with JWST250.</td>
</tr>
<tr>
<td>HIST 254</td>
<td>JEWISH HOLOCAUST: 1933-1945</td>
<td>3</td>
<td>Focuses on the infamous &quot;Final Solution,&quot; with particular emphasis on the roots of Anti-Semitism, National Socialist policies and plans, ghetto and camp life, the Einsatzgruppen, resistance, the politics of rescue and the art and literature of the Holocaust. May be crosslisted with JWST254.</td>
</tr>
<tr>
<td>HIST 268</td>
<td>SEMINAR</td>
<td>3</td>
<td>Introduction to the study and writing of history. Individual instructors take different approaches but all tend to stress the nature and verification of historical evidence, its interpretation and its communication in writing. RESTRICTIONS: Open to history majors only. Cannot be repeated for credit.</td>
</tr>
<tr>
<td>HIST 270</td>
<td>HISTORY OF MODERN ASIA</td>
<td>3</td>
<td>Comparative survey of the modern histories of several Asian countries, for example China, Japan and Vietnam, emphasizing their responses to the modern world. Topics include traditional societies, impact of imperialism, nationalist and communist movements, Pacific War, cultural revolution in China, Vietnam Conflict and emergence of the Japanese economic powerhouse.</td>
</tr>
<tr>
<td>HIST 291</td>
<td>WOMEN'S HISTORY THROUGH FILM</td>
<td>1</td>
<td>Explores women's historical experiences through the medium of film. Students will view and discuss a variety of documentary films on women and read materials related to topics covered in the films. Films will deal with historical and contemporary issues in the United States and internationally. Crosslisted with WOMS291. RESTRICTIONS: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>HIST 300</td>
<td>WOMEN IN AMERICAN HISTORY</td>
<td>3</td>
<td>The position of women in American life viewed from a historical perspective including such topics as home and family life, women in the work force, women as agents of social change and feminism. May be crosslisted with WOMS300.</td>
</tr>
<tr>
<td>HIST 302</td>
<td>THE WORLD IN OUR TIME</td>
<td>3</td>
<td>An examination of current events within the context of historical forces.</td>
</tr>
<tr>
<td>HIST 305</td>
<td>RACE, IMAGE, IN MEDIA/CULTURE</td>
<td>3</td>
<td>Study how images shape and reflect attitudes toward race and ethnicity in culture. Visual materials include film, photography, television, and popular illustrations. Crosslisted with BAMS305.</td>
</tr>
<tr>
<td>HIST 307</td>
<td>THE U.S. IN THE EARLY NATIONAL PERIOD, 1789-1825</td>
<td>3</td>
<td>Political and cultural change in America from 1789 to 1825, from the presidency of George Washington through James Monroe. Particular attention to national politics under the new Constitution, westward expansion under Jefferson and Madison, and cultural life in the early republic.</td>
</tr>
<tr>
<td>HIST 308</td>
<td>THE UNITED STATES IN THE ANTebELLUM PERIOD, 1825-1861</td>
<td>3</td>
<td>Social transformation and politics in America from 1825 to the eve of the Civil War. Particular attention to the presidency of Andrew Jackson, changes in institutions and culture related to expansion, and conflicts leading to disunion.</td>
</tr>
<tr>
<td>HIST 309</td>
<td>MONEY, MARKETS AND MISCHIEF: U.S. BUSINESS AND POLITICAL ECONOMY SINCE 1865</td>
<td>3</td>
<td>A history of the United States as a capitalist civilization, particularly since the nineteenth-century rise of the modern corporation. Emphasis on business history, business-government relations and the larger social history of U.S. political economy.</td>
</tr>
<tr>
<td>HIST 311</td>
<td>POSTWAR AMERICA II: 1963-PRESENT</td>
<td>3</td>
<td>Social, political and diplomatic history of the United States from 1963 to the present.</td>
</tr>
<tr>
<td>HIST 312</td>
<td>HISTORY OF CRIME AND CRIMINAL JUSTICE</td>
<td>3</td>
<td>Examines changing perceptions of criminal and deviant behavior and development of laws, institutions, and social policies to counteract crime from seventeenth century to present. Crosslisted with CRIM312.</td>
</tr>
<tr>
<td>HIST 313</td>
<td>THE UNITED STATES, 1877 - 1914</td>
<td>3</td>
<td>Examines the rise of big business after the Civil War and societal responses to industrialism. Describes and assesses topics including race relations, immigration, and politics.</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credit Hours</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td></td>
</tr>
<tr>
<td>HIST 314</td>
<td>THE UNITED STATES, 1914 - 1945</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 315</td>
<td>HISTORY FOR TEACHERS</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 317</td>
<td>BUYING IN: CONSUMER CAPITALISM IN THE US</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 318</td>
<td>COLONIAL AMERICA</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 319</td>
<td>REVOLUTIONARY AMERICA, 1760-1789</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 320</td>
<td>SLAVE NARRATIVES IN THE AFRICAN DIASPORA</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 321</td>
<td>CIVIL WAR AND RECONSTRUCTION</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 322</td>
<td>THE OLD SOUTH</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 324</td>
<td>AMERICAN CONSTITUTIONAL HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 325</td>
<td>AFRICAN AMERICAN HISTORY TO THE CIVIL WAR</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 326</td>
<td>AFRICAN AMERICAN HISTORY SINCE THE CIVIL WAR</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 327</td>
<td>TOPICS IN JEWISH HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 328</td>
<td>AMERICAN CAPITALISM SINCE 1815</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 329</td>
<td>INTERNATIONAL MIGRATION</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 330</td>
<td>PEASANTS AND REVOLUTION IN AFRICA</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 331</td>
<td>HISTORY OF CARIBBEAN I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 332</td>
<td>HISTORY OF CARIBBEAN II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 333</td>
<td>HISTORY OF BLACKS IN THE AMERICAN WEST</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 334</td>
<td>AFRICAN AMERICAN WOMEN’S HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 335</td>
<td>AMERICAN SLAVERY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 336</td>
<td>TOPICS IN LATIN AMERICAN HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 337</td>
<td>TOPICS IN AMERICAN HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 338</td>
<td>GREEK-ROMAN SPORT-RECREATION</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credit Hours</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>--------------</td>
<td></td>
</tr>
<tr>
<td>HIST 339</td>
<td>TOPICS IN EUROPEAN HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>explores the political, social, cultural, and economic history of europe, with a focus or theme that touches on one or more countries. the emphasis when taught in newark is on particular aspects of european history distinct from national narratives. the syllabi are typically complemented by visits to museums and appropriate historic sites when taught abroad. topics vary but often focus on a sweeping historical survey of the particular european country in which a study abroad program is taking place.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 340</td>
<td>ANCIENT NEAR EAST AND GREECE</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stresses such themes as the way in which the world view of the ancients was different from ours, and the relationship between the individual and society. readings in ancient historical works and ancient literature. extensive use of slides.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 341</td>
<td>ANCIENT ROME</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>students are encouraged to form opinions on such questions as why and how rome came to rule its empire; why julius caesar was murdered; and why augustus succeeded where julius caesar had failed. readings in ancient sources. extensive use of slides.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 342</td>
<td>BARBARIAN EUROPE</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a survey of political, social, and economic developments in europe between 300 and 1050.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 343</td>
<td>MEDIEVAL EUROPE: 1050-1350</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a survey of political, social, cultural and economic developments in europe between 1050 and 1350.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 344</td>
<td>RENAISSANCE EUROPE</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>europe from the late 13th to the early 16th century, with stress on the consequences of the black death, the reform of the church and the flowering of cultural and intellectual life in italy and northern europe.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 345</td>
<td>REFORMATION EUROPE</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>religion in the realms of thought and action during the rise of early modern western civilization: the witch-craze, the scientific revolution, the reformation, the counter-reformation and their impact on the behavior and perceptions of people by 1650.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 348</td>
<td>HISTORY OF SPAIN: 1479-PRESENT</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>history of spain from the unification of the crowns of aragon and castile in 1479 to the present. emphasis on the rise and decline of the spanish empire, expansion into the new world, and the obstacles for political, social and economic modernization since 1715.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 349</td>
<td>MODERN LATIN AMERICA: 1800-PRESENT</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the history of modern latin america. topics include the legacy of colonization, the revolutions of independence, the process of state building in the 19th century, and the struggles for political, social, and economic modernization of the 20th century.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 350</td>
<td>WORLD WAR II IN EUROPE, 1939-1945</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>military history of world war ii in europe. post-world war i revival of german military power, the origins of the war in european context, and military operations from the german attack on poland to the collapse of italy and germany.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 351</td>
<td>EUROPE IN CRISIS: 1919-1945</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>europe from the paris peace conference to the end of world war ii, with emphasis on the breakdown of traditional institutions in an age of totalitarianism, economic depression and world conflict.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 352</td>
<td>EUROPE, 1945 TO THE PRESENT</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a comprehensive survey and analysis of the evolution and structure of post world war ii european society. restrictions: when taught abroad, focuses on the host country.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 353</td>
<td>MODERN GERMANY: 1770-1919</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>german political, socioeconomic, and cultural history from 1770 to the end of the first world war.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 354</td>
<td>GERMANY IN THE TWENTIETH CENTURY: 1914 TO PRESENT</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>german political, socioeconomic and cultural history from the first world war to the present.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 355</td>
<td>EARLY MODERN INTELLECTUAL HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>examines the major development in thought from around 1600 to 1800. questions considered are the nature of political order and justice, the character of the good life and moral obligation, the relation between faith and reason, and the development of historical reason and theories of the fine arts. readings will be from milton, locke, voltaire, Rousseau and others.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 356</td>
<td>MODERN EUROPEAN INTELLECTUAL HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>philosophical and political thought from english romanticism and german classicism through existentialism. readings from hegel, marx, kierkegaard, nietzsche and thomas mann.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 357</td>
<td>THE EUROPEAN CITY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the evolution of cities in european history, emphasizing the development of urban society and culture. topics vary and may include london and paris in the modern age, london in the modern age, paris in the modern age. restrictions: may be taught abroad. may be repeated for credit when taken on different city topics.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 359</td>
<td>SOVIET UNION: 1917-1991</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>political, socioeconomic and cultural developments in the soviet union from 1917 to 1990.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 360</td>
<td>REVOLUTIONARY FRANCE 1789-1871</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>analyzes france’s revolutionary century from the great revolution of 1789 to the paris commune of 1871. it pays close attention to the ideas and actions of individuals like napoleon bonaparte who left their mark not just on france but on europe and beyond.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 361</td>
<td>TWENTIETH CENTURY FRANCE</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>french political, social, and cultural history from the 1890s to the year 2000.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 363</td>
<td>MODERN JEWISH HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>following the french revolution jewish life throughout europe and the us underwent significant changes with respect to legal equality, civic rights, and religious reform. this course will focus on the ways in which jewish history transformed and was transformed by the experience of modernity. may be crosslisted with jwst363.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 365</td>
<td>TOPICS IN ASIAN AND PACIFIC HISTORY</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>topics vary and may include history of civilization (china, japan, korea, southeast asia, etc.), women in historical and modern times, european colonialism in asia, and relations with the united states. restrictions: may be repeated for credit two times when topics vary.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 366</td>
<td>INDEPENDENT STUDY</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>HIST 368</td>
<td>MODERN CHINA: 1600s TO PRESENT</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>introduces students to modern chinese history from the 1600s to the present. provides students with insights into some issues that significantly influence modern chinese history with the aim of understanding what china was in the past, what china is today, and what china might be in the future. students will explore the rise and prosperity of manchu-ruled qing china (1636/1644-1912), china’s decline with the coming of western powers in the 19th century, china’s transformation into a modern nation-state after the nationalist and communist revolutions in the 20th century, and the so-called “rise of china” in the 21st century.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 369</td>
<td>CHINA SINCE 1949</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>explores chinese history since 1949. discusses china’s ideology of launching “continuous revolution” from the 1950s to the 1970s, sino-soviet relations, china’s involvement in and the legacy of the korean war, mainland china-taiwan relations, china’s ethnic and border issues, china’s economic growth, and popular culture. restrictions: not open to freshmen.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 370</td>
<td>HISTORY OF MODERN JAPAN</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>history of japan from 1600 to 1952 with special emphasis on domestic forces of change, impact of the west, japanese imperialism and militarism, the dilemma of progress and japan’s place in the modern world.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HIST 371</td>
<td>POSTWAR JAPAN</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>traces the emergence of contemporary japan in its cultural and social spheres. emphasis is on analysis of the historical significance of postwar japanese culture. investigations explore everyday life as depicted in literature, film, journalism, memoirs and historical writings.</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
The course asks the question, what is Japanese about global popular culture? It explores the theory and practice of global popular culture as it emerges from the history of popular culture in Japan from the eighteenth to the twenty-first century. Topics include entertainment, sports, mass media, tourism, fashion, consumerism, sexuality and gender. The course combines lecture and discussion with intensive reading and writing. May be crosslisted with WOMS372.

**HIST 373 MODERN IRELAND: 1660-PRESENT**
3
Anglo-Irish relations, the emergence and victory of Irish nationalism and the historical roots and subsequent development of the Ulster problem.

**HIST 374 HISTORY OF ENGLAND TO 1688**
3
Political, constitutional, social and economic development to 1715.

**HIST 375 BRITAIN SINCE 1714**
3
British politics, society, and culture in modern times. The rise of parliamentary democracy, industry, liberalism, empire, feminism, social democracy and mass culture.

**HIST 376 ENGLAND: THE FORMATIVE YEARS, 1648-1798**
3
Synthesizes the social, economic, political, and cultural developments during Britain's rise to world power. Topics include the rise of the novel, origins of political parties, voyages of Captain Cook, fascination with landscape, origins of empire, growth of industry, and changing nature of family, fashion, sex and marriage. Expected to write a number of short critical essays.

**HIST 377 RADICALISM AND REVOLUTION: ISLAMIC MOVEMENT/MODERN MIDDLE EAST**
3
Addresses the background, historical development and present state of Islamic fundamentalist movements.

**HIST 378 FAMILY, TRIBE AND NATION: IDENTITY IN THE MODERN MIDDLE EAST**
3
Focuses on the formation of ethnic and national identity in an attempt to explain the political and social makeup of the modern Middle East.

**HIST 379 HISTORICAL ARCHAEOLOGY OF THE EASTERN UNITED STATES**
3
Surveys the substantive contributions of historical archaeology to the study of the cultural history of eastern North America beginning with the period of initial European contact. Crosslisted with ANTH379.

**HIST 380 HISTORY OF THE ARAB-ISRAELI CONFLICT**
3
Explores the roots and the historical complexity of the Arab-Israeli conflict. Topics include: the origins of Zionism, the nature of traditional Arab/Ottoman society in the 19th century, the relationship between the early Zionists and indigenous Arab population of Palestine, the creation of a Jewish society, the rise of Palestinian nationalism, and the protracted search for coexistence between Jews and Arabs. May be crosslisted with JWST381.

**HIST 381 ISLAM AND THE WEST: THE HISTORY OF MUTUAL PERCEPTIONS**
3
Surveys the history of mutual views of Islam and Christianity/Judaism/the West from the Middle Ages to the present. Topics include medieval polemics, Enlightenment attempts at respect and understanding, the question of Orientalism, and the current specter of a clash of civilizations.

**HIST 382 HISTORY OF WESTERN MEDICINE**
3
Social and cultural forces that have influenced the development of modern medicine.

**HIST 384 EARLY IRISH HISTORY: FROM STRONGBOW TO CROMWELL, 1169-1659**
3
Reviews Irish and English sources to examine the cultural differences that underlay the conflict in Ireland. The distinction between pastoral and agricultural societies will be used to examine the civilizing process, the justification of dispossession, and the origins of colonialism.

**HIST 385 HISTORY BEHIND THE SCENES**
1-6
Explore how history is presented to public audiences in a variety of settings (museums and historic sites, archives, public gardens) and media (documentaries, digital media). Field trips and discussion with professionals. Topics may also include art history, historical anthropology and natural history. May be crosslisted with MST385. RESTRICTIONS: Departmental permission.

**HIST 386 ASIAN AMERICA: CULTURE AND HISTORY**
3
Explores the literature, culture and history of Asian Americans and immigrants to the United States variously using fiction, drama, poetry, documentary, photography, narrative film, drama, court cases, primary and secondary historical materials. Patterns of Asian immigration, anti-Asian violence and internment, Asian American resistance in litigation, legislation, and cultural activities, from Gold Rush to globalization. Crosslisted with ENGL386.

**HIST 387 HISTORY OF SEXUALITY IN THE U.S.**
3
A survey of American sexual ideals, practices, and identities, from the Colonial period to the present. How anxieties about interracial sex shaped life in the American South, how the advent of more reliable contraceptives provoked both social movements and political debate, and how the emergence of a scientific discourse of sexual difference simultaneously propelled the gay rights movement and enabled scientists to categorize same-sex love as pathology and perversion. May be crosslisted with SGST387, WOMS387.

**HIST 388 AMERICAN INDIAN HISTORY**
3
Topics vary and may include Indians in American History, American Indian History through Biography, American Indian Women's History. RESTRICTIONS: May be repeated for credit when topics vary.

**HIST 389 THE AMERICAN WEST**
3
Surveys the American West through the eyes of its diverse population as well as those who are drawn to study and define it. Particular attention given to themes currently debated concerning the legacy, meaning and imagery of the American West.

**HIST 390 AMERICAN INDIANS: THE SOUTHWEST**
3
Addresses the history of Indians in the American Southwest from pre-European contact to the present. Approaches the subject from multiple disciplinary and cultural perspectives and focuses on the histories of the "Pueblo," Hopi, Apache and Navajo people.

**HIST 392 BRAZIL IN THE MODERN WORLD**
3
Focuses on the social and political history of Brazil over five hundred years, from first indigenous contact with Europeans through independence, formation of the Republic, modernization and contemporary issues facing the country. Ends by examining Brazil's changing place on the global stage. May be crosslisted with BAM392.

**HIST 393 HISTORY OF MODERN VIETNAM**
3
Covers major social, cultural, political, economic and military developments in Vietnamese history from approximately 1500 to the present, including traditional civilization, colonization, nationalism and communism, the Indochina Wars (among them the "Vietnam Conflict"), the Cambodian Crisis, and life under the Socialist Republic of Vietnam since 1976.

**HIST 395 PAN AFRICANISM**
3
Traces the rise, development and varied expressions of the drive towards the liberation and unity of black people on the continent (Africa) and in the diaspora. Covers liberation struggles in Africa and the Civil Rights movement in the United States. May be crosslisted with BAM395.

**HIST 397 HISTORY OF SOUTH AFRICA**
3
Surveys the complex historical development of South African society. Topics include African resistance to white expansion, wars of resistance, the impact of agricultural and labor laws on African societies, tensions in white society, Africaners in power since 1948, and African struggles for freedom.

**HIST 398 TOPICS IN MEDIEVAL HISTORY**
3
Course topics vary and may be chronologically or thematically based. Examples include "Christians & Muslims in the Middle Ages" and "Germany in the Middle Ages." May be repeated for credit when topics vary. May be crosslisted with JWST398, WOMS398.

**HIST 399 VARYING AUTHORS, THEMES, AND MOVEMENTS**
3
Cultural, especially cross-cultural, study with primary emphasis on the historical development of the announced area, e.g., The Faust Theme in Western Literature, Dante Through the Ages, Don Juan, and the Transformation of a Myth. See http://primus.rss.udel.edu/CoursesSearch/ for topics. Crosslisted with FLIT330. RESTRICTIONS: May be repeated three times for credit when topics vary.

**HIST 403 HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS**
3
Introduction to philosophy, purposes, structure, historical development and future of museums, and botanical and zoological gardens. Examines functions of collection, conservation, research, exhibition/interpretation, and social/cultural services; museum field growth. Crosslisted with MST403.
HIST 408  PUBLIC HISTORY: RESOURCES, RESEARCH AND PRACTICE 3
Team-taught seminar that acquaints students with the function and resources of American historical organizations and how to use these resources in the non-academic setting for productive historical research. Addressed to those pursuing careers in public history and teaching and scholarship.
May be crosslisted with MSST408.

HIST 411  SEMINAR IN AMERICAN HISTORY 3
May be crosslisted with WOMS411. PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

HIST 439  WOMEN AND REVOLUTION IN AFRICA 3
Discusses the critical roles played by women in African revolutionary movements. Why did women join these revolutionary movements? What is the relationship between feminism and revolution? May be crosslisted with WOMS439. PREREQ: HIST268. RESTRICTIONS: Majors only, or permission of instructor.

HIST 440  SEMINAR IN AFRICA UNDER COLONIAL RULE 3
Introduces various colonial policies of the European powers in Africa, emphasizing the comparisons and contrasts among these policies. Attention paid to the effects of Colonialism on Africa’s economic, social and political development.
PREREQ: HIST268. RESTRICTIONS: Majors only, or permission of instructor.

HIST 444  SEMINAR: WOMEN IN THE ISLAMIC MIDDLE EAST 3
Examines the major developments, themes and problems in women’s history in the Middle East from the advent of Islam to the present. By tracing women’s legal status, sexual morality, family and social life, and female economic and political participation, it seeks to shed light on the process of women’s roles in society and to challenge the notion that gender divisions and roles have been static over time.
May be crosslisted with WOMS444. PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

HIST 463  HISTORICAL ARCHAEOLOGY AND THE PUBLIC 3
Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation.
Crosslisted with ANTH463.

HIST 464  INTERNSHIP IN HISTORY 1-6
Internship with a substantially historical content at a museum, historical society, historic site, government agency, or other venue, under joint supervision of Department of History and the sponsoring organization. Includes completion of journal of activities and/or evaluative project.
PREREQ: Sophomore standing or higher. RESTRICTIONS: Requires permission of instructor or (in cases of individual student internships) pre approval from Department of History’s Undergraduate Studies Committee, which also determines the number of credits.

HIST 466  INDEPENDENT STUDY 1-6

HIST 468  UNDERGRADUATE RESEARCH IN HISTORY 1-3
Original research and writing conducted under the direction of a faculty member. May result in a research paper, historical exhibit, field work experience, or conference presentation, or be incorporated into a faculty project.
PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

HIST 471  SEMINAR IN MEDIEVAL HISTORY 3
Topics may include Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.
May be crosslisted with WOMS472. PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

HIST 473  SEMINAR IN EARLY MODERN EUROPEAN HISTORY 3
Topics vary and may include Renaissance Humanism, or Women in Europe from 1100 to 1600.
PREREQ: HIST268. RESTRICTIONS: Majors only, or permission of instructor.

HIST 474  SEMINAR IN BRITISH HISTORY 3
Topics vary and may include Britain Since 1945; British Political Ideas, Hobbes to Burke; and Britain, 1714-1870.
PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

HIST 475  SEMINAR IN MODERN EUROPEAN HISTORY 3
Topics vary and may include The Holocaust, The Cold War, Hitler’s Germany, or The Age of Revolution.
May be crosslisted with WOMS475. PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

HIST 477  SEMINAR IN LATIN AMERICAN HISTORY 3
Topics vary and may include History of Mexico, History of the Caribbean or Slavery in the New World.
PREREQ: HIST268. RESTRICTIONS: Majors only, or permission of instructor.

HIST 479  SEMINAR IN ASIAN HISTORY 3
Topics vary and may include History of Southeast Asia, 20th Century China or Japan in the 20th-Century.
PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

HIST 480  SEMINAR IN WORLD HISTORY 3
Topics vary and may include Decolonization.
PREREQ: HIST268. RESTRICTIONS: Majors only, or permission of instructor.

HIST 483  SEMINAR IN COMPARATIVE HISTORY 3
Topics vary, but all compare some aspect of American with European history or Western with non-Western history.
PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

HIST 491  PLANNING A COURSE OF INSTRUCTION 3
Aims, course planning, instructional strategies, evaluation and selection of materials for teaching history and the social sciences in secondary schools.
RESTRICTIONS: The Student Learning Portfolio must be completed by the end of this course in order to student teach in the spring semester.

HIST 492  INTEGRATING INSTRUCTIONAL TECHNOLOGY INTO SOCIAL STUDIES TEACHING 1
Provides future history teachers with the technology skills that they need in order to become more effective teachers. Melds sound instructional technology skills with the academic content and instructional methods acquired during the course of their academic career. Topics include creating websites and webquests, copyright and fair use laws, plagiarism and internet professionalism, accessing knowledge and instructional materials on the internet, using software and hardware to enhance classroom instruction, and assessment tools.

HIST 493  PROBLEMS IN TEACHING HISTORY AND SOCIAL SCIENCES 3
Helps beginning teachers carry out planned instructional strategies, analyze their teaching behavior, evaluate the effectiveness of their instruction and modify their instructional plans based on their teaching experience.

HIST 601  UNITED STATES HISTORIOGRAPHY 3
Introduces changing interpretations of United States history and examines the development of the American historical profession.

HIST 602  EUROPEAN HISTORIOGRAPHY 3
Introduces changing interpretations of various aspects of European history.

HIST 603  HISTORIOGRAPHY OF TECHNOLOGY 3
Introduces major historiographic issues and examines the development of this subfield of history.

HIST 605  HISTORIOGRAPHY OF MATERIAL CULTURE 3
Landmark works and recent theoretical approaches to the understanding and interpretation of the man-made environment. Readings draw from a variety of disciplinary frameworks including art history, anthropology, historical archeology, cultural geography, sociology and history.
May be crosslisted with ARTH630, EAMC605. RESTRICTIONS: Requires permission of instructor.

HIST 606  ISSUES IN AMERICAN MATERIAL CULTURE 3
Studies major themes in American material culture of the 17th, 18th or 19th centuries. Topics vary.
Crosslisted with EAMC606. RESTRICTIONS: Requires permission of instructor.

HIST 611  SEMINAR IN AMERICAN HISTORY 3-6

HIST 617  SEMINAR IN GENDER AND WOMEN'S HISTORY 3-6
Reading seminar. Topics vary and may include U.S. Women’s History, U.S. Women’s History in Comparative Perspective, Gender in History, or European Women’s History.

HIST 622  THE ATLANTIC WORLD 3
A graduate readings course covering roughly 1500 to 1800 on major themes in the history of the Atlantic World, including empire, identity, race, inter-imperial commerce, migration, borderlands, and Atlantic revolutions.
RESTRICTIONS: Graduate students only.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 623</td>
<td>AGE OF THE AMERICAN REVOLUTION</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>A readings seminar on the Revolutionary era from 1750 to 1812 which addresses the issues of economy, identity, political culture, slavery, frontiers, and America in the Atlantic world.</td>
<td></td>
</tr>
<tr>
<td>HIST 627</td>
<td>ANTEBELLUM AMERICA</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reading seminar on development of the modern political party system, the American presidency in transition, the transportation revolution, slavery, abolition reform and important changes in American society during the antebellum period.</td>
<td></td>
</tr>
<tr>
<td>HIST 633</td>
<td>THE UNITED STATES IN THE TWENTIETH CENTURY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reading seminar on 20th century U.S. history.</td>
<td></td>
</tr>
<tr>
<td>HIST 636</td>
<td>RESEARCH TOPICS IN HISTORIC PRESERVATION</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Seminar addresses a specific research issue 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. Crosslisted with UAPP636.</td>
<td></td>
</tr>
<tr>
<td>HIST 637</td>
<td>LAW AND SOCIETY IN HISTORICAL PERSPECTIVE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>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. Crosslisted with SOCI637.</td>
<td></td>
</tr>
<tr>
<td>HIST 638</td>
<td>DOCUMENTATION OF HISTORIC STRUCTURES</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Focuses on the process of creating a physical record of a historic structure, including preparation of scaled, annotated field notes for measured drawings (plans, sections, elevations and details), writing architectural descriptions, and learning to “read” the critical features of a historic resource. Crosslisted with UAPP631.</td>
<td></td>
</tr>
<tr>
<td>HIST 640</td>
<td>AFRICA UNDER COLONIAL RULE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduces various colonial policies of the European powers in Africa, emphasizing the comparisons and contrasts among these policies. Attention paid to the effect of Colonialism on Africa’s economic, social and political development.</td>
<td></td>
</tr>
<tr>
<td>HIST 646</td>
<td>CREATING EUROPEAN MODERNITY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>The origins and spread of rapid, sustained economic growth since 1750.</td>
<td></td>
</tr>
<tr>
<td>HIST 652</td>
<td>THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Examines the historic preservation planning process, the theory supporting this process and contemporary practices. Case studies used to demonstrate the integration of theory and practice. Crosslisted with UAPP629.</td>
<td></td>
</tr>
<tr>
<td>HIST 654</td>
<td>VERNACULAR ARCHITECTURE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship. Crosslisted with UAPP654.</td>
<td></td>
</tr>
<tr>
<td>HIST 661</td>
<td>AMERICAN VERNACULAR LANDSCAPES</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Course is a multidisciplinary reading seminar that explores the ways in which ordinary people have made and remade the American Landscape. Reading, discussion, two short papers and two required field trips.</td>
<td></td>
</tr>
<tr>
<td>HIST 663</td>
<td>HISTORICAL ARCHAEOLOGY AND THE PUBLIC</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation. Crosslisted with ANTH663.</td>
<td></td>
</tr>
<tr>
<td>HIST 671</td>
<td>STUDIES IN MEDIEVAL HISTORY</td>
<td>3-6</td>
</tr>
<tr>
<td></td>
<td>Topics vary and may include: Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.</td>
<td></td>
</tr>
<tr>
<td>HIST 675</td>
<td>SEMINAR IN MODERN EUROPEAN HISTORY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Topics vary and include The Holocaust, The Cold War or Hitler’s Germany.</td>
<td></td>
</tr>
<tr>
<td>HIST 677</td>
<td>STUDIES IN LATIN AMERICAN HISTORY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Topics vary and may include history of Mexico, history of the Caribbean or slavery in the New World.</td>
<td></td>
</tr>
<tr>
<td>HIST 679</td>
<td>STUDIES IN ASIAN HISTORY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Topics vary and may include History of Southeast Asia, 20th Century China or Japan in the 20th Century.</td>
<td></td>
</tr>
<tr>
<td>HIST 680</td>
<td>STUDIES IN WORLD HISTORY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Topics vary and may include Writing the History of Empires or History and the Global Environment.</td>
<td></td>
</tr>
<tr>
<td>HIST 683</td>
<td>STUDIES IN COMPARATIVE HISTORY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Topics vary, but all compare some aspect of American history with European history or Western history with non-Western history.</td>
<td></td>
</tr>
<tr>
<td>HIST 692</td>
<td>PLANNING A COURSE OF INSTRUCTION</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Aims, course planning, instructional strategies, evaluation and selection of materials for teaching history and the social sciences in secondary schools.</td>
<td></td>
</tr>
<tr>
<td>HIST 693</td>
<td>SEMINAR: PROBLEMS IN TEACHING HISTORY AND SOCIAL SCIENCE</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Helps beginning teachers carry out planned instructional strategies, analyze their teaching behavior, evaluate the effectiveness of their instruction and modify their instructional plans based on their teaching experience.</td>
<td></td>
</tr>
<tr>
<td>HIST 710</td>
<td>WORLD HISTORY CURRICULUM</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>This course will enable secondary social studies teachers to analyze, design, and implement meaningful and effective World History curriculum. They will construct effective teaching research models and develop best methods and strategies based on comparative analysis of regional, national, and international approaches to World History. COREQ: HIST715.</td>
<td></td>
</tr>
<tr>
<td>HIST 715</td>
<td>CONCEPTUALIZING WORLD HISTORY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>This course will introduce frameworks for teaching world history. It will analyze links between the continents and the Atlantic, Pacific, and Indian Ocean worlds from ancient to modern times, as well as investigating interdisciplinary, thematic processes that continue to shape our globe.</td>
<td></td>
</tr>
<tr>
<td>HIST 720</td>
<td>TOPICS IN THE ANCIENT WORLD</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Examine how the earliest world cultures addressed the fundamental questions of social, religious and political organization and how early civilizations laid the basic building blocks for later societies. Multiple interdisciplinary and cultural perspectives on key issues and concepts will be emphasized. PREREQ: HIST710, HIST715.</td>
<td></td>
</tr>
<tr>
<td>HIST 725</td>
<td>TOPICS IN THE MEDIEVAL WORLD</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Investigate the political, economic, cultural and social development of medieval world cultures, including demographic transformation, emerging technologies, exploitation of and conflict over resources, and new concepts in the humanities. Multiple interdisciplinary and cultural perspectives on key issues and concepts will be emphasized. PREREQ: HIST710, HIST715.</td>
<td></td>
</tr>
<tr>
<td>HIST 730</td>
<td>TOPICS IN THE EARLY MODERN WORLD</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Investigate the rise of global processes during the early modern era, creating enduring effects both positive and negative. Race and revolution emerge as themes in this era as power shifts westward due in part to new resources from the Americas. PREREQ: HIST710, HIST715. RESTRICTIONS: This course is restricted to students enrolled in the new MA of Social Studies in World History for teachers program. It is a required course for graduate students in this program. Other students must seek faculty approval for taking this course.</td>
<td></td>
</tr>
<tr>
<td>HIST 735</td>
<td>TOPICS IN THE MODERN WORLD</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Investigate the political, economic, cultural and social events that linked the Atlantic, Pacific, and Indian Ocean Worlds since1800, while attending to the structures and systems of global connectivity. These events have transformed nations, culture, everyday life, and individual identity during this era. PREREQ: HIST710, HIST715. RESTRICTIONS: This course is restricted to students enrolled in the new MA of Social Studies in World History for teachers program. It is a required course for graduate students in this program. Other students must seek faculty approval for taking this course.</td>
<td></td>
</tr>
</tbody>
</table>
HIST 740 TOPICS IN HISTORIC GLOBAL PROCESSES 3
Enable students to apply a single global process as an aid to framing
and connecting the course of human history. All topics will emphasize interdisciplinary
perspectives on key issues and concepts.
PREREQ: HIST710, HIST715. RESTRICTIONS: This course is restricted to students
enrolled in the new MA of Social Studies in World History for teachers program. It is a required course for graduate students in this program. Other students must
seek faculty approval for taking this course.

HIST 745 TOPICS IN GLOBAL ARTS AND HUMANITIES 3
Investigates the spiritual and creative heart of world cultures and societies over
the course of the human endeavor, representing the standard bearers of beliefs
and impulses over time. Particular emphasis will be given to cross-cultural
syncretism and connections to political and social systems.
PREREQ: HIST710, HIST715. RESTRICTIONS: This course is restricted to students
enrolled in the new MA of Social Studies in World History for teachers program. It is a required course for graduate students in this program. Other students must
seek faculty approval for taking this course.

HIST 750 TOPICS IN REGIONAL WORLD CULTURES 3
Focuses on a single region and its culture over the course of a determined
historical era. Attention will be paid to the region's distinct cultural heritage, its
people's world view, and how a region's cultural identity has been a factor in
shaping historical responses to external challenges and opportunities.
PREREQ: HIST710, HIST715. RESTRICTIONS: This course is restricted to students
enrolled in the new MA of Social Studies in World History for teachers program. It is a required course for graduate students in this program. Other students must
seek faculty approval for taking this course.

HIST 755 PROJECT RESEARCH 3 PF
Independent study to complete the program project under the supervision of an
advisor.
RESTRICTIONS: This course is restricted to students enrolled in the new MA of
Social Studies in World History for teachers program. It is a required course for graduate students in this program. It is designed to be the last course taken in the
program.

HIST 803 RESEARCH AND WRITING SEMINAR: AMERICA TO 1860 3
Original research and writing on subjects in American history before 1860.
Evaluation of sources, interpretation of evidence and presentation of research
papers. Emphasis on professional standards of criticism.

HIST 804 MUSEUM INTERNSHIP 3
Internship practice in administration, collections management, exhibition and
interpretation at museums and related institutions. Students spend ten full weeks, or
the equivalent, at the University museum, Winterthur Museum, Hagley
Museum, Longwood Gardens or other acceptable institution. Crosslisted with MAST804. RESTRICTIONS: Open to graduate students only. Requires at least one semester course in museum studies and permission of instructor.

HIST 805 RESEARCH AND WRITING SEMINAR: AMERICA 1860-PRESENT 3
Original research and writing on subjects in American history after 1860.
Evaluation of sources, interpretation of evidence and presentation of research
papers. Emphasis on professional standards of criticism.

HIST 866 SPECIAL PROBLEM 1-6

HIST 868 RESEARCH 1-9 PF

HIST 869 MASTER’S THESIS 1-6

HIST 964 PRE-CANDIDACY STUDY 1-12 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.

HIST 969 DOCTORAL DISSERTATION 1-12 PF

HPR 211 INTRODUCTION TO PUBLIC HEALTH 3
Overview of public health, addressing the history, epidemiological principles,
social and behavioral factors, and environmental, political and medical-care issues
concerning public health practice. Exploration of the practicality of public health
as portrayed through current events, guest speakers, and case studies.
May be crosslisted with UAPP211.

HPR 222 INTRODUCTION TO EPIDEMIOLOGY 3
Introduces the basic concepts of epidemiology and biostatistics as applied to
public health problems. Emphasis is placed on the principles and methods of
epidemiologic investigation, appropriate summaries and displays of data, and the
use of classic statistical approaches to describe the health of populations.
May be crosslisted with UAPP222. COREQ: STAT200 or MATH201 or PSYC209 or
BHAN326.

HPR 233 INTRODUCTION TO GLOBAL HEALTH 3
Introduces key diseases and conditions which affect the health of different
populations including basic biological and varying social aspects which cause
major global health issues. Emphasis on the developing world, the health of the
poor, and possible solutions.
May be crosslisted with UAPP233.

HPR 266 SPECIAL PROBLEM 1-3 PF

HPR 366 SPECIAL PROBLEM 1-3 PF

HPR 430 BEHAVIOR CHANGE STRATEGIES AND TACTICS 3
Development of skills to assist individuals in making health behavior changes
including weight management, physical activity, medication compliance, tobacco
use, and stress management. This course will assist students in developing plans
and courses of action to assist individuals in making health behavior changes.
PREREQ: BHAN332. COREQ: BHAN332.

HPR 466 SPECIAL PROBLEM 1-3 PF

HPR 605 CONCEPTS OF CHRONIC DISEASE MANAGEMENT 3
Focuses on selected aspects of the most common disease processes, symptom
management, pharmacology and the impact of chronic conditions on the quality
of life of clients and their families.
RESTRICTIONS: Graduate Student or Permission of Instructor.

HPR 610 HEALTH AND THE MEDIA 3
Explores the relationships between health behavior and cognition, and media
communications and messages. Specific attention placed on culturally influenced
health outcomes, channels of communication, and personal and demographic
influences. Health promotion programmatic considerations and interventions
related to media factors will be emphasized.

HPR 630 BEHAVIOR CHANGE STRATEGIES AND TACTICS 3
Emphasis on skills to assist individuals in making health behavior changes including
weight management, physical activity, medication compliance, smoking cessation,
and stress management. Students will develop plans and courses of action to assist
individuals in making health behavior changes.
RESTRICTIONS: Graduate Student or permission of instructor.

HPR 631 HEALTH COACHING 3
Course develops patient and client centered coaching skills, techniques and
knowledge to facilitate positive behavior change to improve health and reduce
chronic disease. Emphasis is placed on individual as well as group-oriented
coaching skills within the context of health care through personal practice and
observation.
RESTRICTIONS: Graduate Student or Permission of Instructor.

HPR 632 HEALTH SCIENCE DATA ANALYSIS 3
An overview of the descriptive and inferential statistics needed to analyze and
interpret health data and evaluate health-related literature in the core disciplines
of public health including: epidemiology, biomedical science, social and behavioral
science, health policy and management, and environmental health.
RESTRICTIONS: Graduate students or upper classman with approval of professor.

HPR 664 HEALTH COACHING PRACTICUM 1-3 PF
Course provides 120 hours of coaching practice within a supervised clinical
environment. Students work with patients and clients in clinical and community
settings to hone their skills, knowledge and expertise in health coaching. This
course serves as final preparation for the Health Coaching exit exam.
PREREQ: HPR809 HPR660 HPR661 HPR665 NUR5615. RESTRICTIONS: Graduate Students in Health Coaching Certificate Program only.
HLPR 803 ADVANCED HEALTH PROMOTION PROGRAMMING AND EVALUATION 3
Prepares the student with the skills for planning, developing, implementing and evaluating health promotion programs in a variety of settings and populations. Emphasis on the behavioral, epidemiological and socio-ecological issues that impact programming and the skills required to evaluate a program. PREREQ: HESC490 or permission of instructor. RESTRICTIONS: Open to graduate students only.

HLPR 807 TOPICS AND ISSUES IN HEALTH PROMOTION 3
Seminar format and multidisciplinary approach to study current issues. Different faculty review issues from the viewpoint of their disciplines. Students participate in the selection of topics and are required to prepare and present in-depth reports on multiple issues. RESTRICTIONS: Open to graduate students only.

HLPR 809 HEALTH BEHAVIOR 3
Health and behavioral science theory and research provide a framework for the analysis of health-related behaviors across the lifespan. Emphasis on the psychological and social determinants of health-related behaviors of individuals. Examines the roles of health professionals in facilitating behavior change. RESTRICTIONS: Open to graduate students only.

HLPR 813 HEALTH PSYCHOLOGY AND BEHAVIORAL MEDICINE 3
Relationships among social, psychological, and cultural factors and health, including prevention and treatment of disease and other health behaviors. RESTRICTIONS: Graduate students only.

HLPR 815 HEALTH AND OLDER ADULTS 3
Seminar class emphasizing the biological, sociological, and psychological aspects of the aging process as related to health.

HLPR 819 SOCIAL MARKETING 3
Application of marketing principles to health behavior change. Includes the development, implementation and evaluation of social marketing campaigns; theories of behavior change applied to marketing; message development, targeting and segmentation; analysis of current social marketing initiatives. RESTRICTIONS: Graduate students only.

HLPR 823 HUMAN RESPONSE TO STRESS 3
Provides an overview of current models and theories of stress, a review of multidisciplinary approaches to the study of stress in applied settings, and a reading knowledge of selected research findings in the field of stress. RESTRICTIONS: Open to graduate students only.

HLPR 864 INTERNSHIP 3 PF
Up to a maximum of 450 hours of fieldwork experience in a health promotion setting, completed along with a performance evaluation and term paper. RESTRICTIONS: Open to graduate students only and successful completion of the qualifying examination.

HLPR 866 SPECIAL PROBLEM 1-12

HLPR 868 RESEARCH 3 PF
Affords an opportunity to apply information derived from the graduate program of study to a health promotion setting or specific population. Involves selecting, organizing, conducting and evaluating a project related to the field of health promotion. RESTRICTIONS: Open to graduate students only and successful completion of the qualifying examination.

HLTH 166 SPECIAL PROBLEM 1-6

HLTH 241 ETHICAL ASPECTS OF HEALTHCARE 3
Study of basic ethical thought and principles and their application to selected contemporary issues in healthcare.

HLTH 266 SPECIAL PROBLEM 1-6

HLTH 320 CHRONIC ILLNESS IN AMERICA 3
Interdisciplinary perspective on current health care issues for individuals with chronic illness, including development of client relationships, disease-specific information, caregiving, resource navigation, and health policy. Service learning component involves providing assistance to chronically ill individuals within the home setting. PREREQ: ENGL110.

HLTH 352 HEALTH SCIENCES HONORS SEMINAR 1 PF
Peer-reviewed scientific articles related to the broad areas of public health, health behavior, medicine, nursing, and physiology will be presented and discussed by University of Delaware faculty. RESTRICTIONS: College of Health Sciences honors students and CAS Medical Scholars Program students only. No freshmen.

HLTH 366 SPECIAL PROBLEM 1-6

HLTH 395 GLOBAL INTERNSHIP IN HEALTH SCIENCES 1 PF
Guided experiential learning designed to enhance cultural understanding in global health care settings. Selected issues and problems of the people and healthcare delivery are explored within the global context.

HLTH 411 TOPICS IN HEALTH 3
Selected issues and problems related to individual or population health. Exploration of some topics may include an experiential component. Variable topics. RESTRICTIONS: Can be repeated twice when topics vary.

HLTH 466 SPECIAL PROBLEM 1-6

HLTH 495 HEALTH STUDIES PRACTICUM 6 PF
Directed service learning experience in a health services setting. RESTRICTIONS: Restricted to senior health studies majors.

HLTH 610 NEURAL BASES OF SPEECH AND HEARING 3
Examines neuroanatomical and neurophysiological bases of language, hearing, sensory, and motor function. Special emphasis given to brain behavior correlates and behavioral consequences to speech, language, and hearing as a result of neurologic injury or disease. RESTRICTIONS: Restricted to students admitted to the M.A. in Speech-Language Pathology.

HLTH 611 RESEARCH METHODS IN SPEECH DISORDERS 3
Reviews research methods in communication disorders, including research design, interpretation of published research, preparing students to be critical consumers of the research literature. Focuses on types of research, research designs, research methods, evidence-based practice, and statistics commonly used to investigate normal and disordered human communication. RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 612 COUNSELING IN SPEECH-LANGUAGE PATHOLOGY 2
Addresses basic skills in interviewing, counseling, and behavior management supporting the diagnosis, treatment, and management of speech, language, and hearing disorders. Highlights key counseling issues, including professional boundaries, intense emotions, and counselor's feelings and reactions as well as principles and strategies related to behavior management. RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 613 HEARING ASSESSMENT AND TREATMENT 3
Anatomy and physiology of hearing, including pathologies and disorders affecting the auditory system. Addresses components of adequate evaluation for placement and educational planning; diagnosis using instrumental, functional and communication assessment; stimulation and utilization of residual hearing; and management of assistive/augmentative devices. RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 620 DIAGNOSTIC METHODS IN SPEECH PATHOLOGY 3
Introduces basic diagnostic methods and clinical processes for the evaluation of spoken/written language disorders. Includes steps in clinical problem solving, fundamental concepts of clinical measurement, models of diagnosis, clinical history and interviewing techniques, and report writing. RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 630 CHILDHOOD SPEECH PRODUCTION DISORDERS 3
Examines patterns of normal speech and phonological development and the nature, assessment, and treatment of articulation and phonological disorders of childhood. RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 631 LANGUAGE DISORDERS IN YOUNG CHILDREN 2
Addresses theoretical and applied aspects of typical, delayed and disordered language development in children ages 0 to 5 with an emphasis on family-centered assessment and intervention practices, including prelinguistic and early language interventions. RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.
HLTH 632  LANGUAGE DISORDERS IN SCHOOL CHILDREN  2
Examines the principles and procedures used in the assessment and treatment of school-aged language and literacy disorders. Emphasizes the relationship among verbal and non-verbal language impairment, literacy skills, and the linguistic demands of academic settings.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 633  COGNITIVE AND LANGUAGE DISORDERS  3
Reviews the nature, evaluation, and management of acquired disorders of language and cognition in adults. Addresses language deficits following cerebral vascular accident and the cognitive-communicative impact of other neurogenic disorders, including TBI, right-hemisphere syndrome and dementing processes, with emphasis on cognitive aspects of communication.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 634  ASSESSMENT AND TREATMENT OF VOICE DISORDERS  2
Addresses the physiology, acoustics, and perception of voice quality and speech resonance. Covers the etiology, evaluation, and treatment of voice and resonance disorders.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 635  ASSESSMENT OF FLUENCY DISORDERS  2
Addresses characteristics of fluent speech and the nature and treatment of stuttering and cluttering in children and adults in relation to normal speech production processes, human learning, principal explanations of stuttering, and treatment approaches.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 636  ASSESSMENT OF MOTOR SPEECH DISORDERS  2
Addresses motor speech disorders resulting from neuropsychology of the central and peripheral nervous systems as found in cerebral palsy, Parkinsonism, and other developmental and acquired neuromotor problems of children and adults.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 637  FEEDING AND SWALLOWING DISORDERS  2
Reviews anatomy and physiology or normal and abnormal swallowing in adults and children. Specific etiological categories are discussed. Clinical and instrumental diagnostic methods are described and emphasis is given to treatment methods using a critical decision making model.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 638  AUGMENTATIVE AND ALTERNATIVE COMMUNICATION  2
Focuses on needs of people with significant communication limitations and means for enhancing communicative competence through the use of augmentative tools and strategies. Addresses the assessment process, the selection/development/customization of communication systems, and applications of AAC across a wide spectrum of populations.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 639  CLEFT PALATE AND RELATED DISORDERS  2
Covers the nature and causes of cleft lip, palatate and other craniofacial dysmorphology. Specific focus on issues of speech, language and hearing problems, incorporating principles of assessment, treatment and research.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 640  SEMINAR IN COMMUNICATION DISORDERS  2
Prepares students for successful completion of the SLP Praxis Examination required to obtain ASHA certification and licensure through participation in class discussions and completion of practice tests. It covers the nine ASHA areas of specialty and all 7 areas of the PRAXIS SLP.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 642  PROFESSIONAL ISSUES  3
Covers a range of topics pertinent to students entering professional practice as speech-language pathologists, including current legal, ethical, and clinical service provision issues.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 650  DISORDERS INdiverse PoPulations  2
Provides theoretical and applied information about situational factors impacting spoken and written language, including individual differences due to gender, handicapping conditions, socio-economic status, and cultural-ethnic background.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 651  SPEECH PATHOLOGY IN SCHOOL SETTINGS  2
Explores administrative, legal, ethical, and clinical issues encountered in implementing programs to remediate communication disorders in the school-aged population in the public school setting.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 652  SPEECH PATHOLOGY IN MEDICAL SETTINGS  2
Explores administrative, legal, ethical and clinical issues encountered in addressing communication limitations arising from acute and chronic conditions in the medical setting.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 653  ATYPICAL LANGUAGE DEVELOPMENT  2
Addresses identification and treatment of early communication and language disorders in children with autism, Down syndrome and other intellectual and developmental disabilities. Reviews how language development processes can be disrupted by biological and environmental factors.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 654  SEMINAR IN SPEECH-LANGUAGE PATHOLOGY  2
Offers detailed examination of emerging issues of significance in clinical and/or research areas of the discipline.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 660  PRACTICUM AND SEMINAR IN SLP  2
The first clinical experience in which students are paired and assigned to clients in the campus clinic. The seminar provides practical support and guidance; presentations and discussions help students draw connections between academic coursework and initial clinical experiences.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 661  CLINICAL PRACTICUM  1
Supervised clinical practice with individuals having a variety of speech, language and hearing disorders. Practicum includes diagnostic, treatment, and management work through direct client contact. Conducted in the campus clinic.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 662  CLINICAL PRACTICUM IN AUDIOLOGY  1
Supervised clinical practice in the screening, assessment and treatment of hearing disorders.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 663  ADVANCED CLINICAL PRACTICUM  2
On-campus clinical practice with clients exhibiting a variety of communication disorders.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 664  DIAGNOSTIC PROCEDURES IN SLP  3
Clinical practicum involving evaluation and diagnosis of a variety of communication disorders with clients in the campus clinic.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 665  SCHOOL PRACTICUM IN SLP  4
Clinical practicum with a variety of communication disorders in off-campus settings, including early intervention, early care and education, and school-based facilities for individuals from birth through age 21.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 666  PRACTICUM IN HEALTH FACILITIES  4
Clinical practicum with a variety of communication disorders in off-campus facilities such as hospitals, clinics and rehabilitation facilities.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 670  FIELD PLACEMENT IN SCHOOL SETTINGS  9
Offsite clinical practicum experience, completed under the supervision of community-based clinical professionals, focused on the evaluation and treatment of speech, language, cognitive-communication, and swallowing disorders in early intervention, early care and education, and school-based settings.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 680  FIELD PLACEMENT IN HEALTH FACILITIES  9
Offsite clinical practicum experience, completed under the supervision of community-based clinical professionals, focused on the evaluation and treatment of speech, language, cognitive-communication, and swallowing disorders in hospital, clinic and rehabilitation settings.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HLTH 869  THESIS  1-6 PF
Scholarly activity under the direction of a faculty supervisor.
RESTRICTIONS: Restricted to students in the M.A. in Speech-Language Pathology.

HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT

HRIM 140  INFORMATION TECHNOLOGY AND SERVICES MANAGEMENT  3
Overview of the service industry, its history, current status and future trends. Uses an integrated approach to the study of services, stressing the importance of understanding the underlying processes of service delivery and the way new technologies are affecting them.

HRIM 180  INTRODUCTION TO HOSPITALITY  3
Objectives within the industry, the means of achieving these objectives and opportunities for career development. History of hospitality, current trends and related issues.
HRIM 187 INTRODUCTION TO HOSPITALITY INFORMATION MANAGEMENT 3
Provides an overview of the information systems and technology applications used in the hospitality industry to support operations and management decision-making. Also covers hospitality specific software applications.

HRIM 201 FOOD PRINCIPLES 3
Examines the chemical and physical properties of food and its preparation. Includes the composition and structure of food, functional properties of ingredients, and methods to obtain desired sensory and nutritional qualities. Special focus on food sanitation and safety.
COREQ: HRIM211.

HRIM 211 FOOD PRINCIPLES LABORATORY 1
Principles of food selection and preparation as related to the chemical and physical properties of food. Includes the composition and structure of food, functional properties of ingredients, and methods to obtain desired sensory and nutritional qualities.
COREQ: HRIM201

HRIM 212 CLUB MANAGEMENT 3
Provides an overview of elements unique to club management such as the nature of private membership, investment, governance, club house operations, food and beverage operations, elements of quality service, financial structures of clubs, accounting and private club marketing.

HRIM 214 ISSUES IN TOURISM MANAGEMENT 3
Examines the scope and organization of the tourism industry, motivations for travel, and the management of micro and macro tourism resources. Economic, social, political, and environmental impact of tourism are considered along with the issue of sustainable development within the industry.

HRIM 215 MEETING AND CONFERENCE MANAGEMENT 3
Development of management strategies applicable to meeting and conference management including the methodologies unique to each property and group served by any one operation.

HRIM 217 CATERING MANAGEMENT 3
Application of management principles to the catering function. Topics include: developing catering management systems; catering menu planning and design; on-premise versus off-premise catering management; and food production. Students plan and implement actual catered events.

HRIM 219 QUALITY MANAGEMENT FOR THE HOSPITALITY INDUSTRY 3
Examines the quality revolution in the hospitality industry. Control charts, Pareto charts, scatter diagrams, and other tools used in restructuring, re-engineering, and continuous quality improvement are explored. Integrates principles of customer quality focus and organizational behavior as they apply to the hospitality industry.

HRIM 230 EXECUTIVE PRESENTATIONS AND PROBLEM SOLVING 3
Examines various problem solving methods relating to specific issues of the hospitality industry. Explores oral, written and multi-media executive presentation techniques of problem solving results including personal presentations.

HRIM 313 PRINCIPLES OF GAMING MANAGEMENT 3
An overview of gaming management and how it relates to hospitality management. Topics include a history of gaming in the U.S., social and legal aspects, licensing, organization, credit issues, marketing and Title 31 of the Bank Security Act.

HRIM 314 HOSPITALITY ENTREPRENEURSHIP AND VENTURE CREATION 3
Provides an overview of venture creation in hospitality enterprises from concept development to capital creation. Examines various business structures used in hospitality businesses including franchising and management contracts.

HRIM 316 CROSS CULTURAL ETIQUETTE AND PROTOCOL 3
Introduces students to a range of mores and decorum required to effectively work with and offer services to international visitors and associates. Various levels of treatment accorded domestic and international dignitaries within specific types of events and accommodations in the hospitality industry are also discussed.

HRIM 317 SPA/WELLNESS MANAGEMENT & ENTREPRENEURSHIP 3
Spa and wellness industries are one of the fastest growing segments in the service industry offering a variety of fitness, wellness, life enhancement, and management opportunities. Globally, hotels and hospitals are adding spa/wellness programs to their offerings, as their customers are increasingly demanding complimentary and alternative medicine (CAM). The geographic market of this segment transcends the national borders into international destinations. This program could be offered both at the UD campus or any popular spa/wellness destinations in the world.
May be crosslisted with BUAD317.

HRIM 321 QUANTITY FOOD SERVICE MANAGEMENT 1
Principles of quantity food service management with an emphasis on quality and cost control. Topics include menu planning and technical operations, as well as labor, food and energy cost containment.
PREREQ: HRIM201 AND HRIM211. COREQ: HRIM325.

HRIM 325 LABORATORY IN QUANTITY FOOD SERVICE MANAGEMENT 2
Laboratory experience in quantity food production, service and management. Applications in safety, sanitation, technical operations and quality and cost controls in a quantity food service environment.
PREREQ: HRIM201 AND HRIM211. COREQ: HRIM321

HRIM 327 PROPERTY ENGINEERING 3
Introduction to problems of cost and operational control of security, safety, parking, preventive maintenance, laundry, HVAC, electrical, refrigeration, plumbing, fire prevention, care of guest rooms and public space.

HRIM 330 INTERNATIONAL HOSPITALITY OPERATIONS 3-5
How hotels, food service operations and tourism attractions function outside of the United States, with particular emphasis on Europe. Focuses on cultural, political, environmental, geographic and economic factors critical to successful international hospitality operations.

HRIM 335 HOSPITALITY FACILITY DESIGN 3
Explores architectural design processes, including both aesthetic and functional design, as they relate to hospitality venues such as restaurants, hotels, commercial kitchens and resorts. Examines the impact of codes, construction costs and environmental parameters that affect hospitality construction.

HRIM 346 TRAVEL INTERNET MARKETING 3
Provides information necessary to understand online hospitality and travel related marketing. Through the use of case studies and examples, students learn how to manage the design, implementation and evaluation of web-based marketing programs.

HRIM 355 ECOTOURISM ENTREPRENEURSHIP 3
Sustainable development has received international recognition and a source of business social and economic responsibility. The underlying principles for a sustainable business development are complex, involving interaction among social, economic, and environmental issues, which make the subject critical for intellectual enquiry. The concept of sustainable development is multidisciplinary requiring students how to draw knowledge from various disciplines, such as business and economics, sociology, environmental sciences, and public administration among others.
May be crosslisted with BUAD355.

HRIM 364 EVENT AND MEETING MANAGEMENT PRACTICUM 1-3
Average of 10 hours a week working as an intern under the direction of a selected client, along with academic modules that will be completed under the direction of a faculty member in the Department of Hotel, Restaurant and Institutional Management. Duties and expectations of the practicum will be under the guidance of the practicum sponsor. The faculty member will identify a practicum sponsor (client) for each student.
PREREQ: HRIM215. RESTRICTIONS: Competitive selection process requires students to submit a Resume for consideration and will be interviewed by both the faculty member and the practicum sponsor.

HRIM 366 INDEPENDENT STUDY 1-6

HRIM 380 MANAGEMENT OF LODGING OPERATIONS 3
Management of front desk, housekeeping, maintenance, security and conference operations.

HRIM 381 MANAGEMENT OF FOOD AND BEVERAGE OPERATIONS 3
Management tools available to control sales and expenses in food and beverage operations. Analysis of centers of responsibility. Cost management approach to development of control systems.
PREREQ: HRIM321
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

HRIM 382  MANAGERIAL ACCOUNTING AND FINANCE IN THE HOTEL INDUSTRY  3
Generation and analysis of quantitative information for planning, control and decision making by managers at various levels. Use of timely and relevant information as a vital tool in management. 
PREREQ: ACCT207.

HRIM 390  CRUISE SHIP MANAGEMENT  1-3
Learn "Best Practices" of cruise ship management with a focus on the hospitality industry with this Study at Sea. Students will learn from cruise managers and staff including how the cruise industry operates and responds to the consumer. Students will participate in cruise ship talks and tours.

HRIM 418  BEVERAGE MANAGEMENT  3
Beverages are a large profit and cost center for hospitality operations and requires proper management attention. Alcoholic beverages are a complex product category with legal and social issues that require special attention from management. The wide range of products, their high costs, and legal concerns associated with serving alcohol call for unique procurement, inventory and issuing systems. This course examines these issues along with an in-depth study of wine, beer, distilled spirits and non-alcoholic beverages.

RESTRICTIONS: This is a study abroad course.

HRIM 425  HISTORIC ROADSIDE ARCHITECTURE  3
Examines various historic hospitality and retail venues with emphasis on their development throughout this automobile based century. Hotels, motels, diners, fast food and full service restaurants, roadside attractions and retail outlets will be discussed as they relate to travel and tourism.

HRIM 448  DATA ANALYTICS IN THE HOTEL INDUSTRY  3
Focuses on the value and characteristics of data and the relationships embedded within variables, so as to explore, analyze and determine relationships to improve hospitality service delivery and overall firm performance across a wide range of metrics. The mechanics of identifying data points, studying their characteristics and exploring relationships will be based on principles of statistical modeling and analysis and applied within the context of the hospitality industry. 
PREREQ: HRIM187 or MISY160 and HRIM180 or BUAD110.

HRIM 450  MANAGING HOSPITALITY INFORMATION SYSTEMS  3
Life cycle approach to understanding hospitality industry information systems. Includes study of issues considered in the analysis, design and implementation of information systems in hospitality operations. 
PREREQ: HRIM187 or MISY160.

HRIM 464  INTERNATIONAL HOSPITALITY INTERNSHIP  1-6
International internship under the supervision of a University of Delaware based professor and an onsite internship coordinator. Experience working in a hospitality related internship with written reflections on the cultural and business practices of the host country.

HRIM 466  INDEPENDENT STUDY  1-6

HRIM 480  HUMAN RESOURCES MANAGEMENT IN THE HOTEL INDUSTRY  3
Techniques and philosophies of personnel management as applied to hospitality operations. Motivation, attitude formation and job satisfaction. Case studies related to theories of organizational behavior and industrial psychology.

HRIM 481  MARKETING IN THE HOTEL INDUSTRY  3
Application of marketing principles in hotel, restaurant and institutional management settings. Development of marketing strategies in both profit and non-profit hospitality operations.

HRIM 482  LAW OF INNKEEPING  3
Introduction to the laws relating to hotel, restaurant and institutional operations. 

HRIM 488  HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT PRACTICUM I  1-4
Structured experience in a hospitality industry environment. At least 40 hours per credit hour in planned activities associated with the management and operation of a subsystem of a hospitality property.

HRIM 489  HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT PRACTICUM II  6
Structured experience in a hospitality industry environment. At least 40 hours per credit hour in planned activities associated with the management and operation of a hospitality property. 
PREREQ: HRIM321, HRIM325 and HRIM488.

HRIM 495  HOSPITALITY FEASIBILITY STUDIES  3
Examine a review of feasibility methods of a potential lodging franchise in a given market, review market data, evaluate potential franchises, develop facility and design requirements, examine revenue streams and cash flows and its economic viability.
PREREQ: ACCT207, ACCT208, HRIM380, HRIM481, HRIM381, HRIM 382, and FINC311. RESTRICTIONS: Available only after taking 90 credits. Available only in the Senior Year.

HRIM 601  ADVANCED HOSPITALITY AND TOURISM PRODUCT MANAGEMENT  3
Reviews different types, styles and quality of hospitality and tourism products. Examines product management including branding, product lifecycles, positioning and packaging. Includes the latest trends in product development and theoretical and practical issues related to multi-unit operations.

HRIM 602  CUSTOMER SERVICE MANAGEMENT  3
Provides an understanding of the service delivery system as it relates to the delivery of quality customer service in interpersonal and electronic contexts. The mechanics of identifying and setting organizational vision and service standards, and the relevance of technology in customer service management are covered.

HRIM 603  STRATEGIC HOSPITALITY MANAGEMENT  3
Provides a comprehensive understanding of strategic management concepts and competitive strategy as applied to the hospitality industries. Examines co-alignment of environmental scanning, strategy and structure of the hospitality service firm.

HRIM 604  ISSUES IN HOSPITALITY FINANCIAL MANAGEMENT  3
Examines both managerial accounting and financial management as they are practiced in the hospitality industry. Applies principles of finance and accounting to decision-making in the industry, emphasizing industry features and characteristics. 
PREREQ: HRIM382, its equivalent, or permission of instructor

HRIM 605  ISSUES IN HOSPITALITY INFORMATION TECHNOLOGY MANAGEMENT  3
Examines issues related to information technology in the hospitality industry, including systems, networking, databases, telecommunications, the internet and e-commerce. 
PREREQ: HRIM601

HRIM 642  PROJECT MANAGEMENT APPLICATIONS IN HOSPITALITY  3
A project management approach to the development and implementation of interactive technology applications in the hospitality industry. Focuses on understanding project management concepts and techniques and applying them to the creation of interactive technology-based projects.

HRIM 643  HISTORIC ROADSIDE ARCHITECTURE  3
Examines various historic hospitality and retail venues with emphasis on their development throughout this automobile based century. Hotels, motels, diners, fast food and full service restaurants, roadside attractions and retail outlets are discussed as they relate to travel and tourism. 
Crosslisted with UAPP643.

HRIM 648  DATA ANALYSIS IN THE HOSPITALITY INDUSTRY  3
Overview of basic data analysis principles, techniques, and applications useful in conducting quantitative research in hospitality business management. Focuses on analyzing and interpreting of customer and organizational data using relevant statistical software. 
PREREQ: HRIM601. RESTRICTIONS: Priority for MS HBM students.

HRIM 664  HOSPITALITY TECHNOLOGY INTERNSHIP  3
Supervised technology-related work experience with a hospitality business or related organization.

HRIM 668  INDUSTRY PROJECT  3
Provides the opportunity to research, design and/or develop the solution to a real-world hospitality technology-related problem or issue.
HRIM 687  MANAGEMENT SYSTEMS IN THE HOSPITALITY INDUSTRY  3
Examines issues surrounding the implementation of information technology in supporting hospitality operations from a guest service perspective and decision making from the viewpoint of management. Case studies and review of various software utilized to understand the various subsystems in a hospitality property.
PREREQ: HRIM601

HRIM 764  ADVANCED LODGING PRACTICUM  3
Experience-driven learning course in a live hotel. On the operational side, students will complete a rotation of the various departments of the hotel. The managerial component includes exposure to General Manager duties at financial, operational and strategic levels.
PREREQ: HRIM601, HRIM602, HRIM603, HRIM604, HRIM642, HRIM648, and HRIM687. RESTRICTIONS: Only after taking 21 credits of 600 or higher level HRIM courses.

HRIM 866  SPECIAL PROBLEM  1-6

HRIM 869  MASTER’S THESIS  1-6

HRIM 875  HOSPITALITY MANAGEMENT RESEARCH  3
This capstone course is to identify specific problems and opportunities in the hospitality industry, developing a research question, solve the specific problem and highlight the relevant implications of the findings for industry and academia. Three types of research qualify - empirical research, case studies and business plan/projects.
PREREQ: HRIM601 and HRIM602 and HRIM648. RESTRICTIONS: Must have completed 12 credits in the MS Hospitality Business Management program.

Health Services Administration

HSAD 604  ADVANCED PRACTICE ROLES FOR HEALTHCARE PROVIDERS  3
Focuses on roles and issues affecting healthcare providers engaged in advanced practice. Roles are analyzed in relation to current issues and concepts of advanced practice.
May be crosslisted with NURS604. RESTRICTIONS: Permission required from department.

HSAD 619  FINANCIAL MANAGEMENT IN HEALTH SERVICES ORGANIZATIONS  3
Provides the basic principles and concepts of effective management of budgets for healthcare units. Includes analysis of the environment and departmental organization and their impact on healthcare.
May be crosslisted with NURS619. RESTRICTIONS: Permission of department required.

HSAD 635  HEALTH ADMINISTRATION THEORIES  3
Theories of administration, organization and management, their interaction with other health discipline theories and their influence on management of healthcare agencies. Includes the interaction of theories with attainment of institutional goals.
May be crosslisted with NURS635. PREREQ: NURS604. COREQ: NURS604.

HSAD 637  HEALTH PLANNING STRATEGIES  3
Analyzes organizational systems and roles of managers and administrators. Students identify organizational needs, formulate goals and objectives appropriate to healthcare agencies and identify strategies appropriate to accomplishing goal attainment with ethical constraints of healthcare.
May be crosslisted with NURS637. PREREQ: NURS604 and NURS609 or Permission of Instructor. COREQ: NURS604.

HSAD 638  HEALTH SERVICES EVALUATION  3
Emphasizes the role of managers and administrators in personnel development, promotion of research in clinical settings and development and implementation of quality improvement initiatives and their implications for healthcare.
May be crosslisted with NURS638. PREREQ: NURS604 and NURS609. COREQ: NURS604.

HSAD 664  HEALTH SERVICES ADMINISTRATION PRACTICUM  1-3
In conjunction with his/her faculty advisor and based on student's individualized long range goals, student selects a preceptor and healthcare setting in which to apply didactic contact in real life settings. Requires 126 hours of on-site experience, which can be taken in one semester or divided over three semesters.
COREQ: HSAD635, HSAD637, or HSAD638.

HSAD 868  RESEARCH: SCHOLARLY PROJECT  1-3
Investigation of a problem in clinical settings related to finance, administration, personnel management, public policy or education, resulting in completion of a scholarly project.
PREREQ: Research and statistics and any two of the following: HSAD635, HSAD637, HSAD638

HSAD 890  COLLOQUIUM  0 PF
See NURS890 for course description.

Italian

ITAL 105  ITALIAN I - ELEMENTARY  4
Introduction to the Italian language and development of speaking, listening, reading and writing skills through the use of basic texts.

ITAL 106  ITALIAN II - ELEMENTARY/INTERMEDIATE  4
Completion of basic Italian. Increasing mastery of the basic skills of speaking, listening, reading and writing.
PREREQ: ITAL105. RESTRICTIONS: Two to three years of high school Italian acceptable in lieu of prerequisite.

ITAL 107  ITALIAN III - INTERMEDIATE  4
Review of grammar, continued practice in speaking and writing, reading texts of average difficulty.
PREREQ: ITAL106. RESTRICTIONS: Four years of high school Italian acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.

ITAL 200  ITALIAN GRAMMAR REVIEW  3
Systematic review of fundamental aspects of Italian grammar. Study of special problem areas. Some conversational practice.
PREREQ: ITAL107

ITAL 205  ITALIAN CONVERSATION  3
Practical use of Italian by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review and written work when appropriate.
PREREQ: ITAL107. RESTRICTIONS: Prerequisite requires a minimum grade of B. One 200-level Italian course may be substituted for Prerequisite.

ITAL 206  CULTURE THROUGH CONVERSATION  3
Discussion of topics drawn from contemporary Italian life. Designed for students who wish to broaden their knowledge of Italian culture while improving their oral and aural language skills.
PREREQ: ITAL107. RESTRICTIONS: Taught abroad only.

ITAL 208  ITALY: PAST AND PRESENT  3
An introduction to Italy, its history, its culture, its people, their way of life and the issues confronting them.
RESTRICTIONS: Taught abroad only, in both English and Italian. Not for major credit. Does not satisfy the language requirement.

ITAL 211  ITALIAN READING AND COMPOSITION: SHORT FICTION  3
Reading and discussion of Italian short stories. Several short compositions. Grammar review where appropriate.
PREREQ: ITAL200, ITAL205 or ITAL206.

ITAL 212  ITALIAN READING AND COMPOSITION: DRAMA AND PROSE  3
Reading and discussion of some major 20th-century plays and prose texts. Several short compositions. Grammar review where appropriate.
PREREQ: ITAL200, ITAL205 or ITAL206

ITAL 250  INTRODUCTION TO BUSINESS ITALIAN  3
Familiarizes students with characteristics of business Italian (vocabulary, technology, terminology and syntactical patterns) and aspects of the Italian business community.
PREREQ: ITAL107

ITAL 305  ADVANCED ITALIAN CONVERSATION AND COMPOSITION  3
Discussion of current cultural, social and political topics in Italy. Vocabulary building, grammar exercises and frequent compositions.
PREREQ: ITAL211 or ITAL212

ITAL 306  PRACTICAL ORAL/Written EXPRESSION  3
Offered abroad only, is designed to strengthen skills in grammar and vocabulary in preparation for advanced courses offered in second part of the semester. Class exercises include oral exposés, discussion of articles and videos, textual analysis and compositions.
PREREQ: Any two 200-level Italian courses taught in Italian RESTRICTIONS: Taught abroad only.

ITAL 308  CONTEMPORARY ITALY II  3
Discussion and study of issues related to contemporary cultural, political and social developments in Italy, including its place in today's European community. The course will be conducted in Italian.
PREREQ: Any two 200-level Italian courses taught in the Italian language RESTRICTIONS: Taught abroad only.
<table>
<thead>
<tr>
<th>ITAL 310</th>
<th>SURVEY OF ITALIAN LITERATURE</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of Italian literature from its origins to the mid-17th century. Study and discussion of representative works. PREREQ: ITAL211 or ITAL212</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 311</th>
<th>SURVEY OF ITALIAN LITERATURE</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of Italian literature from the mid-17th century to the present. Study and discussion of representative works. PREREQ: ITAL211 or ITAL212</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 325</th>
<th>ITALIAN CIVILIZATION AND CULTURE I</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A survey of the major cultural, social and political developments in Italy from the Etruscans to the 15th century. PREREQ: ITAL211 or ITAL212</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 326</th>
<th>ITALIAN CIVILIZATION AND CULTURE II</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A survey of the major cultural, social and political developments in Italy from its Unification to the present. PREREQ: ITAL211 or ITAL212</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 355</th>
<th>SPECIAL TOPICS</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explores an area of special interest in Italian literature or cultural studies. See <a href="http://primus.nss.udel.edu/CoursesSearch/">http://primus.nss.udel.edu/CoursesSearch/</a> for topics. PREREQ: Any 300-level Italian course. RESTRICTIONS: May be repeated for credit when topics vary.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 366</th>
<th>INDEPENDENT STUDY</th>
<th>1-3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>ITAL 401</th>
<th>ADVANCED ITALIAN GRAMMAR AND STYLISTICS</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to the various written and spoken styles of contemporary Italian from colloquial to formal. Exercises in writing and speaking, with special emphasis on the grammatical structure of the Italian language. Some translation. PREREQ: Any two 300-level Italian courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 403</th>
<th>HISTORY OF THE ITALIAN LANGUAGE</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of the Italian language from its Latin origins. Exposition of the questions della lingua; linguistic analysis of old Italian texts; and the effects of social, political and cultural factors on usage. Influences from and on other languages. PREREQ: Any two 300-level Italian courses RESTRICTIONS: May be offered jointly with ITAL603.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 406</th>
<th>ADVANCED ITALIAN LANGUAGE</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammatical structure and stylistics with special attention given to technical vocabulary and discourse, e.g., business, law, science and agriculture. PREREQ: Any 300-level Italian course RESTRICTIONS: Taught abroad only.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 454</th>
<th>ITALIAN CINEMA</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study of modern Italian cultural history through cinema. PREREQ: Any two 300-level courses. RESTRICTIONS: May be repeated for credit when topics vary.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 455</th>
<th>SELECTED AUTHORS, WORKS AND THEMES</th>
<th>3-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Works of one or more outstanding authors or on a special theme. PREREQ: Any two ITAL 300-level literature courses RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL655.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 466</th>
<th>INDEPENDENT STUDY</th>
<th>1-3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>ITAL 601</th>
<th>ADVANCED ITALIAN GRAMMAR AND STYLISTICS</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to the various written and spoken styles of contemporary Italian from colloquial to formal. Exercises in writing and speaking, with special emphasis on the grammatical structure of the Italian language. Some translation.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 603</th>
<th>HISTORY OF THE ITALIAN LANGUAGE</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of the Italian language from its Latin origins. Exposition of the questions della lingua; linguistic analysis of old Italian texts; and the effects of social, political and cultural factors on usage. Influences from and on other languages. RESTRICTIONS: May be offered jointly with ITAL403.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITAL 655</th>
<th>SELECTED AUTHORS, WORKS AND THEMES</th>
<th>3-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar on works of one or more outstanding authors or on a special theme. RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL455.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### JAPANESE

<table>
<thead>
<tr>
<th>JAPN 105</th>
<th>JAPANESE I - ELEMENTARY</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to the contemporary Japanese language through developing listening comprehension, speaking, reading, and writing skills, including mastery of the Hiragana and Katakana syllabaries and introduction to Kanji characters. Media Center resources utilized.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 106</th>
<th>JAPANESE II - ELEMENTARY/INTERMEDIATE</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continued practice in the aural, oral, reading, and writing skills of contemporary Japanese, including the identification and reproduction of basic Kanji characters. Introduction to formality levels and critical verb forms needed for more advanced communication. Media Center resources utilized. PREREQ: JAPN105 RESTRICTIONS: Two to three years of high school Japanese acceptable in lieu of prerequisite.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 107</th>
<th>JAPANESE III - INTERMEDIATE</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of aural, oral, reading, and writing skills at the intermediate Japanese level, including continued practice in identifying and reproducing Kanji characters, handling a greater variety of formality levels, and verb forms. Media Center resources utilized. PREREQ: JAPN106 RESTRICTIONS: Four years of high school Japanese acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 200</th>
<th>JAPANESE GRAMMAR AND COMPOSITION</th>
<th>3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>JAPN 201</th>
<th>ADVANCED INTERMEDIATE JAPANESE I</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>First of the two-course series which form the core of 200-level Japanese, the other being JAPN202. The goal is to build upper intermediate level grammar, vocabulary, and Kanji. All four areas of language (listening, reading, speaking, and writing) are emphasized. PREREQ: JAPN107.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 202</th>
<th>ADVANCED INTERMEDIATE JAPANESE II</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second of the two-course series which form the core of 200-level Japanese. (The other is JAPN201.) The goal is to build upper intermediate level grammar, vocabulary, and Kanji with specific emphasis on fluency. All areas of language (listening, reading, speaking, and writing) are emphasized. PREREQ: JAPN201 or JAPN206.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 204</th>
<th>THE ART OF JAPANESE CALLIGRAPHY</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical training in Japanese calligraphy, using brush, inkstone and sumi ink. Students will work with both phonetic syllabaries and kanji characters.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 205</th>
<th>JAPANESE CONVERSATION</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical use of Japanese by means of oral reports on a variety of topics including family, school, and work life. Emphasis on improvement of conversational skills for social situations which require different politeness levels, as well as grammatical and written correctness. PREREQ: One of the following: JAPN107, JAPN200, JAPN201, JAPN202, JAPN209. RESTRICTIONS: Prerequisite requires a minimum grade of B.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 206</th>
<th>CULTURE THROUGH CONVERSATION</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion of topics drawn from contemporary Japanese life. Designed for students who wish to broaden their knowledge of Japanese culture while improving their oral and aural language skills. PREREQ: ONE of the following: JAPN107, JAPN200, JAPN201, JAPN202, JAPN209. RESTRICTIONS: Taught abroad only.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 208</th>
<th>CONTEMPORARY JAPAN</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to contemporary Japan, its culture, people, way of life and issues confronting them. RESTRICTIONS: Taught abroad only, in both English and Japanese. Not for major credit. Does not satisfy language requirement. May be repeated for credit when topics vary.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 209</th>
<th>INTERMEDIATE SITUATIONAL JAPANESE</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical training in Japanese for formal situations. Students develop all four language skills in such contexts as job interviews, telephone etiquette, correspondence and relations with supervisors. Skits and role-play featured. PREREQ: ONE of the following: JAPN200, JAPN201, JAPN202, JAPN205, JAPN206.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JAPN 301</th>
<th>ADVANCED JAPANESE</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to new grammar through conversation, kanji-writing skills, essay and letter writing. Textbook exercises will be used in conjunction with a variety of reading materials. PREREQ: THREE of the following: JAPN200, JAPN201, JAPN202, JAPN205, JAPN209 or ONE of the following: JAPN305, JAPN355, JAPN306.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
JAPN 305 JAPANESE CONVERSATION AND COMPOSITION 3
Discussion of current cultural, social and political topics in Japanese. Vocabulary building, grammar exercises and frequent compositions.
PREREQ: THREE of the following: JAPN200, JAPN201, JAPN202, JAPN205, JAPN209 or ONE of the following: JAPN301, JAPN355, JAPN356.

JAPN 306 PRACTICAL ORAL AND WRITTEN EXPRESSION 3
Designed to increase fluency and vocabulary. Grammar review focuses on special problems.
PREREQ: THREE of the following: JAPN200, JAPN201, JAPN202, JAPN205, JAPN206, JAPN209 or ONE of the following: JAPN301, JAPN305, JAPN355; or permission of instructor. RESTRICTIONS: Taught abroad only.

JAPN 308 CONTEMPORARY JAPAN II 3
A further look into contemporary Japan, its culture, people, way of life and issues confronting them.

JAPN 355 SPECIAL TOPICS 3
Explores an area of special interest in Japanese literature or culture studies. See http://primus.nss.udel.edu/CoursesSearch/ for topics.
PREREQ: THREE of the following: JAPN200, JAPN201, JAPN202, JAPN205, JAPN206, JAPN209, or ONE of the following: JAPN301, JAPN 305, JAPN350. RESTRICTIONS: May be repeated for credit when topics vary.

JAPN 366 INDEPENDENT STUDY 1-3
This course allows the student to pursue their own goals in learning the Japanese language at the intermediate level.
PREREQ: THREE of the following: JAPN200, JAPN201, JAPN202, JAPN205, JAPN206, JAPN209, or ONE of the following: JAPN301, JAPN 305, JAPN350. RESTRICTIONS: May be repeated for credit when topics vary.

JAPN 401 USING JAPANESE: ISSUES IN CONTEMPORARY SOCIETY 3
Provides advanced instruction in Japanese grammar at the 400 level. Textbooks will provide a good basis for students to build grammar and discuss social issues such as marriage, illness, careers for women, and globalization. Students will also discuss issues using complementary materials chosen by the instructor (newspapers, magazines, television and so on). 
PREREQ: JAPN301 plus one other JAPN course at the 300 level.

JAPN 405 JAPANESE TRANSLATION: THEORY AND PRACTICE 3
Explores the major issues in translating a Japanese literary text into English, including synonym choice, literal versus loose translation, poetic license and the tense-aspect controversy. Students will find their own method of translation, balancing creative expression with accuracy and fidelity to the text.
PREREQ: JAPN301 plus one other JAPN course at the 300-level.

JAPN 455 SELECTED AUTHORS, WORKS, AND THEMES 3
Works of one or more outstanding authors or on a special theme.
PREREQ: Two 300-level Japanese courses RESTRICTIONS: May be repeated for credit when topics vary.

JAPN 466 INDEPENDENT STUDY 1-3
This course allows the student to pursue their own goals in learning the Japanese language at the advanced level.
PREREQ: TWO of the following: JAPN301, JAPN305, JAPN355; plus permission of instructor.

JAPN 490 RESEARCH THESIS IN JAPANESE 3
Allows students to conduct research and write a thesis on a topic of their choosing related to Japanese culture. The thesis is written in Japanese and class discussion is also in Japanese. Students use research sources in both English and Japanese. This is a challenging course aimed at seniors in the Japanese Studies Major in their last semester at UD.
PREREQ: Two courses in Japanese at the 400 level. RESTRICTIONS: For students in the Japanese Studies Major.

JOUR 329 BROADCAST NEWSWRITING 3
Emphasizes broadcast newswriting fundamentals and comparisons to other forms of writing. Includes news judgment, news gathering, and news editing, as well as integration of current events.
Crosslisted with COMM329. RESTRICTIONS: COMM and COMI majors not minorin in JOUR.

JOUR 425 ETHICS AND ISSUES IN JOURNALISM 3
Examination of issues faced by journalism and journalists today, including different standards of truth, competing responsibilities (to readers, sources, corporate shareholders), blending of news and entertainment, and changing nature of journalism in digital age.
PREREQ: JOUR301.

JOUR 464 INTERNSHIP IN JOURNALISM 3
Internship experiences under joint supervision of Journalism faculty and the sponsoring organization.

JWST 101 INTRODUCTION TO JUDAISM 3
Foundation course for the Jewish Studies minor but also open to all students interested in learning about the history, traditions, and customs of Judaism, the tenets of the religion, its relation to other world religions, etc.

JWST 105 HEBREW I - ELEMENTARY 4
Introduction to the Hebrew alphabet and language, and development of basic speaking, listening, reading and writing skills.
Crosslisted with HEBR105.

JWST 106 HEBREW II - ELEMENTARY/INTERMEDIATE 4
Continuation of Elementary Hebrew. Increasing mastery of the basic skills of speaking, listening, reading, and writing through texts, conversations and songs.
Crosslisted with HEBR106. PREREQ: HEBR105. Those with background other than HEBR105 should see instructor for appropriate placement.

JWST 107 HEBREW III - INTERMEDIATE 4
Strengthening grammar skills, continued practice in speaking, listening, writing and reading through conversation, texts and songs.
Crosslisted with HEBR107. PREREQ: HEBR106. Those with background other than HEBR106 should see instructor for appropriate placement. RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.

JWST 166 SPECIAL PROBLEM 1-4

JWST 201 ISSUES AND IDEAS IN JEWISH STUDIES 1
A forum for scholars to share their thoughts and research on the culture, literature and history of the Jewish people. Topics range from historical reviews to contemporary issues.

JWST 202 BIBLICAL AND CLASSICAL LITERATURE 3
Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts.
Crosslisted with ENGL202. PREREQ: ENGL110.

JWST 205 HEBREW CONVERSATION 3
Practical use of Hebrew by means of discussions and oral reports on a variety of topics including family, school and work life. Emphasis on improvement of conversational skills for social situations, as well as grammatical competence and reading comprehension through multicultural themes including the revival of the Hebrew language and various issues related to Hebrew culture.
Crosslisted with HEBR205. PREREQ: HEBR107 or equivalent

JWST 207 TEL AVIV AND JERUSALEM THROUGH TIME 3
A cultural comparison of Tel Aviv and Jerusalem. Tel Aviv and Jerusalem represent different aspects and faces of Israeli society. Our exploration of the two cities will unravel the histories of these cities, while at the same time, look at their present structural, cultural, and social components.
Crosslisted with HEBR208.

JWST 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.
Crosslisted with PHIL208.
JWST 209 CONTEMPORARY ISRAEL THROUGH FILM  
Development of oral and written proficiency in Hebrew through discussion and analysis of Israeli films pertaining to major issues in the development of the young state. Grammar review where needed.  
Crosslisted with HEBR209. PREREQ: HEBR107 or one 200-level Hebrew course or professor's permission. RESTRICTIONS: Minimum grade of A- required for HEBR107 and minimum grade of B required for a 200-level course.  

JWST 212 SHOW BIZ: A JEWISH PERSPECTIVE  
As the Jewish population of America grew rapidly during the early decades of the 20th century, Jews brought with them a rich and diverse tapestry of dramatic and theatrical modes. This course will examine the development of this extraordinary creative and commercial phenomenon.  
Crosslisted with THEA212.  

JWST 222 RELIGION IN MODERN AMERICA  
Surveys major themes in American religious history since the Civil War, including religion and social reform, politics, popular culture, and everyday life.  
Crosslisted with HIST222.  

JWST 225 JEWISH MUSIC  
Designed to present a study of the Jewish music as it has evolved from biblical era through the contemporary period. Encompasses the numerous cultures and lands that the Jewish people have found themselves residing from Australia to America, Brazil to Bombay and many more. The course will look at the formal presentation of music in ethnic Jewish life and combine this with the study of the music of Jews from the diaspora.  
Topics include political and racial ideology, government institutions, perpetrator motivations, international responses, and genocide prevention.  
Crosslisted with HIST250.  

JWST 250 COMPARATIVE GENOCIDE  
Examines genocidal acts in the 20th century in a comparative framework. Cases include genocides of Armenians, Jews, Cambodians, Bosnians, and Rwandans. Topics include political and racial ideology, government institutions, perpetrator motivations, international responses, and genocide prevention.  
Crosslisted with HIST250.  

JWST 254 JEWISH HOLOCAUST: 1933-1945  
Focuses on the infamous “Final Solution,” with particular emphasis on the roots of Anti-Semitism, National Socialist policies and plans, ghetto and camp life, the Einsatzgruppen, resistance, the politics of rescue and the art and literature of the Holocaust.  
Crosslisted with HIST254.  

JWST 266 SPECIAL PROBLEM  

JWST 303 WOMEN IN THE HOLOCAUST  
Examines the role of women who encountered the Holocaust. Such information has often been overlooked in the study of the Holocaust. Adding the perspective of women will enrich our understanding and offer a more complete picture of what happened. Students will read a variety of texts, engage in group work and create a final project that demonstrates both what they have learned and what they wanted to learn about women in the Holocaust.  
May be crosslisted with WOMS303.  

JWST 308 TOPICS IN JEWISH THEOLOGY  
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.  
Crosslisted with PHIL308. PREREQ: PHIL208 recommended.  

JWST 310 ANTI-SEMITISM  
Explore various aspects of the subject, beginning with the history of anti-Semitism in the early Christian period and the Crusades and extending to the present day. Focus on various psychological and philosophical theories to explain the causes and expressions of anti-Semitism. Examples of anti-Semitism will be included in literary works and films as well as newspaper accounts of incidents around the world and on college campuses. The Nazi Holocaust will be only one major illustration of anti-Semitism; others will include the Spanish Inquisition and the expulsion of Jews from England in the thirteenth century and elsewhere.  

JWST 318 STUDIES IN FILM  
Special topics such as film genres, major directors and Soviet cinema.  
Crosslisted with ENGL318. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.  

JWST 327 TOPICS IN JEWISH HISTORY  
Introductory courses on focused topics in the history of Jewish people from ancient to modern times. Course topics explore the development of religion, culture, politics, and demography of Jews throughout the Diaspora and in modern Israel.  
Crosslisted with HIST327.  

JWST 333 ISRAELI FILM  
Enrollment required of Israeli films from the immediate postwar period to present. Historical and societal changes emphasized. Aesthetic and technical elements of film production and reception featured. Discussion intensive.  
Crosslisted with FILT333.  

JWST 345 MODERN JEWISH HISTORY AND CULTURE  
Many factors contribute to a diverse and intriguing Israeli society. Topics include the roots of Zionism, the concept of the Israeli Sabra, the effects of the Holocaust, ethnic groups and the Arab-Israeli conflict, through history, film, literature and music.  
Crosslisted with FILT345.  

JWST 348 CONTEMPORARY JEWISH-AMERICAN LITERATURE  
Lectures and discussions of outstanding contemporary Jewish American novelists, short story writers, and others.  
Crosslisted with ENGL348. PREREQ: ENGL110  

JWST 349 INTRODUCTION TO JEWISH SOURCES: TEXT AND INTERPRETATION  
Examines the central texts which form the basis of Jewish thought, religion and culture—the Torah, or Hebrew Bible (in translation) and the interpretive traditions which have evolved to understand it (e.g., Midrash, Rashi, contemporary biblical sources) as sources of uniquely Jewish meanings.  
Crosslisted with ENGL349.  

JWST 350 STUDIES IN JEWISH LITERATURE  
Focus on Jewish writers, stories, and/or culture from around the world. Course content will address issues, concepts, or problems such as: anti-Semitism, passing, secularism, Jewish-Christian and Jewish-Muslim relations, Diaspora, homeland, nation, race, ethnicity, and/or the Holocaust.  
Crosslisted with ENGL350. RESTRICTIONS: May be taken up to three times when topics vary.  

JWST 360 SOCIOLOGY OF RELIGION  
Sociological analysis of religious practices and beliefs that are practiced in the contemporary United States, including changes in religious affiliation and the effect of religion on social change, political behavior, gender roles, sexuality, racial inequality, and cultural membership.  
Crosslisted with SOCI360.  

JWST 363 MODERN JEWISH HISTORY  
Following the French Revolution Jewish life throughout Europe and the US underwent significant changes with respect to legal equality, civic rights, and religious reform. This course will focus on the ways in which Jewish history transformed and was transformed by the experience of modernity.  
Crosslisted with HIST363.  

JWST 365 STUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS  
Particular areas or writers to be announced.  
Crosslisted with ENGL365. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.  

JWST 366 INDEPENDENT STUDY  

JWST 377 ARAB-ISRAELI POLITICS  
Development of the Arab-Israeli conflict analyzed from the Dreyfus Affair and the Balfour Declaration to current events.  
Crosslisted with PDSC377.  

JWST 381 HISTORY OF THE ARAB-ISRAELI CONFLICT  
Explores the roots and the historical complexity of the Arab-Israeli conflict. Topics include: the origins of Zionism, the nature of traditional Arab/Islamic society in the 19th century, the relationship between the early Zionists and Indigenous Arab population of Palestine, the creation of a Jewish society, the rise of Palestinian nationalism, and the protracted search for coexistence between Jews and Arabs.  
Crosslisted with HIST380.  

JWST 382 STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH  
Consideration of multiculturalism as it pertains to American culture or literature in English from Africa and other non-European societies. Variable in historical range, geography, and genre.  
Crosslisted with ENGL382. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.  

JWST 398 TOPICS IN MEDIEVAL HISTORY  
Course topics vary and may be chronologically or thematically based. Examples include "Christians & Muslims in the Middle Ages" and "Germany in the Middle Ages." May be repeated for credit when topics vary.  
Crosslisted with HIST398.
JWST 430 COMPARATIVE SOCIOLOGY 3-6
Exposes sociological similarities and differences between the United States and a selected country on a number of critical sociological topics. Topics include ethnic and religious diversity, culture, demographic structure, social institutions, social stratification and urbanization. Crosslisted with SIOC430. 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.

JWST 466 INDEPENDENT STUDY 1-3

JWST 480 LITERARY STUDIES SEMINAR 3
Intensive capstone seminar employs research presentations as the occasion for students to consolidate skills acquired in 100-, 200-, and 300-level coursework. Content varies by expertise of instructor. Crosslisted with ENGL480. PREREQ: ENGL 110 and six ENGL credits at the 300 level or higher or by instructor consent. RESTRICTIONS: Can be repeated once when topics vary. Only counts toward major if taken as senior (after completing 90 credits). [Non-seniors are not excluded, but a student who completes the course before senior year must re-take the course as a senior for major credit

JWST 482 AMERICA IN THE MIDDLE EAST 3
Examines history of America's engagement with an emphasis on issues since 1979. After brief intro portion on the mechanics of American foreign policy-making and America's global political and strategic position over time, we will spend most of the semester on America's involvement in regional oil politics, Middle East peace process, first and second Iraq Wars, relations with Iran, plans for Middle East democratization and the Bush II administration. Evaluation will be based upon a mid-term and final exam, a medium-length research paper, and one or two short writing assignments. Crosslisted with POSC482.

KINESIOLOGY & APPL PHYSIOLOGY

KAAP 105 FRESHMAN SEMINAR IN EXERCISE SCIENCE 1 PF
Introduction to biomechanics, exercise physiology, and motor control, including familiarization with types of laboratory research and career opportunities associated with each discipline.

KAAP 155 LIFESTYLE AWARENESS - ATHLETIC TRAINERS 3
Exploration into the basic principles of healthy lifestyle awareness necessary for athletic training students to satisfy the educational competencies mandated by the National Athletic Trainers Association. Serves as the First Year Experience (FYE) requirement for all Athletic Training Interest students. RESTRICTIONS: Open to athletic training interest (ATI) only.

KAAP 180 INTRODUCTION TO EXERCISE SCIENCE 3
Introduction to the science of human movement. Survey of selected topics in the areas of exercise physiology, sports medicine, biomechanics, exercise psychology, and motor control.

KAAP 210 EMERGENCY MANAGEMENT OF INJURIES AND ILLNESSES 3
Emergency management of life-threatening and non-life-threatening injuries and illnesses. Includes CPR skills and initial and secondary assessments; first aid for wounds, burns, heat illnesses, and cold illnesses; and injuries to the head, spine, chest, and extremities.

KAAP 220 ANATOMY AND PHYSIOLOGY 3
Structure and function of human body: skeletal, muscular, circulatory, respiratory, nervous, endocrine, digestive and urinary systems. Foundation course for all areas of physical education and athletics. RESTRICTIONS: Students may not receive credit for KAAP220 if taken after completion of KAAP309.

KAAP 240 INTRODUCTION TO ATHLETIC TRAINING 3
Orientation to athletic training as a career in the health care industry and introduction to the prevention and care of injuries in the physically active population. PREREQ: KAAP220. COREQ: KAAP220. RESTRICTIONS: Restricted to Athletic Training Interest (ATI) students only. Not open to students who have taken KAAP305.

KAAP 257 ATHLETIC TRAINING PRACTICUM I 3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies. PREREQ: KAAP240. RESTRICTIONS: Open to athletic training majors only.

KAAP 258 ADVANCED TAPPING AND BRACING TECHNIQUES 1 PF
Laboratory experience in advanced tapping, wrapping, bracing and splinting; variations for upper and lower extremity orthopedic injuries; emergency and non-emergency on-field transportation techniques; and equipment fitting and modification techniques. RESTRICTIONS: Open to athletic training majors only.

KAAP 266 SPECIAL PROBLEM 1-3 PF

KAAP 268 SOPHOMORE SPECIAL TOPICS 1-4 PF
Sophomore level independent study.

KAAP 285 INTRODUCTION TO RESEARCH IN HEALTH SCIENCES 3
Explore basic elements of research in health sciences, including experimental design, statistics, ethics, and human subjects and biosafety certification. Investigate research techniques used in laboratories in the Department of Kinesiology and Applied Physiology, elsewhere on campus and at other collaborating sites. RESTRICTIONS: Restricted to Freshman - Junior status.

KAAP 301 LIFESPAN MOTOR DEVELOPMENT 4
Motor skill development across the lifespan from infancy through older adulthood in both typical and atypical populations. Focus is on behavioral aspects of movement pattern change, and analysis of underlying mechanisms related to that change, such as neumaturation, growth, and biomechanics. Includes Service Learning experiences. RESTRICTIONS: Requires at least Sophomore standing.

KAAP 305 FUNDAMENTALS OF SPORTS HEALTH CARE 3
Students will gain an understanding of the prevention, assessment and treatment of athletic injuries. Laboratory sessions will involve learning basic sports health care skills. PREREQ: KAAP220 or KAAP309. RESTRICTIONS: Credit cannot be received for both KAAP305 and KAAP240.

KAAP 309 HUMAN ANATOMY AND PHYSIOLOGY I 4
Structure and function of the human body for pre-professionals in clinical and allied health fields. Emphasis on integumentary, skeletal, muscular, and nervous systems. PREREQ: CHEM104 and BISC208.

KAAP 310 HUMAN ANATOMY & PHYSIOLOGY II 4
Structure and function of the human body for pre-professionals in clinical and allied health fields. Emphasis on endocrine, circulatory, respiratory, digestive, and urinary systems. PREREQ: KAAP309.

KAAP 320 PRINCIPLES OF STRENGTH/CONDITIONING 4
Addresses scientific basis of strength and conditioning based upon principles related to biomechanics, exercise physiology, injury prevention techniques and anatomy. Emphasis on program design, energy systems, advanced lifting techniques, nutrition, plyometrics, ergogenic aids and effects of strength training on the cardiovascular system. PREREQ: KAAP220 or KAAP309. RESTRICTIONS: Open to students whose major or minor requires this course.

KAAP 350 BASIC CONCEPTS IN KINESIOLOGY 3
Review of musculoskeletal anatomy and lever systems provides foundation for analyzing human movement. Practical kinesiological evaluation focuses on common fitness and health related exercises. Movement analysis and proper techniques discussed for cardiovascular machines, abdominal work, stretching, etc. PREREQ: KAAP220 or KAAP309. RESTRICTIONS: Open to students whose major or minor requires this course.

KAAP 353 PRE-PROFESSIONAL SEMINAR 2 PF
Prepares exercise science majors with planning of employment and/or advanced degree opportunities. Includes in-depth resume and cover letter writing, interviewing techniques, standardized test preparation and personalized career inventory and career exploration projects. RESTRICTIONS: Restricted to exercise science majors. Requires junior status.

KAAP 357 ATHLETIC TRAINING PRACTICUM II 3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies. PREREQ: KAAP257. RESTRICTIONS: Open to athletic training majors only.

KAAP 358 ATHLETIC TRAINING PRACTICUM III 3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies. PREREQ: KAAP357. RESTRICTIONS: Open to athletic training majors only.
KAAP 366  INDEPENDENT STUDY  1-6 PF

KAAP 368  JUNIOR SPECIAL TOPICS  1-4
Junior level independent study.

KAAP 395  SPORT MEDICINE PHARMACOLOGY  3
Provides athletic training majors with an understanding of the origin, chemistry, effects and uses of medications commonly used in sports medicine. Major topics include pharmacokinetics, indications, contraindications, adverse reactions, management of overdose, pharmacophoresis, iophosphoresis, drugs affecting skeletal muscle, pain and inflammation.
PREREQ: KAAP358. RESTRICTIONS: Open to athletic training majors only.

KAAP 400  RESEARCH METHODS  3
Introduction to research on health and physical activity, including types of research, research design, matching appropriate statistical tools with research designs, research writing style and format and ethical issues related to research.
PREREQ: Junior or senior standing. STAT200 or MATH201 or PSYC209.
RESTRICTIONS: Open only to majors in Exercise Science and the Health Studies Occupational Therapy Track.

KAAP 405  REHABILITATION OF ATHLETIC INJURIES I  3
Foundations of injury treatment and rehabilitation, including the healing process, neuromuscular control, flexibility and range of motion, strength/power/endurance, postural stability and balance, and cardio-respiratory considerations.
PREREQ: KAAP357 RESTRICTIONS: Open to athletic training majors only.

KAAP 406  REHABILITATION OF ATHLETIC INJURIES II  3
Building upon the content of KAAP405, students develop enhanced proficiency with rehabilitation techniques and skills for both the upper and lower extremities, as well as the trunk and low back regions.
PREREQ: KAAP405 RESTRICTIONS: Open to athletic training majors only.

KAAP 407  PREVENTION AND RECOGNITION OF ATHLETIC INJURIES  3
Procedures for preventing, diagnosing, treating and rehabilitating athletic injuries. Emphasis on early detection of both nature and extent of injury.
PREREQ: KAAP400 and KAAP401. RESTRICTIONS: Open to AT majors only.

KAAP 409  THERAPEUTIC MODALITIES  4
Provides both theory and clinical experience in the use of the most common types of therapeutic modalities utilized in sports medicine.
RESTRICTIONS: Open to athletic training majors only.

KAAP 417  INTRODUCTION TO LabVIEW  3
LabView is a graphical programming language that is widely used in exercise science laboratories and clinics. This course will provide students with a functional knowledge of the LabView programming environment with applications in biomechanics, motor control, and exercise physiology.

KAAP 420  FUNCTIONAL HUMAN ANATOMY  5
Anatomical individuality, functional significance and human performance interpretations involved through consideration of muscular, skeletal and nervous systems. Laboratory experience emphasizes meaning and significance of musculoskeletal movements and utilizes dissected human specimens, models, x-rays, dry biological materials and other aids.
PREREQ: KAAP220 or KAAP309. RESTRICTIONS: Open to athletic training majors and to honors program majors in exercise science.

KAAP 425  BIOMECHANICS OF HUMAN MOTION  4
Study of the fundamental mechanical principles governing the human body in motion and at rest, including application of statics and dynamics in the quantitative analysis of sport and exercise.
PREREQ: KAAP220 or KAAP309. RESTRICTIONS: Open only to students in the athletic training major, health and physical education major, figure skating coaching minor, and strength and conditioning minor.

KAAP 426  BIOMECHANICS I  4
Application of mechanical principles in the study of the human musculoskeletal system, including analysis of joint forces, as well as the mechanical properties of bone, muscle, and connective tissues.
PREREQ: PHYS201 or PHYS207; KAAP309. RESTRICTIONS: Open to exercise science majors only.

KAAP 427  BIOMECHANICS II: MEASUREMENT OF HUMAN MOTION  3
Provides information on measurement of human motion in three dimensions and on calculation of inverse dynamics in two dimensions as applied to analysis of human motion.
PREREQ: KAAP417 and KAAP426. RESTRICTIONS: Open to exercise science majors only.

KAAP 428  MOTOR CONTROL AND LEARNING  4
Teaches concepts in the control and learning of human movement, with emphasis on historical and contemporary theories, psychomotor aspects of movement, learning and performance, and the fundamental systems related to perception and action.
PREREQ: KAAP309. RESTRICTIONS: Open to exercise science majors and minors.

KAAP 430  EXERCISE PHYSIOLOGY  4
Study of the integration of human physiological systems in the performance of exercise, work and sports activities and under the influence of environmental stressors.
PREREQ: KAAP220 or KAAP310 or BISC276 or BISC306. RESTRICTIONS: Open to majors and minors in exercise science, athletic training, health studies, health studies/OT or strength and conditioning.

KAAP 433  APPLIED PHYSIOLOGY OF ACTIVITY  4
Function of human body during exercise, including integration of body systems during exercise, work, and sport activities and ways in which environment impacts performance.
PREREQ: KAAP220. RESTRICTIONS: Restricted to majors in Health Behavior Science and Health and Physical Education and minors in Strength and Conditioning.

KAAP 434  TWELVE-LEAD ELECTROCARDIOGRAM INTERPRETATION  3
Study of all aspects of electrocardiography including arrhythmia identification, r-lead determination, axis deviation, heart blocks, hypertrophy and myocardial infarction patterns.
PREREQ: KAAP430.

KAAP 440  TOPICS IN EXERCISE SCIENCE  3
Course content varies each semester with a focus on topics within Kinesiology and Applied Physiology.
RESTRICTIONS: Open to seniors or with permission of instructor. May be repeated for nine credits when topics vary.

KAAP 441  READINGS IN BIOMECHANICS AND MOTOR CONTROL  1 PF
In depth discussion of peer reviewed scientific articles in the areas of biomechanics and motor control. Both classic papers and current literature will be discussed.
RESTRICTIONS: Open to junior and senior exercise science majors or with permission of instructor.

KAAP 442  READINGS IN APPLIED PHYSIOLOGY  1 PF
In depth discussion of peer reviewed scientific articles in the area of applied physiology. Both classic papers and current literature will be discussed.
RESTRICTIONS: Open to junior and senior exercise science majors or with permission of instructor.

KAAP 447  ADVANCED TOPICS IN STRENGTH AND CONDITIONING  3
Theoretical principles for developing individualized strength and conditioning programs based on biomechanical, physiological and neural concerns, including calculations of volume, intensity and tonnage. Topics include teaching progressions and technique training for Olympic style exercises, weight room safety and weight room design.
PREREQ: Junior or senior standing. Completion of KAAP320, KAAP350 and KAAP425 or KAAP426 with at least a C-. KAAP426 may be a corequisite.
RESTRICTIONS: Restricted to minors in strength and conditioning.

KAAP 448  ORGANIZATION AND ADMINISTRATION  3
Information for prospective certified athletic trainers on organization and administration of athletic training programs as identified by the NATA. Topics include record keeping, purchasing and maintenance of equipment and facilities and policies and procedures for the operation of an athletic training program.
RESTRICTIONS: Open to athletic training majors only.

KAAP 449  ADVANCED TOPICS IN SPORTS MEDICINE  3
Exposure to a variety of medical specialists and allied health professionals including physical therapists, dentists, nurses and specialists in orthopaedics, neurology, cardiology, pediatrics, internal medicine, ophthalmology and physical medicine.
RESTRICTIONS: Open to athletic training majors only.

KAAP 457  ATHLETIC TRAINING PRACTICUM IV  3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies.
PREREQ: KAAP358. RESTRICTIONS: Open to athletic training majors only.

KAAP 458  ATHLETIC TRAINING PRACTICUM V  3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA’s Athletic Training Educational Competencies.
PREREQ: KAAP457 RESTRICTIONS: Open to athletic training majors only.
KAAP 459  ATHLETIC TRAINING PRACTICUM VI  3 PF
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies.
PREREQ: KAAP458. RESTRICTIONS: Open to athletic training majors only.

KAAP 462  PRACTICUM IN STRENGTH AND CONDITIONING  3 PF
Directed practical experience in a strength and conditioning environment. RESTRICTIONS: Open to athletic training majors only.

KAAP 463  PRACTICUM IN EXERCISE SCIENCE  1-6 PF
Directed practical experiences in clinical aspects of exercise science. Please request the practicum handbook from the instructor on record and follow the procedures for enrollment. Some clinical sites require background checks, health and immunization histories, TB testing or certificate, or drug screenings. Specific sites may impose additional academic requirements.
PREREQ: KAAP447. COREQ: KAAP447. RESTRICTIONS: Open to athletic training majors only.

KAAP 466  INDEPENDENT STUDY  1-6 PF
Senior level independent study.

KAAP 468  SENIOR SPECIAL TOPICS  1-4 PF
Senior level independent study.

KAAP 475  CLINICAL EXERCISE PHYSIOLOGY  4 IF
Methods of evaluating cardiovascular function through graded exercise tests as well as principles of exercise prescription. Theoretical as well as practical covering of administrative aspects of testing, metabolic calculations, variety of testing protocols, basic exercise physiology and exercise prescription.
PREREQ: KAAP430. RESTRICTIONS: Open to exercise science majors only.

KAAP 480  UPPER EXTREMITY AND SPINE EVALUATION  3 IF
Evaluation of the upper extremity, cervical spine and facial injuries. SOAP format evaluation, on-field evaluation, mechanics and pathomechanics of joint movement, detailed anatomy, etiology of specific injuries and special and stress tests will be discussed.
PREREQ: KAAP220 and KAAP240 RESTRICTIONS: Open to athletic training majors only.

KAAP 481  LOWER EXTREMITY AND SPINE EVALUATION  3 IF
Evaluation of the lower extremity, lumbar spine and sacroiliac joint. SOAP format evaluation, on-field evaluation, mechanics and pathomechanics of joint movement, detailed anatomy, etiology of specific injuries and special and stress tests will be discussed.
PREREQ: KAAP220 and KAAP240 RESTRICTIONS: Open to athletic training majors only.

KAAP 483  INJURY CONSIDERATIONS FOR THE FEMALE ATHLETE  3 IF
There are a variety of gender-specific sport-related injuries that involve the female athlete population. Explore gender-specific anatomical, biological, and physiological mechanisms responsible for such injuries and provide specific case studies for discussion.
May be crosslisted with WOMS483.

KAAP 484  WOMEN IN SPORTS  3 IF
Historical and contemporary perspectives on the female athlete, encompassing biological, psychological, sociological, and legal issues that are gender dependent and culturally unique.
May be crosslisted with WOMS484.

KAAP 485  RESEARCH IN EXERCISE SCIENCE  1-3 IF
Undergraduate laboratory research experience in biomechanics, exercise physiology, or motor control.
RESTRICTIONS: Restricted to exercise science majors. Requires permission of instructor. May be repeated for up to six credits.

KAAP 487  RESEARCH IN SPORTS MEDICINE  1-3 IF
Undergraduate laboratory research experience in sports medicine.
RESTRICTIONS: Restricted to junior and senior athletic training majors. Consent of instructor required. May be repeated for up to six credits.

KAAP 488  UPPER EXTREMITY AND SPINE EVALUATION LABORATORY  1 IF
Laboratory exercises to complement the evaluation of the upper extremity, cervical spine and facial injuries.
COREQ: KAAP480. RESTRICTIONS: Open to athletic training majors only.

KAAP 489  LOWER EXTREMITY AND SPINE EVALUATION LABORATORY  1 IF
Laboratory exercises to complement the evaluation of the lower extremity, lumbar spine, sacroiliac joint, posture, and gait analysis.
COREQ: HESC481. RESTRICTIONS: Open to athletic training majors only.

KAAP 601  RESEARCH METHODS  3 IF
Emphasis on procedures for designing experimental research studies including choice of subjects, group design, choice of proper instrumentation, statistical design, formulation of experimental group programs and technical writing for proposals and publication.

KAAP 602  DATA ANALYSIS AND INTERPRETATION IN HEALTH SCIENCES  3 IF
Overview of statistical practice in health sciences research, particularly experimental research. Topics include experimental design, regression, analysis of variance including repeated measures designs and nonparametric tests.

KAAP 603  SEMINAR IN EXERCISE SCIENCE  1 IF
Guest and student presentations on research or other topics related to exercise science.

KAAP 604  SENSORS/MOTOR CHARACTERISTICS OF INJURY  3 IF
Nervous system attributes related to acute injury and overuse syndromes, including mechanoreceptor function, muscle tone and stiffness regulation, dynamic restraint, neuromuscular dyskinesia, and neurocognitive traits. Implications for research and clinical outcomes will be discussed.
PREREQ: HESC220 or equivalent

KAAP 605  PATHOLOGY OF MUSCULOSKELETAL INJURIES  3 IF
Physiological, mechanical, and neuromuscular mechanisms of common musculoskeletal injuries with implications for both clinical and research environments.
PREREQ: HESC220 or equivalent RESTRICTIONS: Restricted to graduate students.

KAAP 606  EVIDENCE-BASED SPORTS MEDICINE  3 IF
Theory and practice of evidence-based sports medicine for both clinical and research environments, with emphasis on understanding results of health care interventions and practices for patients and research subjects.

KAAP 607  MOTOR LEARNING AND CONTROL  3 IF
Exploration of theoretical perspectives of motor learning and control, with a focus on contemporary approaches. Surveys neurological systems involved in perception and motor performance. Application of specific principles of learning and control of movement to the teaching of motor skills in daily living activities, physical education and sport.

KAAP 609  CONCussion PATHology & Management  3 IF
In addition to addressing the current controversies surrounding concussions, this course will provide foundation knowledge in concussion pathophysiology, epidemiology, clinical and experimental assessment techniques, post-injury cognitive, postural deficits, imaging approaches, and cumulative effects and later life neuropathological complications. Students present and discuss contemporary research.

KAAP 615  ADVANCED MAMMALIAN PHYSIOLOGY  4 IF
Systemic mammalian physiology: cellular mechanisms, muscle, cardiovascular, respiratory, renal, digestive and endocrine systems. Emphasizes human physiology and includes discussions of primary literature in the field of physiology research.
Crosslisted with BISC605. PREREQ: BISC306 or instructor's approval.
RESTRICTIONS: Priority given to graduate students and seniors seeking research-related careers.

KAAP 616  ADVANCED MAMMALIAN PHYSIOLOGY II  4 IF
Continuation of BISC605. Systemic mammalian physiology: respiratory, renal, gastrointestinal, and reproductive systems and metabolism.
Crosslisted with BISC606. PREREQ: BISC605.

KAAP 617  INTRODUCTION TO LABORATORY INSTRUMENTS  3 IF
Introduction to the principles of operation of laboratory equipment common to the areas of exercise physiology and biomechanics. Includes theory of operation, environmental considerations and applications. Involves hands-on use of equipment to collect data for faculty and student research projects.

KAAP 627  BIOMECHANICAL METHODS  3 IF
Introduces students to fundamental methods of two- and three-dimensional analysis in biomechanics. Topics will include creation of local coordinate systems, coordinate system transformations, joint center predictions, vector manipulation, linear and angular kinematics, joint forces and moments.
PREREQ: KAAP417 or KAAP617.
KAAP 650  LIFE SPAN MOTOR DEVELOPMENT  3
Theoretical and empirical inquiry into developmental changes in movement patterns across the life span. Focus will be placed on changes in behavioral aspects of human motor behavior and the underlying mechanisms to which these changes relate. Students will design and complete research projects.

KAAP 651  NEUROPHYSIOLOGICAL BASIS OF HUMAN MOVEMENT  3
Neural control of human movement, including gradation of muscular force, motor unit control principles, neuromuscular aspects of strength, segmental motor control, the organization of ballistic movements, adaptations in the control of movement, and aging. Students will learn related research techniques through hands-on demonstrations.

KAAP 654  MEDICAL PHYSIOLOGY  3
Survey of medical physiology, including discussion of major body systems with emphasis on system interaction, homeostasis, and pathophysiology. PREREQ: A previous course in mammalian, applied, cell, or exercise physiology.

KAAP 655  ADVANCED PHYSIOLOGY OF EXERCISE  3
Advanced study of the integration of the cardiovascular, pulmonary, metabolic, muscular, and temperature-regulating systems during exercise.

KAAP 665  12 LEAD ECG INTERPRETATION  3
Designed to teach the fundamentals for administering the 12-lead and single-lead electrocardiograms and stress test protocols for individuals recovering from cardiovascular disease. Emphasis on determining rate, rhythm, axis, hypertrophy and infarction.

KAAP 666  SPECIAL PROBLEM  1-12

KAAP 671  CLINICAL EXERCISE PHYSIOLOGY INTERNSHIP  3-9 PF
The purpose of the internship is to provide hands-on experiences in preventive and rehabilitative practices for patients with cardiopulmonary, metabolic, and musculoskeletal diseases as well as apparently healthy and low risk populations. In addition, the experience will help prepare students to take the American College of Sports Medicine (ACSM) clinical exercise physiology registry examination (RCEP) and/or the ACSM clinical exercise specialist certification. PREREQ: KAAP665 and KAAP675.

KAAP 675  CLINICAL EXERCISE PHYSIOLOGY  3
Methods of evaluating cardiovascular function through graded exercise tests as well as principles of exercise prescription. Theoretical as well as practical covering of administrative aspects of testing, metabolic calculations, variety of testing protocols, basic exercise physiology and exercise prescription.

KAAP 686  MATHEMATICS FOR BIOMECHANICS  3
Mathematical techniques for research in biomechanics and related fields, with emphasis on methods useful for biomedical signal processing. Topics include Fourier analysis, matrix algebra, and signal processing. May be crosslisted with BMSC686. PREREQ: MATH221 and MATH222 or equivalent.

KAAP 687  SEMINAR IN BIOMECHANICS  3
Introduction to contemporary and classical research literature on the biomechanics of human movement with an emphasis on exercise, clinical and sport applications. Lecture/discussion format.

KAAP 688  ELECTROMYOGRAPHIC KINESIOLOGY  3
Introduction to the theoretical basis and practical application of electromyography. Topics include the electrophysiological basis of muscle actions, mechanical properties of muscle, EMG recording and processing methods and applications of EMG to the study of human motion.

KAAP 801  GRADUATE SEMINAR IN APPLIED PHYSIOLOGY  0-4 PF
Guests and student research presentations in areas of Applied Physiology.

KAAP 802  HUMAN CARDIOVASCULAR CONTROL  3
Focuses on human cardiovascular control as it pertains to orthostasis, exercise and heat stress. The role of mechanical, neural and humoral factors is emphasized, as well as factors that control oxygen transfer from lungs to cells. PREREQ: Undergraduate human or exercise physiology at the 200-level or higher.

KAAP 808  SEMINAR IN MOTOR BEHAVIOR  3
Introduction to research literature on contemporary theories, models and patterns of motor behavior. Topics include a variety of both motor behavior and motor learning phenomena and processes, their relations with contemporary motor control theory, as well as a possible role of the central nervous system in distinctive behavioral and motor learning patterns. RESTRICTIONS: Requires permission of instructor.

KAAP 840  ADVANCED HUMAN ANATOMY  3
Laboratory requiring detailed gross dissection of the extremities and their girdles. Specific emphasis is placed upon neuromuscular, skeletal, cardiovascular and mechanical factors dictating functional capabilities of the human body. Understanding the relationship between structure and function must be demonstrated frequently.

KAAP 866  SPECIAL PROBLEM  1-12

KAAP 868  RESEARCH  1-12

KAAP 869  MASTER’S THESIS  1-6

KAAP 964  PRE-CANDIDACY STUDY  3-12 PF

KAAP 969  DOCTORAL DISSERTATION  1-12 PF

LATIN AMERICAN STUDIES

LAMS 390  METHODS IN INTERDISCIPLINARY RESEARCH  1 PF
Introduces students to methodologies used by disciplines represented in LALS. Students will learn about interdisciplinary research in Area Studies, as well as the methods faculty in Anthropology, Art, Art History, Foreign Languages and Literature, Geography, History, Political Science, and Women’s Studies utilize to generate their scholarship.

LAMS 464  INTERNSHIP IN LATIN AMERICAN STUDIES  1-3
On-the-job experience and explore potential occupational areas at associations, non-governmental organizations, foundations, or other venues connected to Latin American history, culture, politics, and society, under joint supervision of Latin American and Iberian Studies Program and sponsoring organization. Completion of journal of activities and/or final academic project or paper. RESTRICTIONS: Open only to Latin American and Iberian Studies majors and minors.

LAMS 491  LATIN AMERICAN STUDIES CAPSTONE  3
Through intensive research and study of texts and artifacts on a single theme, students will integrate and focus their knowledge of Latin American cultures across several disciplines. Taught in Spanish. Crosslisted with SPAN491. PREREQ: SPAN326.

LATIN

LATN 101  ELEMENTARY LATIN I  3
Prepares students to read ancient Roman literary works in the original language. Emphasizes building a basic vocabulary and acquiring essential grammar. Discussion of Roman culture and civilization.

LATN 102  ELEMENTARY LATIN II  3
Completion of elementary Latin. PREREQ: LATN101 or equivalent. RESTRICTIONS: One year of high school Latin acceptable in lieu of prerequisite.

LATN 201  INTERMEDIATE LATIN PROSE  3
Introduction to reading Latin literature in the original language, focusing on the philosophical and forensic works of Cicero, the historical writings of Livy, and the letters of Pliny. PREREQ: LATN101 and LATN102 or equivalent.

LATN 202  INTERMEDIATE LATIN POETRY  3
Readings, in the original language, will be drawn from Vergil’s Aeneid as well as from the works of Ovid and Catullus. Attention will be given not only to review of grammar but also to the socio-political circumstances under which these works were composed. PREREQ: LATN201 or equivalent. RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LATN 221</td>
<td>Roman Letters</td>
<td>3</td>
<td>Explores the letter as a literary form in the Roman world. Readings from the letters of Cicero and Pliny.</td>
</tr>
<tr>
<td></td>
<td>PREREQ: LATN214</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LATN 222</td>
<td>Historians of the Republic</td>
<td>3</td>
<td>Selected readings from the works of Livy, Sallust and Cornelius Nepos.</td>
</tr>
<tr>
<td></td>
<td>PREREQ: LATN214</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LATN 301</td>
<td>Advanced Intermediate Latin Prose</td>
<td>3</td>
<td>Focuses on the works (in the original language) of one or more prose authors with particular attention to interpretive issues such as themes and contemporary intellectual and cultural milieu. Readings drawn from the philosophical, historical, and oratorical works of authors such as Tacitus, Pliny the Elder, Pliny the Younger, Caesar, Cicero, Sallust, and Seneca in rotation or in combination.</td>
</tr>
<tr>
<td></td>
<td>PREREQ: LATN202 or equivalent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LATN 302</td>
<td>Advanced Intermediate Latin Poetry</td>
<td>3</td>
<td>Focus on the works (in the original Latin) of one or more poets with particular attention to interpretive issues such as themes and contemporary intellectual and cultural milieu. Readings will be drawn from authors such as Lucretius, Tibullus, Propertius, Ovid, Virgil, Ennius, Catullus, Plautus, Terence, and Seneca in rotation and/or in combination.</td>
</tr>
<tr>
<td></td>
<td>PREREQ: LATN202 or equivalent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LATN 366</td>
<td>Independent Study</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>LATN 401</td>
<td>Advanced Latin Prose</td>
<td>3</td>
<td>Focuses on the works (in the original language) of one or more prose authors with particular attention to interpretive issues such as themes and contemporary intellectual and cultural milieu. Readings drawn from the philosophical, historical, and oratorical works of authors such as Tacitus, Pliny the Elder, Pliny the Younger, Caesar, Cicero, Sallust, and Seneca in rotation or in combination.</td>
</tr>
<tr>
<td></td>
<td>PREREQ: LATN301 and LATN302 or equivalent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LATN 402</td>
<td>Advanced Latin Poetry</td>
<td>3</td>
<td>Focus on the works (in the original Latin) of one or more poets with particular attention to interpretive issues such as themes and contemporary intellectual and cultural milieu. Readings will be drawn from work of poets such as Lucretius, Virgil, Terence, Plautus, Catullus, Ennius, Propertius, Seneca, and Tibullus in rotation and/or combination.</td>
</tr>
<tr>
<td></td>
<td>PREREQ: LATN301 and LATN302 or equivalent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LATN 403</td>
<td>Roman Lyric Poetry</td>
<td>3</td>
<td>Readings in the lyric poetry of Catullus and Horace.</td>
</tr>
<tr>
<td></td>
<td>PREREQ: LATN214</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LATN 466</td>
<td>Independent Study</td>
<td>1-3</td>
<td></td>
</tr>
</tbody>
</table>

**LEAD 100** LEADERSHIP, INTEGRITY AND CHANGE  3
Introduces students to the challenges of leadership. An experiential practice-based change project will give students hands-on experience in applying the skills and practices of effective leadership to create positive change.

**LEAD 101** GLOBAL CONTEXTS FOR LEADERSHIP  3
Understanding a variety of issues and problems that impact quality of life of individuals and groups and demand effective leadership in global contexts.

**LEAD 110** PERSPECTIVES ON LEADERSHIP  1-3
Overview of leadership as an academic discipline and a field of practice. Topics include exploration of career paths, resources for academic success, and opportunities for leadership development. Emphasis on individual and team skills for problem solving.

RESTRICTIONS: Priority given to freshmen.

**LEAD 125** DOLLARS AND SENSE  3
An overview of the concepts and skills in personal financial management, including an understanding of how leaders impact the financial environment of individuals, families and communities. Topics include developing financial goals, budgeting, debt, savings, retirement planning and investing in insurance, stocks, bonds, and mutual funds.

**LEAD 200** THE LEADERSHIP CHALLENGE  3
Introduces students to the challenge of leadership in an increasingly complex, global, and fast-paced world. Provides theoretical bases of leadership while encouraging students to develop their own leadership potential.

**LEAD 209** PRESENTATION STRATEGIES  3
Methods for delivering leadership messages and for developing strategic presentations, with an emphasis on purpose, vision, audience and formats.

**LEAD 268** UNDERGRADUATE RESEARCH  1-3
Undergraduate research conducted on or off campus, out of class, and under the supervision of a LEAD faculty member. Students must keep a log of activities, meet regularly with their faculty sponsor, and submit a final report. One credit requires a minimum of 40 hours of research.

RESTRICTIONS: Permission of instructor required.

**LEAD 300** LEADERSHIP, CREATIVITY, AND INNOVATION  3
Provides students with the theoretical bases of leadership, creativity, and innovation that inform the effective practice of leadership.

**LEAD 337** POLI COMM LECTURE SERIES  1 PF
This lecture series focuses on various thematic issues in political communication and campaign politics to highlight the University of Delaware’s place at the epicenter of politics. The lectures are given by UD scholars and national political practitioners in a variety of fields. Crosslisted with COMM337.

**LEAD 340** LEADERSHIP INTERNSHIP  3-6
An off-campus supervised and coordinated field study in selected agencies and organizations.

PREREQ: LEAD100 RESTRICTIONS: May be repeated once for credit. Requires permission of instructor.

**LEAD 341** DECISION-MAKING AND LEADERSHIP  3
The application of different decision-making tools and models for making effective decisions in a leadership context.

PREREQ: LEAD100

**LEAD 366** INDEPENDENT STUDY  1-6

**LEAD 390** TEACHING ASSISTANT  1-3 PF
Practical teaching experience. Students participate and assist in instruction of an undergraduate LEAD course. Students must work 28 hours for each credit hour.

RESTRICTIONS: Must have a 3.0 GPA, have completed the course for which they assist in good standing, and be available the entire semester. Permission of instructor required.

**LEAD 400** LEADERSHIP FOR THE COMMON GOOD  3
Direct action organizing, coalition building, consensus organizing as strategies for mobilizing people to create positive change. Emphasis on social responsibility, sustainability, collaborations, and multisector interactions.

PREREQ: LEAD100, LEAD101.

**LEAD 404** LEADERSHIP IN ORGANIZATIONS  3
Building the capability of organizations to develop and operationalize leadership capacity at all levels of an organization. Concepts and theories of organizational effectiveness studied relate to impacts of structure, culture, and other characteristics upon an organization’s ability to unleash leadership potential.

PREREQ: LEAD100

**LEAD 411** TOPICS IN LEADERSHIP DYNAMICS  1-6
Topics relating to aspects of leadership. Themes in leadership dynamics will be explored.

PREREQ: LEAD100 RESTRICTIONS: This course may be taken more than once for a maximum of 6 credits.

**LEAD 419** POLICY LEADERSHIP AND ETHICS  3
Advanced examination of the theory and practice of leadership in public policy, specifically emphasizing ethical issues and implications with and between multiple sectors. Crosslisted with UAPP419.

**LEAD 451** LEADERSHIP FOR SUSTAINABILITY  3
Theoretical foundations, practical challenges and innovations for engaging and fostering sustainability - economic, social, and environmental. Integration with leadership theory and practice, specifically aimed at developing the sustainability leader.

PREREQ: LEAD100 or permission of instructor.

**LEAD 466** INDEPENDENT STUDY  1-6
LEAD 468 UNDERGRADUATE RESEARCH 1-3
Undergraduate research conducted on or off campus, out of class, and under the supervision of a LEAD faculty member. Students must keep a log of activities, meet regularly with their faculty sponsor, and submit a final report. One credit requires a minimum of 40 hours of research.

LEAD 490 SENIOR CAPSTONE 3
Engage in a project addressing "real world" leadership challenges. Successful project completion requires integration, synthesis and reflection upon knowledge and skills acquired in previous courses. Specific projects vary by semester.
PREREQ: LEAD100, LEAD341. RESTRICTIONS: Open to senior LEAD majors only.

LEGAL STUDIES

LEST 210 THE LAW AND YOU 1 PF
Provides an opportunity for students to learn more about how the law affects them directly. Prominent guest speakers cover current issues relating to the law, how it operates and how it may affect students and other members of the university community.

LEST 301 INTRODUCTION TO LEGAL STUDIES 3
Introduces legal studies as a multidisciplinary field.
May be crosslisted with CRJU301.

LEST 345 LEGAL ISSUES OF THE MASS MEDIA 3
Survey of legal issues affecting the development and performance of the mass media. The foundation of American communications law outlined through the study of First Amendment theory, its origin and development. Legal issues concerning libel, obscenity, copyright and broadcast regulation discussed.
Crosslisted with COMM345.

LEST 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.
Crosslisted with POSC380.

LEST 401 SENIOR SEMINAR 3
Culminates the legal studies minor by requiring an independent research project resulting in a term paper. Seminar focuses on a specific substantive issue, provides guidance from professor and chance to share ideas and problems with fellow students.
May be crosslisted with CRJU401, SOCI401.

LEST 408 ECONOMICS OF LAW 3
Effect of legal rules on resource allocation both in and between the public and private sectors. Considers common law, regulation and constitutional rules.
Crosslisted with ECON408. PREREQ: One of ECON251, ECON255, or ECON300 or ECON301.

LEST 450 TOPICS IN ENVIRONMENTAL LAW 3
Overview of the legal process and environmental laws in order to understand policy issues and learn action processes in the environmental field.
Crosslisted with APEC450.

LEST 466 INDEPENDENT STUDY 1-6

LEST 475 SOCIAL SCIENCE AND THE LAW 3
Examines the relationship of social science to law and the legal process, how social science has contributed to our understanding of law, and how social science has been employed in litigation.
Crosslisted with CRJU475.

LEST 649 CIVIL RIGHTS LAW AND POLICY 3
Examines the origin and evolution of the laws and policies that govern the rights of African-Americans and other people of color in the United States. Examines emerging approaches to civil rights scholarship and considers the implications of the Supreme Court’s recent embrace of a conservative posture in civil rights issues.
Crosslisted with UAPP649.

LEST 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.
Crosslisted with MAST673. RESTRICTIONS: Requires permission of instructor.

LINGUISTICS

LING 101 INTRODUCTION TO LINGUISTICS I 3
Nature of language: structure of sounds, words, sentences, and meaning; relationships of language and society, culture, and thought. Emphasis is on language universals and variation both within and between languages, including non-Western and non-white varieties.
LING 102 LANGUAGE, MIND AND SOCIETY 3
Explores the interrelation between language, mind and society. Topics will vary depending on instructor, but may include: origins of language, impact of culture on language and thought, structural aspects of language variation and the mental representation of language, role of universal grammar in language learning, regional and social variation in language, sociolinguistics of multilingual/multiethnic communities, language change, and the role of language in social and political decision making.
May be crosslisted with CGSC102.

LING 201 LANGUAGES INVENTED FOR BOOKS AND FILM 3
Languages like Elvish, Klingon, and Na’vi were created to add depth, richness, and atmosphere to an imagined world. Examines such invented languages and asks what it takes for an invented language to be convincingly authentic.

LING 202 SCIENCE OF LANGUAGE 3
Extension of the study of linguistics begun in LING101. The focus is on formal, scientific aspects of linguistics, specifically articulatory phonetics and the IPA transcription system, phonology, morphology and syntax. The course examines linguistic phenomena in American English as well as other languages.
PREREQ: LING101.

LING 203 LANGUAGES OF THE WORLD 3
Survey of the world’s languages, examining a number of important phenomena from a wide range of languages. Phenomena are both structural (e.g., word order and agreement) and societal or psychological (how multicultural societies choose a common language, the relation between language and thought).
May be crosslisted with FLIT203.

LING 222 LANGUAGE AND GENDER 3
Explores various ways in which gender is reflected in language. Topics include sexism in language, sexist language and differences in the structural aspects of men’s and women’s language and conversational style. Emphasis on the social implications of these differences.
May be crosslisted with WOMS222.

LING 253 LABORATORY PHONETICS 3
Study of speech sounds, emphasizing the measurement of the acoustic signal. Introduction to acoustic phonetics, concentrating on the source-filter model of speech production. Computer laboratory projects in speech recording, digitization, analysis, variation, synthesis and perception.
PREREQ: LING101.

LING 265 STUDIES IN LANGUAGE 3
See http://primus.nss.udel.edu/CoursesSearch/ for topics.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 366 INDEPENDENT STUDY 1-6

LING 390 ENGLISH LINGUISTICS 3
General introduction to the study of the English language, with emphasis on modern linguistic approaches.
Crosslisted with ENGL390. PREREQ: ENGL110.

LING 401 HISTORICAL LINGUISTICS 3
Examines how languages evolve over time and how present and past languages are related to each other. Students learn techniques of historical analysis, such as the comparative method, and what is known about the historical development of major linguistic families like the Indo-European family of languages.
May be crosslisted with FLIT401. PREREQ: LING101.

LING 403 INTRODUCTION TO PHONOLOGY 3
Introduction to phonological theory and analysis, concentrating on principles of articulatory phonetics, the IPA transcription system, distinctive feature theory, phonological analysis, and phonological rules.

LING 404 STRUCTURE OF LANGUAGE 3
Introduction to the Structure of Language, concentrating on morphology and syntax. Analysis and theories of how morphemes and words are put together to create larger and larger units.
PREREQ: Ling 101
LING 418   MEANING AND LANGUAGE USE  
Introduction to theories of meaning based on the notion of truth and their application to language use. May be crosslisted with CGSC418, PHIL418. PREREQ: LING101.

LING 421   METHODS OF TEACHING FOREIGN LANGUAGES  
Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science. Includes demonstrations and practical exercises. Crosslisted with FLTL421.

LING 422   LANGUAGE SYLLABUS DESIGN  
Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, notion-functional and task-based approaches. Topics: materials development, textbook evaluation and adaptation, design and implementation of learning units for second-language special purpose and bilingual learners. Includes faculty supervised 25 hours of observation in high school classrooms. Crosslisted with FLTL422.

LING 424   SECOND LANGUAGE TESTING  
Study of the principles and techniques of second-language testing, including measurement of the four skills and of communicative competence. Bilingual measures. Practice in item construction and analysis. Crosslisted with FLTL424.

LING 433   INTRODUCTION TO ACOUSTIC PHONETICS  
Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily lecture format with assigned text, a few laboratory sessions provide an introduction to computer-based methods used in instrumental studies of speech. Crosslisted with CGSC433. PREREQ: LING253.

LING 444   FIRST LANGUAGE DEVELOPMENT  
Explores how humans acquire a language in infancy: innate versus environmental factors; the development of grammatical competence and its relation to cognitive and communicative development; cultural and societal influences; development disorders. PREREQ: LING101.

LING 451   LOGICAL STRUCTURES IN LANGUAGE  
Prior mathematics knowledge not assumed. Mathematical introduction to phonology, syntax, and semantics. Elementary material on logic, sets, functions, relations, and trees. PREREQ: LING101.

LING 455   COMPUTATIONAL LINGUISTICS  
Natural language can be studied from a computational perspective. Course content includes aspects of formal language theory, model theory, formal grammars, computational complexity, and computational learning theory as it pertains to natural language syntax, semantics, morphology, and phonology. May be crosslisted with CGSC455. PREREQ: LING101.

LING 462   LANGUAGE ACQUISITION  
The factors which distinguish human language from animal communication, as well as the development of many facets of language (semantics, syntax and phonology). To supplement reading and discussion, students gain research experience by working approximately eight hours per week on the on-going language acquisition projects. Crosslisted with EDUC462.

LING 466   INDEPENDENT STUDY  
1-3

LING 471   DISCOVERING HUMAN LANGUAGE  
Introduction to field linguistics. Examines how languages are put together through a face-to-face encounter with an unknown language. Determine how this language - and human language in general - is constructed. Explores culture, people and even the food where the language is spoken. May be crosslisted with CGSC471. PREREQ: LING101.

LING 472   TEACHING ENGLISH AS A SECOND LANGUAGE  
Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English; and devising and presenting lesson plans. Crosslisted with EDUC472. RESTRICTIONS: Open only to students in the Cognitive Science major, Elementary Teacher Education major, Linguistics major, or by permission of instructor.

LING 476   SECOND LANGUAGE ACQUISITION AND BILINGUALISM  

LING 477   THE STRUCTURE OF ENGLISH  
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). May be crosslisted with EDUC477, ENGL477. PREREQ: LING101.

LING 481   SOCIOLINGUISTICS  
Interface between language and contemporary society: theories, research and analytical methods. Topics include: language and culture; language planning and policy development in education and the Official English movement; technology and communication; language attitudes; self-identity and naming; linguistic strategies in advertising and the language of compliments, among others. PREREQ: LING101. RESTRICTIONS: Restricted to Junior and Senior CGSC Majors/Minors and LING Minors.

LING 496   PSYCHOUGUISHISTICS  
Linguistic approaches to cognition. Issues in the relation of language to thought, universals, language acquisition, and theories of syntactic and semantic processing. Crosslisted with CGSC496. PREREQ: LING101.

LING 499   ISSUES IN TEACHING ENGLISH LANGUAGE LEARNERS  
Addresses theoretical and instructional issues related to teaching English Language Learners (ELLs). Topics include issues in bilingual education, theories of L2 acquisition, ELL educational models, integrating language and content instruction, documentation and assessment of ELL skills, and understanding cultural diversity.

LING 601   HISTORICAL LINGUISTICS  
Examines how languages evolve over time and how present and past languages are related to each other. Students learn techniques of historical analysis, such as the comparative method, and what is known about the historical development of major linguistic families like the Indo-European family of languages. May be crosslisted with FLTL601.

LING 603   INTRODUCTION TO PHONOLOGY  
Basic introduction to phonology, concentrating on principles of articulatory phonetics, the IPA transcription system, distinctive feature theory, phonological analysis, and phonological rules.

LING 604   STRUCTURE OF LANGUAGE  
Introduction to the Structure of Language, concentrating on morphology and syntax. Analysis and theories of how morphemes and words are put together to create larger and larger units.

LING 607   PHONOLOGY I  
Basic introduction to phonology, concentrating on principles of articulatory phonetics, IPA transcription system, distinctive feature theory, segmental phonological analysis and the writing of phonological rules.

LING 608   PHONOLOGY II  
Continuation of LING607. More advanced phonological analysis and rule writing. Introduction to recent developments in nonsegmental phonology: autosegmental, metrical and prosodic theories. PREREQ: LING607

LING 609   SYNTAX I  
Introduction to syntactic theory and analysis. Emphasis on argumentation and analysis rather than on the fine points of syntactic theory.

LING 610   SYNTAX II  
Continuation of LING609. More advanced analysis of syntactic structures. Attention given to the theory of Principles and Parameters and to principles of universal grammar. PREREQ: LING609

LING 612   INTRODUCTION TO MORPHOLOGY  
Introduces major types of morphological phenomena, their analysis and current theoretical approaches to handling them. PREREQ: LING607

LING 618   MEANING AND LANGUAGE USE  
A graduate introduction to theories of meaning based on the notion of truth and their application to language use. May be crosslisted with CGSC618.

LING 621   METHODS OF TEACHING FOREIGN LANGUAGES  
Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science. Includes demonstrations and practical exercises. Crosslisted with FLTL621.
LING 622  LANGUAGE SYLLABUS DESIGN  3  Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, notional-functional, and task-based approaches. Topics: materials development, textbook evaluation and adaptation, design and implementation of learning units for second-language special purpose and bilingual learners. Crosslisted with FLIT622.

LING 624  SECOND LANGUAGE TESTING  3  Study of the principles and techniques of second-language testing, including measurement of the four skills and of communicative competence. Bilingual measures. Practice in item construction and analysis. Crosslisted with FLIT624.

LING 644  FIRST LANGUAGE DEVELOPMENT  3  Explores how humans acquire a language in infancy: innate versus environmental factors; the development of grammatical competence and its relation to cognitive and communicative development; cultural and societal influences; development disorders.

LING 651  LOGICAL STRUCTURES IN LANGUAGE  3  Prior mathematics knowledge not assumed. Mathematical introduction to phonology, syntax, and semantics. Elementary and advanced material on logic, sets, functions, relations, and trees.

LING 655  COMPUTATIONAL LINGUISTICS  3  Natural language can be studied from a computational perspective. Course content includes aspects of formal language theory, model theory, formal grammars, computational complexity, and computational learning theory as it pertains to natural language syntax, semantics, morphology, and phonology. May be crosslisted with CGSC655.

LING 671  DISCOVERING HUMAN LANGUAGE  3  Introduction to field linguistics. Examines how languages are put together through a face-to-face encounter with an unknown language. Determine how this language - and human language in general - is constructed. Explores culture, people and even the food where the language is spoken. May be crosslisted with CGSC671.

LING 672  TEACHING ENGLISH AS A SECOND LANGUAGE  3  Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English; and devising and presenting lesson plans. Crosslisted with EDUC672.

LING 675  LANGUAGE ACQUISITION  4  Examines the factors which distinguish human language from animal communication as well as the development of many facets of language (semantics, syntax and phonology). Main emphasis on how children in the first three years acquire language. Crosslisted with EDUC675.

LING 676  SECOND LANGUAGE ACQUISITION AND BILINGUALISM  3  Psycholinguistic, sociolinguistic and neurolinguistic approaches to Second Language Acquisition (SLA). General models of first and second language learning, SLA within bilingual education programs. The linguistic, psychological and social experiences of the bilingual. Bilingual instruction and models of bilingual education. May be crosslisted with EDUC676.

LING 677  THE STRUCTURE OF ENGLISH  3  Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish). May be crosslisted with EDUC677, ENGL677.

LING 680  SOCIOLINGUISTICS  3  Interface between language and contemporary society: theories, research and analytical methods. Topics include: language and culture; language planning and policy development in education and the Offical English movement; technology and communication; language attitudes; self-identity and naming; linguistic strategies in advertising and the language of compliments, among others.

LING 691  SEMANTICS I  3  Introduction to linguistic theories of meaning. Survey of the semantic issues in reference, ambiguity, presupposition and implicature. Selected linguistic phenomena (e.g., tense, aspect, predication and thematic roles). Some elements of formal semantics.

LING 696  PSYCHOLINGUISTICS  3  Study of linguistic approaches to cognition. Issues in the relation of language to thought: universals, language acquisition and theories of syntactic and semantic processing. Crosslisted with CGSC696.

LING 699  ISSUES IN TEACHING ENGLISH LANGUAGE LEARNERS  3  Addresses theoretical and instructional issues related to teaching English Language Learner (ELL) students. Topics include issues in bilingual education, theories of L2 acquisition, methods of teaching ELLs, L2 testing, educational models, integrating language and content instruction, documentation and assessment of ELL skills, and role of cultural diversity in classrooms.

LING 801  LINGUISTIC TYPOLOGY  3  Introduction to the concerns of linguistic typology and the study of language universals and language documentation. COREQ: LING607, LING609

LING 802  SPECIAL TOPICS IN OLD & MIDDLE ENGLISH  3  A study of the English language either from before 1100 or between 1100 and 1400 with selected readings in Old or Middle English poetry and prose. Crosslisted with ENGL802. RESTRICTIONS: May be repeated once for credit when topics vary.

LING 830  SYNTAX III  3  In-depth investigation of syntactic universals and recent developments in the theory of syntax. PREREQ: LING610. RESTRICTIONS: May be repeated for credit when topics vary.

LING 831  TOPICS IN SYNTAX  3  Current topics in syntactic theory, problems in the syntactic analysis of specific languages. PREREQ: LING830. RESTRICTIONS: May be repeated for credit when topics vary.

LING 832  THE ACQUISITION OF SYNTAX  3  Current issues in the acquisition of syntax, such as: relationship between UG and specific language grammars, parameter setting model in L1 acquisition, effect of input frequency, methods for assessing children’s syntax. PREREQ: Syntax I and II, or concurrent enrollment in Syntax II

LING 848  SEMINAR IN LANGUAGE DEVELOPMENT  3  Covers aspects of semantic, syntactic and phonological development through examination of current research and theory in the field. Treats educational implications of language development. Crosslisted with EDUC848.

LING 851  LINGUISTIC FIELD METHODS  3  Development of skills and techniques in various kinds of field analysis. Use of native informants. Discussion of the relationship between data collecting and grammatical statement.

LING 855  ADVANCED COMPUTATIONAL LINGUISTICS  3  This is an advanced course in computational linguistics addressing advanced topics in formal language theory, model theory, formal grammars, computational complexity, and computational learning theory as it pertains to natural language syntax, semantics, morphology, and phonology. May be crosslisted with CGSC855. PREREQ: LING655, CGSC655, or permission of instructor.

LING 861  TOPICS IN PHONOLOGY  3  Detailed examination of one or more current (controversial) issues in phonological theory. PREREQ: LING608. RESTRICTIONS: May be repeated for credit when topics vary.

LING 862  ACQUISITION OF PHONOLOGY  3  Development of phonology in normal children from babbling stage through acquisition of phonemes and basic phonological rules of a language. Examination of data from a variety of languages, focusing on language: specific and universal phenomena. PREREQ: LING608

LING 863  PROJECTS IN ACOUSTIC PHONETICS  3  Brief review of the articulatory, acoustic, and perceptual characteristics of speech and computer-based laboratory instrumentation. Students conduct research projects in acoustic phonetics, speech analysis, or speech synthesis. Projects will be suggested by the instructor, however, students may (with instructor’s approval) choose a project of their own design.

LING 890  STUDIES IN LINGUISTICS  3 9  Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing. May be crosslisted with CGSC890, ENGL890. RESTRICTIONS: May be repeated for credit when topics vary.
### LING 892  READINGS IN LINGUISTICS 0 PF
Meetings for working groups in linguistics to discuss readings, present current research, and discuss new research directions.

### LING 895  COLLOQUIUM 0 PF
A series of talks by invited speakers in Linguistics and Cognitive Science.

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

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

### MALS 621  WHEN CULTURES MEET 3
Seeks an understanding of the dynamics that occur when one culture comes into contact with another. Examples include the arrival of a new group in a previously homogeneous culture, immigration, racial or ethnic profiling, and cultural assimilation.

### MALS 622  INTERPRETING THE PAST 3
Applies a variety of interdisciplinary perspectives, e.g., archaeology, anthropology, history, literature, philosophy, and religion to explain how and what we learn about the past.

### MALS 624  WRITING IN LIBERAL STUDIES 3
Provides instruction and practice in the various kinds of writing students may wish to do in the course of the MALS program and beyond. Focuses on one or more specific genres, such as the writing of poetry, fiction, memoirs, or research papers.

### MALS 625  FILM AND SOCIETY 3
Explores the ways in which films produced within one or more cultures or time periods both reflect and help to shape their social and historical backgrounds. May include the making of films that include this social/historical perspective. May be repeated twice when topics vary.

### MALS 626  STUDIES IN CONTEMPORARY CULTURE 3
Addresses contemporary problems and movements from a multidisciplinary perspective. Examples include artistic, literary, or sociological movements; religious or ethical questions; and political or global issues.

**Restrictions:** May be taken twice when topics vary.

### MALS 627  STUDIES IN MATERIAL CULTURE 3
Examines the use and development of artifacts and their impact on culture and society. Examples include the history and importance of such objects as cuisine and textiles; and the use of artifacts to understand the past, the belief systems of different cultures, and social evolution.

### MALS 628  TEXTS IN TIME AND CONTEXT 3
A multidisciplinary interpretation of print and/or nonprint texts within the cultures of specific periods -- e.g., the Renaissance, the Jazz Age, or the 1960s. Texts may reflect historical, literary, philosophical, religious, political, sociological, scientific, or other perspectives.

### MALS 630  HUMAN RIGHTS AND LIBERTIES 3
Explores such topics as intellectual freedom, free speech, freedom of religion, criminal justice, political systems, and philosophical or religious interpretations of inherent human rights.

### MALS 648  ENVIRONMENTAL ETHICS 3
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format. Crosslisted with PHIL648.

### MALS 660  ON BECOMING HUMAN 3
Examines the biological and cultural evolution of humans, focusing on similarities and differences between humans and our closest primate relatives.

### MALS 800  RESEARCH SEMINAR 3
Students who elect not to do a thesis (MALS869) or project (MALS879) take this course to fulfill their MALS research requirement. Each section of this course will focus on a broad area of study within which students will write substantial research papers.

**Restrictions:** Completion of 27 credits of coursework toward the MALS degree. Students may take the last 3 of the required 27 credits of MALS coursework concurrently with the Research Seminar.

### MALS 869  MASTER’S THESIS 1-6
**Restrictions:** Open only to matriculated MALS students who have completed 24 hours of coursework toward the degree with a cumulative grade point average of 3.0 or higher.

### MALS 879  PROJECT 1-6
**Restrictions:** Open only to matriculated MALS students who have completed 24 hours of coursework toward the degree with a cumulative grade point average of 3.0 or higher.
MARINE STUDIES

MAST 100 MARINE SCIENCE COLLOQUIUM I 2
Broad introduction to academic life at the University of Delaware and the breadth of contemporary marine science research conducted in the field; core aspects of biological, physical, chemical and geological marine science; and introduces potential research and career tracks.

MAST 101 MARINE SCIENCE COLLOQUIUM II 1
Continues the first year seminar series in Marine Science. Themes include an exploration of non-academic career tracks, introductory readings of hot-topics in marine science, and a submit on horseshoe crab biology, culminating in an evening spawing survey on one of the Delaware Bay beaches, or other field experience.

MAST 120 LIFE’S BEACH: GEOLOGICAL PROCESSES & LIVING WITH THE COAS 3
Introduction to geology of the coast. "Reading" beaches by geological phenomenon and physical processes. Historical and contemporary analysis of how populations have chosen to live with or against the natural dictates of the shore with costly and tragic consequences. One-day field trip required.

MAST 200 THE OCEANS 3
Integrates physical, chemical, geological and biological principles into an overview that addresses why and how the oceans work. Draws heavily on current ocean issues to illustrate marine science principles and problems.

MAST 201 MARINE SCIENCE COLLOQUIUM III 1
Builds on previous colloquia in Marine Science. Course themes include a submit on pursuing internships and research, discussions of current topics in Marine Science and working with datasets from marine research.

MAST 215 FULL OF HOT AIR UNDERSTAND CLIMATE CHG 3
Understanding climate and climate change is important for everyone. Explores climate change and its impacts at local, regional, and global levels. Policy and decision making, as well as adaptation and mitigation will be discussed with a focus on current events.

MAST 231 MARINE SCIENCE SEMINAR 1
The final Marine Science Colloquium which focuses on the next steps beyond the undergraduate degree, including pursuit of graduate school opportunities, networking for jobs, resumes, CVs and cover letters. Includes student-led discussions of peer-reviewed literature.

MAST 234 COMPARATIVE TERRESTRIAL AND MARINE ECOSYSTEMS 3
Comparative overview of similarities and dissimilarities of life in terrestrial and marine environments. Topics include geological history, subsistence, growth and development, life history, reproduction, dispersal, population regulation, and impact of humans.

MAST 340 MARINE SCIENCE 3
Understanding the earth's climate and how the climate is changing is a fundamental part of modern earth system science. Explores the scientific basis for the study of climate and climate change, including long term and modern change, with a discussion of current topics.

MAST 366 INDEPENDENT STUDY 1-6

MAST 382 INTRODUCTION TO OCEAN SCIENCES 3
This is a quantitative introduction to sub-fields within ocean sciences including marine geology, marine chemistry, ocean physics, coastal oceanography and marine biology. An introduction to the major for Marine Sciences and an in-depth overview for those with a minor or concentration in Marine Science.

MAST 402 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.

MAST 407 RESEARCH EXPERIENCE IN BIODIVERSITY 4
Hands-on experience in marine science research, from hypothesis development through field and laboratory data collection, analysis, and presentation of results. Research questions centered on physical and biological aspects of coastal biodiversity. Recommended for Lewes Semester in Residence students.

MAST 408 HEAT AND LIGHT IN NATURE - RADIATIVE TRANSFER 3
The energetic interaction of sunlight with the atmosphere and oceans influences the entire earth system. Examines the theory of radiative transfer within the ocean and atmosphere, and then explores several areas of applicable research including climate modeling and remote sensing.

MAST 409 THE OCEAN & CLIMATE VARIATION 3
Study of the ocean-atmosphere system; the fluxes of heat, water and energy in the ocean and interchanges with the atmosphere; budgets and mechanisms of exchange; and interannual and long-term climate variations as related to the ocean.

MAST 410 SCIENTIFIC DIVING 3
Introduction to scientific SCUBA diving techniques. Completion of will certify the student as an American Academy of Underwater Sciences (AAUS) Scientific Diver and allow eligibility to participate in UD diving projects with reciprocity with other universities and government agencies.

MAST 413 METEOROLOGICAL PROCESSES FOR WIND ENERGY 3
Explores the fundamental concepts of meteorology that are needed to understand onshore, offshore, and airborne wind energy. Topics include: forces affecting winds; terrain and land-use effects; air turbulence; numerical modeling; wind power and energy from turbines; and wind measurement technologies.

MAST 415 METEOROLOGIC PROCESSES IN AIR POLLUTION 3
An introduction to meteorological processes that affect air pollution, such as diffusion, atmospheric stability, and turbulence, with a focus on the atmospheric boundary layer.

MAST 416 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.

MAST 421 COASTAL FIELD BIOLOGY 3
Hands-on study of estuarine and coastal communities with emphasis on patchiness in time and space. Instruction in field techniques as well as analysis and presentation of data. Experience in scientific writing.

MAST 426 ADVANCED ATMOSPHERIC DYNAMICS 3
Part 2 of Atmospheric Dynamics (GEOL 423/623). Topics include Boussinesq approximation, Vorticity dynamics, Kelvin’s circulation theorem; Vorticity equation; Wave theory; Surface and internal gravity waves; and Geophysical fluid dynamics. Crosslisted with GEOG426.

MAST 427 MARINE BIOLOGY 3
Ecologically-oriented study of biological oceanography and marine biology. Emphasis on food web dynamics, nutrient cycles, and ecophysiology in the open oceans, benthos, coral reefs and hydrothermal vents. Topics include coastal eutrophication, overfishing, role of marine organisms and the oceans in climate change.

MAST 428 OFFSHORE WIND POWER: SCIENCE, ENG & POL 3
Integrates multiple disciplines required to understand, plan, regulate and develop offshore wind resources for large-scale power production. Offshore wind is emerging as a critical technology for large CO2 reductions because the technology is available, proven, and cost-competitive, and the resource near population centers.

MAST 429 UNIVERSITY OF DELAWARE COURSE CATALOG (AS OF 7/24/15) ANTICIPATING FALL-2015
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAST 437</td>
<td>GEOLOGICAL OCEANOGRAPHY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>MAST 439</td>
<td>RENEWABLE ENERGY &amp; CLIMATE: LAW &amp; REG</td>
<td>1-3</td>
</tr>
<tr>
<td></td>
<td>This course is an introduction to US laws and regulations pertaining to greenhouse gases and the generation, transmission, and integration of renewable energy into the electrical, transportation and building heat systems. The course primarily draws on judicial opinions but also considers technical and scientific sources. RESTRICTIONS: Freshman and Sophomores may only register with permission from instructor.</td>
<td></td>
</tr>
<tr>
<td>MAST 441</td>
<td>ALGAL ECOLOGICAL PHYSIOLOGY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>The cellular physiology of marine algae with a focus on the phytoplankton in today's ocean. Emphasis on a range of issues from photosynthesis, nutrient dynamics, and primary production to community dynamics such as seasonal succession and competition among different marine algae.</td>
<td></td>
</tr>
<tr>
<td>MAST 442</td>
<td>ECOLOGY AND EVOLUTION OF CORAL REEFS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>The ecology of reef building corals and coral reef environments are addressed, with an emphasis on control of species diversity and community dynamics, as well as physiological aspects of reproduction, symbioses, and calcification. The geological development of different reefs through time, reticulate evolution, and current policy issues related to human development and reef management are also introduced.</td>
<td></td>
</tr>
<tr>
<td>MAST 443</td>
<td>FIELD STUDIES CORAL REEF ENVIRONMENTS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>The geology, ecology, evolution of coral reef environments are addressed in a field setting. An integrated approach of classroom instruction and theory will complement hands on observation, sampling, and experimentation in the field. Larger issues of climate change and human pressures will also be examined.</td>
<td></td>
</tr>
<tr>
<td>MAST 451</td>
<td>MARINE INVERTEBRATE BIODIVERSITY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Overview of marine invertebrate structure and function physiology, development and life history, and ecology within the context of their evolutionary origins and phylogeny. Appreciation of their biodiversity and significance in marine ecosystems. Special attention to systematics and taxonomy of important groups and local fauna.</td>
<td></td>
</tr>
<tr>
<td>MAST 455</td>
<td>GEOPHYSICAL FLUID DYNAMICS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Development of the fundamental fluid dynamics used in analyzing flows in physical oceanography and meteorology. Fundamentals of vorticity dynamics and geostrophy, inviscid theory of Rossby waves, and Ekman boundary layers.</td>
<td></td>
</tr>
<tr>
<td>MAST 457</td>
<td>NUMERICAL WEATHER PREDICTION</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduces students to the basic numerical techniques used in current models to predicting and/or simulating weather. Topics include: conservation equations of the atmosphere (momentum, energy, mass); numerical methods of solution (finite difference schemes, time splitting); boundary and initial conditions; coordinate systems (horizontal, vertical, staggering); parameterization schemes (turbulence, radiation, moist physics); and model application and evaluation. Particular emphasis will be placed on the Weather Research and Forecasting (WRF) model. Students will learn to run the WRF model and use it as a benchmark for testing and applying the techniques learned in class. Crosslisted with GEOG457. PREREQ: GEOG405, MATH243, MATH302, GEOG423.</td>
<td></td>
</tr>
<tr>
<td>MAST 458</td>
<td>PALEOClimatology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Covers the factors that cause natural variations in Earth's climate on different time scales, focusing on biotic, geologic, and geochemical records. Includes discussion of changing continental configurations, atmospheric greenhouse gas levels, and the Earth-Sun geometry on ocean circulation and climate change. Crosslisted with GEOG458.</td>
<td></td>
</tr>
<tr>
<td>MAST 462</td>
<td>CLIMATE CHANGE: POLICY, EQUITY AND MITIGATION</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Focuses on climate change equity, international compliance mechanisms, and US initiatives. It is designed for graduate students and advanced undergraduates who seek to gain substantive understanding of climate change policy and the means, impediments and opportunities to reaching resolution of complex international questions. May be crosslisted with POSC462, UAPP465.</td>
<td></td>
</tr>
<tr>
<td>MAST 464</td>
<td>MARINE SCIENCE SUMMER INTERNSHIP</td>
<td>1-3</td>
</tr>
<tr>
<td></td>
<td>Students design a research project with an advisor and present it to peers, advisors and course instructor.</td>
<td></td>
</tr>
<tr>
<td>MAST 466</td>
<td>INDEPENDENT STUDY</td>
<td>1-3</td>
</tr>
<tr>
<td>MAST 468</td>
<td>UNDERGRADUATE RESEARCH</td>
<td>1-6</td>
</tr>
<tr>
<td>MAST 484</td>
<td>ELECTRIC VEHICLES AND THE GRID</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>This seminar covers design of electric vehicles and charging infrastructure, existing and needed policies, consumer perspective on electric vehicles, and the use of electric vehicles for grid services, including leveling variable generation. May be crosslisted with ELEG498. PREREQ: Students must have had basic physics or engineering in order to understand relationships among voltage, current, resistance, and power.</td>
<td></td>
</tr>
<tr>
<td>MAST 492</td>
<td>MARINE ENVIRONMENTAL STUDIES</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Examines the science behind contemporary issues in coastal and marine systems, with emphasis placed on environmental problem solving. Explore how science is practiced to address regional and global topics of concern, including marine pollution, managing shorelines, sustaining ecosystems, and living with climate change. Practical skills in synthesizing scientific literature, data analysis, and public speaking. PREREQ: MAST482.</td>
<td></td>
</tr>
<tr>
<td>MAST 497</td>
<td>BIOINFORMATICS PROGRAMMING FOR BIOLOGISTS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Basic PERL programming for biologists doing bioinformatics research with no experience in computer programming. Teaches PERL syntax enabling editing and trouble-shooting existing PERL programs/modules without writing new programs/scripts. Uses Biowulf parallel computing cluster at DBI. Goal is proficiency with computers from command-line, unix-based, terminal interface.</td>
<td></td>
</tr>
<tr>
<td>MAST 498</td>
<td>ENVIRONMENTAL AND SYSTEMS BIOINFORMATICS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Teaches bioinformatic methods used to link genomic/proteomic sequence features to mechanisms of environmental adaptations or metabolic systems organization. For graduate students and advanced undergraduates applying basic informatic approaches/computational tools to research. Expectation of some programming experience. Computational tools include: PERL, PYTHON, R, and MatLab.</td>
<td></td>
</tr>
<tr>
<td>MAST 601</td>
<td>INTRODUCTION TO OCEANOGRAPHY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Topics include the geology and history of the ocean floor, oceanic sediments, the physics of the marine environment and the oceanic circulation, chemical processes in the ocean, and biological processes and production in the oceans. RESTRICTIONS: For non-oceanographers. Requires graduate status.</td>
<td></td>
</tr>
<tr>
<td>MAST 602</td>
<td>PHYSICAL OCEANOGRAPHY</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Geographic and hydrodynamic aspects of oceanography. The geography of ocean basins; physical properties of seawater; radiation; and observed distributions of temperature, salinity, oxygen and currents. Scalar and vector fields; hydrostatics; kinematics, momentum dynamics, vorticity dynamics, viscous flow and eddy flux. RESTRICTIONS: Requires permission of instructor.</td>
<td></td>
</tr>
<tr>
<td>MAST 604</td>
<td>ENVIRONMENTAL DATA MANAGEMENT</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Emphasizes the use of remotely sensed data for research and management of coastal resources. Environmental issues and data requirements are discussed. Case studies illustrate the use of Geographic Information Systems for integrating remotely sensed imagery with ancillary data to address coastal environmental problems. RESTRICTIONS: Requires approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>MAST 606</td>
<td>OCEAN AND ATMOSPHERE REMOTE SENSING</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>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 crosslisted with CIEG606, ELEG606, GEOG606.</td>
<td></td>
</tr>
<tr>
<td>MAST 607</td>
<td>WRITING PAPERS IN THE MARINE SCIENCES</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>The process and mechanics of publishing scientific papers in scientific journals. Covers organizing data in tables and figures; mechanics of drawing up effective figures; marshalling of tables, figures and scientific ideas into a coherent story; and strategies and techniques used in effective writing. Examples taken from and principles applicable to all fields of science.</td>
<td></td>
</tr>
<tr>
<td>MAST 608</td>
<td>HEAT AND LIGHT IN NATURE - RADIATIVE TRANSFER</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>The energetic interaction of sunlight with the atmosphere and oceans influences the entire earth system. Examines the theory of radiative transfer within the ocean and atmosphere, and then explores several areas of applicable research including climate modeling and remote sensing. May be crosslisted with GEOG608.</td>
<td></td>
</tr>
<tr>
<td>MAST 609</td>
<td>THE OCEAN &amp; CLIMATE VARIATION</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Study of the ocean-atmosphere system; the fluxes of heat, water and energy in the ocean and interchanges with the atmosphere; budgets and mechanisms of exchange; and interannual and long-term climate variations as related to the ocean. May be crosslisted with GEOG609.</td>
<td></td>
</tr>
</tbody>
</table>
MAST 613 METEOROLOGICAL PROCESSES FOR WIND ENERGY 3
This course explores the fundamental concepts of meteorology that are needed to understand onshore, offshore, and airborne wind energy. Topics include: forces affecting winds; terrain and land-use effects; air turbulence; numerical modeling; wind power and potential from turbines; and wind measurement technologies. May be crosslisted with GEOG613.

MAST 615 METEORLOGIC PROCESSES IN AIR POLLUTION 3
An introduction to meteorological processes that affect air pollution, such as diffusion, atmospheric stability, and turbulence, with a focus on the atmospheric boundary layer. May be crosslisted with CIEG615, GEOG615. PREREQ: MATH 241 and MATH 242; CHEM104 or CHEM112; PHYS201 or PHYS207.

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

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

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

MAST 620 ENERGY POLICY AND ADMINISTRATION 3
Analyzes energy use and energy policy with respect to politics, society, economics, political economy, technology, resources, and environment. Focuses on interrelationships among energy, environment, economy and equity (EQ). It considers the energy policy options needed to achieve a more sustainable world. Crosslisted with ENEP625.

MAST 621 COASTAL FIELD BIOLOGY 3
Hands-on study of estuarine and coastal communities with emphasis on patchiness in time and space. Instruction in field techniques as well as analysis and presentation of data. Experience in scientific writing.

MAST 622 CONSERVATION AND RENEWABLE ENERGY POLICY 3
Covers current policy issues for energy conservation, energy efficiency, and renewable energy sources. Some prior background in energy policy is assumed. Topics include environmental impacts, utility programs, and international comparisons.

MAST 623 PHYSIOLOGY OF MARINE ORGANISMS 3
Processes and mechanisms of adaptation 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: Graduate Students only or permission from instructor.

MAST 625 MICROBIAL 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: BSCI 207/208, CHEM 321 or CHEM 331, or permission of instructor. RESTRICTIONS: Juniors, Seniors, and Graduate Students

MAST 627 BIOLOGICAL OCEANOGRAPHY 3
Ecologically-oriented study of biological oceanography and marine biology. Emphasis on food web dynamics, nutrient cycles, and ecophysiology in the open oceans, benthos, coral reefs and hydrothermal vents. Special topics include coastal eutrophication, overfishing, role of marine organisms and the oceans in climate change. Students will be expected to read primary literature, write a research proposal and learn some basic programming to solve homework problems. PREREQ: Undergraduates must have BSCI207, BSCI208, MAST314, MAST482. No pre-requisites for graduate students.

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

MAST 630 ICHTHYOLOGY 3
The biology of fishes with emphasis on marine fishes and their adaptations and roles in the marine environment. The first half of the course covers the diversity of fishes (characteristics, classification, & zoogeography). This part establishes a foundation in the diversity of fishes, family-level characteristics, and overall relationships among fish groups. The second half covers fish anatomy, physiology, and behavior, and the ecology of fishes and fish communities. Although the course focuses on marine fishes, many of the topics covered apply to fishes in all environments.

MAST 634 MARINE MOLECULAR SCIENCES 3
This course surveys the dominant molecular processes in marine organisms that are essential for survival. Students are introduced to metabolic pathways, protein structure and function, DNA replication and repair, gene transcription and translation, and mitochondrial and chloroplast organelle function.

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

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

MAST 639 RENEW ENERGY AND CLIMATE: LAW AND REGULATION 1-3
This course is an introduction to US laws and regulations pertaining to greenhouse gases and the generation, transmission, and integration of renewable energy into the electrical, transportation and building heat systems. The course primarily draws on judicial opinions but also considers technical and scientific sources. May be crosslisted with UAPP739.

MAST 641 ALGAL ECOLOGICAL PHYSIOLOGY 3
The cellular physiology of marine algae with a focus on the phytoplankton in today's ocean. Emphasis on a range of issues from photosynthesis, nutrient dynamics, and primary production to community dynamics such as seasonal succession and competition among different marine algae.

MAST 642 ECOLOGY AND EVOLUTION OF CORAL REEFS 3
The ecology of reef building corals and coral reef environments are addressed, with an emphasis on control of species diversity and community dynamics, as well as physiological aspects of reproduction, symbioses, and calcification. The geological development of different reefs through time, reticulate evolution, and current policy issues related to human development and reef management are also introduced.

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
Primary emphasis on linear wave-water theory and its applications. Shaoing, refraction and diffusion of waves. Basic aspects of wave-structure and wave-bottom interaction. Introduction to basic wave propagation models. Crosslisted with CIEG672. PREREQ: CIEG305.

MAST 651 MARINE INVERTEBRATE BIODIVERSITY 3
Overview of marine invertebrate structure and function, physiology, development and life history, and ecology within the context of their evolutionary origins and phylogeny. Appreciation of their biodiversity and significance in marine ecosystems. Special attention to systematics and taxonomy of important groups and local fauna.

MAST 654 APPLICATIONS IN ENVIRONMENTAL ECONOMICS 3
Nonmarket valuation and other empirical methods used in the application of the theory of environmental economics to policy issues pertaining to water and air quality, climate change, and other relative environmental resources. May be crosslisted with ECON654.

MAST 655 GEOPHYSICAL FLUID DYNAMICS 3
Development of the fundamental fluid dynamics used in analyzing flows in physical oceanography and meteorology. Fundamentals of vorticity dynamics and geostrophy, inviscid theory of Rossby waves, and Ekman boundary layers.
MAST 658  PALEOClimATology  3
Covers the factors that cause natural variations in Earth's climate on different time scales, focusing on biotic, geologic, and geochemical records. Includes discussion of changing continental configurations, atmospheric greenhouse gas levels, and the Earth-Sun geometry on ocean circulation and climate change. Crosslisted with GEOG658.

MAST 659  RegionAl CLIMAtology: Tech & ApPL  3
Global change is impacting an increasing number of sectors in science, engineering and policy, creating a need for high-resolution regional climate data used in impact assessments and mitigation plans. The primary objective is to understand regional climate processes, modeling techniques, and tools for analysis. Crosslisted with GEOG659. PREREQ: GEOG220 and MATH241.

MAST 660  internAtional and nAtional OCEAn Policies  3
Analyzes the major policy and legal frameworks for managing oceans and coasts at international, regional, and national levels, with special attention to the Law of the Sea Convention, to the world summits on sustainable development, and to United States ocean policy.

MAST 661  Introduction to Ocean Modeling  3
Introduction to numerical methods used to solve the equations of ocean motion. Topics range from basic numerical concepts with applications to general transport and shallow-water equations to an overview of turbulence and ocean circulation models that are employed to understand weather and climate. May be crosslisted with CIEG661, GEOG661. PREREQ: CIEG663, or permission from instructor.

MAST 662  CLIMAtic CHAnge: Policy, Equity and Mitigation  3
Focuses on climate change equity, international compliance mechanisms, and US initiatives. It is designed for graduate students and advanced undergraduates who seek to gain substantive understanding of climate change policy and the means, impediments and opportunities to reaching resolution of complex international questions. May be crosslisted with UAPP665.

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 crosslisted with UAPP663.

MAST 669  Statistics for the Marine Sciences  3
Introduces the fundamental practices of statistics, emphasizing methods used in marine sciences. Topics include exploratory data analysis, correlation, regression, analysis of variance, analysis of frequencies, statistical graphics, basic experimental design and modern computer-intensive statistical methods. Weekly computer lab included to conduct statistical analyses.

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

MAST 672  Benefit-Cost 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 crosslisted with ECON670. PREREQ: ECON300 or ECON301.

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 crosslisted with LEST673. RESTRICTIONS: Requires permission of instructor.

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

MAST 675  Economics of Natural Resources  3
Study of the allocation of natural resources, especially marine and coastal zone resources, in modern economics. Application of economic theory to the problems of misallocations and the means of correction, under both free and planned markets. May be crosslisted with ECON675.

MAST 676  Environmental Economics  3
Study of the choice of policies to protect the environment, including land, air and water resources. Theory of market failure and externalities, use of economic incentives in policy design, valuation of environmental resources and examination of inefficiencies in existing U.S. environmental policies. May be crosslisted with ECON676.

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/satellite data. Application to oceanography, coastal processes, geology, land use, geography, agriculture, climate and pollution studies. Includes hands-on image analysis in GIS laboratory. May be crosslisted with CHEM683.

MAST 683  Environmental Chemistry  3
Reactions in gas, liquid and solid phases of the Earth's atmosphere, hydrosphere, and geosphere, and energy fluxes and chemical exchanges across these interfaces discussed in the context of basic chemical principles. Applications to current issues such as climate change and air/water pollution discussed. Crosslisted with CHEM683.

MAST 684  Electric Vehicles and the Grid  3
This seminar covers design of electric vehicles and charging infrastructure, existing and needed policies, consumer perspective on electric vehicles, and the use of electric vehicles for grid services, including leveling variable generation. May be crosslisted with ELEG684. PREREQ: Enough physics or engineering to understand relationships among voltage, current, resistance and power.

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

MAST 686  Remote Sensing Seminar  1-12
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  Fluid Dynamics in Marine Systems  4
The material covered includes kinematics and dynamics of fluids with emphasis on coastal and ocean flows; governing equations; viscous flows; flows on a rotating planet; flows with variable density; boundary layers; transport, diffusion and mixing in the oceans and coastal zones; simple models; and turbulence.

MAST 692  Environmental Values, Movements and Policy  3
Examines citizens' beliefs and values, voluntary environmental groups and the ways in which individuals and groups affect environmental policy. Shows how research in areas such as environmental sociology and ecological anthropology can inform policy. May be crosslisted 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 crosslisted with CIEG693. PREREQ: MEEG690

MAST 694  Systems Biology  I  3
Couples lectures and hands-on exercises to introduce students to experimental methods and bioinformatics analysis in systems biology, showing how global analysis of omics data improves understanding of biological systems. Covers three units: (i) experimental techniques; (ii) genomics and transcriptomics data analysis; and (iii) proteomics and pathway/network data analysis.
MAST 697 BIOINFORMATICS PROGRAMMING FOR BIOLOGISTS  3
Basic PERL programming for biologists doing bioinformatics research with no experience in computer programming. Teaches PERL syntax enabling editing and trouble-shooting existing PERL programs/modules without writing new programs/scripts. Uses Biowolf parallel computing cluster at DRL. Goal is proficiency with computers from command-line, unix-based, terminal interface.

MAST 698 ENVIRONMENTAL AND SYSTEMS BIOINFORMATICS  3
Teaches bioinformatic methods used to link genomic/proteomic sequence features to mechanisms of environmental adaptations or metabolic systems organization. For graduate students and advanced undergraduates applying basic informatic approaches/computational tools to research. Expectation of some programming experience. Computational tools include: PERL, PYTHON, R, and Matlab.

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.

MAST 802 CASE STUDY IN ENVIRONMENTAL DECISION MAKING  3
Analyzes issues in environmental management of coupled-human-natural systems such as coastal regions. Develops interdisciplinary problem-solving strategies. Engages students in real-world marine science/policy problems. Applies disciplinary knowledge, develops synthesis skills. Topics change, but case designs contain multi-disciplinary elements, e.g., physical ocean science, marine biology, oceanography, and marine policy.

MAST 808 COASTAL/ESTUARINE PHYSICAL DYNAMICS  4
Coastal and estuarine dynamics covering continental shelf wind-forced circulation; continental shelf waves; modes of estuarine circulation; shelf-estuary interaction; shelf break front dynamics; and estuarine and river plume fronts.
PREREQ: MAST602.

MAST 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.

MAST 812 ETHICS, BUSINESS AND COMMUNICATION  3
Provides professional development in ethics, business and communication related to systems biology research applications in stem cell, tissue engineering, and drug delivery technologies. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF815.

MAST 813 SYSTEMS BIOLOGY OF CELLS IN ENGINEERED ENVIRONMENTS  3
Provides a technical review of systems biology approaches including genomics, transcriptomics, proteomics, metabolomics, and bioinformatics as well as applications in tissue engineering, stem cell differentiation, and drug delivery. Intended for PhD students in interdisciplinary life science and engineering programs.
Crosslisted with BINF816.

MAST 814 POLITICAL ECONOMY OF THE ENVIRONMENT  3
Reviews major theories developed over the last half century to explain nature-society relations. Policy case studies on environmental justice, trade and environment, global climate change, and sustainable development used to evaluate current range of political-economic explanations of nature-society relations. International, national and local responses to these problems are analyzed.
Crosslisted with ENEP810.

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

MAST 820 DATA ANALYSIS AND STATISTICAL MODELING  1-3
Overview of advanced, multivariate data analysis and statistical modeling of large research data sets in marine science. Students will analyze their own data and present findings related to workflow, programming and computation, statistical theory, and effective presentation of data based conclusions. work.
PREREQ: Basic, one-semester, univariate statistics class.

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.

MAST 827 CURRENT TOPICS IN MARINE BIOLOGY  1-4
Subject areas change each term. Topics include aspects of plant biology, fish and invertebrate ecology and other aspects of marine ecology. May include lectures, tutorials and demonstration of techniques. See http://primus.nss.udel.edu/CoursesSearch/ for topics.

MAST 831 COASTAL AND ESTUARINE SEDIMENT DYNAMICS  3
Fundamentals of fluid flow and sedimentary processes in modern coastal and estuarine environments. Traditional topics in clastic sedimentology and sediment transport are covered in addition to contemporary themes in cohesive sediments and morphodynamics.

MAST 832 MESOSCOPIC CFD METHOD  3
Crosslisted with MEEG833.

MAST 834 ROUTINE BIOGEOCHEMICAL METHODS  2
Biological, Chemical, Biological Oceanographers and Marine Biologists use methods addressed in course. Resource management and regulatory agencies use methods for water quality and ecosystem monitoring. Theories for routine aquatic measurements including hands-on experience with individual methods. For marine-science graduate students and state-agency personnel.

MAST 847 CURRENT TOPICS IN CHEMICAL METHODS IN OCEANOGRAPHY  1-3
Principles, capabilities and limitations of analytical methods to the chemistry of marine waters and sediments. Analytical methods include electrochemical, spectroscopic, chromatographic, electron microscopy and surface techniques. Emphasis on the analysis of trace components (biochemical, inorganic and organic) in the marine environment. Laboratory experiments. See http://primus.nss.udel.edu/CoursesSearch/ for topics.

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

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

MAST 853 OCEANOGRAPHY SEMINAR  1-12
A review of current oceanographic literature through student presentations. 

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

MAST 857 PALEOCEANOGRAPHY  3
Focuses on processes related to climate change from tectonic to millennial timescales based on the marine sedimentary record of the past 65 million years. Topics include light stable isotopes and biogeochemical cycling of elements.
Includes lectures and student-lead discussion of current literature. 
May be crosslisted with GEOG857. RESTRICTIONS: Requires permission of instructor.
MATH 865  MMP ANTHROPLOGICAL PAPER 3
Propose, write, and orally defend a journal-length article on a marine policy topic approved by your major advisor. The layout and analytical content should rise to the standard of publication in a conventional marine policy journal. Required for all MMP students.

MATH 868  RESEARCH 1-9

MATH 869  MASTER’S THESIS 1-6

MATH 870  INTEGRATED COASTAL MANAGEMENT 3
Provides a practical guide to the development, implementation, operation, and evaluation of integrated coastal management (ICM) programs. Examines the evolution of international prescriptions on ICM, and compares and contrasts experiences with integrated coastal management in both developed and developing countries.

MATH 871  ENVIRONMENTAL POLITICS AND POLICY 3
U.S. 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. Crosslisted with POSC818.

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 FISHERY ECONOMICS 3
Theoretical and applied study of the optimal utilization and management of commercial and recreational fisheries with emphasis on equity issues and the difficulty of deriving regulations which are biologically effective and which provide incentives for economic efficiency at reasonable costs. May be crosslisted with ECON875. PREREQ: MAST675 or ECON675

MATH 882  PHYSICAL OCEAN SCIENCE AND ENGINEERING SEMINAR 1
A review of the 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 104  INTERMEDIATE ALGEBRA 3 R
Review skills necessary for pre-calculus and college mathematics and statistics. Topics include a review of sets, operations with polynomial and rational expressions, solving equations and inequalities, and an introduction to the coordinate plane and functions.

PREREQ: Students must achieve an acceptable score on the Math Placement Exam in accordance with current standards determined by the Department of Mathematical Sciences. See www.math.udel.edu/placement for more information. RESTRICTIONS: Requires arithmetic and Algebra I skills. MATH010 does not earn credit towards a degree.

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

PREREQ: Students must achieve an acceptable score on the Math Placement Exam in accordance with current standards determined by the Department of Mathematical Sciences. See www.math.udel.edu/placement for more information. 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. Students must achieve an acceptable score on the Math Placement Exam in accordance with current standards determined by the Department of Mathematical Sciences. See www.math.udel.edu/placement for more information. RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.

MATH 115  PRE-CALCULUS 3
The various classes of functions and their graphs are explored. Function classes include linear, quadratic, polynomial, rational, exponential, logarithmic and trigonometric. Skills and concepts needed for calculus (MATH211) are emphasized.

PREREQ: MATH010. Students must achieve an acceptable score on the Math Placement Exam in accordance with current standards determined by the Department of Mathematical Sciences. See www.math.udel.edu/placement for more information. 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, and nonlinear systems. Other topics may be added at the discretion of the instructor.

PREREQ: Students must achieve an acceptable score on the Math Placement Exam in accordance with current standards determined by the Department of Mathematical Sciences. See www.math.udel.edu/placement for more information. 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 data analysis, basic probability, discrete and continuous distributions, sampling distributions and confidence intervals, and one- and two-sample 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. RESTRICTIONS: Credit may be awarded for only one of STAT200, APEC408, MATH201, and MATH205.

MATH 202  INTRODUCTION TO STATISTICAL METHODS II 3
Two-sample tests on means and proportions, chi-square analysis of contingency tables, completely randomized 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. RESTRICTIONS: Credit may be awarded for only one of STAT200, APEC408, MATH201, and MATH205.

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, exponential and logarithmic functions, integration, and techniques of integration. Business applications are emphasized.
PREREQ: Requires two years of high school algebra, one year of geometry, and one year of precalculus, or MATH115, or students must achieve an acceptable score on the Math Placement Exam in accordance with current standards determined by the department of M. RESTRICTIONS: 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 or MATH241. 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 log functions; simple differential equations modeling exponential growth and decay (linear and separable ODEs).
PREREQ: MATH 117, or students must achieve an acceptable score on the Math Placement Exam in accordance with current standards determined by the Department of Mathematical Sciences. See www.math.udel.edu/placement for more information. RESTRICTIONS: 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 computers 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 computers 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 number 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
Introduces to University of Delaware rules and regulations, resources, and educational enrichment opportunities. Discussion of University and departmental expectations, academic conduct, and important academic advisement issues. Perspectives on mathematics, its applications, and careers for math majors. The role of mathematics in society at large.
RESTRICTIONS: Majors only.

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.
COREQ: 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 computers to solve differential equations.
COREQ: MATH243. RESTRICTIONS: Credit not given for both MATH302 and either MATH341, MATH342, MATH351 or MATH352.

MATH 305  APPLIED MATHEMATICS FOR BIOMED, CHEM AND BIOMOL ENG 3
A special applied mathematics course designed for chemical engineering majors. Emphasis is given on the interaction between mathematical theory and its engineering applications.
May be crosslisted with CHEG205, PREREQ: A minimum grade of C- in MATH242 and CSC 106. RESTRICTIONS: For chemical engineering and biomedical engineering majors only. Credits cannot be received for both MATH302 and MATH305.

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

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

MATH 341  DIFFERENTIAL EQUATIONS WITH LINEAR ALGEBRA I  3
Topics include first and second order differential equations, systems of algebraic equations, determinants, vector spaces, eigenvalues and eigenvectors of matrices and systems of differential equations. Emphasis on the interaction between these topics and appropriate physical systems.
PREREQ: MATH242 RESTRICTIONS: Credit not given for both MATH341 and either MATH302, MATH342, MATH343 or MATH351. Open to majors outside mathematics.

MATH 342  DIFFERENTIAL EQUATIONS WITH LINEAR ALGEBRA II  3
A continuation of MATH341 or MATH351. Topics include series solutions, Laplace transform methods, boundary value problems, orthogonality, higher order equations, difference equations and numerical techniques. Continued emphasis on the interaction between these topics and physical systems.
PREREQ: MATH341 or MATH351. RESTRICTIONS: Credit not given for both MATH342 and either MATH302, MATH343 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 350  PROBABILITY THEORY AND SIMULATION METHODS  3  
Introduces the basic theory of discrete and continuous aspects of probability theory. Topics include bivariate distributions, sums of independent random variables, moment generating functions, laws of large numbers and central limit theorem.  
COREQ: MATH243.  RESTRICTIONS: Requires basic knowledge of the counting principles in permutation and combination.  

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 problems; solution of linear ordinary differential equations, nonlinear differential equations, with engineering applications.  
COREQ: MATH243  RESTRICTIONS: Credit not given for both MATH351 and either MATH302, MATH341 or MATH349. Open to MEEG and CIEG students only.  

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

MATH 353  ENGINEERING MATHEMATICS III  3  
Numerical solution of linear and non-linear algebraic equations, numerical solution of ordinary differential equations, Runge-Kutta methods, boundary value problems, finite differences, diffusion, Laplace equation, applications to engineering problems with programming.  
PREREQ: MATH351 and CISC106.  RESTRICTIONS: Open to MEEG and CIEG majors.  

MATH 366  INDEPENDENT STUDY  1-6  

MATH 379  TEACHING AND LEARNING SECONDARY MATHEMATICS I  3  
Emphasis on standards for school mathematics, cognitively demanding tasks, and developing lesson plans, unit plans, and long-term plans. Focuses on problem solving as an effective instructional strategy for teaching mathematics in secondary schools. Addresses the importance of affect and motivation in the learning of mathematics. Examines the teaching and learning of Number and Operations, Measurement, Algebra, Functions, Trigonometry, and Modeling and incorporates content specific use of technology. Includes a teaching/field experience.  
PREREQ: Students must have completed 60 credits of course work and 18 credits in Math courses at 100 level or higher one of which must be MATH243.  RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. This course cannot count towards the Minor in Math or any other degree in Math except the BA in Secondary Math Education, the BS in Secondary Math Education, and the Honors versions of.  

MATH 380  TEACHING AND LEARNING SECONDARY MATHEMATICS II  4  
Explores the evaluation and selection of materials for teaching mathematics in secondary schools, effective instructional strategies, and assessment. Addresses classroom management, equity, meeting the needs of all students, and establishing an effective learning environment. Stresses reasoning, proof, and communication. Examines the teaching and learning of Geometry, Probability & Statistics, Calculus, and Modeling and incorporates content specific use of technology. Includes a field experience.  
PREREQ: MATH379.  Passing scores on all sections of the Praxis I exam.  RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. This course cannot count towards the Minor in Math or any other degree in Math except the BA in Secondary Math Education. 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 383  TEACHING AND LEARNING SECONDARY MATHEMATICS III  3  
Emphasis on standards for school mathematics, cognitively demanding tasks, and developing lesson plans, unit plans, and long-term plans. Focuses on problem solving as an effective instructional strategy for teaching mathematics in secondary schools. Addresses the importance of affect and motivation in the learning of mathematics. Examines the teaching and learning of Number and Operations, Measurement, Algebra, Functions, Trigonometry, and Modeling and incorporates content specific use of technology. Includes a teaching/field experience.  
PREREQ: Must have completed 18 credits in Math courses at the 200 level or higher one of which must be MATH243.  RESTRICTIONS: Students must have completed 60 credits of course work. Requires permission of the Committee on Secondary School Mathematics. This course cannot count towards the Minor in Math or any other degree in Math except the BA in Secondary Math Education, the BS.  

MATH 384  TEACHING AND LEARNING SECONDARY MATHEMATICS II  4  
Explores the evaluation and selection of materials for teaching mathematics in secondary schools, effective instructional strategies, and assessment. Addresses classroom management, equity, meeting the needs of all students, and establishing an effective learning environment. Stresses reasoning, proof, and communication. Examines the teaching and learning of Geometry, Probability & Statistics, Calculus, and Modeling and incorporates content specific use of technology. Includes a field experience.  
PREREQ: MATH379.  Passing scores on all sections of the Praxis I exam.  RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. This course cannot count towards the Minor in Math or any other degree in Math except the BA in Secondary Math Education, the BS in Secondary Math Education, and the Honors versions of.  

MATH 401  INTRODUCTION TO REAL ANALYSIS  3  
A rigorous treatment of one variable calculus. Topics will include sequences of real numbers, limit theorems, monotonous sequences, Cauchy sequences, Bolzano-Weierstrass Theorem, continuity, uniform continuity, differentiability and Riemann integral. A historical perspective on the development of these topics will be provided.  
PREREQ: MATH245  

MATH 426  COMPUTATIONAL MATHEMATICS I  3  
Floating point numbers; conditioning and stability; LU, Cholesky, and QR factorizations; square and overdetermined linear systems; Newton and quasi-Newton root-finding methods; piecewise polynomials for interpolation, integration, and finite differences; explicit methods for initial-value problems. Prerequisites: MATH 305, MATH 349, or MATH 351. Students may not receive credit for both MATH 353 and MATH 426.  
May be crosslisted with CISC428.  PREREQ: MATH305 or MATH351 or MATH349.  RESTRICTIONS: Requires familiarity with computing (e.g., programming language).  

MATH 428  COMPUTATIONAL MATHEMATICS II  3  
Eigenvalue and singular-value decompositions; power and Krylov subspace iterations; global interpolation and quadrature; methods for boundary-value problems and Poisson's equation; implicit solvers for stiff problems; methods of lines for partial differential equations; diffusion and advection problems.  
May be crosslisted with CISC411.  PREREQ: MATH426 or CISC410 or MATH353.  

MATH 450  MATHEMATICAL STATISTICS  3  
Introduction to mathematical aspects of statistics. Topics include exploratory data analysis, parameter estimation, maximum likelihood method, testing of hypothesis, confidence intervals and others. Includes application of a computer software package to perform data analysis.  
PREREQ: MATH350 or an equivalent course in probability  

MATH 451  ABSTRACT ALGEBRA I  3  
Basic properties of the integers and the rationals, fields of quotients, polynomial rings, root-finding, introduction to groups, rings and fields. A historical perspective on the development of the notion of number and algebraic structure.  
PREREQ: MATH349 and MATH245.  

MATH 460  INTRODUCTION TO SYSTEMS BIOLOGY  3  
Systems biology approach, mathematical modeling of biological systems; examples from biomedical and agricultural research areas, biotechnology, industrial processes, and others. Differential equations, stochastic, feedback and control, or network models are discussed. Hands-on work via PBL modules.  May be crosslisted with CHEG460.  PREREQ: One of BISC302, BISC305, BISC306, BISC401 or BISC403.  

MATH 466  INDEPENDENT STUDY  1-6  

MATH 503  ADVANCED CALCULUS AND NONLINEAR DYNAMICS  3  
Change of variables, surface integrals, Stokes' Theorem, Divergence Theorem, Calculus of Variations, Euler's Equation, Brachistochrone and isoperimetric problems. Introduction to the qualitative theory of ordinary differential equations, including linear systems, phase space analysis, Lyapunov's Methods, and elements of the analysis of nonlinear systems.  
PREREQ: 300 level or above courses in ordinary differential equations and linear algebra.  

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.  
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015
MATH 518 Mathematical Models and Applications 3
Illustration and analysis of mathematical models for problems in the biological, physical and social sciences. PREREQ: MATH243 and MATH349 or MATH350. Does not satisfy the requirements for a minor.

MATH 529 Fundamentals of Optimization 3
Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and non-smooth programming. Optimality conditions. Saddle points and dual problems. Penalties and decomposition. Overview of computational approaches. PREREQ: Linear algebra (MATH349 or equivalent) and vector calculus (MATH 243 or equivalent).

MATH 530 Application of Mathematics in Economics 3
Provides students with experience in the application of mathematics in economics. Applications may vary from semester to semester. Mathematical topics may include applications of ordinary and partial differential equations, game theory, linear programming, dynamic programming, stochastic programming and calculus of variations. May be crosslisted with ECON350. PREREQ: MATH302, MATH 349, 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 MATH305 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: MATH341 or MATH349 or MATH351.

MATH 579 Geometry and Proof 3
In-depth study of high school geometry from an advanced perspective. Logic and proof provide a foundation for studying axiomatic systems, transformational geometry, and finite geometries. PREREQ: An undergrad. 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 Advanced 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: An undergrad. 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 include graphical methods, probability models, statistical inference and study design. Orientation to popular software packages. Applications selected from current literature. PREREQ: Undergraduate statistics course RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.

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

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

MATH 586 Mathematical Problem Solving: Theories and Practices 3
Designed to offer secondary teachers an opportunity to face and solve nonroutine problems. Teachers become familiar with problem solving strategies used not only with nonroutine problems but also with standard problems in an existing mathematics curriculum. RESTRICTIONS: Requires permission of instructor. Credit to be used only in graduate programs in mathematics education.

MATH 587 Proportional Reasoning 3
Introduces and reinforces the underlying concepts of proportional reasoning and their applications in science or social 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 crosslisted 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 the development of students' mathematical understandings and provides a context for best classroom practices. Examines in-depth topics in number and operations, algebra, geometry, measurement, and/or data analysis. RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing teachers, or by permission of instructor.

MATH 600 Fundamentals of Real Analysis 3
Rigorous introduction to classical real analysis. Brief review of real numbers. Full discussion of the basic topology of metric spaces, continuity and compactness. Differential analysis of functions of one real variable. Sequences and series of functions. PREREQ: MATH401 or equivalent. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

MATH 602 Measure, Integration and Complex Variables 3
Review of Riemann integration. Introduction to Lebesgue measure and integration. Holomorphic functions, residue theory, and conformal mappings. PREREQ: MATH600. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.
MATH 607 Survey of Scientific Computing 3
Numerical solution of linear systems; interpolation; differentiation and quadrature; transforms; FFT; nonlinear equations; initial value problems; boundary value problems; Monte Carlo methods; finite difference methods for partial differential equations. Additional topics at the discretion of the instructor.
PREREQ: Linear algebra, differential equations, multivariable calculus.
RESTRICTIONS: This course may not be taken for credit toward degree programs in Mathematical Sciences.

MATH 611 Introduction to Numerical Discretization 3
Piecewise polynomial and global interpolation, adaptive, Gaussian, and multidimensional quadrature, Runge-Kutta and multistep methods for initial value problems, finite differences for boundary value problems, method of lines for partial differential equations.
PREREQ: Multivariate calculus and ordinary differential equations. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

MATH 612 Computational Methods for Equation Solving and Function Min 3
LU and QR factorizations, singular value and eigenvalue decompositions, matrix conditioning, solution of linear systems and linear least-squares problems, iterative methods in linear algebra, descent and quasi-Newton methods of optimization, globalizing convergence, constrained optimization, applications.
PREREQ: Elementary linear algebra and programming. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

MATH 616 Modeling in Applied Mathematics 3
Introduction to modeling and analytical techniques used in solving problems arising in a variety of physical settings. Biological modeling. Derivation of the equations of mathematical physics. Solution behavior of nonlinear systems of ODE's. Use of software to explore solutions to physical systems.
PREREQ: One semester of advanced calculus. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

MATH 617 Techniques of Applied Mathematics 3
Introduction to techniques used in solving problems arising in a variety of physical settings. Sturm-Liouville problems and Green's functions. Methods of solution for the wave, heat and Laplace equations. Variational principles.
PREREQ: One semester of advanced calculus. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

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 elements, 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.
PREREQ: One semester of advanced calculus. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

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 or equivalent. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

MATH 650 Algebra I 3
Properties of integers, commutative rings, finite fields, elementary group theory, and classification of finite abelian groups.
PREREQ: MATH672 or permission of instructor. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

MATH 660 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: The equivalent of CHEM527, MATH535 and one of BISC302, 305, 306, 401 or 403. RESTRICTIONS: No graduate credits given for graduate students in mathematics and applied mathematics.

MATH 668 Seminars-Colloquia 1
Requires attendance at 8 departmental seminars/colloquia each semester. A short written summary on one of the talks must be submitted to the 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. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

MATH 688 Combinatorics and Graph Theory I 3
Enumeration techniques, Ramsey theory, topics from graph theory, extremal combinatorics, introduction to finite geometry.
PREREQ: Requires permission of instructor. RESTRICTIONS: Undergraduate students must have a B or better in six credits of MATH at the 400 level or 500 level, exclusive of MATH518 and MATH540.

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

MATH 817 Introduction to Numerical Methods for Partial Differential Equations 3
Accuracy, stability, and convergence of finite difference discretizations of partial differential equations, numerical dispersion and dissipation, Fourier and Chebyshev spectral methods, boundary conditions, coordinate mapping, collocation methods, fast multipole methods, applications and other topics at the discretion of the instructor.
PREREQ: MATH611 and MATH612 or equivalent.

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 829 Topics in Mathematics 3
Topics vary and are chosen from a variety of areas in pure and applied mathematics.
PREREQ: Requires permission of instructor.

MATH 835 Evolutionary Partial Differential Equations 3
Methods of solution for evolutionary partial differential equations and systems primarily from a classical perspective. Linear and nonlinear equations and systems; characteristics; shocks and discontinuous solutions; similarity solutions; modern applications and dynamical systems approaches.
PREREQ: MATH617 or equivalent.

MATH 836 Elliptic Partial Differential Equations 3
Sobolev spaces, potential theory, variational methods for elliptic equations, inverse problems.
PREREQ: MATH606.

MATH 838 Finite Element and Boundary Element Methods 3
PREREQ: MATH806 or equivalent.

MATH 845 Algebra II 3
Ternary rings and their relationship to finite geometry, Sylow's theorems and group actions, classical matrix groups, linear representations, character theory. Computational software such as Magma or Maple will be used.
PREREQ: MATH650 and MATH672 or permission of instructor.
MATH 850  THEORY OF PROBABILITY  
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 MATH631 or equivalent; or permission of instructor.

MATH 868  RESEARCH  1-6

MATH 869  MASTER'S THESIS  1-6

MATH 870  READING IN MATHEMATICS  1-6

MATH 888  COMBINATORICS II  3
Algebraic graph theory, linear algebraic methods, designs, codes, geometry. Computational software, such as Magma or Maple, will be used. PREREQ: MATH672, MATH688. COREQ: MATH650.

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

CULTURAL STUDIES

MCST 216  INTRODUCTION TO MATERIAL CULTURE STUDIES  3
Introduces students to material culture studies, broadly defined as study of all things people make and all the ways people have altered the physical world. Explores the approaches, concepts, and methods of numerous disciplines that investigate material culture. Crosslisted with ANTH216.

MCST 243  AMERICAN DECORATIVE ARTS, 1700-1900  3
An introduction to interior decoration and household arts during the 18th and 19th centuries, with an emphasis on furniture, metalwork, glass, ceramics, textiles, prints, and wallpaper. Field trips to Winterthur and the Delaware Art Museum are required. Crosslisted with ARTH243.

MCST 299  RESEARCH IN MATERIAL CULTURE STUDIES  1
Wide-ranging, interdisciplinary lectures in which faculty and advanced graduate students discuss their research on the broad topic of material culture studies, or stuff studies, investigations into the relationship between people and their things. May be repeated for credit when topics vary.

MCST 402  MATERIAL CULTURE STUDIES RESEARCH SEMINAR  3
Balanced emphasis on writing skills, research strategies and interpretation related to the study of material culture. Students will develop research projects drawing on the collections of local and regional personal collectors, museums, libraries, and historical agencies. PREREQ: ANTH216 or permission of instructor.

MCST 435  SEMINAR IN AMERICAN ART  3-12
American art from the Colonies to the present. Recent topics include Art and Revolution in Early America; Early American Modernism, and American Painting and Sculpture after World War II. Crosslisted with ARTH435. RESTRICTIONS: May be repeated for credit when topics vary.

MCST 449  SOCIOLOGY OF ART AND CULTURE  3
This course is designed as an introduction to sociological perspectives on culture and the arts. Topics include the role of culture in the creation of social inequality, fashion, the social production of art, the culture industry, and outsider art. Crosslisted with SOCI449.

MCST 464  MATERIAL CULTURE STUDIES INTERNSHIP  3-6
Provides practical behind-the-scenes experience in collections management, public programming, exhibition design, interpretation, or other aspects of professional life in such cultural institutions as museums, historical societies, or research agencies. To qualify for an internship a minor must demonstrate initiative, motivation, and appropriate skills through a review process. Students select internship placements from a list maintained by the Center for Material Culture Studies or seek approval for internship of their choice outside that list. PREREQ: ANTH216. RESTRICTIONS: Open to minors only.

MCST 466  INDEPENDENT STUDY  1-6

MEDICALLY LABORATORY SCIENCES

MEDT 100  INTRODUCTION TO MEDICAL LABORATORY SCIENCE  1
Orientation to the profession of medical laboratory science with overview of clinical laboratory science areas. Discussion of the laboratory's critical role in healthcare delivery and the diversity of employment and career opportunities.
RESTRICTIONS: Open to Freshmen, Sophomores and Juniors.

MEDT 160  INFECTION: SEX, FOOD AND SNEEZING  3
This course will educate students about microorganisms affecting our lives. Lecture will concentrate on good and bad organisms, especially those problematic for college students. Students will learn from case studies for organism-infection association and will discuss society's treatment, control and prevention of infection.

MEDT 200  THE LANGUAGE OF MEDICINE  3
Comprehensive foundation of medical terminology for use in health care careers. Emphasis on body structures, anatomical systems, pathologies, medical procedures, medical specialties, and common terms and abbreviations used in health care.

MEDT 220  FORENSIC SCIENCE  3
Introduction to the field of forensic science, discussing laboratory techniques and assays used in determining evidential value of crime scene and related evidence. Emphasis on blood and DNA analysis, forensic toxicology, and forensic microbiology.

MEDT 230  FORENSIC PATHOLOGY  3
Overview of the field of forensic pathology including the history, related specialties, and determining the cause of death. Medical examiners/coroners system, hospital pathology and legal/ethical issues in forensic science are also discussed.

MEDT 240  CRIME SCENE INVESTIGATION  3
Crime scene investigation techniques are covered with an emphasis upon securing and recording the crime scene, identifying and preserving physical evidence, collecting, transporting and storing evidence and the examination of evidence. Techniques available to the crime scene investigator also will be discussed.

MEDT 250  COMMUNICATION, EDUCATION, & ETHICS IN HEALTHCARE  1
Focuses on tools to achieve effective interpersonal and interdisciplinary communication. Includes the use of educational methodology to instruct laboratory personnel, as well as other practitioners and consumers who utilize laboratory services. Discussion of ethics and professionalism in relationship to health-related topics.
RESTRICTIONS: Open to Medical Laboratory and Diagnostics Interest and Medical Laboratory Science majors only.

MEDT 270  MEDICAL MICROBOL & INFECTIOUS DISEASES  4
Introduction to principles of human medical microbiology. Bacterial pathogenic mechanisms, clinical manifestations, and diagnostic methods are emphasized. Explores important human viral and parasitic diseases, antimicrobial agents, immunology and immune disorders.
PREREQ: BISC207 or BISC205.

MEDT 360  CLINICAL IMMUNOLOGY AND MEDICAL VIROLOGY  3
Introductory immunology concepts and use of immunological assays, such as enzyme immunoassays and fluorescent antibody assays, for diagnosis of infectious diseases and immunological disorders. Study of viruses, diseases they cause, and methods used to diagnose viral infections.
PREREQ: BISC208 and CHEM104. RESTRICTIONS: Not open to Medical Laboratory and Diagnostics Interest students or Medical Laboratory Science majors.

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 Laboratory Science majors only.

MEDT 375  STATISTICS & RESEARCH FOR MEDICAL LABORATORY SCIENTISTS  2
Introductory statistics, principles of research design and data interpretation for medical laboratory scientists.
RESTRICTIONS: Open to Medical Laboratory Science majors only.
MEDT 380  CLINICAL IMMUNOLOGY AND MEDICAL VIROLOGY WITH LAB  4
Introductory immunology concepts and use of immunological assays, such as 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. The laboratory component provides experience with some of the concepts and assays discussed in lecture. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 390  INTRODUCTION TO GENETICS AND MOLECULAR DIAGNOSTICS  3
Study of genetics, molecular biology principles and techniques as it applies to the clinical laboratory for use in diagnosis, prognosis and treatment of disease. Topics include Mendelian genetics, principles of DNA, RNA, and proteins, and the use of molecular techniques in diagnosis. PREREQ: BISC208 and CHEM104. RESTRICTIONS: Not open to Medical Laboratory and Diagnostics Interest students.

MEDT 391  INTRODUCTION TO MOLECULAR DIAGNOSTICS LABORATORY  1
Laboratory exercises that correlate with MEDT390. Techniques include isolation of nucleic acids from biological fluids, electrophoresis, PCR, viral load testing and DNA sequencing. PREREQ: MEDT390. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 398  BODY FLUID ANALYSIS  1
Overview of protocols, technical and clinical correlations involved in body fluid analysis of non-blood body fluids, including urine, synovial, cerebrospinal, seminal, serous, amniotic and gastric fluids. PREREQ: BISC208 and CHEM104. RESTRICTIONS: Open to Medical Diagnostics majors and minors only.

MEDT 400  URINALYSIS AND BODY FLUIDS  2
The study of routine urinalysis examination, renal function and body fluid testing procedures. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 401  CLINICAL PHYSIOLOGICAL CHEMISTRY I  3
Application and theory of manual and automated techniques used in diagnostic and therapeutic medicine. Emphasis on clinical procedures for carbohydrates, proteins, lipids, nonprotein nitrogenous compounds, blood gases and pH, and electrolytes. PREREQ: BISC208 and CHEM104. RESTRICTIONS: Not open to Medical Laboratory and Diagnostics Interest students.

MEDT 403  CLINICAL PHYSIOLOGICAL CHEMISTRY II  4
Application and theory of methodologies in enzymology, endocrinology and toxicology. Relationship of normal and abnormal laboratory findings in organ functional tests. PREREQ: MEDT401

MEDT 404  HEMATOLOGY I  2
Quantitative and qualitative study of the formed elements of blood with emphasis on the normal state, as well as the study of normal and abnormal coagulation and hemostasis. PREREQ: BISC208 and CHEM104. RESTRICTIONS: Not open to Medical Laboratory and Diagnostics Interest students.

MEDT 405  HEMATOLOGY II  2
Study of the pathophysiology of erythrocytic and leukocytic disorders and the laboratory findings of these disorders. PREREQ: MEDT404

MEDT 406  MEDICAL MICROBIOLOGY  3
Study of the occurrence and pathogenesis of human infections and microorganisms associated with humans in health and disease. PREREQ: BISC208 and CHEM104. RESTRICTIONS: Not open to Medical Laboratory and Diagnostics Interest students.

MEDT 409  IMMUNOHEMATOLOGY I  1
Study of antigen and antibody systems of human red cells and compatibility testing of blood for transfusion. RESTRICTIONS: Not open to Medical Laboratory and Diagnostics Interest students.

MEDT 411  CLINICAL PHYSIOLOGICAL CHEMISTRY LABORATORY I  2
Laboratory exercises that complement the topics covered in MEDT401. COREQ: MEDT401. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 413  CLINICAL PHYSIOLOGICAL CHEMISTRY LABORATORY II  2
Laboratory exercises that complement the topics covered in MEDT403. COREQ: MEDT403. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 414  HEMATOLOGY I LABORATORY  1
Study and implementation of laboratory procedures that correlate with the material taught in MEDT404. COREQ: MEDT404. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 415  HEMATOLOGY II LABORATORY  2
Study and implementation of laboratory procedures in hematology consistent with the material taught in MEDT405. COREQ: MEDT405. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 416  MEDICAL MICROBIOLOGY LABORATORY  2
Laboratory study of microorganisms important in the normal flora and infectious diseases of humans. COREQ: MEDT406. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 418  SENIOR SEMINAR: MEDICAL LABORATORY SCIENCE  0 PF
Readings, case studies, career planning and orientation for clinical education. RESTRICTIONS: Open to senior Medical Laboratory Science majors only.

MEDT 419  IMMUNOHEMATOLOGY I LABORATORY  1
Laboratory procedures consistent with MEDT409. COREQ: MEDT409. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 420  IMMUNOHEMATOLOGY II  1
Study of blood and component transfusions, their risks, complications and quality assurance. Also blood component therapy and testing of the neonate and adult. PREREQ: MEDT409

MEDT 421  IMMUNOHEMATOLOGY II LABORATORY  1
Laboratory procedures consistent with MEDT420. COREQ: MEDT420. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 430  DIAGNOSTIC BACTERIOLOGY AND MEDICAL MYCOLOGY  2
Diagnostic bacteriology, emphasizing the correlation of in vitro and in vivo findings in the diagnosis and treatment of infectious disease, including human mycoses. Identification of pathogenic and nonpathogenic bacteria and fungi in clinical specimens. PREREQ: MEDT360 or MEDT380, and MEDT406.

MEDT 431  DIAGNOSTIC BACTERIOLOGY AND MEDICAL MYCOLOGY LABORATORY  2
Study and implementation of laboratory procedures that correlate with the material taught in MEDT430. COREQ: MEDT430. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 440  INTRODUCTORY NANOMEDICINE  3
Introduction to the interdisciplinary field of nanomedicine for students with physical, chemical or biological sciences background. Emphasis on emerging nanotechnologies and biomedical applications including nanomaterials, nanomedicine, nanotechnology-based drug delivery systems, nano-particle-based imaging, nanodiagnostic systems, nanotoxicology, and translating nanomedicines into clinical research. PREREQ: BISC208 or CHEM104 or CHEM112 and CHEM120. RESTRICTIONS: Requires permission of Instructor.

MEDT 455  FORENSIC SCIENCE PRACTICUM  3 PF
Working with practicing criminals, students gain hands-on real life experience in the exciting field of forensic science. Students will be given the opportunity to develop an appreciation for the analyses performed in a forensic science laboratory. PREREQ: CRUI110 and MEDT220.

MEDT 460  TECHNIQUES IN NANOMEDICINE  3
Chemical and physical approaches used to make functionalized nanoparticles and their characterizations with spectroscopy including Fourier transform infrared spectroscopy (FTIR), UV and visible, scanning electron microscope (SEM), transmission electron microscope (TEM) and nuclear magnetic resonance (NMR). PREREQ: BISC208 or CHEM104 or CHEM112 and CHEM120. RESTRICTIONS: Requires permission of Instructor.

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: Open to Medical Laboratory Science majors only.
MEDT 462 EXPERIENTIAL LEARNING 3
Final reflective component of the volunteer experiences accumulated throughout the student's undergraduate years in preparation for a graduate program in a healthcare field. Evidence of critical thinking and knowledge of healthcare concepts will be demonstrated through an ePortfolio and a formal summary paper.
RESTRICTIONS: Open to Medical Diagnostics senior majors or Pre-Physician Assistant concentration junior students only.

MEDT 466 INDEPENDENT STUDY 1-6

MEDT 471 LABORATORY PRACTICE AND LEADERSHIP II 1
Discussion of clinical laboratory practice and leadership. Emphasis on responsibilities relating to daily operation of the laboratory, including human resource management, financial planning, cost analysis, laboratory design, laboratory information systems, marketing, government regulations and accreditation.
PREREQ: MEDT461.

MEDT 472 CLINICAL URINALYSIS PRACTICUM 1 PF
Clinical experience in the application of laboratory theory and techniques in urinalysis.
PREREQ: MEDT400. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 473 CLINICAL CHEMISTRY PRACTICUM 3 PF
Supervised experience in the application of laboratory theory and techniques in clinical chemistry.
PREREQ: MEDT403 and MEDT413. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 474 HONORS CLINICAL CHEMISTRY PRACTICUM 3
Supervised experience in the application of laboratory theory and techniques in clinical chemistry.
PREREQ: MEDT403 and MEDT413. RESTRICTIONS: Open to Honors students only -- min. 3.0 GPA required. See www.udel.edu/honors for enrollment policies. Requires permission from the instructor. Open to Medical Laboratory Science majors only.

MEDT 475 CLINICAL HEMATOLOGY PRACTICUM 3 PF
Supervised experience in the application of laboratory procedures in hematology.
PREREQ: MEDT405 and MEDT415. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 476 HONORS CLINICAL HEMATOLOGY PRACTICUM 3
Supervised experience in the application of laboratory procedures in hematology.
PREREQ: MEDT405 and MEDT415. RESTRICTIONS: Open to Honors students only -- min. 3.0 GPA required. See www.udel.edu/honors for enrollment policies. Requires permission from the instructor. Open to Medical Laboratory Science majors only.

MEDT 477 CLINICAL MICROBIOLOGY PRACTICUM 3 PF
Supervised experience in the application of laboratory procedures in diagnostic microbiology.
PREREQ: MEDT430 and MEDT431. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 478 HONORS CLINICAL MICROBIOLOGY PRACTICUM 3
Supervised experience in the application of laboratory procedures in diagnostic microbiology.
PREREQ: MEDT430 and MEDT431. RESTRICTIONS: Open to Honors students only -- min. 3.0 GPA required. See www.udel.edu/honors for enrollment policies. Requires permission from the instructor. Open to Medical Laboratory Science majors only.

MEDT 479 CLINICAL IMMUNOHEMATOLOGY PRACTICUM 3 PF
Supervised experience in the application of laboratory procedures in immunohematology.
PREREQ: MEDT420 and MEDT421. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 480 SENIOR CAPSTONE 1
Enhances problem-solving skills by integrating multiple clinical laboratory disciplines utilizing literature reviews to assess case studies. Focuses on integration and synthesis of knowledge acquired in previous courses while enhancing written and oral communication and presentation skills. Includes written assessment of all clinical laboratory disciplines.
COREQ: MEDT473, MEDT475, MEDT477, MEDT479. RESTRICTIONS: Open to Medical Laboratory Science majors only.

MEDT 481 HNRS CLINICAL IMMUNOHEMATOLOGY PRACTICUM 3
Supervised experience in the application of laboratory procedures in immunohematology.
PREREQ: MEDT420 and MEDT421. RESTRICTIONS: Open to Honors students only -- min. 3.0 GPA required. See www.udel.edu/honors for enrollment policies. Requires permission from the instructor. Open to Medical Laboratory Science majors only.

MEDT 500 GENETICS AND MOLECULAR DIAGNOSTICS FOR CLINICAL LAB 3
Molecular diagnostics topics emphasize DNA, RNA and protein structure and function, including detailed review of the central dogma. Genetic topics emphasize cell development, chromosome structure and function, and disease inheritance patterns.
PREREQ: BISC208, CHEM104 or equivalents, or by permission of the Department.

MEDT 501 MOLECULAR DIAGNOSTICS 3
Molecular processes required to diagnose inherited disorders, cancer, hematological disorders, and infectious agents. Additionally, the employment of DNA identity based testing in transplantation, paternity testing and forensics will be discussed.
PREREQ: MEDT500. RESTRICTIONS: Minimum grade of C- in MEDT500.

MEDT 502 APPLICATION OF MOLECULAR DIAGNOSTICS TECHNIQUES 3
Molecular techniques commonly employed in the clinical molecular diagnostics laboratory are presented.
PREREQ: MEDT500 and MEDT501. RESTRICTIONS: Minimum grade of C- in MEDT500 and in MEDT501.

MEDT 640 ADVANCED NANOMEDICINE 4
Emphasis is placed on emerging nanotechnologies and biomedical applications including nanomaterials, nanoeengineering, nanotechnology-based drug delivery systems, nano-particle-based imaging, nanodiagnostic systems, nanotoxicology, and translating nanomedicines into clinical research.
PREREQ: BISC208 or CHEM104 or CHEM112 and CHEM120. RESTRICTIONS: Requires permission of Instructor.

MEDT 660 ADVANCED TECHNIQUES IN NANOMEDICINE 4
Emphasis is on nanotechnology-based bio-imaging and chemical and physical approaches used to make functionalized nanoparticles and their characterizations with spectroscopy including Fourier transform infrared spectroscopy, UV and visible spectroscopy, and scanning electron microscopy, transmission electron microscopy, and nuclear magnetic resonance.
PREREQ: BISC208 or CHEM104 or CHEM112 and CHEM120. RESTRICTIONS: Requires permission of Instructor.

MEDT 800 PREPARING RESEARCH PROPOSALS 3
Comprehensive practical experience in the design and writing of research proposals on the level of NIH/NSF grant funding.
RESTRICTIONS: Open to graduate students only.

MEDT 803 GRADUATE RESEARCH SEMINAR 1
Seminar allowing graduate students to report on the progress of their research and discuss the current literature on their research focus.

MEDT 804 GRADUATE RESEARCH SEMINAR 0
Seminar taken after achieving candidacy, allowing graduate students to report on the progress of their research and discuss the current literature on their research focus.
RESTRICTIONS: Open to students following successful completion of their candidacy examination.

MEDT 805 BIOMARKER DEVELOPMENT 3
Focus on the critical thinking processes involved in the development of a diagnostically usable biomarker: target identification, proof of mechanism, proof of concept, treatment/safety monitoring, outcome measurement, predictive value.

MEDT 810 EVIDENCE BASED PRACTICE 3
Theoretical and practical concepts to integrate clinical expertise, patient values, and research evidence into decision making for patient care. Emphasis on efficient literature searching, application of rules of evidence in evaluating the clinical literature, and best study designs for the question to be asked.

MEDT 868 RESEARCH 3
Active involvement in graduate research before completion of required coursework.

MEDT 969 DOCTORAL DISSERTATION 1-9
Independent dissertation research after completion of the Candidacy Examination.
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.
PREREQ: 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 an engineering audience through parametric solid modeling drafting standards and 3) begin to recognize connection between a virtual design and an actual component.

MEEG 211 DYNAMICS 3
Intermediate-level development of the kinematics and dynamics of particle systems and rigid bodies. Solution of engineering problems by force, momentum and energy methods with applications to mechanisms, machines, and vehicles. Computer problems.
PREREQ: Grade of C- or better in MEEG112 or CIEG211.

MEEG 215 MECHANICS OF SOLIDS 3
Analytical study of stresses and deformations and their application to the design of machine and structural elements under axial, torsional, bending and lateral loads. Buckling and energy methods are discussed.
PREREQ: Grade of C- or better in MEEG112 or CIEG211.

MEEG 216 SOLID MECHANICS LAB 1
Mechanics of Solids Laboratory serves to reinforce the theory discussed in Mechanics of Solids lecture through experimental means. The topics studied include: 1) modern measurements and instrument calibration; 2) failure in uniaxial tension; 3) tensile deformation; 4) deformation of composite materials; 5) cantilevered and 3-point beam bending; 6) torsion. The students will learn and reinforce professional skills related to the analysis and communication of technical information.
COREQ: MEEG215.

MEEG 301 MACHINE DESIGN-KINEMATICS AND KINETICS 3
Kinematic analysis of mechanisms and machines, kinematic synthesis, cam design, gear train analysis and machine dynamics.
PREREQ: C- or better in MEEG211 or CIEG311. 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: MEEG301 and C- or better in MEEG215 or CIEG212. COREQ: MEEG202. RESTRICTIONS: Open to majors only.

MEEG 311 VIBRATION AND CONTROL 3
PREREQ: C- or better in MEEG211 or CIEG311. RESTRICTIONS: Open to majors only.

MEEG 312 VIBRATION AND CONTROL LAB 1
Vibration and control lab serves to reinforce the theory discussed in vibration and control lecture through experimental means. The topics studied include: 1) system and parameter identification, (ii) time response of dynamical systems to forcing inputs, (iii) development and testing of controllers, (iv) Frequency response of linear dynamical systems, (v) controller designs. The students will learn and reinforce professional skills related to the analysis and communication of technical information.
COREQ: MEEG311.

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: MEEG302 and a C- or better in MEEG215 or CIEG212. RESTRICTIONS: Open to majors only.

MEEG 331 FLUID MECHANICS I 3
Incompressible fluid mechanics: fluid statics, control volume analysis for mass, momentum and energy; differential analysis of viscous and inviscid flow; dimensional analysis.
PREREQ: MATH 351 and a C- or better in MEEG112 or CIEG211. 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, or CIEG305 in place of MEEG331, and MATH352. RESTRICTIONS: Open to majors only.

MEEG 333 FLUID MECHANICS LAB 3
Introduction to experimental and measurement techniques in fluid mechanics.
COREQ: MEEG331.

MEEG 341 THERMODYNAMICS 3
Basic concepts of thermodynamics including properties of substances and gas mixtures, energy, entropy, and exergy. First and second law analysis of systems and control volumes. Applications to steady-flow devices and systems in power production, propulsion, and air conditioning.
COREQ: MATH351. RESTRICTIONS: Open to majors only.

MEEG 342 HEAT TRANSFER 3
PREREQ: MEEG341 and MATH352. COREQ: MATH353. RESTRICTIONS: Open to majors only.

MEEG 346 THERMAL LABORATORY 3
Introduction to experimental and measurement techniques related to thermodynamics and heat transfer.
PREREQ: MEEG341. COREQ: MEEG342. RESTRICTIONS: Open to majors only.

MEEG 366 INDEPENDENT STUDY 1-6

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

MEEG 402 SENIOR DESIGN - FSAE 6
Capstone engineering practice where teams develop real engineering system designs; discover customer requirements; benchmark best practices; develop engineering specifications; generate concepts; and justify aspecific concept. Design, fabricate, assemble, test and improve an actual prototype. Focus is upon successful competition at the annual spring FSAE competition.
PREREQ: MEEG304. RESTRICTIONS: Open to majors only.

MEEG 403 FORENSIC FAILURE ANALYSIS 3
Study of the application of Mechanical Engineering in forensic investigation and failure analysis. Case study topics include product liability, injury biomechanics, accident reconstruction, structural failure. Discussion on the role of the engineer as an expert witness in the legal system.
RESTRICTIONS: Senior engineering status.

MEEG 413 NANOMATERIALS AND NANOTECHNOLOGY 3
Advanced topics in nanoscience and nanotechnology including nanostructures, nanomaterial synthesis, properties, characterizations, and applications. The emphasis will be to introduce students to the science of the building blocks of nanostructured materials, material behavior when they are assembled, technology for building nanoscale structures and features, nanomaterials for energy conversion and storage, and the technological implications of these nanomaterials and nanotechnologies.

MEEG 414 ANALYSIS OF AIRCRAFT STRUCTURE 3
Deals with analysis and design of flight structures and other light-weight structures. Loads, supports and reactions, constitute equations, and stress and deformation of components for flight vehicles are investigated. Overview of fatigue, vibration (flutter) and instability of structures are given.
PREREQ: MEEG215, or CIEG212 in place of MEEG215.

MEEG 417 COMPOSITE MATERIALS 3
Fiber and matrix materials, fiber-matrix interface, polymer, metal, ceramic and carbon matrix composites, geometric aspects, elastic properties, lamination theory, strength of unidirectional composites, strength of laminates, durability, hybrid composites, flexible composites and textile structural composites.
PREREQ: MEEG215 or CIEG212 or permission of instructor.

MEEG 419 MECHANICAL BEHAVIOR OF MATERIALS AND STRUCTURES 3
Explores how material properties influence structural response and failure mechanisms under the influence of external loads. Includes plasticity; thermal stresses; fracture and damage mechanics; and buckling. Problem solving based on both analytical methods and computational mechanics.
PREREQ: MEEG215, or CIEG212 in place of MEEG215.
MEEG 422 INTERFACE SCIENCE AND ENGINEERING 3
Materials tribology examines the material's response to sliding or tribological contact. Moving systems become immobile when tribological materials fail. Provides an introduction to tribology, imparting a basic understanding of interfacial phenomena, and surveys emerging interface challenges in aerospace, wind power, and osteoarthritis applications.

MEEG 424 VEHICLE DYNAMICS 3
Theory of the dynamics of ground vehicles. Topics include tire adhesion, slip angle, suspension analysis and design, chassis design and aerodynamics with downforce generation. PREREQ: MEEG112 or CIEG111, and MEEG211 or CIEG311. RESTRICTIONS: 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 and MEEG341.

MEEG 432 AERODYNAMICS 3
Theoretical and computational aerodynamics. Review of fluid mechanics. Airfoils and finite wings in incompressible flow. Panel and vortex-lattice methods. Complex variable techniques. Boundary-layer theory. PREREQ: MEEG331 or CIEG305 in place of MEEG331, and MEEG332 or permission of instructor.

MEEG 435 WIND POWER ENGINEERING 3
Includes an historical overview, the energetics of wind power, wind turbine aerodynamics, and the basics of related dynamical, structural and electrical aspects of wind power. There is also a class visit to a nearby wind farm. PREREQ: MEEG332.

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, or CIEG305 in place of MEEG331, and MEEG341 and MEEG342.

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

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

MEEG 451 INTRODUCTION TO MICROSYSTEMS 3
This course examines the mechanical, thermal, optical, fluidic, chemical, and biological devices that can be derived using microfabrication methods. Topics include typical fabrication steps, device physics and mechanics, and a survey of emerging and existing device areas. PREREQ: PHYS202 or PHYS245 or graduate standing.

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

MEEG 455 PRINCIPLES OF COMPOSITES MANUFACTURING 3
Fundamental principles and an application involving composites manufacturing are introduced. Modeling of such processes is emphasized and a specific project is required. Assignments include open-ended problems. Areas of manufacturing include: injection molding, compression molding, filament winding, pultrusion and resin transfer molding. PREREQ: MEEG331 and MEEG342.

MEEG 466 INDEPENDENT STUDY 1-6

MEEG 482 CLINICAL BIOMECHANICS 3
The biomechanics and patho-mechanics of various human musculoskeletal joint systems. Normal joint anatomy and biomechanics; the mechanical effects of pathology and the goals of surgical repairs to counteract them will be explored through in vitro, in vivo and mathematical modeling studies of joint system mechanics.

MEEG 483 ORTHOPAEDIC BIOMECHANICS 3
Anatomy and physiology including microanatomy and mechanics of bone, cartilage, tendon and muscle. Mechanical modeling of body including joint loads, motion analysis, muscle forces and interaction with orthopaedic devices. PREREQ: PHYS201 or PHYS207.

MEEG 484 BIOMATERIALS AND TISSUE ENG APP 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 the neuro-musculo-skeletal system, experimental techniques for study of CNS organization, and coordination principles of simple and complex tasks. PREREQ: PHYS201 or 207, or permission of instructor.

MEEG 486 CELL AND TISSUE TRANSPORT 3
Analysis of water, solute, gas, and heat exchange in microcirculation and relationship between structure and function. Transport in biological porous media examined and applied to arterial wall, bone, and cartilage. Active transport across membranes considered and applied to kidney and secretory organs. Introduction to transport across cell membrane and role of receptors in transport, cell adhesion, and intracellular signaling presented. PREREQ: MEEG331, or CIEG305 in place of MEEG331.

MEEG 600 SEMINAR 0 PF
Lectures by invited scholars on various topics in Mechanical Engineering and related areas.

MEEG 602 INDUSTRIAL DESIGN 3
Provides an introduction to the theory and practice of industrial design - an interdisciplinary field involving the engineering, manufacturing, and business aspects of new product development. Students will apply modeling, prototyping, and testing concepts towards creating a commercially viable product. Crosslisted with ENTR602. PREREQ: ENTR601 or permission from the instructor.

MEEG 603 FORENSIC FAILURE ANALYSIS 3
Study of the application of Mechanical Engineering in forensic investigation and failure analysis. Case study topics include product liability, injury biomechanics, accident reconstruction, structural failure. Discussion on the role of the engineer as an expert witness in the legal system. RESTRICTIONS: Senior engineering status.

MEEG 604 INTEGRATED DESIGN 3
Integrates form (art) and function (engineering) to create user-centered commercial products. Students will work in interdisciplinary teams on design portfolios for industry sponsors. A studio-based course with occasional lectures from faculty and invited guests. PREREQ: MEEG401. RESTRICTIONS: MEEG majors only.

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

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

MEEG 612 BIOMECHANICS OF HUMAN MOVEMENT 3
Mechanics of the musculoskeletal system with an emphasis on the control of human movement. Topics include how the nervous system activates musculature, the mechanical properties of skeletal muscle and mechanisms for controlling limb movement. Applications include gait analysis, sports biomechanics and hand trajectory formation. Involves computer modeling of musculoskeletal systems. PREREQ: PHYS201 or PHYS207 or graduate status.
MEEG 613  **NANOMATERIALS AND NANOTECHNOLOGY**  3
Advanced topics in nanoscience and nanotechnology including nanostructures, nanomaterial synthesis, properties, characterizations, and applications. The emphasis will be to introduce students to the science of the building blocks of nanostructured materials, material behavior when they are assembled, technology for building nanoscale structures and features, nanomaterials for energy conversion and storage, and the technological implications of these nanomaterials and nanotechnologies.

MEEG 614  **ANALYSIS OF AIRCRAFT STRUCTURES**  3
Deals with analysis and design of flight structures and other light-weight structures. Loads, supports and reactions, constitute equations, and stress and deformation of components for flight vehicles are investigated. Overview of fatigue, vibration (flutter) and instability of structures are given.

MEEG 615  **MECHANICAL PROPERTIES OF MATERIALS**  3

MEEG 616  **COMPOSITE MATERIALS STRUCTURES**  3
Introduction to composite materials; anisotropic elasticity and laminate theory; plates and panels of composite materials; beams, columns and rods; composite material shell structures; energy methods; strength and failure theories; adhesive bonding and mechanical fastening; hygrothermal effects; stress analysis, buckling, vibrations and impact.

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

MEEG 619  **MECHANICAL BEHAVIOR OF MATERIALS AND STRUCTURES**  3
Examines how material properties influence structural response and failure mechanisms under the influence of external loads. Includes plasticity; thermal stresses; fracture and damage mechanics; and buckling. Problem solving based on both analytical methods and computational mechanics. PREREQ: MEEG610 or permission of instructor.

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 622  **INTERFACE SCIENCE AND ENGINEERING**  3
Materials tribology concerns the material's response to sliding or tribological contact. Moving systems become immobile when tribological materials fail. This course provides an introduction to tribology, imparts a basic understanding of interfacial phenomena, and surveys emerging interface challenges in aerospace, wind power, and osteoarthritis applications.

MEEG 623  **NONLINEAR DYNAMICS AND CHAOS**  3
Nonlinear dynamics and chaotic phenomenon as applied to natural and engineering systems. Geometric and computational techniques, analytical methods for the qualitative analysis of dynamical systems modeled by differential equations and iterated maps. Planar and non-planar phase space analysis, local and global bifurcation analysis, catastrophes, resonances. PREREQ: MATH351 or graduate status.

MEEG 624  **CONTROL OF DYNAMIC SYSTEMS**  3
State-space analysis of linear dynamical systems. Solution of state-space equations, and analysis of structural system properties based on eigenvalues and eigenvectors. Similarity transformations and decompositions. Lyapunov stability. Observability and controllability. State feedback control design. May be crosslisted with ELEG624. PREREQ: MATH349 or MATH351 or graduate status.

MEEG 630  **INTERMEDIATE FLUID MECHANICS**  3

MEEG 635  **WIND POWER ENGINEERING**  3
Lecture course on engineering aspects of modern large wind turbines.

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 638  **COMPUTATIONAL MULTIPHASE FLOW**  3
Overview of computational methods for multiphase flow involving moving solid boundaries and deformable fluid-fluid interfaces. Example codes to study physical and numerical issues such as numerical convergence, accuracy and stability. PREREQ: MEEG332 or MEEG630 or permission of instructor.

MEEG 640  **INTERMEDIATE HEAT TRANSFER**  3
Theory and equations of heat conduction, boundary conditions, steady and transient heat conduction, theory of convection, forced convection in laminar flows, derivation of conservation equations, numerical methods.

MEEG 642  **INTRODUCTION TO FUEL CELLS**  3
Basic principles of fuel cells, fuel cell types and their applications, fuel processing and hydrogen storage.

MEEG 651  **INTRODUCTION TO MICROSYSTEMS**  3
This course examines the mechanical, thermal, optical, fluidic, chemical, and biological devices that can be derived using modern microfabrication methods. Topics include typical fabrication steps, device physics and mechanics, and a survey of existing and emerging device areas. PREREQ: PHYS620 or PHYS245 or graduate standing.

MEEG 653  **MANUFACTURING PROCESSES AND SYSTEMS**  3
Explains key concepts and elements of a basic processes (metal cutting, forming, plastic molding), technologies (robotics, ergonomics, material handling, quality management, machine vision), industries/systems (pharmaceutical, automotive, packaging, food, and current advances (lean mfg., just-in-time). PREREQ: MEEG321 or graduate status.

MEEG 655  **PRINCIPLES OF COMPOSITES MANUFACTURING**  3
Fundamental principles involved in composites manufacturing are introduced. Modeling of such processes emphasized with applications of injection molding, compression molding, filament winding, pultrusion and resin transfer molding. PREREQ: MEEG332 and MEEG342.

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

MEEG 683  **ORTHOPEDIC BIOMECHANICS**  3
Anatomy and physiology including microanatomy and mechanics of bone, cartilage, tendon and muscle. Mechanical modeling of body including joint loads, motion analysis, muscle forces and interaction with orthopedic devices.
MEEG 684 BIOMATERIALS AND TISSUE ENG APP 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 the neuro-musculo-skeletal system, experimental techniques for study of CNS organization, and coordination principles of simple and complex tasks.
PREREQ: PHYS201 or PHYS207 or graduate status.

MEEG 686 CELL AND TISSUE TRANSPORT 3
Analysis of water, solute, gas, and heat exchange in microcirculation and relationship between structure and function. Transport in biological porous media examined and applied to arterial wall, bone, and cartilage. Active transport across membranes considered and applied to kidney and secretory organs. Introduction to transport across cell membrane and role of receptors in transport, cell adhesion, and intracellular signaling presented.

MEEG 690 INTERMEDIATE ENGINEERING MATHEMATICS 3

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

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

MEEG 817 COMPOSITE MATERIALS 3
Introduction, thermoelastic behavior of laminated composites, statistical strength theorems of continuum-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 fiber and matrix. May be crosslisted with MSEG817. PREREQ: MEEG610.

MEEG 818 PLATES AND SHELLS IN AEROSPACE STRUCTURES I 3

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

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

MEEG 829 APPLIED NONLINEAR CONTROL 3

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

MEEG 833 MESOSCOPIC CFD METHOD 3
Introduction to lattice Boltzmann equation and its applications as a numerical approach to single and multiple-phase flows. Relationships between mesoscopic operation rules and macroscopic Navier-Stokes equations. Treatment of complex boundary conditions and multiscale fluid-fluid and fluid-particle interfaces. Examples of lattice-Boltzmann computer simulations. May be crosslisted with MAST833.

MEEG 837 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 840 SPECIAL TOPICS IN CONTINUUM MECHANICS 3
Study of advanced principles of continuum mechanics in one or more special fields. Topics selected by instructor. Special subjects may include the general theory of constitutive equations, hyperelasticity, electroelasticity, hypoelasticity, simple and nonsimple fluids, and solutions of special problems in these areas.

MEEG 868 RESEARCH 1-9
Experimental investigation conducted for the purpose of contributing new useful data and theory in some field of mechanical engineering. Although supervised, investigation is independent in character to encourage development of initiative.

MEEG 874 DIFFERENTIALLY FLAT SYSTEMS 3
Nonlinear dynamic systems. Examples from robotics and physical processes, Linear time-invariant SISO and MIMO systems, Nonlinear time-invariant SISO and MIMO systems, Mobile robots and non-holonamic systems. Non differentially flat systems.

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

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

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

MEEG 969 DOCTORAL DISSERTATION 1-12 PF

MANAGEMENT INFORMATION SYSTEMS

MISY 160 BUSINESS COMPUTING: TOOLS AND CONCEPTS 3
Introduction to computers: components and operations. Introduction to management information/decision support systems and the system development process. Emphasis on microcomputers and software packages used in business.

MISY 225 INTRODUCTION TO PROGRAMMING BUSINESS APPLICATIONS 3
Use of higher level contemporary computing languages to structure Prototyping applications of systems. PREREQ: MISY160 or CISC101. RESTRICTIONS: Not open to CIS majors in the MIS minor.

MISY 261 BUSINESS INFORMATION SYSTEMS 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
Covers the design and implementation of enterprise databases in the business environment. A networking setting and its effect on database management will be emphasized. PREREQ: MISY225, MISY261 or CISC181. RESTRICTIONS: MIS majors and minors only. Not open to computer science majors in the MIS minor.
MISY 340 **EMERGING TECHNOLOGIES** 3
Businesses need to learn how to leverage new technologies to be effective. Explores emerging technologies, both from a technical and a managerial perspective. Focus will be on using technology to improve business processes and solve business problems.
PREREQ: MISY225 or CISC181

MISY 350 **WEB DESIGN** 3
Covers concepts related to client side development, including cascading style sheets and JavaScript.
PREREQ: MISY225

MISY 360 **WEB DEVELOPMENT** 3
Programming Concepts for creating data-driven, web-based applications, including object oriented programming, XML, and service-oriented architecture.
PREREQ: MISY225 and MISY330.

MISY 364 **MANAGEMENT INFORMATION SYSTEMS IN PRACTICE** 3
Requires at least 120 hours of MIS-related assignments in an internship, verified by the hiring company. A term paper relating the real world duties and responsibilities of the internship to principles learned in traditional MIS classes is required.
PREREQ: MISY330

MISY 366 **INDEPENDENT STUDY** 1-6

MISY 370 **LARGE IT PROJECTS: BUSINESS AND IT VIEW** 3
Exposes students to challenges of large IT projects from two perspectives: the software development life cycle and the business modeling of IT projects. Students learn to model the value of IT, measure IT risk and how the software development life cycle operates.
PREREQ: MISY300 and MISY330. RESTRICTIONS: Open only to MIS Majors and GET Minors in the Immersion Program.

MISY 375 **GET IMMERSION EXPERIENCE INTERNSHIP** 3
Fully supervised internship within a large and complex enterprise over an 8 month period of time. Documented project deliverables and learning outcomes. Students complete a learning contract with their on-site manager, participate in scheduled residencies with university faculty and review process with a faculty advisor.
PREREQ: MISY300 and MISY330. RESTRICTIONS: Open to MIS Majors and GET Minors Only.

MISY 380 **ENTERPRISE RESOURCE PLANNING SYSTEMS** 3
Focuses on large scale enterprise resource planning systems, their development, functionality, and implementation. Students configure a company on a live system. Delivery of ERP systems, such as hosted environments, is explored, as well as, business intelligence tools for analysis of enterprise data.
PREREQ: MISY300 and MISY330. RESTRICTIONS: Open to MIS Majors and GET Minors Only.

MISY 385 **INTEROPERABLE INFORMATION SYSTEMS** 3
Focuses on the development of interoperable information systems. Coverage will include: syntactic interoperability (exchanging data), semantic interoperability (the interpretation of information), open source software, and standards such as XML.
PREREQ: MISY225 or MISY261. RESTRICTIONS: Open to MIS majors and minors, Information Systems majors and GET minors only.

MISY 395 **GLOBAL ISSUES IN INFORMATION TECHNOLOGY** 3
Selected information technology topics facing global organizations are explored. Emphasis placed on enterprise systems and challenges of managing global systems. Company visits abroad deliver this perspective.
RESTRICTIONS: Taught abroad.

MISY 420 **GLOBAL IT ENABLED INNOVATION AND CHANGE** 3
Student interns learn how to develop a strategic approach to technology innovation and change; understand organizational implications of innovation; present innovative ideas to senior management. Learn to understand the use of IT to solve a problem or create a competitive advantage.
PREREQ: MISY300 and MISY330. COREQ: MISY421. RESTRICTIONS: Open only to MIS Majors and GET Minors in the immersion program.

MISY 421 **GLOBAL BUSINESS COMMUNICATIONS** 3
Principles and practices for effective communication and collaboration in a global enterprise, includes formal presentations, conducting meetings, preparing written summaries and providing clear electronic messaging. Integrates theoretical foundations and practical guidance with real world experiences in communicating effectively in the global workplace.
PREREQ: MISY300 and MISY330. COREQ: MISY420. RESTRICTIONS: Open to MIS Majors and GET Minors Only.

MISY 427 **MANAGEMENT OF INFORMATION SYSTEMS** 3
Explores practical applications of information technology in all aspects of management including organizational behavior, human resource management, international management and strategic decision making. Issues of managing emerging technologies, integrating technologies with people, organizational culture and structure and strategic decision making will be discussed.
PREREQ: BUAD309. RESTRICTIONS: Open to management and MIS majors only.

MISY 430 **SYSTEMS ANALYSIS AND IMPLEMENTATION** 3
Covers the challenges of developing and managing systems analysis and design projects. Students learn to determine systems requirements, analyze systems problems, model potential solutions and design and implement these solutions. Other current topics will be included to reflect the changing information systems environment.
PREREQ: MISY330 or CISC437. RESTRICTIONS: Open to MIS majors and minors and INSY majors only.

MISY 431 **MIS PROJECT MANAGEMENT** 3
MISY310 and MISY321 serve as the MIS program capstone. Students learn project management techniques, and working in teams, apply this knowledge by developing technology-based business solutions for various enterprises.
PREREQ: MISY430 COREQ: MISY432 RESTRICTIONS: MIS Majors and Minors only.

MISY 432 **MIS PROJECTS** 3
MISY310 and MISY321 serve as the MIS program capstone. Students learn project techniques, and working in teams, apply this knowledge by developing technology-based business solutions for various enterprises.
PREREQ: MISY430 COREQ: MISY432 RESTRICTIONS: Open to MIS Majors and Minors only.

MISY 465 **INTRODUCTION TO CYBERSECURITY** 3
This cybersecurity course is an introduction to computer and network security and covers the foundation security policies and methods to provide confidentiality, integrity, and availability, as well as cryptography, auditing, and user security. Topics are reinforced with hands-on exercises run in a virtual machine environment.
Crosslisted with CPEG465.

MISY 466 **INDEPENDENT STUDY** 1-6

MISY 665 **INTRODUCTION TO CYBERSECURITY** 3
Introduction to computer and network security and covers the foundation security policies and methods to provide confidentiality, integrity, and availability, as well as cryptography, auditing, and user security. Topics are reinforced with hands-on exercises run in a virtual machine environment.
Crosslisted with CPEG665.

MISY 810 **TELECOMMUNICATIONS AND NETWORKING** 3
Leadership skills in information technology, telecommunications and internet technology for technology management. Introduces concepts in data and image compression, digital audio and digital cellular telephony. Provides fundamental knowledge of transmission and storage technology and a system-level understanding of computer networks and the internet.

MISY 830 **BUSINESS INTELLIGENCE AND ANALYTICS** 3
Considers how to structure and define complex business decision problems; the analytical framework and techniques required to understand the problem; where the data needed for the analysis resides in the organization and the tools and techniques needed to obtain it.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

MISY 831 **ENTERPRISE INFORMATION SYSTEMS** 3
Focus on the various technologies and implementation issues of enterprise information system (EIS). Students will learn the critical role of EIS in business organizations, the interplay between business processes and EIS, how to use and configure an EIS, and the best practices in managing an EIS. (Primary designation MISY; secondary designation FSAN. May be crosslisted with FSAN31.

MISY 840 **PROJECT MANAGEMENT AND COSTING** 3
Provides the technical knowledge and skills needed to successfully plan, execute and evaluate IT projects. Strong emphasis on the costing of IT projects.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

MISY 850 **SECURITY AND CONTROL** 3
Considers state-of-the-art technological and organizational approaches to enhancing the security and integrity of corporate information resources in a cost-effective manner.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.
MISY 865 SEMINAR 1-12
Taught from an IT perspective and provides a background for understanding the 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 the M.S. in Information Systems and Technology Management program.

MISY 870 HIGH TECHNOLOGY SEMINARS 2
Explores how information technologies to enhance the strategic goals of the organization. Examines the relationship between broad strategic goals and organizational mission, and specific tactical IT responses. Considers the strategic importance of ERP, CRM, corporate intelligence, knowledge sharing, etc.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

MISY 871 MS IN IS&T/M RESEARCH PROJECT 1
This class involves an independent research project under the supervision of an MIS faculty member chosen by the student.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

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

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

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

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

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

MLSC 366 INDEPENDENT STUDY 1-3

MATERIALS SCIENCE AND ENGINEERING

MSEG 288 NANOTECH IN THE NEWS 3
Provides an exposure to nanotechnology and engineering as it impacts daily life. Based on current topics in the news, we discuss the underlying science in an approachable manner and consider the relevant societal, economic, and ethical issues. Students will leave with a greater understanding of the emerging technologies that shape our society. May be crosslisted with EGGG288.

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 or 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 the micromechanical and thermomechanical response of composite materials. Execution and assessment of experiments conducted to investigate strength and stiffness characteristics of composite materials.

MSEG 420 CAREER SURVIVAL OUTSIDE THE UNIVERSITY 1
Provides mechanisms to overcome cultural barriers existing between university and industrial cultures. Topics include leadership vs. management, professional and cultural ethics, individual responsibility vs. teamwork, and networking and mentorship in accomplishing career goals. Includes guest speakers from local industries, technical writing and oral communication exercises.

MSEG 422 CHARACTERIZATION OF ELECTRONIC MAT AND DEV 3
Focus on the fundamentals and practical considerations of the myriad techniques which are used to characterize electronic materials. Explore the theoretical underpinnings of the techniques and discuss applicability and limitations. May be crosslisted with ELEG425.
MSEG 425 Entrepreneurship and Risk: Meeting the Challenges 3
Deals with critical financial, legal, scientific and engineering issues confronted during initial planning stages of high technology start-up enterprise. Range of speakers from finance, marketing, engineering, law and early- and late-stage start-up companies provide perspective on challenges of launching new business venture. Work in cross-disciplinary teams to develop R&D strategic and business plan for new high tech product offering.

MSEG 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 theories of elements of semiconductors, emphasizing unique properties at micro- and nanometer scale. Reviews basic properties of bulk semiconductors and discusses how these properties modify at the micro- and nano-meter 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 undergraduates (at 4xx level) and graduates (at 6xx level) in materials science and engineering, electrical engineering, and physics.

MSEG 443 Ethics in Nanoscience 3
Investigates the societal, environmental, and ethical issues that come out of rapid advances in nanotechnology. The current status of nanotechnology and basic concepts and theories of ethics are presented and overlaid to critically reflect on the future of responsible technological development in this area.

MSEG 446 Senior Research 1-6
Research general areas of materials science and/or engineering under the direction of a member of the materials science faculty or other faculty in science or engineering subject to the approval of the materials science chair.
RESTRICTIONS: Open to seniors only. Science background required.

MSEG 455 Nanophotonics: Materials and Devices 3
Explores materials and device theories for nanophotonics which deals with optical phenomena at length scales comparable or much smaller than the conventional diffraction limit. Topics include optical absorption/scattering processes in the nanoscale, resonant cavities, quantum emitters, plasmonics, and metamaterials.
PREREQ: Quantum Mechanics or Equivalent: MSEG608 or Equivalent.

MSEG 460 Biomaterials and Tissue Engineering 3
Explores the principles and methodologies of tissue engineering with polymeric biomaterials. Both biological and materials science concepts will be introduced. Specific topics include cell growth and differentiation, extracellular matrix composition and properties, polymerization methods, polymer characterization methods and mechanical properties, and drug delivery.
RESTRICTIONS: Students are expected to have a basic knowledge of organic chemistry and biology prior to enrollment in this course.

MSEG 466 Independent Study 1-6

MSEG 470 Solar Energy 3
Considers the basics of solar energy utilization. Emphasis on photovoltaic systems, including inorganic and organic based systems, as well as hybrid solar cells, followed by consideration of passive and active usage such as solar thermal power.

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: MSEG307.

MSEG 605 Nanophotonics: Materials and Devices 3
The course covers materials and device theories for nanophotonics which deals with optical phenomena at length scales comparable or much smaller than the conventional diffraction limit. Key topics of the course include optical absorption/scattering processes in the nanoscale, resonant cavities, quantum emitters, plasmonics, and metamaterials.
PREREQ: MSEG 640 or equivalent.

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 permission 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 PHY208.

MSEG 608 Structure and Properties of Materials I 3
Introduces general principles of material structure and properties, including chemical and physical bonding, crystal structure, lattices, energy levels, and materials synthesis and chemistry. Introduces the fundamental structure and properties of polymer, solid state and composite materials. Includes a significant laboratory component.

MSEG 609 Structure and Properties of Materials II 3
Introduces mechanical, thermal, electrical, optical, magnetic and biological properties of materials. Considers polymer, solid-state, and composite materials and discusses engineering of material properties via structure, composition, and processing.
PREREQ: MSEG608.

MSEG 610 Experimental Mechanics of Composite Materials 3
Study of the micromechanical and thermostrechnical response of composite materials. Execution and assessment of experiments conducted to investigate strength and stiffness characteristics of composite materials.

MSEG 615 Mechanical Properties of Materials 3
RESTRICTIONS: Requires graduate status.

MSEG 616 Chemistry and Physics of Surfaces and Interfaces 3
Fundamental and engineering aspects of metal, semiconductor, and oxide surfaces; their structure and defects, characterization, electronic properties, adsorption and reaction kinetics and thermodynamics. Applications to catalysis, microelectronics, and environment sensitive behavior.
Crosslisted with CHEG616. PREREQ: CHEG332 and CHEM444.
RESTRICTIONS: Open to seniors and graduate students only.

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 622 Characterization of Electronic Mat & Dev 3
Focus on the fundamentals and practical considerations of the myriad techniques which are used to characterize electronic materials. Explore the theoretical underpinnings of the techniques and discuss applicability and limitations. May be crosslisted with ELEG625.

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

MSEG 625 Entrepreneurship and Risk: Meeting the Challenges 3
Deals with critical financial, legal, scientific and engineering issues confronted during initial planning stages of high technology start-up enterprise. Range of speakers from finance, marketing, engineering, law and early- and late-stage start-up companies provide perspective on challenges of launching new business venture. Work in cross-disciplinary teams to develop R&D strategic and business plan for new high tech product offering.
MSEG 640 APPLIED QUANTUM MECHANICS I 3
Focuses on the fundamentals of quantum mechanics, such as Schroedinger’s equation, eigenfunctions and eigenvalues, operators, Dirac notation, quantum wells and tunneling, harmonic oscillators, perturbation theory and approximation methods, and the application of quantum mechanics in crystalline materials.

MSEG 641 NANOMATERIALS AND THIN FILM PROCESSES 3
Includes physical and chemical vapor deposition processes. Topics selected from Vacuum Science and Technology, Thin-Film Evaporation Processes, Discharges, Plasmas, Ion-Surface Interactions, Chemical Vapor Deposition, Laser Ablation, Substrate Surfaces and Thin-Film Nucleation, Epitaxy, Film Structure, Characterization of Thin Films and nanostructures, etc. Crosslisted with PHYS641.

MSEG 643 ETHICS IN NANOSCIENCE 3
The course investigates the societal, environmental, and ethical issues that come out of rapid advances in nanotechnology. The current status of nanotechnology and basic concepts and theories of ethics are presented and overlaid to critically reflect on the future of responsible technological development in this area.

MSEG 650 TOPICS IN RENEWABLE ENERGY 3
Technical analyses of renewable energy systems, particularly solar and hydrogen. Determination of energy payback, application, and efficiency of energy systems, economics, and policy. Problem based learning, with students expected to complete several group project.

MSEG 655 NANOPHOTONICS: MATERIALS AND DEVICES 3
Explores materials and device theories for nanophotonics which deals with optical phenomena at length scales comparable or much smaller than the conventional diffraction limit. Topics include optical absorption/scattering processes in the nanoscale, resonant cavities, quantum emitters, plasmonics, and metamaterials. PREREQ: Quantum Mechanics or Equivalent: MSEG608 or Equivalent.

MSEG 660 BIOMATERIALS AND TISSUE ENGINEERING 3
This course covers the principles and methodologies of tissue engineering with polymeric biomaterials. Both biological and materials science concepts will be introduced. Specific topics include cell growth and differentiation, extracellular matrix composition and properties, polymerization methods, polymer characterization methods and mechanical properties, and drug delivery. RESTRICTIONS: Students are expected to have a basic knowledge of organic chemistry and biology prior to enrollment in this course.

MSEG 666 SPECIAL PROBLEM 1-12

MSEG 670 SOLAR ENERGY 3
Considers the basics of solar energy utilization. Emphasis on photovoltaic systems, including inorganic and organic based systems, as well as hybrid solar cells, followed by consideration of passive and active usage such as solar thermal power.

MSEG 803 EQUILIBRIA IN MATERIAL SYSTEMS 3

MSEG 804 KINETICS IN MATERIAL SYSTEMS 3

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

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

MSEG 815 ETHICS, BUSINESS AND COMMUNICATION 3
Provides professional development in ethics, business and communication related to systems biology research applications in stem cell, tissue engineering, and drug delivery technologies. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF815.

MSEG 816 SYSTEMS BIOLOGY OF CELLS IN ENGINEERED ENVIRONMENTS 3
Provides a technical review of systems biology approaches including genomics, transcriptomics, proteomics, metabolomics, and bioinformatics as well as applications in tissue engineering, stem cell differentiation, and drug delivery. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF816.

MSEG 821 COMPOSITE MATERIALS 3

MSEG 823 TRANSMISSION ELECTRON MICROSCOPY IN MATERIALS SCIENCE 3

MSEG 832 PRINCIPLES OF POLYMERIZATION 3
Provides background in the theoretical and synthetic considerations of polymer synthesis. Topics include theoretical descriptions of molecular weight distributions, step growth polymerizations, chain growth polymerizations, living polymerizations, as well as chemical strategies for the production of various polymers. Specialized topics in the current polymer chemistry literature may also be discussed.

MSEG 833 POLYMER SYNTHESIS AND CHARACTERIZATION LAB 3
Provides direct laboratory experience with the synthesis of a variety of conventional polymers via step growth, radical, and ionic polymerization methods. Polymers synthesized are also characterized via common polymer characterization methods such as IR spectroscopy, gel permeation chromatography, differential scanning calorimetry, and NMR spectroscopy. PREREQ: MSEG832 (COREQ: MSEG832).

MSEG 835 PRINCIPLES TO POLYMER PHYSICS 3
Chain statistics, thermodynamics, and kinetics are discussed in the context of modern polymer physics characterization techniques, such as dynamic and static light scattering and elastic/inelastic neutron scattering.

MSEG 841 SOLID STATE MATERIALS I 3
Structure and properties of solid-state materials, including inorganic atomic structure and lattices, calculation of three-dimensional energy bands and band gaps, calculation of density of states, derivation of physical properties from the density of states, electronic properties of materials, models for approximating band structure and phonons. PREREQ: MSEG609 and MSEG640.

MSEG 842 SOLID STATE MATERIALS II 3
Properties of solid-state materials, including magnetic properties, optical properties, electrical properties, scattering and tunneling transport. Introduction to semiconductor devices and low-dimensional structures. PREREQ: MSEG841.
### MUSEUM STUDIES

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSST 385</td>
<td>HISTORY BEHIND THE SCENES</td>
<td>1-6</td>
<td>Explore how history is presented to public audiences in a variety of settings (museums and historic sites, archives, public gardens) and media (documentaries, digital media). Field trips and discussion with professionals. Topics may also include art history, historical anthropology and natural history. Crosslisted with HIST385. RESTRICTIONS: Departmental permission.</td>
</tr>
<tr>
<td>MSST 403</td>
<td>HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS</td>
<td>3</td>
<td>Introduction to philosophy, purposes, structure, historical development and future of museums, and botanical and zoological gardens. Examines functions of collection, conservation, research, exhibition/interpretation, and social/cultural services; museum field growth. May be crosslisted with ARTH403, HIST403.</td>
</tr>
<tr>
<td>MSST 408</td>
<td>PUBLIC HISTORY: RESOURCES, RESEARCH AND PRACTICE</td>
<td>3</td>
<td>Team-taught seminar that acquaints students with the function and resources of American historical organizations and how to use these resources in the non-academic setting for productive historical research. Addressed to those pursuing careers in public history and teaching and scholarship. Crosslisted with HIST408.</td>
</tr>
<tr>
<td>MSST 463</td>
<td>HISTORICAL ARCHAEOLOGY AND THE PUBLIC</td>
<td>3</td>
<td>Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation. Crosslisted with ANTH463.</td>
</tr>
<tr>
<td>MSST 464</td>
<td>MUSEUM STUDIES INTERNSHIP</td>
<td>3</td>
<td>Internship placement supplementing theoretical and methodological background in administration, collections management, exhibition, research, interpretation, and public programming and services of museums. Students intern at the University museum or other acceptable museum, related institution or organization in the United States. PREREQ: MSST403.</td>
</tr>
<tr>
<td>MSST 600</td>
<td>INTRODUCTION TO MUSEUMS: HISTORY AND PROFESSIONAL PRACTICE</td>
<td>3</td>
<td>Core course for the Museum Studies Certificate Program. Introduction to the history of museums and examines selected current issues in museum professional practice. Content may offer discussion of issues in collecting and exhibition practice, education and audience development, evolving professional ethics, and museum governance. RESTRICTIONS: Open to graduate students only. Students who are not seeking the certificate in Museum Studies must have the instructor’s permission to register.</td>
</tr>
<tr>
<td>MSST 601</td>
<td>CURATORSHIP AND COLLECTIONS MANAGEMENT</td>
<td>3</td>
<td>Theory and practice in curatorial collecting and collections management. Topics include the ethical framework and legal requirements of collecting by not-for-profit organizations; research techniques to support collecting and collection documentation; the legal requirements and best practices of collections administration; care and handling requirements; and decision making for conservation. Combines classroom instruction, demonstrations and field trips with &quot;hands on&quot; projects. RESTRICTIONS: Open to graduate students only.</td>
</tr>
<tr>
<td>MSST 602</td>
<td>CURATORSHIP AND MANAGEMENT OF ARCHIVES AND PAPER COLLECTIONS</td>
<td>3</td>
<td>PF</td>
</tr>
<tr>
<td>MSST 603</td>
<td>MUSEUMS AND MODERN TECHNOLOGY</td>
<td>3</td>
<td>Examines the use of digital technology in museums. Topics include communication strategies, digital image processing, collections databases, geographic information systems, CAD, animation, exhibitions, and web design. Students will plan and prepare a web site that deals with a museum-related topic. RESTRICTIONS: Open to graduate students only.</td>
</tr>
<tr>
<td>MSST 605</td>
<td>HISTORICAL PROPERTIES</td>
<td>3</td>
<td>Administration and interpretation of historical properties, including historic site surveys, preservation research, building restoration, conservation techniques and the establishment and attainment of interpretive objectives. Field trips to area historic sites. Combines classroom instruction and work projects at area historic sites. RESTRICTIONS: Open to graduate students only.</td>
</tr>
<tr>
<td>MSST 606</td>
<td>ISSUES IN AMERICAN MATERIAL CULTURE</td>
<td>3</td>
<td>Studies major themes in American material culture of the 17th, 18th or 19th centuries. Topics vary. Crosslisted with EAMC606. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>MSST 607</td>
<td>MUSEUM EDUCATION AND INTERPRETATION</td>
<td>3</td>
<td>The theory, strategies, practices, evaluation and administration of learning in a museum environment with emphasis on interpretation of collections through a variety of instructional means. Lectures, discussions, field trips, program planning, curriculum development, proposal writing, audience studies, practice teaching and special project work area museums. RESTRICTIONS: Open to graduate students only.</td>
</tr>
<tr>
<td>MSST 610</td>
<td>EXHIBITIONS</td>
<td>3</td>
<td>Best practices in planning, scripting, designing, fabricating, and evaluating exhibitions in museums, libraries, and related venues. RESTRICTIONS: Graduate students only. By permission of instructor.</td>
</tr>
<tr>
<td>MSST 629</td>
<td>THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING</td>
<td>3</td>
<td>Examines the historic preservation planning process, the theory supporting this process and contemporary practices. Case studies used to demonstrate the integration of theory and practice. Crosslisted with UAPP629.</td>
</tr>
<tr>
<td>MSST 654</td>
<td>VERNACULAR ARCHITECTURE</td>
<td>3</td>
<td>Study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship. Crosslisted with UAPP654.</td>
</tr>
<tr>
<td>MSST 663</td>
<td>HISTORICAL ARCHAEOLOGY AND THE PUBLIC</td>
<td>3</td>
<td>Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation. Crosslisted with ANTH663.</td>
</tr>
<tr>
<td>MSST 804</td>
<td>MUSEUM INTERNSHIP</td>
<td>3</td>
<td>Internship practice in administration, collections management, exhibition and interpretation at museums and related institutions. Students spend ten full weeks, or the equivalent, at the University museum, Winterthur Museum, Hagley Museum, Longwood Gardens or other acceptable institution. May be crosslisted with HIST804. RESTRICTIONS: Open to graduate students only. Requires at least one semester course in museum studies and permission of instructor.</td>
</tr>
</tbody>
</table>

### MUSIC EDUCATION

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUED 166</td>
<td>SPECIAL PROBLEM</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>MUED 178</td>
<td>CLASS GUITAR FOR EDUCATION</td>
<td>1</td>
<td>Basic strumming, improvisation, beginning solos, and classical techniques. Students will be required to develop a syllabus for teaching a one-semester guitar class for middle school. PREREQ: MUSC177 or permission of instructor based on musical background. RESTRICTIONS: Open to education majors only, but not limited to music majors.</td>
</tr>
</tbody>
</table>
MUSC 100 REPERTOIRE ATTENDANCE 0 PF
A recital experience; see Department of Music Student Handbook for details.
RESTRICTIONS: May be repeated. Offered in fall and spring semesters.

MUSC 101 APPRECIATION OF MUSIC 3
Introduction to Western music literature through a nontechnical presentation of various musical styles and forms.
RESTRICTIONS: Not open to music majors. Offered in fall and spring semesters.

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

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

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

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

MUSC 107 HISTORY OF ROCK 3
The study of various styles of rock music. Introduction to folk, country, blues, and jazz as predecessors to rock. Intended for the non-music major. No music reading skills required. May be crosslisted with BAMS107.

MUSC 108 UNIVERSITY SINGERS 0-1
Members enter by audition: A chorus of sopranos and altos that performs its own concerts and may also perform with other choirs.
RESTRICTIONS: 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. May be repeated for credit. Offered

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

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

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 Renaissance to works by contemporary composers. Additional emphasis given to fostering healthy vocal production and development of sight singing skills.
PREREQ: Audition/permission of instructor. RESTRICTIONS: May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during

MUSC 112 UNIVERSITY STRINGS 0-1
A music ensemble for string instrument players who are not in Symphony Orchestra. No audition required. One performance per semester. May be repeated for credit.
RESTRICTIONS: Students may enroll for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 113 MARCHING BAND 1
RESTRICTIONS: Contact the Director for detailed information. All interested percussionists, colorguard and twirlers must audition. May be repeated for credit. Offered in fall semester only.
MUSC 114  SYMPHONIC BAND  0-1
Sixty-five to 70 member ensemble performs standard concert literature as well as new compositions.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally appro

MUSC 115  WIND ENSEMBLE  0-1
Select 45-member group of woodwind, brass and percussion players that performs original band music, chamber music and transcriptions.
RESTRICTIONS: Requires audition and may be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally appro

MUSC 116  JAZZ ENSEMBLE  0-1
Study and performance of the diverse styles characteristic of the medium.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally appro

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

MUSC 118  PERCUSSION ENSEMBLE  0-1
Study and performance of works for percussion instruments.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally appro

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: Requires audition and may be repeated for credit. Offered in spring semester only. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally appro

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: Requires audition and may be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally appro

MUSC 124  STEEL BAND: ADVANCED ENSEMBLE  0-1
Traditional Caribbean Steel Drum ensemble. Students rehearse and perform music of the Caribbean tradition.
PREREQ: MUSC123 or permission of instructor. RESTRICTIONS: Permission of instructor students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally appro

MUSC 125  COLLEGIUM MUSICUM  0-1
Ensemble for the performance of instrumental and vocal music of the Medieval, Renaissance and Early Baroque periods. Size, instrumentation and repertoire for the group varies from semester to semester dependent upon resources at hand, players’ skills and other factors.
PREREQ: Audition RESTRICTIONS: May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally appro

MUSC 126  CHAMBER ORCHESTRA  0-1
A small, highly select group of orchestral musicians. The group performs one program of challenging, sophisticated music each semester both on and off campus. Audition required. May be repeated for credit.
RESTRICTIONS: Students may enroll 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 appro

MUSC 150  FRESHMAN HONORS PRIVATE STUDY  1
Private study for qualified freshman honors students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: Requires audition. RESTRICTIONS: Restricted to freshman honors students only. May be repeated for credit. Offered in fall and spring semesters. Must be enrolled in a departmentally approved ensemble.

MUSC 151  PRIVATE STUDY FOR BACHELOR OF MUSIC I  2
Private study for freshmen bachelor of music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: Admission and acceptance into Bachelor of Music program. COREQ: One of MUSC108, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC231. RESTRICTIONS: For bachelor of music students only. Offered in fall and spring semesters.

MUSC 152  PRIVATE STUDY FOR BACHELOR OF MUSIC II  2
Continuing private study for freshman bachelor of music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC151 with a grade of C- or better. COREQ: One of MUSC108, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC231. RESTRICTIONS: or bachelor of music students only. Offered in fall and spring semesters.

MUSC 153  PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS I  2
Private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: Admission and acceptance into bachelor of arts (Music) or music minor. COREQ: One of MUSC108, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC231. RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered in fall and spring semesters.

MUSC 154  PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS II  2
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC153 with a grade of C- or better. COREQ: One of MUSC108, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC231. RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered in fall and spring semesters.

MUSC 155  PRIVATE STUDY FOR SECONDARY AND MERIT I  1
Private study for music majors pursuing a secondary area, and qualified students not enrolled in a music degree program. Student adds to course title the branch of study elected: piano, organ, voice, or orchestral instrument. Includes a one-hour studio class.
COREQ: One of MUSC108, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC231. RESTRICTIONS: Requires audition and permission of instructor. Offered in fall and spring semesters.

MUSC 171  DICTION: ENGLISH AND ITALIAN  1
Study of pronunciation rules for singing in English and Italian. Includes practicum. RESTRICTIONS: Restricted to applied music/voice majors. Offered in fall semester only.

MUSC 174  CLASS VOICE: BEGINNING  1
Fundamentals of singing for nonvocal music major. Study of basic technique, repertoire and function of voice mechanism.
PREREQ: Requires one semester of University vocal experience. RESTRICTIONS: Open to instrumental music education majors only. Offered in spring semester only.

MUSC 175  CLASS PIANO: ELEMENTARY I  1
Beginning piano primarily for the vocal or instrumental music major. Basic techniques, reading, transposition and playing by ear.
RESTRICTIONS: Preference for enrollment given to music majors and minors. Nonmusic majors require permission of instructor. Offered in fall semester only.

MUSC 176  CLASS PIANO: ELEMENTARY II  1
A 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. Offered in spring semester only.

MUSC 177  CLASS GUITAR 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. Performance majors may also find this course particularly useful for classroom teaching.
RESTRICTIONS: Offered in fall and spring semesters.
MUSC 178 CLASS GUITAR II 1
A continuation of Class Guitar I with a stronger emphasis on ensemble playing and development of a repertoire.
PREREQ: MUSC177 with a grade of C- or better. RESTRICTIONS: Offered in spring semester only.

MUSC 179 ORGAN CLASS 1
Students learn the basic techniques needed to play the organ. Students apply these skills in a class setting, focusing on introductory organ literature and hymn playing.
RESTRICTIONS: Requires permission of instructor.

MUSC 181 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES 2
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
PREREQ: MUSC181 with a grade of C- or better. RESTRICTIONS: Requires permission of instructor. Offered in fall and spring semesters.

MUSC 182 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES 2
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
PREREQ: MUSC181 with a grade of C- or better. RESTRICTIONS: Requires permission of instructor. Offered in fall and spring semesters.

MUSC 183 JAZZ IMPROVISATION 2
This course will develop skills for improvisation on standard jazz forms such as blues, rhythm changes, modal structures and other standard songs. Emphasis will be placed on the application of chord/scale relationships, transcription and analysis of jazz solos, and aural skills.
PREREQ: MUSC197 or permission of instructor.

MUSC 185 AURAL SKILLS I 3
Techniques of sight singing and music reading skills. Development of ability in aural recognition of melody, harmony and rhythm.
PREREQ: MUSC185 with grade of C- or better. COREQ: MUSC195. RESTRICTIONS: Must take department music theory placement test. Offered in fall semester only.

MUSC 186 AURAL SKILLS II 2
Techniques of sight singing and music reading skills. Development of ability in the aural recognition of melody, harmony and rhythm.
PREREQ: MUSC185 with grade of C- or better. COREQ: MUSC195. RESTRICTIONS: Open to music majors and minors. Offered in spring semester only.

MUSC 193 SIGHT READING AT THE KEYBOARD I 1
Techniques for improving coordination and musical comprehension when playing from sight at the keyboard.
RESTRICTIONS: For keyboard majors. Offered in fall and spring semesters.

MUSC 194 SIGHT READING AT THE KEYBOARD II 1
Continuation of MUSC193.
PREREQ: MUSC193 with a grade of C- or better. RESTRICTIONS: For keyboard majors. Offered in fall and spring semesters.

MUSC 195 HARMONY I 3
PREREQ: MUSC185 with grade of C- or better. COREQ: MUSC186. RESTRICTIONS: Must pass department Music Theory Placement Test or Theory Review Class. Offered spring only.

MUSC 196 HARMONY II 3
Continuation of harmony: diatonic through chromatic harmony with keyboard application. Chord structures and functional relationships. Basic melodic and contrapuntal compositional techniques. Writing, playing and analysis.
PREREQ: MUSC186 and MUSC195 with grades of C- or better. COREQ: MUSC285. RESTRICTIONS: Open only to music majors and minors. Offered fall only.

MUSC 197 JAZZ HARMONY 3
Study of elementary aspects of melody, harmony, texture, dynamics, rhythm and form in selected jazz and American popular literature; development of elementary aural-perceptual and compositional skills related to jazz and American popular music.
PREREQ: MUSC105 with a grade of C- or better. RESTRICTIONS: Offered in odd numbered years, fall semesters only.

MUSC 205 MUSIC OF THE WORLD 3
Survey of non-Western world musical cultures utilizing textbook, reprinted reserve articles, films and in-class performance/demonstrations. Goal is the understanding and appreciation of various world musics.

MUSC 206 MUSIC OF CHINA, KOREA AND JAPAN 3
Systematically examines the origin and historical development of the musical cultures of the Far East. Studies how the musical and cultural influence of Chinese musical culture has had an enormous impact on the development of such cultures in Korea and Japan.

MUSC 207 HISTORY OF JAZZ 3
Chronological study of the style changes in jazz from the late 19th century to the present. Emphasis on the sociological, economic and technological influences of the period and on the principal personalities who have been primarily responsible for change.
May be crosslisted with BAMS207. RESTRICTIONS: Offered in even numbered years, fall semester only.

MUSC 209 HISTORY OF SPANISH MUSIC 3
Covers the most outstanding traditions of Spanish music, including Arab-influenced Andalusian music, 13th century music, schools of the "Renacimiento", 17th century court music, the "Zarzuela", 19th century Nationalism, and the most modern tendencies of the 20th century.
RESTRICTIONS: Taught abroad only.

MUSC 210 MUSIC OF BRITAIN 3
Chronological study of music of Britain with emphasis on English music from 1485 to present. Explores music for various media (including choral, instrumental, opera) and principal British composers, relating the development of musical styles to events in British history. When taught as part of UD London Semester, will include attendance at variety of London performances.
RESTRICTIONS: Requires permission of instructor.

MUSC 211 INTRODUCTION TO MUSIC HISTORY 3
Survey of selected works in music history with emphasis on selected basic terminology, forms and style changes, through score reading and listening.
PREREQ: MUSC195 with a grade of C- or better. RESTRICTIONS: Offered in fall semester only.

MUSC 212 HISTORY OF LITURGY AND HYMNS 3
Study of the evolution, structure and content of historical liturgies and of the hymnody which developed within them. Includes examination of Jewish and Eastern elements while focusing on the texts and music of the services and hymns of various traditions within the Western Church.

MUSC 213 FRENCH MUSICAL CULTURE 3
Explores the contributions of French culture to the history of Western Music. Special focus on major trends in music written and performed in Paris from the Middle Ages through the 20th century, and on the musical institutions that made Paris a world capital of music.
RESTRICTIONS: Taught abroad only.

MUSC 214 STRINGED INSTRUMENTS I 1
Development of pedagogy and performance skills.
RESTRICTIONS: Open only to music education and theory/composition majors.

MUSC 215 BRASS INSTRUMENTS I 1
Development of pedagogy and performance skills.
RESTRICTIONS: Open only to music education and theory/composition majors.

MUSC 216 BRASS INSTRUMENTS II 1
Advanced development of pedagogy and performance skills.
PREREQ: MUSC215 with a grade of C- or better. RESTRICTIONS: Open only to music education and theory/composition majors.

MUSC 217 WOODWIND INSTRUMENTS I 1
Development of pedagogy and performance skills.
RESTRICTIONS: Open only to music education and theory/composition majors.

MUSC 218 WOODWIND INSTRUMENTS II 1
Advanced development of pedagogy and performance skills.
PREREQ: MUSC217 with a grade of C- or better. RESTRICTIONS: Open only to music education and theory/composition majors.

MUSC 219 PERCUSSION INSTRUMENTS 1
Development of pedagogy and performance skills.
RESTRICTIONS: Open only to music education and theory/composition majors.

MUSC 220 MARCHING BAND TECHNIQUES 1
Focuses on designing and charting a show of the complete contemporary marching band. Overview of history and development of the marching band, as well as "hands-on" sessions in marching percussion and color guard.
PREREQ: MUSC113 with a grade of C- or better. RESTRICTIONS: Offered spring semester only.
MUSC 221  MARCHING PERCUSSION TECHNIQUES  1
Focuses on advancing skills on the marching snare drum, multi-tenos, 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. May be repeated for credit.

MUSC 222  STRINGED INSTRUMENTS II  1
Advanced development of pedagogy and performance skills. PREREQ: MUSC214. RESTRICTIONS: Open only to music education and theory/composition majors.

MUSC 223  STEEL BAND TRADITIONS AND PRACTICE  3
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. In addition students make weekly visits to the “panyards” where the many steel bands of Trinidad and Tobago rehearse for the Panorama Competition. RESTRICTIONS: Taught in Trinidad.

MUSC 224  LONDON AND THE MOVIE SOUNDTRACK  3
Examine the role music plays in film with a particular concentration on the scores recorded by the London Symphony Orchestra, London Philharmonic Orchestra, and the Philharmonia Orchestra. Includes a brief overview of the evolution of film music, an exploration of select composers and compositional style, as well as recording session techniques. We will visit the archives of these three orchestras, attend open rehearsals, performances, screen select films and hear from a variety of experts on music and film. RESTRICTIONS: Winter session study abroad course.

MUSC 225  JEWISH MUSIC  3
Designed to present a study of the Jewish music as it has evolved from biblical era through the contemporary period. Encompass the numerous cultures and lands that the Jewish people have found themselves residing from Australia to America, Brazil to Bombay and many more. The course will look at the formal presentation of music in religious life, the creative presentation in social and religious life, and to the languages, styles, and cross-fertilization that happens when civilizations combine. From the synagogue to the street, the school room and bedroom, music is one lens through which we can understand Jewish life. Crosslisted with JWST225.

MUSC 226  LONDON: CITY OF SYMPHONIES  3
Examines the fertile arts environment in London that led to the development of one of the world’s greatest symphonic traditions. Dating back to the late eighteenth century and the rise of an established public concert series to the present day symphonic tradition, London boasts a diversity of orchestral opportunity that is unparalleled. After a brief examination of the historical roots, this class will focus on the contemporary orchestral music scene. We will visit the archives of major orchestras, attend open rehearsals, performances and hear from a variety of experts including musicians and administrators. RESTRICTIONS: Winter session study abroad course.

MUSC 241  ACCOMPANYING CHAMBER MUSIC: PIANO  1
Accompanying vocalists and instrumentalists in the performance of chamber music with keyboard. PREREQ: Sight-Reading Placement Test. RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters. May be taken 4 times for credit.

MUSC 251  PRIVATE STUDY FOR BACHELOR OF MUSIC III  2
Continuing private study for sophomore bachelor of music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC152 with a grade of C- or better. COREQ: One of MUSC108, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. 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. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. In lieu of a jury, the student performs a Sophomore Review which must be passed in order to continue on to junior-level private study (see student handbook for details). PREREQ: MUSC251 with a grade of C- or better. COREQ: One of MUSC108, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. 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. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC144 with a grade of C- or better. COREQ: One of MUSC108, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered fall and spring semesters.

MUSC 254  PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS IV  2
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC253 with a grade of C- or better. COREQ: One of MUSC108, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered fall and spring semesters only.

MUSC 271  DICTION: GERMAN  1
A study of pronunciation rules for singing in German. Includes practicum. PREREQ: MUSC171 with a grade of C- or better. COREQ: Enrollment in applied study. RESTRICTIONS: Offered fall semester only.

MUSC 272  DICTION: FRENCH  1
A study of pronunciation rules for singing in French. Includes practicum. PREREQ: MUSC171 with a grade of C- or better. COREQ: Enrollment in applied study. RESTRICTIONS: Fledged spring semester only.

MUSC 275  CLASS PIANO: INTERMEDIATE I  1
Piano techniques applicable to the levels and needs of the students; a continuation of reading and transposition; and improvisation and repertory of grade two pieces. PREREQ: MUSC176 and MUSC196 with grades of C- or better. RESTRICTIONS: Restricted to music majors and minors, or by permission of instructor. Offered fall semester only.

MUSC 276  CLASS PIANO: INTERMEDIATE II  1
A continuation of MUSC275. PREREQ: MUSC275 with a grade of C- or better. RESTRICTIONS: Restricted to music majors and minors, or by permission of instructor. Offered spring semester only.

MUSC 279  INTRODUCTION TO THE ORGAN  1
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: MUSC181 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 audition. Offered fall and spring semesters.

MUSC 283  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: MUSC282 with grade of C- or better. RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters.

MUSC 285  ADVANCED AURAL SKILLS I  2
Continuation of MUSC185 and MUSC186. PREREQ: MUSC186 and MUSC195 with grades of C- or better. COREQ: MUSC196. RESTRICTIONS: Open to music majors and minors, or by permission of instructor. Offered fall semester only.

MUSC 286  ADVANCED AURAL SKILLS II  2
Continuation of MUSC185, MUSC186 and MUSC285. PREREQ: MUSC285 and MUSC196 with grades of C- or better. COREQ: MUSC295. RESTRICTIONS: Open to music majors and minors, or by permission of instructor. Offered 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.

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 included.

MUSC 295 ADVANCED HARMONY I 3
Review of chromatic harmony. Study, writing and analysis of 18th century counterpoint. Introduction to instrumentation. Introduction to form and analysis. Eighteenth and nineteenth century harmony, techniques and styles. Open to music majors and minors, or by permission of instructor. Offered spring semester only.

MUSC 296 ADVANCED HARMONY II 2
Continuation of MUSC295. Study of late 19th and 20th century harmony, techniques and styles. Continuation of instrumentation. Original compositions. Offered spring semester only.

MUSC 298 BEGINNING MUSIC COMPOSITION 1
Private study in beginning composition. Creative writing in vocal and instrumental media. Restricted to theory/composition majors. May be repeated for up to 4 credits. Offered and fall and spring semesters.

MUSC 301 JUNIOR RECITAL 0
A 30-minute public recital. COREQ: MUSC351, MUSC352, MUSC357, MUSC358, MUSC451. RESTRICTIONS: Offered 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 crosslisted with WOM302.

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

MUSC 311 MUSIC HISTORY: 400 THROUGH 1600 3
The history of musical style and theory in the Middle Ages (5th through 14th centuries) and the Renaissance (15th and 16th centuries). RESTRICTIONS: Offered spring semester only.

MUSC 312 MUSIC HISTORY: 1600 THROUGH 1827 3
The history of musical style and theory during the Baroque period (1600-1750), and the Classic period through the death of Beethoven (1827). RESTRICTIONS: Offered fall semester only.

MUSC 313 MUSIC HISTORY: 1827 TO THE PRESENT 3
The Romantic era. Impressionism and the 20th century. Musical thought and style from 1827 to the present. RESTRICTIONS: Offered spring semester only.

MUSC 321 ENSEMBLE: INSTRUMENTAL, PIANO, OR VOCAL 0-1
Performance of chamber literature for instrument, piano or voice. Performance of chamber literature for instrument, piano or voice. Performance of chamber literature for instrument, piano or voice. 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 term.

MUSC 328 CHORAL LITERATURE 2
Study of style, structure and interpretations of representative choral works, including large and small forms composed since 1500. RESTRICTIONS: Offered fall semester only.

MUSC 335 BASIC CONDUCTING 2
The principles of conducting and score reading. RESTRICTIONS: Offered fall semester only.

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

MUSC 345 HISTORY OF THEATER: AMERICAN MUSICAL THEATER 3
Musical-dramatic forms of the 18th, 19th and 20th centuries in the United States and their impact on the modern musical theatre. Complete works read and compared to a series of criteria that are found in successful modern shows. Comparison of older and current works. May be crosslisted with THEA345. RESTRICTIONS: Offered fall semester only.

MUSC 351 PRIVATE STUDY FOR MUSIC EDUCATION V 2
Continuing private study for junior music education majors. The student adds to the course the title of branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. RESTRICTIONS: Offered fall and spring semesters.

MUSC 352 PRIVATE STUDY FOR MUSIC EDUCATION VI 2
Continuing private study for junior music education majors. The student adds to the course the title of branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. RESTRICTIONS: Offered fall and spring semesters.

MUSC 353 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS V 2
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course the title of branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. RESTRICTIONS: Offered fall and spring semesters.

MUSC 354 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS VI 2
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course the title of branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. RESTRICTIONS: Offered fall and spring semesters.

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

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

MUSC 363 KEYBOARD LITERATURE 3
Style, structure and technical performance of keyboard music from the 17th century to the present. RESTRICTIONS: Offered in even numbered years, fall semester only.

MUSC 366 INDEPENDENT STUDY 1-3

MUSC 390 HONORS COLLOQUIUM 3

MUSC 392 CONTRAPUNTAL WRITING 2
Contrapuntal techniques with emphasis on 16th- and 18th-century styles and forms. RESTRICTIONS: Offered in fall 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: MUSC276 and MUSC295 with grades of C- or better. RESTRICTIONS: Offered in spring semesters only.

MUSC 400  INTERNSHIP IN CHURCH MUSIC  1-3
Capstone 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
A 60-minute public recital. COREQ: MUSC457, MUSC458 or MUSC420. RESTRICTIONS: Requires senior status. Offered in fall and spring semesters.

MUSC 403  CHAMBER MUSIC LITERATURE  3
Survey of chamber music literature from the 17th century to the present. PREREQ: MUSC312 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 18th 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  INTRODUCTION TO MUSIC RESEARCH  3
Designed to prepare the student to conduct extended research in music theory or musicology. The student will learn basic research methods and survey the general literature appropriate to his or her area of interest in preparation for the senior thesis. RESTRICTIONS: Requires permission of instructor. Limited to Music Theory and Music History and Literature Majors.

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: MUSC415 with a grade of C- or better. RESTRICTIONS: Offered in fall and spring semesters.

MUSC 424  MARCHING BAND LEADERSHIP STAFF  0-1
Marching band members apply/audition for leadership roles. (Auditions each spring semester.) During fall semester, topics include challenges in peer-to-peer teaching, time management, leadership hierarchy, and development of positive leadership skills. Practical field experience is gained as students engaged in peer-to-peer teaching during marching band rehearsals and events resulting in direct application of lecture materials. PREREQ: 1 semester of MUSC113 and audition in preceding spring. COREQ: MUSC113. RESTRICTION: Offered in fall semester only.

MUSC 426  GERMAN LIEDER  2
Literature survey of the standard vocal repertoire of the German tradition. Includes examples of the works of such composers as Schubert, Brahms, Schumann, Wolf and Strauss. RESTRICTIONS: MUSC211 with a grade of C- or better. Offered every third spring semester, in rotation with MUSC427 and MUSC428.

MUSC 427  FRENCH ART SONG  2
A literature survey of the standard vocal repertoire of the French tradition. Includes examples of the works of such composers as Faure, Debussy, Duparc and Poulenc. PREREQ: MUSC211 with a grade of C- or better. RESTRICTIONS: Offered every third spring semester, in rotation with MUSC426 and MUSC428.

MUSC 428  TWENTIETH-CENTURY ART SONG  2
A literature survey of the standard vocal repertoire of the 20th Century. Includes examples of the works of such composers as Barber, Britten, Schonberg, Ives, Vaughan Williams and Rorem. PREREQ: MUSC211 with a grade of C- or better. RESTRICTIONS: Offered every third spring semester, in rotation with MUSC426 and MUSC428.

MUSC 431  ORCHESTRATION  2
Advanced orchestral and band arranging; review of instrumental ranges and colors; scoring for small ensembles; special problems in scoring accompaniments. Final arrangement performed by a University Ensemble. PREREQ: MUSC296 with a grade of C- or better. RESTRICTIONS: 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 RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters. May be repeated 1 time for credit.

MUSC 451  PRIVATE STUDY FOR MUSIC EDUCATION VII  2
Continuing private study for senior music education majors. The student adds to the course title the branch of study selected: 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, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. RESTRICTIONS: For music education majors only. Offered fall and spring semesters.

MUSC 452  PRIVATE STUDY FOR MUSIC EDUCATION VIII  2
Optional continuing private study for senior music education majors. The student adds to the course title the branch of study selected: 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, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. RESTRICTIONS: For music education majors only. Offered fall and spring semesters.

MUSC 453  PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS VII  2
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study selected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC354, with a grade of C- or better, or permission of instructor. COREQ: One of MUSC108, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. RESTRICTIONS: For bachelor of arts (music) students and music minors only. Does not count for bachelor of arts degree credit. Offered fall and spring semesters.

MUSC 454  PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS VIII  2
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study selected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC353 with a grade of C- or better, or permission of instructor. COREQ: One of MUSC108, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 457  PRIVATE STUDY FOR APPLIED MUSIC VII  4
Continuing private study for senior applied music majors, including preparation for Senior Recital. The student adds to the course title the branch of study selected: 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, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 458  PRIVATE STUDY FOR APPLIED MUSIC VIII  4
Continuing private study for senior applied music majors, including preparation for Senior Recital. The student adds to the course title the branch of study selected: 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, MUSC109, MUSC110, MUSC113, MUSC114, MUSC115, MUSC116, MUSC117, MUSC118, MUSC321. RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

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

MUSC 466  INDEPENDENT STUDY  1-3
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 480  VOCAL PEDAGOGY  3
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015
MUSC 481 PEDAGOGY AND LITERATURE 3
The study of teaching methods and literature (music scores, books, and other media). Shows teaching skills needed at the secondary level and lower.
RESTRICTIONS: Requires permission of instructor.

MUSC 484 RECORDING TECHNIQUES 3
Covers three parameters: history of recording and recording technology; recording techniques with hands-on experiences; and aesthetics of recording and its impact on music through the 20th and 21st centuries.
PREREQ: MUSC105 or MUSC195. RESTRICTIONS: Enrollment by permission of instructor.

MUSC 485 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: Enrollment by permission of instructor.

MUSC 486 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. Offered fall semester only.

MUSC 487 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 489 OPERA WORKSHOP 0-3
Dramatic and musical preparation of operatic roles through the production of opera scenes or chamber opera.
RESTRICTIONS: Admission by audition, with permission of private instructor. 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 department.

MUSC 490 OPERA WORKSHOP 0-3
Participation and performance in University of Delaware Opera Theatre’s fall or spring Mainstage productions. Rehearsals will include musical preparation, musical coaching and staging. Additional outside rehearsals and coachings may be required and will vary based on repertoire choices.
PREREQ: Admission by audition, with permission of private instructor. RESTRICTIONS: Auditions for Mainstage productions and casting decisions for the following year are made at the very end of the Spring semester, so those interested in participating are encouraged to contact UD Opera Theatre staff as early as possible. Offered fall and

MUSC 495 ANALYSIS AND INTERPRETATION 3
Structure of homophonic and polyphonic music representing different periods of musical history.
PREREQ: MUSC295 with a grade of C- or better.

MUSC 511 HISTORICAL FOUNDATIONS REVIEW 2 PF
Review of the history of Western music (c. CE 400-Present). Designed for students who do not pass the Graduate Music History Entrance Examination. Students must pass course before taking MUSC611.
RESTRICTIONS: Does not count toward credits for degree.

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

MUSC 571 GRADUATE DICTION REVIEW 1 PF
Review of International Phonetic Alphabet (IPA) and pronunciation rules for singing in English, Italian, German and French.

MUSC 595 THEORY FOUNDATIONS REVIEW 2 PF
Review of basic harmony and ear-training skills. Designed for students who do not pass the Graduate Music Theory Placement Exam. Students must pass course before taking MUSC695.

MUSC 600 MASTER’S PERFORMANCE IN Conducting 2
Reflects the culmination of student performances as a conductor with one or more large ensembles in the Department of Music.
PREREQ: MUSC682 RESTRICTIONS: For students in the Master of Music degree, Performance Concentration (Conducting).

MUSC 601 MASTER’S RECITAL 1-3 PF
A sixty-minute public recital.

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

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

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

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

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

MUSC 608 VOCAL LITERATURE I: SONG 3
A survey of important literature for solo voice. Focus on German Lieder, French Art Song, and twentieth-century Art Song.

MUSC 609 CHORAL MUSIC LITERATURE I 2
Study of style, structure, and interpretation of representative choral works, with special emphasis upon analytical process while determining appropriate performance practices as related to primary sources. Studies in this section shall be illustrated through the development of sacred choral repertoire best exemplified by the mass and the motet.
RESTRICTIONS: Requires permission of instructor.

MUSC 610 CHORAL MUSIC LITERATURE II 2
Study of style, structure, and interpretation of representative choral works, with special emphasis on analytical process while determining appropriate performance practice as related to primary sources. Studies in this section shall be illustrated through the development of secular forms ranging from those derived out of early Italian opera and madrigal traditions to modern part-songs and secular compositions.
RESTRICTIONS: Requires permission of instructor.

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

MUSC 612 CHORAL MUSIC LITERATURE III 2
In depth study of three major choral works in an examination of musical architecture, compositional language, and performance decisions related to score preparation for rehearsal and performance.
RESTRICTIONS: Permission of instructor.

MUSC 618 VOCAL LITERATURE II: OPERA 3
Study of the musical and dramatic content of operatic works and movements which comprise the standard international repertoire; it includes a survey of the genre’s historical development and extensive exposure to listening examples from the different movements.

MUSC 620 LARGE ENSEMBLE 1
Participation as a performer in a large ensemble.
RESTRICTIONS: Entry audition required.
MUSC 621 CHAMBER ENSEMBLE 1
Performance of chamber literature for winds, strings, piano or voice. Ensembles receive faculty coaching in addition to their regular rehearsals. Ensembles perform at least one public program per semester.
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 624 MARCHING BAND LEADERSHIP STAFF 0-1
Marching band members apply/audition for leadership roles. (Auditions each spring semester.) During fall semester, topics include challenges in peer-to-peer teaching, time management, leadership hierarchy, and developing positive leadership skills. Practical field experience is gained as students engaged in peer-to-peer teaching during marching band rehearsals and events resulting in direct application of lecture materials.
RESTRICTIONS: Requires permission of instructor. Offered in fall semester.

MUSC 625 ARTISTIC INNOVATIONS I 2
Directed towards all students in the department. Emphasis is on functional development and applied techniques. Topics include emerging techniques and musical ideas in music education.

MUSC 626 ARTISTIC INNOVATIONS II 2
Focuses primarily on Teaching Artistry. Students design interactive performances for school and concert settings that introduce audiences to key musical concepts. Discussion of issues related to effective arts advocacy and the role of musicians in society.
RESTRICTIONS: MUSC625 preferred, but not required for this course.

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 636 ADVANCED CHORAL CONDUCTING 1-3
Advanced conducting techniques for directors of choral performing groups.
RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program.

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 641 ADVANCED SECONDARY PRIVATE STUDY: I 2
Advanced graduate-level private instruction in a secondary instrument or voice. Requires permission of instructor. May be repeated one time for credit.

MUSC 642 ADVANCED SECONDARY PRIVATE STUDY: II 2
Advanced graduate-level private instruction in a secondary instrument or voice. Continuation of MUSC642.
PREREQ: MUSC641. RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program and requires permission of instructor. May be repeated one time for credit.

MUSC 643 ADVANCED SECONDARY PRIVATE STUDY: III 2
Advanced graduate-level private instruction in a secondary instrument or voice. Continuation of MUSC642.
PREREQ: MUSC642. RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program and requires permission of instructor. May be repeated one time for credit.

MUSC 644 ADVANCED SECONDARY PRIVATE STUDY: IV 2
Advanced graduate-level private instruction in a secondary instrument or voice. Continuation of MUSC643.
PREREQ: MUSC643. RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program and requires permission of instructor. May be repeated one time for credit.

MUSC 651 ADVANCED PRIVATE STUDY: CONDUCTING I 2
Advanced instruction in conducting.
RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program and requires permission of instructor.

MUSC 652 ADVANCED PRIVATE STUDY: CONDUCTING II 2
Advanced instruction in conducting. Continuation of MUSC651.
PREREQ: MUSC651. RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program and requires permission of instructor.

MUSC 653 ADVANCED PRIVATE STUDY: CONDUCTING III 2
Advanced instruction in conducting. Continuation of MUSC652.
PREREQ: MUSC652. RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program and requires permission of instructor.

MUSC 654 ADVANCED PRIVATE STUDY: CONDUCTING IV 2
Advanced instruction in conducting. Continuation of MUSC653.
PREREQ: MUSC653. RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program and requires permission of instructor.

MUSC 661 ADVANCED PRIVATE STUDY: I 2
Advanced private study; instrumental or vocal.
RESTRICTIONS: Requires an audition. May be repeated once for credit.

MUSC 662 ADVANCED PRIVATE STUDY: II 2
Advanced private study; instrumental or vocal.
PREREQ: MUSC661. RESTRICTIONS: Requires permission of instructor. May be repeated once for credit.

MUSC 663 ADVANCED PRIVATE STUDY: III 2
Advanced private study; instrumental or vocal.
PREREQ: MUSC662. RESTRICTIONS: Requires permission of instructor. May be repeated once for credit.

MUSC 664 ADVANCED PRIVATE STUDY: IV 2
Advanced private study; instrumental or vocal.
PREREQ: MUSC663. RESTRICTIONS: Requires permission of instructor. May be repeated once for credit.

MUSC 667 ADVANCED PRIVATE STUDY: COMPOSITION I 2
Advanced instruction in composition.
RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program.

MUSC 668 ADVANCED PRIVATE STUDY: COMPOSITION II 2
Advanced instruction in composition. Continuation of MUSC671.
PREREQ: MUSC671. RESTRICTIONS: Requires permission of instructor.

MUSC 669 ADVANCED PRIVATE STUDY: COMPOSITION III 2
Advanced instruction in composition. Continuation of MUSC672.
PREREQ: MUSC672. RESTRICTIONS: Requires permission of instructor.

MUSC 670 ADVANCED PRIVATE STUDY: COMPOSITION IV 2
Advanced instruction in composition. Continuation of MUSC673.
PREREQ: MUSC673. RESTRICTIONS: Requires permission of instructor.

MUSC 675 GENERAL MUSIC PREK-12 3
Advanced methods in PreK-12 General Music.
RESTRICTIONS: Open to graduate students enrolled in the Masters in Music degree program.

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

MUSC 677 SEMINAR IN MUSIC EDUCATION II 3
A continuation of advanced topics in music education (MUSC676).
RESTRICTIONS: Open to Masters in Music students only.

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

MUSC 680 PROFESSIONAL DEVELOPMENT PROJECT II 3
Implementation of the portfolio developed in MUSC679.
PREREQ: MUSC679. RESTRICTIONS: Taken in sequence with MUSC679 as an alternative to thesis option.
MUSC 681  PEDAGOGY AND LITERATURE  3
The study of teaching methods and literature (music scores, books and other media). Shows teaching skills needed at the university level and lower.

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

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

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

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

MUSC 865  CAPSTONE PROPOSAL  2
Designed to assist students with developing proposals for the Master’s thesis or Professional Development Project.
RESTRICTIONS: Open to Master’s in Music students only.

MUSC 866  SPECIAL PROBLEM  1-3

MUSC 869  MASTER’S THESIS  1-6

---

**NEUROSCIENCE**

NSCI 100  PSYCHOLOGICAL AND BRAIN SCIENCES  3
Covers topics studied by both psychologists and neuroscientists: biological bases of behavior, cognitive, developmental, and social psychology, and psychopathology. Recommended for neuroscience majors.

NSCI 320  INTRODUCTION TO NEUROSCIENCE  3
Survey of the basic sciences of the brain in relation to behavioral phenomena, including perception, memory, fear and aggression, and several mental disorders. May be crosslisted with PSYC320. PREREQ: C- or better in PSYC100 or NSCI100.

NSCI 368  RESEARCH  1-6
Participation in research program of a faculty member, and in a weekly seminar with students from other labs focusing on research methodology and other topics.
PREREQ: NSCI320 or PSYC320.

NSCI 414  DRUGS AND THE BRAIN  3
Topics covered include drug treatment of mental illness, and drug abuse/addiction. Crosslisted with PSYC414. PREREQ: PSYC209.

NSCI 426  ADVANCED NEUROANATOMY  3
Covers the functional organization of the nervous system with emphasis on the brain stem, cranial nerves, limbic system, and cerebral cortex. Surveys basic etiology, signs and symptoms of injury to spinal pathways, sensory-motor systems, methods of neurologic testing, and the Mental Status Exam.

NSCI 427  ADVANCED NEUROPHYSIOLOGY  3
Study of the physiology of the central nervous system, with an emphasis on the cellular and molecular basis of signal transmission in the brain.
PREREQ: NSCI320.

NSCI 428  ADVANCED NEUROPHARMACOLOGY  3
Examines the actions of psychoactive drugs on neurons, neural circuits, and behavior. Focus is on drugs used in mental health, neurological disorders, and drug abuse.
PREREQ: NSCI320. RESTRICTIONS: Restricted to NSCI majors and minors. Not open to students with PSYC/NSCI414 credit.

NSCI 429  INTEGRATIVE NEUROSCIENCE I  3
Integrates current views on various systems of the brain with the functions they support.
PREREQ: NSCI320. RESTRICTIONS: Restricted to NSCI majors and minors.

NSCI 430  INTEGRATIVE NEUROSCIENCE II  3
Surveys select topics in behavioral neuroscience, including nervous system development, and brain systems underlying arousal, emotion, physiological regulation, and cognitive functioning.
PREREQ: NSCI320. RESTRICTIONS: Restricted to NSCI majors and minors.

NSCI 431  STRESS AND THE BRAIN  3
Surveys clinical and experimental research to understand the impact of stress and experience on brain development, brain function, and behavior.
PREREQ: NSCI320.

NSCI 433  COGNITIVE NEUROSCIENCE  3
Examines brain mechanisms responsible for cognitive functions such as perception, memory, and language. Surveys methods for relating mind and brain, including brain-damaged patients, and brain imaging techniques.
Crosslisted with PSYC433. PREREQ: PSYC209.

NSCI 435  HORMONES AND BEHAVIOR  3
Examines how hormones produce changes in behavior over the life course. Topics include mating and parental behavior, aggression, stress and depression, and learning and memory.
PREREQ: NSCI320. RESTRICTIONS: NSCI majors or minors.

NSCI 436  NATURE VS NURTURE  3
Examines the contribution of biological and environmental determinants to individual differences in behavior and disease.
PREREQ: NSCI320. RESTRICTIONS: Open to NSCI majors and minors only.

NSCI 438  CLINICAL NEUROSCIENCE  3
Examines the effects of localized brain trauma on cognitive, personality, and psychosocial functioning. Focuses on neuropsychological assessment, intervention, and common neuropathological syndromes.
PREREQ: NSCI320. RESTRICTIONS: Open to NSCI majors and minors.

NSCI 442  SOCIAL NEUROSCIENCE  3
Examines how neuroscience methods can help in understanding basic and complex social processes, and how social psychological methods help reveal hierarchal brain functions.
PREREQ: NSCI320. RESTRICTIONS: Restricted to NSCI majors and minors.

NSCI 468  ADVANCED RESEARCH  3
Participation in research program of a faculty member. Expected to contribute to conceptualization of research problems, design, and methodological discussions.
PREREQ: NSCI368. RESTRICTIONS: Open to NSCI majors and minors only.

NSCI 626  ADVANCED NEUROANATOMY  3
Covers the functional organization of the nervous system from a clinical perspective, with emphasis on the brain stem, cranial nerves, limbic system, and cerebral cortex. Also surveys basic etiology, signs and symptoms of injury to spinal pathways, sensory-motor systems, methods of neurologic testing, and the Mental Status Exam. May be crosslisted with BISC626, PSYC626.

NSCI 627  ADVANCED NEUROPHYSIOLOGY  3
Study of the physiology of the central nervous system, with an emphasis on the cellular and molecular basis of signal transmission in the brain.
Crosslisted with BISC627.

NSCI 628  ADVANCED NEUROPHARMACOLOGY  3
Examines the actions of psychoactive drugs on neurons, neural circuits, and behavior. Focus is on drugs used in mental health, neurological disorders, and drug abuse.
May be crosslisted with PSYC628.

NSCI 629  INTEGRATED NEUROSCIENCE I  3
The course integrates current views on various systems of the brain with the functions they support.

NSCI 630  INTEGRATIVE NEUROSCIENCE II  3
Surveys select topics in behavioral neuroscience, including nervous system development, and brain systems underlying arousal, emotion, physiological regulation, and cognitive functioning.

NSCI 631  CURRENT TOPICS IN NEUROSCIENCE  3-12
In depth discussions of current research in a specific field of neuroscience.
NSCI 632  DEVELOPMENTAL BEHAVIORAL NEUROSCIENCE  3
The aim is to understand behavioral development from a biological and comparative perspective. Course surveys development of sensory, motor, motivational, and cognitive processes.

NSCI 633  NEUROPLASTICITY  3
This course focuses on neuroplasticity and requires some prior knowledge of neuroanatomy and physiology. Topics include effects of experience on neurogenesis, stress effects, and synaptic remodeling.

NSCI 634  STRESS AND THE BRAIN  3
Course surveys clinical and experimental research on the impact of stress and experience on brain development, brain function, and behavior.

NSCI 635  NEUROPLASTICITY  3
Focus on changes in the structure and function of the brain as a function of experience. Topics include neurogenesis, neuromediators, stress, protein synthesis, and synaptic remodeling.

NSCI 636  SPATIAL COGNITION  3
Focus on brain mechanisms that enable acquisition of information about the environment and the use of that information in spatial navigation for both animals and humans.

NSCI 637  BEHAVIORAL EPIGENETICS  3
Provides an overview of the field of behavioral epigenetics, focusing on landmark and current studies in human and animal models. Examines multi-generational trajectories and clinical implications.

NSCI 638  CLINICAL NEUROPSYCHOLOGY  3
Examines the effects of localized brain trauma on cognitive, personality, and psychosocial functioning. Focuses on neuropsychological assessment, intervention, and common neuropsychological syndromes.

NSCI 639  THE EMOTIONAL BRAIN  3
The last 20 years has seen an explosion of research on the role of the brain in emotions. Examines the neuroscience of normal emotions and pathology of emotions in animals and humans.

NSCI 640  THE IMMUNE SYSTEM AND BEHAVIOR  3
Examines the interaction of the brain and the immune system. Topics include mood alteration, motivation, and cognition, and relations to addiction, psychopathology, and learning disorders.

NSCI 641  HORMONES AND BEHAVIOR  3
Examines how hormones produce changes in behavior over the life course. The focus includes sexual differentiation of the brain, mating and parental behavior, aggression, stress and depression, immune function, and learning and memory.

NSCI 642  SOCIAL NEUROSCIENCE  3
Examines how neuroscience methods can help in understanding basic and complex social processes, and how the social psychological methods help reveal hierarchical brain functions.

NSCI 643  BODY AND SPACE  3
Our bodies are our gateway to the world. Examines theories about body perception, space representation, and sense of self. Topics include phantom limbs, tool use, motor control, intention, and pain.

NSCI 866  NEUROSCIENCE COLLOQUIUM  1 PF
The Neuroscience colloquia and brown bag seminars feature faculty, student, and guest presentation of recent research.
RESTRICTIONS: Open to graduate students only.

NSCI 868  GRADUATE RESEARCH  1-6 PF
Laboratory research.

NSCI 869  MASTER’S THESIS  1-6
Master’s Thesis research.

NUTRITION AND DIETETICS

NTDT 103  INTRODUCTION TO NUTRITION PROFESSIONS  1
Career opportunities in dietetics and nutrition. Provides information about undergraduate programs and the competencies required of dietitians and nutritional scientists. Introduces opportunities for undergraduate research. Introduction to concepts of a profession and relevant professional organizations.
RESTRICTIONS: Open to APN, NS, and DIET majors only.

NTDT 105  NUTRITION FOR SPORT  3
Nutrition for optimizing health and performance among student athletes, including appropriate selection and timing of foods, fluids, and supplements to accommodate sport-specific nutrient needs and body weight/body composition goals. Students will not receive credit if they have already taken NTDT200.
RESTRICTIONS: May not be taken by students who have previously taken NTDT200.

NTDT 166  SPECIAL PROBLEM  1-12 PF

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 250  INTRODUCTION TO THE NUTRITION CARE PROCESS  3
Introduction to skills and competencies of the clinical dietitian based on Nutrition Care Process (assessment, diagnosis, intervention, monitoring, and evaluation). Evidence-based practice promoted with emphasis on state-of-the-science and state-of-the-art of dietetics practice.
PREREQ: NTDT200. RESTRICTIONS: Not available for credit to those who have taken NTDT450. Open only to APN, DIET and NS majors.

NTDT 266  SPECIAL PROBLEM  1-3 PF

NTDT 268  SOPHOMORE SPECIAL TOPICS  1-6
 Sophomore level independent study.

NTDT 301  CULTURAL PERSPECTIVES ON FOOD AND NUTRITION  3
Examination of the cultural context from which ethnic foods and food habits emerge and evolve; social, religious, geographic and economic influences on ethnic dietary practices of culturally distinct groups; United States immigration patterns, cultural adaptations and nutrition-related health problems for selected groups.

NTDT 305  NUTRITION IN THE LIFESPAN  3
Nutrition and health during the different stages of life: pregnancy, lactation, infancy, preschool years, middle childhood, adolescence, adulthood and later maturity.
PREREQ: NTDT200 and a course in biology.

NTDT 310  NUTRITION AND ACTIVITY  3
Energy and nutrient needs for activity with emphasis on particular physical and athletic activities; common myths and fallacies concerning diet and athletic performance; and appropriate dietary approaches for specific activities and active people.
PREREQ: NTDT200 and a physiology course

NTDT 321  QUANTITY FOOD PRODUCTION AND SERVICE  3
Principles of quantity food production and delivery systems; menu planning and purchasing design; safety, sanitation and technical operations in a food service system.
PREREQ: NTDT200 and NTDT201

NTDT 322  MANAGEMENT OF FOOD AND NUTRITION SERVICES  3
Organization and administration of not-for-profit and entrepreneurial services. Functions and responsibilities related to these products including planning, marketing, total quality and human resource management, and food and labor cost accounting.
PREREQ: NTDT200 and NTDT201
NTDT 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 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 the impact of diet and nutrition on the aging process, field experiences with older adults across the spectrum of aging, and design and implementation of interactive nutrition education programs with older adults. PREREQ: NTDT200, and BISC106 or BISC276.

NTDT 366  INDEPENDENT STUDY  1-6 PF
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 the life cycle. PREREQ: NTDT200, CHEM214 and CHEM216

NTDT 401  MICRONUTRIENTS  3
Mechanisms and interactions of vitamins and minerals in cellular metabolism, scientific bases of nutrient requirements during the life cycle. PREREQ: NTDT400

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

NTDT 410  OVERWEIGHT AND OBESITY PREVENTION AND MANAGEMENT  3

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 BISC106 or BISC276.

NTDT 421  NUTRITIONAL ASSESSMENT METHODS  3
Nutritional screening and assessment methods and techniques including evaluation of dietary intake, anthropometric measurements, biochemical tests and clinical assessment. Overview of the methodologies involved in nutrition research. PREREQ: NTDT400 and a course in statistics

NTDT 445  TEACHING METHODS: NUTRITION/FOODS  3
Needs assessment; writing instructional objectives; selecting appropriate methods, materials and resources for audiences varying in age, literacy and ethnicity; planning, implementing and evaluating education programs related to food and nutrition. PREREQ: NTDT200. RESTRICTIONS: Open to juniors and seniors only.

NTDT 450  MEDICAL NUTRITION THERAPY I  3
Pathophysiology, diet and disease relationships, and diet therapy for diabetes, obesity, neurological disorders, gastrointestinal, cardiovascular, musculoskeletal, and respiratory diseases. Evidence based practice and skills for nutritional management are integrated into course topics. PREREQ: NTDT250, NTDT400, BISC276. RESTRICTIONS: Majors only.

NTDT 451  MEDICAL NUTRITION THERAPY II  3
Pathophysiology, diet and disease relationships, and diet therapy for liver and renal disease, cancer, AIDS, inborn errors of metabolism, fluid balance and acid base abnormalities, and physiological stress and trauma. Evidence based practice and skills for nutritional management are integrated into course topics. PREREQ: NTDT250, NTDT400, BISC276. RESTRICTIONS: Majors only.

NTDT 452  TOPICS IN NUTRITION AND DIETETICS  1-3
In-depth analysis of a specific topic in an area of nutrition and dietetics. RESTRICTIONS: Junior-level NTDT course(s) relating to the specific topic required.

NTDT 455  ISSUES IN INTERNATIONAL NUTRITION  3
Presents major nutritional problems that influence the health, survival and developmental capacity of populations in low income (developing) countries. Addresses these major issues as a problem of socio-economic development. The course will also address issues of culture, agriculture, economics, water sanitation and disaster. RESTRICTIONS: Restricted to junior and senior level students.

NTDT 460  COMMUNITY NUTRITION  3
Nutritional care as a part of health maintenance, health promotion, and health care delivery in community settings; the relationship of community resources, structure and dynamics to an individual’s ability to be well fed. Community nutrition needs and programs. Means of effecting change in nutrition knowledge and practices in populations. Teaching methods include lecture, field work, case studies. The field work is provides 30 hours of supervised service in a community nutrition or health agency. PREREQ: NTDT321 and NTDT400. RESTRICTIONS: Students are offered site opportunities and final placement is managed by the instructor.

NTDT 466  INDEPENDENT STUDY  1-6 PF
Senior level independent study.

NTDT 468  SENIOR SPECIAL TOPICS  1-6
Senior level independent study.

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

NTDT 550  DIETETICS PRACTICUM I  1-4 PF
Introduces supervised practice experiences for incorporation and application of skills, knowledge, and attitudes with special emphasis on current dietetic issues facing the health professional in public health nutrition. COREQ: NTDT650. RESTRICTIONS: Open to dietetic internship students only.

NTDT 551  DIETETICS PRACTICUM II  1-4 PF
Continued supervised practice experiences for incorporation and application of skills, knowledge, and attitudes, focusing on entry-level level competence with special emphasis on current dietetic issues facing the health professional. PREREQ: NTDT550. COREQ: NTDT651. RESTRICTIONS: Open to dietetic internship students only.

NTDT 566  SPECIAL PROBLEM  1-12

NTDT 610  OVERWEIGHT AND OBESITY PREVENTION AND MANAGEMENT  3

NTDT 611  ADVANCED MACRONUTRIENT METABOLISM  3
Metabolism and its relation to human nutrition; current literature; methods and techniques of nutrition research. PREREQ: Course in macronutrients.

NTDT 612  ADVANCED VITAMIN METABOLISM  3
Biochemical and physiological aspects of vitamin metabolism as it relates to human nutrition; assessment of requirements; factors affecting needs and utilization; review of literature and current issues. PREREQ: Biochemistry course (undergraduate or graduate).

NTDT 613  ADVANCED MINERAL METABOLISM  3
Biochemical and physiological aspects of mineral metabolism as it relates to human nutrition; assessment of requirements; factors affecting needs and utilization; review of literature and current issues. PREREQ: Biochemistry course (either undergraduate or graduate).

NTDT 615  ADVANCED NUTRITION AND PHYSICAL ACTIVITY  3
Critical analysis of current research on effects of nutrition, food and diet on physical activity and optimal athletic performance. Develops specific topics and interests through independent projects. PREREQ: Undergraduate and physiology courses
NTDT 620  MATERNAL AND INFANT NUTRITION  3
Maternal physiological adjustments in pregnancy and their relationship to nutritional needs; effect of maternal nutrition on fetal growth and development; physiology of lactation and maternal nutrient needs; neonatal nutritional needs and current infant feeding practices.
PREREQ: NTDT400 and BISC106, BISC276.

NTDT 622  RESEARCH METHODS IN NUTRITION ASSESSMENT  3
Advanced study of nutrition status assessment methods from a research perspective. Principles/assumptions of methods; critical evaluation of literature as it relates to contemporary issues. Course culminates with study design/research proposal development.
PREREQ: Introduction to Nutrition course (undergraduate) Human physiology course (undergraduate or graduate) Statistics course (undergraduate or graduate).

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

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

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

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

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

NTDT 654  ADVANCED RUMINANT NUTRITION  3
Emphasis of metabolic aspects of ruminant microbiology and intermediary metabolism. Discussions on methods to partition nutrients at the tissue level and methods to alter rumen fermentation. Crosslisted with ANF5654. PREREQ: Undergraduate or graduate courses in nutrition, microbiology, biochemistry, ANF5454 or equivalents. ANF5404 or ANF5417 recommended.

NTDT 655  ISSUES IN INTERNATIONAL NUTRITION  3
Presents major nutritional problems that influence the health, survival and developmental capacity of populations in low-income (developing) countries. Addresses these major issues as a problem of socio-economic development. The course will also address issues of culture, agriculture, economics, water sanitation and disaster. RESTRICTIONS: Restricted to graduate students.

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

NTDT 665  SEMINAR  1-3 PF

NTDT 666  SPECIAL PROBLEM  1-12

NTDT 668  RESEARCH  1-6

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

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

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

NTDT 866  SPECIAL PROBLEM  1-12

NTDT 868  RESEARCH  1-6

NTDT 869  MASTER’S THESIS  1-6

NURSING

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

NURS 101  HUMAN ANATOMY  3
Introduction to the study of human anatomy which provides a foundation for the future study of human physiology and other related courses. Includes a clinically relevant, fundamental overview of the human body using a “systems” approach.
RESTRICTIONS: Open to nursing and health studies majors only.

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

NURS 166  SPECIAL PROBLEM  1-3

NURS 200  CLINICAL DECISION MAKING  2
Introduces and explores nurses’ decision making processes including the nursing process. Builds upon basic clinical skills with psychomotor, cognitive, and affective skills used by nurses.
PREREQ: NURS110, ENGL110. RESTRICTIONS: Open to nursing majors only.

NURS 214  HEALTHCARE COMMUNICATION: UDSSP  3
Nursing and Theater course where students will learn to be standardized patients and patient family members. Students will then be used in mock real life scenarios to assess the medical and communication skills of student health care providers. May be crosslisted with THEA214.

NURS 220  CONCEPTS OF NURSING PRACTICE  3
Introduction to the nursing profession which includes psychomotor, cognitive and affective skills integral to basic nursing practice. The nursing process, professional ethics and basic clinical skills are covered.
COREQ: NURS230, NURS250. RESTRICTIONS: Open to accelerated nursing majors only.

NURS 222  PHARMACOLOGY  3
Focuses on therapeutic and adverse biological, psychological and social reactions to pharmacological agents. Drug use and medication abuse, client teaching, laboratory data and current research discussed. Nursing responsibilities and clinical applications emphasized.
RESTRICTIONS: Open to nursing majors only.

NURS 230  FOUNDATIONS OF NURSING  2
Examines the health continuum with an emphasis on wellness, health promotion across the lifespan, the aging process, and an introduction to community-based nursing. Clients are discussed as individuals, members of families, and as parts of cultural and global communities.
COREQ: NURS220, NURS250. RESTRICTIONS: Open to accelerated nursing majors only.

NURS 235  HEALTH, VULNERABILITY, & DIVERSITY  3
Focuses on health promotion and cultural diversity in individual, families, and communities across the lifespan. Special attention is paid to the nursing care of vulnerable populations. Diverse points of view regarding wellness, self-care and personal growth are emphasized.
PREREQ: NURS110. RESTRICTIONS: Nursing majors only.
NURS 241 **SCIENTIFIC BASIS OF NURSING** 3
Examines pathophysiological concepts as a scientific basis of disease processes. Focuses on major body systems, including immune, endocrine, neurological and psychological. Emphasizes concepts of cancer, pain and infection. PREREQ: BISC207, CHEM105, NURS110. RESTRICTIONS: Open to nursing majors only.

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

NURS 250 **HEALTH ASSESSMENT ACROSS THE LIFESPAN** 2
Introduces and develops clinical skills of physical health assessment across the lifespan. Field experiences develop physical assessment skills. COREQ: NURS220, NURS230. RESTRICTIONS: Open to nursing majors only.

NURS 253 **HEALTH AND PHYSICAL ASSESSMENT** 3
Introduces and develops the clinical skills of physical examination and health assessment across the lifespan. Laboratory assignments and field experiences develop history taking and physical assessment skills with developmental and cultural implications included. PREREQ: NURS110, NURS200. RESTRICTIONS: Open to traditional nursing majors only.

NURS 266 **SPECIAL PROBLEM** 1-3

NURS 312 **PATHOPHYSIOLOGY** 4
Focuses on biological processes leading to alterations of body structure and functions. Emphasis on identification of etiology and pathogenesis of selected disease states. RESTRICTIONS: Open to nursing majors only.

NURS 320 **TRANSITION TO BACCALAUREATE NURSING** 3
Provides an orientation to the education process at UD. Emphasizes knowledge essential for successful program completion including: APA format, formal paper writing, professionalism in nursing, critically reading research articles, evidence-based practice, and strategies for learning. RESTRICTIONS: Eligible students include those matriculated in the RN to BSN or RN to MSN program.

NURS 325 **CRITICAL ISSUES IN HEALTHCARE** 3
Examines current trends in the nursing profession and in the larger healthcare system. Explores the role of the professional nurse in current and future health care delivery systems and models. Broadens awareness of the larger systemic context of professional nursing. Evidence-based practice and critical inquiry will be applied to participant’s current professional experiences. COREQ: NURS320. RESTRICTIONS: Eligible students include those matriculated in the Baccalaureate for the Registered Nurse Program.

NURS 350 **WELLNESS AND HEALTH ASSESSMENT** 3
Explores selected concepts, theories and skills utilized in health promotion and disease prevention of individuals from socioculturally diverse populations within the context of family, community and healthcare systems. Key elements include a health history, physical, and psychosocial assessment. COREQ: NURS320. RESTRICTIONS: Open to BRN majors only. Course sequence alteration requires permission of instructor.

NURS 352 **ADULT HEALTH NURSING** 4
Examines selected concepts and theories related to restoring and maintaining optimal health in adult populations. Focuses on major body systems, including immune, endocrine, renal and gastrointestinal; also discusses concepts of cancer. Selected laboratory and field experiences are included to enhance concepts. PREREQ: NURS222, NURS241 & NURS242 or NURS312, NURS250 or NURS253. 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: NURS222, NURS241 & NURS242 or NURS312, NURS250 or NURS253. RESTRICTIONS: Open to nursing majors only.

NURS 356 **CARE OF CHILDREN AND FAMILIES** 3
Presents selected concepts and theories related to the nursing care of infants, children and adolescents and their families. Selected laboratory and field experiences are included to enhance concepts. PREREQ: NURS222, NURS241 & NURS242 or NURS312, NURS250 or NURS253. RESTRICTIONS: Open to nursing majors only.

NURS 358 **WOMEN’S HEALTH NURSING** 3
Examines selected concepts and theories related to nursing care of the childbearing family and major women’s health issues. Selected laboratory and field experiences included to enhance concepts. PREREQ: NURS222, NURS241 & NURS242 or NURS312, NURS250 or NURS253. RESTRICTIONS: Open to nursing majors only.

NURS 362 **RESEARCH CONCEPTS IN HEALTHCARE** 3
Application of the research process and the research utilization process to healthcare practice. PREREQ: STAT200 or MATH201. RESTRICTIONS: Open to nursing and health studies majors only.

NURS 366 **INDEPENDENT STUDY** 1-6

NURS 372 **ADULT HEALTH NURSING** 4
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: NURS222, NURS241 & NURS242 or NURS312, NURS250 or NURS253. RESTRICTIONS: Open to nursing majors only.

NURS 382 **COMMUNITIES AND HEALTH POLICY** 2
Examines nurse’s role in community health and health policy. Major issues affecting healthcare and current political issues examined. Issues of bioterrorism, environment, and occupational health included. PREREQ: NURS222, NURS241 & NURS242 or NURS312, NURS250 or NURS253. RESTRICTIONS: Open to nursing majors only.

NURS 390 **CLINICAL WORK EXPERIENCES** 1-2 PF
Students receive credit for approved healthcare-related work/volunteer experience. Students must work/volunteer in an appropriate healthcare-related position and credit will be given based on hours worked. PREREQ: NURS200 or NURS220. RESTRICTIONS: Open to nursing majors only.

NURS 411 **TOPICS IN HEALTHCARE DELIVERY** 3
Consideration of selected issues and problems of nursing practice within the healthcare delivery system. Exploration of some topics may include a laboratory or clinical component. Variable topics. RESTRICTIONS: Open to nursing and health studies majors, or by permission of professor. May be repeated for up to one credit hour.

NURS 412 **MULTICULTURAL TOPICS IN HEALTHCARE DELIVERY** 3
Presents a cultural consideration of selected issues and problems of nursing practice within the global healthcare delivery system. Exploration of some topics may include a laboratory or clinical component. Variable topics. RESTRICTIONS: Open to nursing and health studies majors, or by permission of instructor. May be repeated for up to nine credit hours.

NURS 413 **BIOMEDICAL RESEARCH ETHICS** 3
Critically examines scientific integrity and responsible conduct in biomedical and translational research within theoretical and social context of research ethics using case examples and previous experiences. Topics include: individual and institutional responsibilities for promoting scientific integrity; protection of the rights of the researcher and human and animal subjects; data issues; collaboration; authorship practices; intellectual property; and impact of future developments in science. Students write case analyses, reflections and critiques about field experiences to ethical review boards and research laboratories and discuss the culmination of their experiences specific to research ethics.

NURS 414 **WOMEN AND GENDER IN HEALTHCARE** 3
Explores women’s healthcare issues from the perspective of gender needs within our healthcare delivery system. Global issues related to cultural needs, health beliefs and practices, lifespan and lifestyle considerations, wellness goals, and health issues unique to women are the focus of content. May be crosslisted with WOMS414. RESTRICTIONS: Open to nursing, health studies, and women’s studies majors and minors, or by permission of instructor.

NURS 416 **MULTIMEDIA PROJECTS IN NURSING** 1
Examines how to capture media segments while actively learning abroad. Explore archived digital media, prepare storyboards, write scripts, and create clips to highlight the diversity of the people’s lives and healthcare abroad. Develop electronic portfolios that demonstrate their understanding of complex global issues and post their work on a program blog to share their experiences with those following the program from the U.S. COREQ: NURS411

NURS 435 **LEADERSHIP AND MANAGEMENT IN HEALTH ORGANIZATIONS** 3
Introduces the principles of leadership and management and their application in healthcare systems where nursing care is delivered. Focuses on the roles of nurse leaders and managers across practice settings. PREREQ: NURS220. RESTRICTIONS: Open to BRN majors only. Course sequence alteration requires permission of instructor.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 442</td>
<td>Community Health Nursing</td>
<td>3</td>
<td>Focuses on conceptual foundations for community health nursing practice with the community, family and individual as clients. Diversity in nursing roles and practice is related to community health promotion and community health problems. PREREQ: NURS320.</td>
</tr>
<tr>
<td>NURS 443</td>
<td>BRN Role Practicum</td>
<td>3</td>
<td>A preceptored clinical experience focused upon the integration of concepts learned in baccalaureate nursing education. PREREQ: NURS320, NURS362.</td>
</tr>
<tr>
<td>NURS 450</td>
<td>Synthesis of Professional Nursing Practice</td>
<td>1 PF</td>
<td>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.</td>
</tr>
<tr>
<td>NURS 453</td>
<td>Clinical Applications Adult Health Nursing I</td>
<td>3 PF</td>
<td>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.</td>
</tr>
<tr>
<td>NURS 457</td>
<td>Clinical Applications: Maternal Child Nursing</td>
<td>3 PF</td>
<td>Clinical application of science and nursing theories of care for infants, children, adolescents and childbearing families. PREREQ: All 300-level required nursing courses. RESTRICTIONS: Open to nursing majors only.</td>
</tr>
<tr>
<td>NURS 459</td>
<td>Clinical Applications: Psychosocial Nursing</td>
<td>3 PF</td>
<td>Clinical application of science and nursing theories of care for clients with acute and chronic psychiatric healthcare needs. PREREQ: All 300-level required nursing courses. RESTRICTIONS: Open to nursing majors only.</td>
</tr>
<tr>
<td>NURS 460</td>
<td>Transition to Professional Nursing Practice I</td>
<td>2</td>
<td>Using a seminar format, students discuss major issues associated with preparing the student nurse for professional nursing practice. Content assists students in integrating scientific and theoretical knowledge, focusing on professionalism, the job experience, legal and ethical issues, and application of selected concepts such as QSEN. Students reflect on the integration of class concepts within their clinical experiences. PREREQ: All required 300-level nursing courses. RESTRICTIONS: Open to nursing majors only.</td>
</tr>
<tr>
<td>NURS 464</td>
<td>Teaching Assistantship in Nursing</td>
<td>1-2 PF</td>
<td>Allows junior and senior nursing students to develop professional teaching, peer leadership, and communication skills while enhancing their knowledge base in course content. RESTRICTIONS: Must have a 3.0 GPA, have completed the course for which they TA in good standing, and be available the entire semester. Students must work at least 28 hours throughout the semester to receive 1 credit or 56 hours to receive 2 credits.</td>
</tr>
<tr>
<td>NURS 466</td>
<td>Independent Study</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>NURS 473</td>
<td>Clinical Applications: Adult Health Nursing II</td>
<td>3 PF</td>
<td>Advanced clinical application of science and nursing theories in acute care health settings. Builds upon clinical practice skills of NURS453. PREREQ: NURS453, NURS460. COREQ: NURS479 and NURS480. RESTRICTIONS: Open to nursing majors only.</td>
</tr>
<tr>
<td>NURS 477</td>
<td>Clinical Applications: Care of Populations</td>
<td>3 PF</td>
<td>Clinical application of science and nursing theories in community health settings. Local, national, and global issues are addressed. PREREQ: NURS453, NURS457, NURS459, NURS460. COREQ: NURS479, NURS480. RESTRICTIONS: Open to nursing majors only.</td>
</tr>
<tr>
<td>NURS 478</td>
<td>Honors: Care of Populations</td>
<td>3</td>
<td>Clinical application of science and nursing theories in community health settings. Local, national, and global issues are addressed. Focus is synthesis of knowledge, application of evidence based practice and reflection on their nursing care provided to families, aggregates, in the community. PREREQ: NURS453, NURS457, NURS459, NURS460. COREQ: NURS479, NURS473, NURS480. RESTRICTIONS: Open to honors nursing majors only.</td>
</tr>
<tr>
<td>NURS 479</td>
<td>Clinical Preceptorship</td>
<td>3 PF</td>
<td>Clinical application of science and nursing theories in student-selected clinical settings. Provides a transition from student-faculty relationships to mentor-new graduate relationships. Students are mentored by a nurse preceptor. PREREQ: NURS453, NURS460. For accelerated students, NURS473 must precede NURS479. COREQ: NURS473, NURS480. RESTRICTIONS: Open to nursing majors only.</td>
</tr>
<tr>
<td>NURS 480</td>
<td>Transition to Professional Nursing Practice II</td>
<td>2</td>
<td>Using a seminar format, students discuss major issues associated with professional nursing practice within the local and global health care system. Content assists students in integrating scientific and theoretical knowledge, focusing on domains of professional nursing care, nursing healthcare organizations, and nursing and the world. Students reflect on the integration of class concepts within their clinical experiences. PREREQ: NURS460. RESTRICTIONS: Open to nursing majors only.</td>
</tr>
<tr>
<td>NURS 499</td>
<td>Oncology Nursing: Multicultural Perspectives</td>
<td>3</td>
<td>Provides nursing students with an overview of selected aspects of oncology nursing for adults, with a focus on the multicultural aspects of cancer care. PREREQ: All sophomore nursing classes or permission of instructor. RESTRICTIONS: Nursing majors.</td>
</tr>
<tr>
<td>NURS 556</td>
<td>Special Problem</td>
<td>1-12</td>
<td></td>
</tr>
<tr>
<td>NURS 600</td>
<td>Issues in School Health Nursing</td>
<td>3</td>
<td>Focuses on roles of new school nurse and healthcare needs of school-age children and adolescents. Includes testing/screening, guidance/counseling, health teaching, and skills in school health setting. PREREQ: Registered nurse.</td>
</tr>
<tr>
<td>NURS 604</td>
<td>Advanced Practice Roles for Healthcare Providers</td>
<td>3</td>
<td>Focuses on roles and issues affecting healthcare providers engaged in advanced practice. Roles are analyzed in relation to current issues and concepts of advanced practice. Crosslisted with HSAD604. RESTRICTIONS: Permission required from department.</td>
</tr>
<tr>
<td>NURS 609</td>
<td>Nursing Science: Theory and Research</td>
<td>4</td>
<td>Examines the science of nursing from theoretical and research perspectives and emphasizes theory as the foundation for research and practice. PREREQ: EDUC665. COREQ: EDUC665. RESTRICTIONS: Open to majors only. Permission required from department.</td>
</tr>
<tr>
<td>NURS 610</td>
<td>Crosscultural Healthcare</td>
<td>3</td>
<td>An in-depth study of cultural diversity, delineating ethnocultural congruent healthcare practices in a pluralistic society. Assessment, planning and interventions for health promotion, illness and disease prevention, health restoration and health policy legislation are explored. RESTRICTIONS: Open to only to graduate students or by permission of instructor.</td>
</tr>
<tr>
<td>NURS 613</td>
<td>Death Education</td>
<td>3</td>
<td>Focuses on the field of death education, its relevance to everyday life and most specifically to the professional practice of practitioners providing support to the dying and bereaved. RESTRICTIONS: Admission to BRN major or BSN degree or bachelor's degree in another discipline.</td>
</tr>
<tr>
<td>NURS 615</td>
<td>Integrative Health</td>
<td>3</td>
<td>This course focuses on the use of integrative therapies within a holistic framework of care. Integrative interventions are examined through research, demonstrations, and experiential learning. Self-care and personal growth of the healthcare provider is developed. The use of integrative therapies as a complement to standard medical practice to manage health conditions will be explored. PREREQ: HLPR 630- Health Behaviors Change Strategies, HLPR 631- Health Coaching HLPR 605- Concepts of Chronic Disease Management. COREQ: HLPR 630- Health Behaviors Change Strategies, HLPR 631- Health Coaching HLPR 605- Concepts of Chronic Disease Management RESTRICTIONS: Permission of instructor needed if student not a matriculated health care provider program.</td>
</tr>
<tr>
<td>NURS 616</td>
<td>Primary Care in Community Health</td>
<td>3</td>
<td>Focuses on community based primary care issues in relation to individual, family, and community health. Clinical component includes health promotion and disease prevention activities. PREREQ: NURS622 and NURS621 and NURS604. COREQ: NURS604 and NURS620. RESTRICTIONS: Open to majors only. Requires permission from department. RESTRICTIONS: Open to majors only. Requires permission from department.</td>
</tr>
<tr>
<td>NURS 617</td>
<td>Preceptorship I</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>NURS 619</td>
<td>Financial Management in Health Services</td>
<td>3</td>
<td>Provides the basic principles and concepts of effective management of budgets for healthcare units. Includes analysis of the environment and departmental organization and their impact on healthcare. Crosslisted with HSAD619. RESTRICTIONS: Permission of department required.</td>
</tr>
</tbody>
</table>
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

NURS 620  ADVANCED HEALTH ASSESSMENT  3
Assists graduate students in acquiring advanced knowledge and proficiency in performing health assessments. Includes eliciting a complete health history and performing a comprehensive examination.
PREREQ: NURS604  COREQ: NURS604  RESTRICTIONS: Requires permission of department.

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

NURS 622  ADVANCED PHARMACOLOGY  3
Applies principles of pharmacology to the therapeutic management of the client. Emphasizes prescribing, monitoring drug regimens, identifying adverse reactions, and anticipating changes inherent in self medicating.
RESTRICTIONS: Permission of department required.

NURS 623  MANAGEMENT OF WOMEN’S HEALTHCARE  3
Focuses on gynecological and reproductive primary healthcare. Emphasizes management of gynecologic health needs and the normal reproductive cycle.
PREREQ: NURS604 and NURS622. COREQ: NURS604 and NURS622.

NURS 624  MANAGEMENT OF CHILDREN’S HEALTH  3
Focuses on delivery of primary healthcare to children and adolescents. Emphasizes physical and developmental variations and management of acute and episodic illness.
PREREQ: NURS620 and NURS621  RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.

NURS 625  MANAGEMENT OF ADULT EPISODIC HEALTH NEEDS AND PROBLEMS  3
Focuses on delivery of primary care to adults and the elderly with acute and episodic health problems. Emphasizes the clinical decision making necessary to serve as a foundation for planning primary healthcare services.
PREREQ: NURS620 and NURS621  RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.

NURS 626  MANAGEMENT OF ADULT CHRONIC HEALTH NEEDS AND PROBLEMS  3
Focuses on delivery of primary care to adults and the elderly with chronic health problems. Emphasizes management of ongoing needs.
PREREQ: NURS620 and NURS621  RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.

NURS 627  PRECEPTORSHIP II  3
Emphasizes clinical decision making in an interdisciplinary environment with the nurse practitioner as the principal provider of primary care.
PREREQ: NURS617. COREQ: NURS617.

NURS 635  HEALTH ADMINISTRATION THEORIES  3
Theories of administration, organization and management, their interaction with other health discipline theories and their influence on management of healthcare agencies. Includes the interaction of theories with attainment of institutional goals.
Crosslisted with HSAD635.  PREREQ: NURS604. COREQ: NURS604.

NURS 636  ADULT-GERONTOLOGY I  4
This course provides knowledge needed to develop core CNS practice competencies in Adult-Gerontology. These include therapeutic interventions (health promotion, disease prevention, health coaching, and restoration of health), education of patients and caregivers, evidence-based practice, consultation, interdisciplinary collaboration, and healthcare issues across the adult life span.
COREQ: NURS604, NURS621. RESTRICTIONS: Open to clinical nurse specialist students only.

NURS 637  HEALTH PLANNING STRATEGIES  3
Analyzes organizational systems and roles of managers and administrators. Students identify organizational needs, formulate goals and objectives appropriate to healthcare agencies and identify strategies appropriate to accomplishing goal attainment with ethical constraints of healthcare.
Crosslisted with HSAD637.  PREREQ: NURS604 and NURS609 or Permission of Instructor. COREQ: NURS604.

NURS 638  HEALTH SERVICES EVALUATION  3
Emphasizes the role of managers and administrators in personnel development, promotion of research in clinical settings and development and implementation of quality improvement initiatives and their implications for healthcare.
Crosslisted with HSAD638.  PREREQ: NURS604 and NURS609. COREQ: NURS604.

NURS 639  HUMAN RESOURCE MGMT IN HEALTH CARE  3
Principles, policies, and practices related to the recruitment, development, maintenance, and utilization of human resources in organizations, with particular focus paid to the demands of healthcare organizations.

NURS 641  PRIMARY/EPISODIC CARE: ADULT-GERO  3
This clinical course focuses on care of adults needing primary care for episodic health problems. Assessment, analytic skills for differential diagnoses, and use of evidence based guidelines and holistic management are emphasized. Mentored clinical experiences on healthcare teams promote independent and interprofessional patient-centered practice.
PREREQ: NURS620, NURS621. COREQ: NURS622.

NURS 642  PRIMARY/CHRONIC CARE: ADULT-GERO  3
This clinical course focuses on adults needing primary care for chronic health problems. Assessment and analytic skills for differential diagnoses, application of evidence-based guidelines and holistic management are emphasized. Mentored clinical experiences on healthcare teams promote independent and interprofessional patient-centered practice.
PREREQ: NURS620, NURS621. COREQ: NURS622, NURS641.

NURS 643  PRIMARY/COMPLEX CARE: ADULT-GERO  3
This clinical course focuses on delivery of primary health care to older adults with acute and chronic health problems, disabilities, palliative care needs, and end of life care. Content focuses on healthy aging, prevention, pharmacologic and non-pharmacologic management, and coordination of care with other disciplines.
PREREQ: NURS620, NURS621. COREQ: NURS622, NURS641, NURS642.

NURS 644  NURSE PRACTITIONER PRECEPTORSHIP I  3
Focuses on the delivery of primary care to patients in primary care practice sites across the lifespan. Serves as a part of a culminating experience in role development. Clinical practice sites will serve as an environment for students to develop primary care clinical skills as a novice nurse practitioner by working with a preceptor.

NURS 645  NURSE PRACTITIONER PRECEPTORSHIP II  3
Serves as a culminating experience in role development. In conjunction with clinical practice, it provides an environment for students to examine ways to monitor and ensure quality primary care while practicing as a Nurse Practitioner. Clinical seminar topics include peer review, interdisciplinary communication and collaboration, ethical decision making, political and legal issues, and other professional issues such as responsibility, autonomy, and accountability.

NURS 646  ADULT-GERONTOLOGY II  4
Provides opportunities to develop advanced skills (e.g., case management) inherent to the CNS role. Course content focuses on leadership, collaboration, citizenship, cost effective care, innovations in practice, and mentorship as they relate to care for adults across the life span.
PREREQ: NURS636. RESTRICTIONS: Open to graduate clinical nurse specialist students only.

NURS 654  NURSING OF CHILDREN I  4
Explores the scientific basis for the routine healthcare guidance required by children and their families. Focuses primarily on the acutely ill child.
PREREQ: NURS604 and NURS621. COREQ: NURS604 and NURS621.

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

NURS 664  NURSING PRACTICUM  3
In conjunction with the faculty advisor and based on the student’s individualized long range goals, the student selects a preceptor and healthcare setting in which to apply didactic contact in real life settings. Requires 135 hours of on-site experience, which can be taken in one semester or divided over three semesters.
PREREQ: NURS635, NURS637, or NURS638. COREQ: NURS635, NURS637, or NURS638.

NURS 666  SPECIAL PROBLEM  1-12

NURS 668  ADVANCED CLINICAL NEUROSCIENCE  3
Explores advanced concepts of neuroanatomy and neurophysiology including structural and functional components of the nervous system. Contrasts normal and abnormal neurodevelopment across the lifespan. Presents genetic/epigenetic advances in neuroscience. Relevance to lifespan mental illnesses is a major course focus.
PREREQ: NURS621. COREQ: NURS621. RESTRICTIONS: Requires permission of department.
NURS 669 ADVANCED PSYCHOPHARMACOLOGY 3
Explores advanced pharmacokinetics and pharmacodynamics of all psychoactive medication classes. Emphasizes the clinical management of psychiatric symptoms within the context of lifespan mental illness. Examines evidenced-based treatment and best practices in psychopharmacologic intervention. Highlights legal/ethical issues related to prescribing.
PREREQ: NURS622, NURS668. COREQ: NURS668. RESTRICTIONS: Requires permission of department.

NURS 670 ADVANCED LIFESPAN PSYCHOPATHOLOGY 3
Explores nosology and etiology of mental illnesses across the lifespan with emphasis on different diagnosis. Examines selected theories of psychopathology and scientific findings. Highlights trends, research, ethical implications, and limitations of nosology and labeling. Cultivates interviewing and assessment skills using simulation and/or field experiences.
PREREQ: NURS620. RESTRICTIONS: Requires permission of department.

NURS 671 PSYCHIATRIC MENTAL HEALTH NURSING I 3
Explores evidence-based clinical. Emphasizes care of mental illnesses across the lifespan. Integrates analysis and application of cognitive-behavioral theory as a clinical modality. Highlights health and wellness promotion across the lifespan within the individual and family context. Includes supervised clinical hours.
PREREQ: NURS668, NURS669 and NURS670. RESTRICTIONS: Open to Psych NP concentration only.

NURS 672 PSYCHIATRIC/MENTAL HEALTH NURSING II 3
Explores evidence-based clinical management of selected mental illnesses across the lifespan. Integrates analysis and application of family systems theory as a clinical modality. Highlights health and wellness promotion across the lifespan with in the community context. Includes supervised clinical hours.
PREREQ: NURS668, NURS669, NURS670. RESTRICTIONS: Open to Psych NP concentration only.

NURS 673 PSYCHIATRIC/MENTAL HEALTH NURSING III 3
Explores evidence-based clinical management of selected mental illnesses across the lifespan. Integrates analysis and application of selected clinical modalities. Highlights health and wellness promotion across the lifespan. Includes supervised clinical hours.
PREREQ: NURS668, NURS669, NURS670. RESTRICTIONS: Open to Psych NP concentration only.

NURS 674 PSYCH NURSE PRACTITIONER PRECEPTORSHIP I 3
Integrates evidence-based clinical management of mental illness and promotion of mental health in individuals across the lifespan. Explores integration and refinement of clinical modalities. Emphasizes role transition/development, legal/ethical issues, mental health care delivery systems, and local and global practice trends. Includes supervised clinical hours.
PREREQ: NURS671, NURS672, NURS673. RESTRICTIONS: Open to Psych NP concentration only.

NURS 675 PSYCH NP PRECEPTORSHIP II 3
Integrates evidence-based clinical management of mental illness and promotion of mental health in individuals across the lifespan. Explores integration and refinement of clinical modalities. Emphasizes role transition/development, legal/ethical issues, mental healthcare delivery systems, and local and global practice trends. Includes supervised clinical hours.
PREREQ: NURS671, NURS672, NURS673. RESTRICTIONS: Open to Psych NP concentration only.

NURS 686 CLINICAL NURSE SPECIALIST ROLE INTEGRATION 4
Integration of theories and concepts related to roles of the clinical nurse specialist. Emphasizes advanced practice roles within the broad context of healthcare.
PREREQ: All required clinical courses

NURS 687 NURSING SCIENCE: RESEARCH APPLICATION 3
Focuses on the application of research to nursing practice. Includes critical analysis of research through an organized critique process, examination of data, and examination of 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 810 PHILOSOPHICAL AND THEORETICAL BASIS OF NURSING SCIENCE 3
Critical analysis of historical, theoretical and philosophical foundations of science in the evolution of knowledge development and inquiry in nursing science. Exploration and analysis of middle-range theory development in nursing science and related health and social science theories.
PREREQ: Admission to PhD in Nursing Science program.

NURS 811 CONCEPTS IN ADVANCED NURSING PRACTICE 2
Focuses on concepts relevant to advanced nursing practice across the life span. Includes the impact of changing demographics, environmental influences and cultural determinants on delivery of health care. Emphasis on the responsibility of advanced practitioners for review of current health policies and legislation.
RESTRICTIONS: Requires BSN and permission of instructor.

NURS 812 RESPONSIBLE CONDUCT OF RESEARCH 1
Critically examines scientific integrity and responsible conduct in biomedical, clinical and translational research within the theoretical and social context of research ethics using case examples and previous experience. Topics include: individual and institutional responsibilities for promoting scientific integrity, protection of the rights of researchers and human and animal subjects, data issues, collaboration, authorship practices, intellectual property, and impact of future developments in science.
PREREQ: Admission to the doctoral program or permission of instructor.

NURS 814 ADVANCED QUANTITATIVE RESEARCH IN NURSING SCIENCE 3
In-depth analysis of quantitative research methodology within the context of research studies or existing data bases. Provides practical experience in collecting, analyzing and interpreting quantitative data. Topics include: formulation of research questions and hypotheses that are supported by a critical review of the literature and conceptual or theoretical frameworks; examination of quantitative research designs, sampling strategies and sample size estimation; data collection methods and planning for data analysis.
PREREQ: NURS810, NURS812. Doctoral level statistics course or Permission of instructor. COREQ: NURS810, NURS812, Doctoral level statistics course or Permission of instructor.

NURS 816 ADVANCED QUALITATIVE RESEARCH IN NURSING SCIENCE 3
The naturalistic paradigm and qualitative approaches, such as ethnography, phenomenology, grounded theory and/or others, are explored. The appropriateness of each approach for exploration, description and explanation of phenomena encountered in clinical, organizational and educational settings is emphasized. Development of a qualitative research proposal.
PREREQ: NURS810 and NURS812.

NURS 833 NURSE SCIENTIST SPECIAL TOPICS SEMINAR I 1
Students share scholarly discourse with experts in nursing science and health-related research to develop their dissertation research and advance their knowledge of theoretical, methodological and practical aspects of research and grant writing. The expected behavior and responsibilities of the nurse scientist and academicians are integrated.
PREREQ: NURS810, NURS812. COREQ: NURS814 or NURS816.

NURS 834 NURSE SCIENTIST SPECIAL TOPICS SEMINAR II 1
Students share scholarly discourse on current topics in nursing science and health-related research, advance their ideas for dissertation, and incorporate behavior needed by the nurse scientist for engaging with the local and global scientific community. Builds upon work accomplished in NURS833.
PREREQ: NURS833.

NURS 835 NURSE SCIENTIST SPECIAL TOPICS SEMINAR III 1
Students share scholarly discourse with experts in nursing science to advance their ideas for dissertation. Strategies for promoting professional development and career trajectory planning are emphasized. Facilitates the socialization process to the nurse scientist role. Builds upon work accomplished in NURS834.
PREREQ: NURS834 or permission of instructor.

NURS 841 PHILOSOPHICAL AND THEORETICAL BASIS OF NURSING EDUCATION 3
Critical inquiry into major philosophical positions and associated educational theories relevant to nursing higher education. Ideas and historical roots which are relevant to contemporary issues in teaching nursing will be explored. Learners will evaluate theories of education used in educational research and develop an awareness of how and why philosophy and theory matters to education and teaching in schools of nursing.
PREREQ: NURS810, NURS814 and NURS816.

NURS 842 NURSING HIGHER EDUCATION: STRUCTURE, PROCESSES & OUTCOMES 3
Overview of structure and processes in systems of higher education in nursing including but not limited to curriculum development, educational strategies and outcome evaluation of individual students, groups and programs.
PREREQ: NURS810 COREQ: NURS841

NURS 850 DISSERTATION PROPOSAL SEMINAR 1 PF
Students evaluate and refine their dissertation proposal through interactions with peers and faculty. The seminar is facilitated by faculty involved with dissertation committees. Attention is given to University requirements and preparing students for dissertation proposal defense.
PREREQ: Completion of all other PhD courses or permission of instructor. COREQ: Written comprehensive examination or permission of instructor.

NURS 866 SPECIAL PROBLEM 1-12

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

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

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

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

**PHIL 105 CRITICAL THINKING**
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. 3

**PHIL 115 PHILOSOPHY FIRST YEAR SEMINAR**
Meet four different philosophy professors for one hour each to discuss different areas of philosophy. Times arranged to fit student schedules. 0 PF

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

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

**PHIL 201 SOCIAL AND POLITICAL PHILOSOPHY**
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. 3

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

**PHIL 203 ETHICS**
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. 3

**PHIL 204 WORLD RELIGIONS**
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. 3

**PHIL 205 LOGIC**
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. 3

**PHIL 207 SCIENTIFIC REASONING**
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. 3

**PHIL 208 INTRODUCTION TO JEWISH PHILOSOPHY**
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 crosslisted with JWST208. 3

**PHIL 209 PHILOSOPHY OF RELIGION**
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. 3

**PHIL 210 WOMEN AND RELIGION**
Explores the relationship between sacred text and women's religious and societal roles within Christianity, Judaism, Islam, Hinduism and Buddhism during diverse historical moments. Examine the experience of women operating within the confines of their various traditions as well as consider those who pushed the boundaries of their faith communities. Utilize a variety of feminist approaches to the study of religion. Crosslisted with WOMS210. 3

**PHIL 211 BASIC DECISION THEORY**
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. 3

**PHIL 216 INTRODUCTION TO FEMINIST THEORY**
This course explores the various theoretical explanations for and solutions to gender inequality. The development of feminist theory will be presented as an intellectual history placing each theoretical framework in conversation with the others covered during the course of the semester. Students will become familiar with a variety of feminist theories including: liberal, Marxist, socialist, transnational, radical, homosexual, multicultural, psychoanalytic, cultural, standpoint, social construction, multiethnic/racial, postmodern, and queer. Our understanding of these theoretical perspectives will be aided by the inclusion of current case studies and class debates. Crosslisted with WOMS216. 3

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

**PHIL 241 ETHICAL ISSUES IN HEALTHCARE**
Interdisciplinary study of ethical thought and its application to contemporary medicine, with a focus on ethical challenges in the provision and distribution of healthcare. Consideration of such issues as whether there is a right to health care, personal responsibility for ill health, and healthcare rationing. 3

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

**PHIL 246 PHILOSOPHICAL PERSPECTIVES OF MEDICINE**
Ethical and epistemological foundations of medicine; medicine as a way of knowing about the world compared with other ways. 3

**PHIL 301 ANCIENT PHILOSOPHY**
Beginnings of Western science and philosophy. The pre-Socratics, Sophists, Socrates, Plato, Aristotle, the Epicureans, Stoics and Skeptics. 3
**PHIL 303**  **MODERN PHILOSOPHY**  3  
Skepticism and the birth of Modernity. Bacon and scientific experimentalism; Hobbes materialism, Descartes, Spinoza and Leibniz; Locke, Berkeley, Hume and Kant; and the Age of Enlightenment and its impact on philosophy, science and religion.

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

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

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

**PHIL 307**  **BLACK THOUGHT AND PHILOSOPHY**  3  
Readings and discussions of Black philosophies, ideologies and concepts as reflected in the thought of significant Black figures. May be crosslisted with BAM5307.

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

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

**PHIL 310**  **CHINESE RELIGION AND PHILOSOPHY**  3  

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

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

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

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

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

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

**PHIL 320**  **THEORY OF KNOWLEDGE**  3  
An examination of some central issues in epistemology: classical and contemporary analyses of empirical knowledge; the nature of justification and rationality; implications for science, religion and metaphysics. May be crosslisted with CGSC320.

**PHIL 322**  **EXISTENTIALISM**  3  
Study of the origins and development of existential philosophy. Emphasis on the fundamental insight into the nature of man that separates the existentialists from the rest of the Western philosophical tradition. Sources include Pascal, Kierkegaard, Nietzsche and Sartre.

**PHIL 327**  **RACE, GENDER, SCIENCE**  3  
Critically examines a number of conceptual, epistemological, and ethical issues related to science of race, gender, and sexual orientation. Topics may include (a)evolution of sex and gender, (b) gender and cognition, (c) biological basis, or lack thereof, of sexual orientation/preference (d) evolutionary, cognitive, historical, and political origins of race thinking, (d) relationship between everyday conceptions of race and gender as compared with scientific conceptions of race and gender, (e) ethical issues raised by human kind classification schemes. May be crosslisted with BAM5327, CGSC327, 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 crosslisted with CGSC330.

**PHIL 340**  **CROSS CULTURAL ENVIRONMENTAL ETHICS**  3  
Critical and global study of the ethics of human-environmental 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, feminism 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 crosslisted with SCEN344.

**PHIL 366**  **INDEPENDENT STUDY**  1-6  

**PHIL 389**  **TOPICS: WOMEN AND HEALTH ISSUES**  3  
Varying special topics related to women’s health. Topics may include, but are not limited to: the relationship between women, health and development; theoretical contributions of feminism to thinking about relationship between gender and health; women’s health conditions in various parts of the world. Crosslisted with WOMS389. PREREQ: Any WOMS 200-level course. RESTRICTIONS: May be repeated for credit when topics vary.

**PHIL 390**  **HONORS COLLOQUIUM**  3  

**PHIL 404**  **ANIMAL MINDS**  3  
Examines philosophical, theoretical, and methodological issues raised by study of animal cognition and behavior. Topics may include mental continuity between human and nonhuman animals, animal communication and deception, self-recognition, emotions, culture, as well as the ethical treatment of animals. Crosslisted with CGSC404.

**PHIL 418**  **MEANING AND LANGUAGE USE**  3  
Introduction to theories of meaning based on the notion of truth and their application to language use. Crosslisted with LING418. PREREQ: LING101.

**PHIL 421**  **PHILOSOPHY, BIOLOGY, SOCIETY**  3  
Recent topics in philosophy of biology, with emphasis on those related to self, community, and society at large. Topics may include intelligent design, evolutionary altruism, psychological altruism, evolutionary psychology, cultural evolution, evolutionary game theory, and evolutionary ethics. Crosslisted with CGSC421.

**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 446   PHILOSOPHY OF LAW 3
Explores basic topics in the philosophy of law (e.g., the nature of law, constitutional and statutory interpretation, theories of criminal punishment), as well specific controversial issues concerning the law.

PHIL 448   ENVIRONMENTAL ETHICS 3
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format. May be crosslisted with UAPP448.

PHIL 450   RECENT TOPICS IN 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 crosslisted with CGS450.

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: Open only to Philosophy Majors and by permission of instructor. May be repeated once for credit when topics vary.

PHIL 466   INDEPENDENT STUDY 1-6

PHIL 604   ANIMAL MINDS 3
Examines philosophical, theoretical, and methodological issues raised by study of animal cognition and behavior. Topics may include mental continuity between human and nonhuman animals, animal communication and deception, self-recognition, emotions, culture, as well as ethical treatment of animals. Crosslisted with CGS604.

PHIL 613   RAISE: RESEARCH ETHICS 0-3 PF
The RAISE (Responsibility and Integrity in Science and Engineering) seminar provides graduate instruction on research ethics and professional practice. The seminar prepares participants as future leaders of professional integrity in their fields. Issues include attribution of authorship, data falsification, conflicts of interest, plagiarism, and whistleblowing. May be crosslisted with UNIV613. RESTRICTIONS: Consent of instructor.

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 crosslisted with MAL648, UAPP648.

PHIL 650   RECENT TOPICS IN THE PHILOSOPHY OF MIND 3
Recent topics in the philosophy of mind such as theory of mind, naturalized semantics, animal cognition, evolution of language. May be crosslisted with CGS650.

PHIL 815   ETHICS, BUSINESS AND COMMUNICATION 3
Provides professional development in ethics, business and communication related to systems biology research applications in stem cell, tissue engineering, and drug delivery technologies. Intended for PhD students in interdisciplinary life science and engineering programs. Crosslisted with BINF815.

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

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

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

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

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

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

PHYS 169   PERSPECTIVES ON PHYSICS AND ASTRONOMY 1 PF
First year seminar providing 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 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. Introduction to concepts of force, energy, and momentum, with examples of linear, rotational, and oscillatory motion. Solid body and fluid mechanics discussed. PREREQ: MATH115 or MATH117 or MATH221 or MATH 241. RESTRICTIONS: Requires a strong mathematics background in geometry, algebra and trigonometry. Only one course among PHYS201, PHYS207 and SCEN101 can count toward graduation.

PHYS 202   INTRODUCTORY PHYSICS II 4
Second course in a sequence with PHYS201 that provides an introduction to physics for students in the life and environmental sciences. Topics include wave motion, electricity and magnetism, and optics. PREREQ: PHYS201 or PHYS207. Only one course from PHYS202 and PHYS208 can count toward graduation.

PHYS 207   FUNDAMENTALS OF PHYSICS I 4
First course in a sequence with PHYS208 that provides an introduction to physics for those in physical sciences and engineering. Emphasis on Newton's laws of motion and conservation principles. These are applied to motion in a gravitational field, and to rotation of a rigid body. Integrates conceptual understanding with extensive problem solving and laboratory experience. COREQ: MATH241. RESTRICTIONS: One year of high school calculus is recommended. Only one course from PHYS201, PHYS207 and SCEN101 can count toward graduation.

PHYS 208   FUNDAMENTALS OF PHYSICS II 4
Second course in a sequence with PHYS207 that provides an introduction to physics for those in the physical sciences and engineering. Emphasis on electro- and magnetostatics in terms of forces, fields and potentials, with some elements of circuit theory. Furthermore, magnetic induction and Maxwell's equations in integral form are introduced. Integrates conceptual understanding with extensive problem solving and laboratory experience. PREREQ: PHYS207, MATH241 COREQ: MATH242

PHYS 211   OSCILLATIONS AND WAVES 3
Builds on and extends concepts of classical physics introduced in PHYS207. Explores simple harmonic oscillation, the damped harmonic oscillator and forced and coupled oscillations. Provides a simple treatment of traveling and standing waves, reflection of waves at discontinuities as well as interference and diffraction. PREREQ: PHYS207, MATH241. COREQ: MATH242.
PHYS 245 INTRODUCTION TO ELECTRICITY AND ELECTRONICS 4
This course provides an introduction to electricity and magnetism. The pertinent fundamental concepts are then applied to DC and AC circuit analysis and the study of electric motors and actuators. The course also provides a brief introduction to sensors and transducers, and electronic amplifiers.
PREREQ: PHYS207 COREQ: MATH243 RESTRICTIONS: Not for major credit.

PHYS 266 SPECIAL PROBLEM 1-3

PHYS 309 PHYSICS OF THE TWENTIETH AND TWENTY-FIRST CENTURIES 3
Fundamentals in physics that help form a modern understanding of science and technology. Intended for physical science and engineering majors, the emphasis is on electromagnetic radiation, quantum mechanics, nuclear reactions, Bohr atom, solid state physics and devices, and special relativity.
PREREQ: PHYS208 or PHYS245 and MATH242, COREQ: MATH243.

PHYS 310 INTRODUCTION TO THERMAL PHYSICS 3
General overview of thermal phenomena. Provides detailed treatment of the First Law of Thermodynamics. Introduces concepts of micro- and macro-states, and entropy and the Second Law are treated within a statistical context. First and second laws are applied to power and refrigeration cycles. The concept of free energies and their connection to phase transitions is developed. Finishes with brief introduction to Boltzmann factor and partition function.
PREREQ: PHYS207 and MATH 242.

PHYS 311 ASPECTS OF MODERN PHYSICS 3
Continuation of PHYS309. The course covers basic solid state physics, nuclear physics, and introductions to elementary particle physics, general relativity and cosmology.
PREREQ: PHYS309

PHYS 313 PHYSICAL OPTICS 4
A detailed treatment of optics at an intermediate level appropriate for physics, engineering and other students with a physical science background. Emphasis is on physical concepts and analysis of geometric optics, wave optics and applications of optics.
PREREQ: PHYS208 or PHYS245. COREQ: MATH243.

PHYS 333 FUNDAMENTALS OF ASTROPHYSICS 3
A quantitative approach to astronomy and astrophysics. Treatment of stars, the interstellar medium, galaxies, and cosmology.
PREREQ: PHYS208 or PHYS245, MATH243.

PHYS 366 INDEPENDENT STUDY 1-3

PHYS 419 CLASSICAL MECHANICS I 3
PREREQ: PHYS207, PHYS208 and MATH243. COREQ: MATH302 or MATH341, MATH303 recommended.

PHYS 424 QUANTUM MECHANICS I 3
First in a sequence with PHYS425 that provides introduction to basic principles and applications of quantum mechanics. Emphasizes on formalism of quantum mechanics. Schrödinger equation is solved for simple cases such as free-particle motion, simple harmonic oscillator and hydrogen atom, with a basic treatment of angular momentum. Topic of identical particles also considered. May be crosslisted with ELEG424. PREREQ: MATH341 or MATH302 or MATH349.

PHYS 425 QUANTUM MECHANICS II 3
Second in a sequence with PHYS424 that provides introduction to basic principles and applications of quantum mechanics. Emphasis on approximation methods with illustrative applications. Topics include: time-independent and time-dependent perturbation theory, variational principle, WKB approximation, and introduction to scattering. Applications of quantum mechanics to modern physics and technology discussed.
PREREQ: PHYS424.

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

PHYS 434 ASTROPHYSICS AND THE ORIGINS OF LIFE 3
Develops fundamental concepts of astronomy, physics, chemistry, and biology in order to identify conditions that may have helped life to originate in the young Earth, and to determine other environments in which those conditions might have occurred in the course of planetary evolution. Attention paid to (1) current cosmology, (2) generation of chemical elements necessary for life, (3) basics of chemistry prior to appearance of life, (4) steps in molecular evolution which could have led to cellular life, and (5) identification of most extreme conditions in which life known to exist, with a survey of where these conditions may arise in solar system and beyond.
PREREQ: PHYS207 and PHYS208 or PHYS201 and PHYS202

PHYS 445 ELECTRONICS FOR SCIENTISTS 4
Fundamentals of analog and digital electronics, with emphasis on applications in science. Circuit analysis, operational amplifiers, filters, gates, flip-flops, counters, analog to digital and digital to analog converters.
PREREQ: PHYS208 or PHYS245.

PHYS 446 INSTRUMENTATION FOR SCIENTISTS 4
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 or PHYS245.

PHYS 460 COMPUTATIONAL METHODS OF PHYSICS 3
Introduction to basic computational techniques in science with application to a number of disciplines of current research interest, such as quantum physics, biophysics, statistical mechanics and chaos.
PREREQ: MATH302 or MATH341, CISC106 or equivalent, PHYS208 or PHYS245.

PHYS 465 SENIOR SEMINAR 1
Senior seminar for physics majors.

PHYS 466 INDEPENDENT STUDY 1-3

PHYS 468 INTRODUCTION TO RESEARCH 1-6
Undergraduate research on an assigned problem carried out under supervision of the faculty.

PHYS 469 OBSERVATIONAL ASTRONOMY 3
Hands-on experience focusing 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. Credit can only be received for either PHYS469 or PHYS569, not for both.

PHYS 480 HISTORY OF PHYSICS 3
Survey of the development of physical ideas, from observations of the heavens and calculations of planetary positions by the ancient Egyptians, Babylonians, and Greeks, and the development of natural philosophy, to the revolutionary discoveries from the 16th century onward by Galileo, Newton, Einstein, etc. Attention to individual contributions by scientists from a wide variety of geographical and ethnic backgrounds, and to international collaborations on large scientific projects in the modern world.
PREREQ: PHYS207, PHYS208, PHYS309.

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

PHYS 600 PHYSICS RESEARCH TALKS 1 PF
Lectures by Physics and Astronomy faculty describing their current research to aid undergraduate students in selection of an area of thesis research.

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

PHYS 603 ELECTRICITY AND MAGNETISM I 3
First of a two-part sequence (with PHYS604) that provides an intermediate level treatment of electrostatics and magnetostatics, as well as an introduction to electrodynamics. Topics include a discussion of different techniques used for the calculation of electrostatic and magnetostatic fields in vacuum and in matter, and effects of time varying electric and magnetic fields.
PREREQ: PHYS208, MATH302 or MATH341.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 604</td>
<td>Electricity and Magnetism II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 607</td>
<td>Methods of Mathematical Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 608</td>
<td>Methods of Mathematical Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 610</td>
<td>Quantum Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 616</td>
<td>Statistical Physics and Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 620</td>
<td>Classical Mechanics II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 624</td>
<td>Introduction to Condensed Matter Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 626</td>
<td>Introduction to Atomic, Molecular and Optical Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 630</td>
<td>Galaxies</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 631</td>
<td>Astrophysics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 632</td>
<td>Astrophysics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 633</td>
<td>Introduction to Stellar Astrophysics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 634</td>
<td>Physics of the Sun</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 635</td>
<td>Space Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 638</td>
<td>Selected Topics in Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 639</td>
<td>Selected Topics in Astrophysics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 641</td>
<td>Nanomaterials and Thin Film Processes</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 644</td>
<td>Elementary Particles and Big Bang Cosmology</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 645</td>
<td>Electronics for Scientists</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 646</td>
<td>Instrumentation for Scientists</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 650</td>
<td>Quantum Computation</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 655</td>
<td>Statistical Biophysics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 660</td>
<td>Computational Methods of Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 669</td>
<td>Observational Astronomy</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 699</td>
<td>Physics and Astronomy Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

**PREREQ:** PHYS603.

**Restrictions:** May be repeated for credit when topics vary.

**PREREQ:** PHYS607.

**Restrictions:** May be repeated for credit when topics vary.

**PREREQ:** PHYS208 or PHYS245.

**PREREQ:** Prior knowledge of quantum mechanics recommended and familiarity with linear algebra.

**PREREQ:** PHYS616 or CHEG828.

**PREREQ:** PHYS649 or PHYS669, not both.
PHYS 806  ATOMIC, MOLECULAR AND OPTICAL PHYSICS  3
Treatment of atomic and molecular systems including experimentally observed phenomena and modern theory techniques. Topics include atomic and molecular structure, light-matter interactions, laser physics, quantum computing, Bose-Einstein condensation, and scattering phenomena.
PREREQ: PHYS811. COREQ: PHYS809.

PHYS 809  ELECTROMAGNETIC THEORY I  3
Electrostatics, boundary value problems, Green functions, orthogonal functions, multipole expansion, dielectric media, magnetostatics, Maxwell's equations, electromagnetic waves in vacuum and in dispersive media (plasmas, dielectrics, and conductors), MHD waves, electromagnetic radiation. May be crosslisted with ELEG809.

PHYS 810  ELECTROMAGNETIC THEORY II  3
Special relativity, classical field theory, Lagrangians for fields, symmetries and conserved quantities, stress-energy tensor, local symmetry and the gauge principle; masslessness of the photon, the Higgs mechanism, non-abelian generalizations of electromagnetism (the strong and weak forces), electromagnetic waves, the method of virtual quanta, geometrical optics, diffraction.
PREREQ: PHYS809.

PHYS 811  QUANTUM MECHANICS  3
Develops formal description of quantum systems as states in a complex vector space. Topics include time evolution, path integrals, symmetry groups and conservation laws, parity, angular momentum and tensor operators, operator treatment of the harmonic oscillator, identical particles, time independent and time dependent perturbation theory, and radiative transitions. Includes a summary of special functions and boundary problems appropriate to simple quantum systems.
PREREQ: PHYS811.

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

PHYS 813  QUANTUM STATISTICAL MECHANICS  3
Basic concepts of quantum statistical mechanics, density matrix, and quantum partition function. Ideal Bose and Fermi gases; Bose-Einstein condensation. Mean field and Landau theories of phase transitions; critical phenomena; introduction to renormalization group methods. Linear response theory and Boltzmann equation. Interacting quantum many-particle systems. May be crosslisted with ELEG813. PREREQ: PHYS616.

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

PHYS 821  QUANTUM FIELD THEORY I  3
Introduction to quantum field theory. Covers symmetry groups (including Lorentz and Poincare groups), classical field theory, relativistic wave mechanics, second quantization, scalar, vector and Fermion fields, quantum electrodynamics, Feynman rules, renormalization theory and the renormalization group.

PHYS 822  QUANTUM FIELD THEORY II  3
Introduction to rapidly-evolving ideas in nanophysics. Covers principles involved in fabrication of nanostructures and in measurement of phenomena on the nanoscale. Concepts necessary to appreciate applications in such areas as nano-electronics, nano-magnetism, nano-mechanics and nano-optics, are discussed.

PHYS 825  INTERMEDIATE CONDENSED MATTER PHYSICS  3
PREREQ: PHYS624.

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

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

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

PHYS 835  PLASMA PHYSICS I: FLUIDS AND MHD  3
Introduction to the 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  3-6
Selected topics from: quantum field theory, renormalization group and critical phenomena, nuclear theory, elementary particles and applications of group theory in physics.
RESTRICTIONS: May be repeated for up to six credit hours when topics vary.

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

PHYS 868  RESEARCH  1-9

PHYS 869  MASTER'S THESIS  1-6

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

PHYS 969  DOCTORAL DISSERTATION  1-12 PF

PHYS 166  SPECIAL PROBLEM  1-3

PHYS 466  INDEPENDENT STUDY  1-6

PHYS 600  PHYSICAL THERAPY AS A PROFESSION  1 PF
Ethics, licensure laws and practice of physical therapy are explored. The Guide to Physical Therapy Practice is introduced and the importance to effective practice discussed.
RESTRICTIONS: Open to physical therapy graduate students only.

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

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

PHYS 608  MUSCULOSKELETAL EVALUATION AND TREATMENT  4-8
In-depth analysis of evaluation and treatment strategies of spinal and extremity joints, muscles and connective tissue. Emphasizes research on the physiological basis of immobilization and mobilization. The diagnoses, prognosis, treatment, consultation and basis for referral of orthopedic and musculoskeletal disorders is examined.
PREREQ: PHYT604, PHYT622, PHYT626. 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 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 students only.

PHYT 623  CLINICAL NEUROSCIENCES  4
A study of the structure and function of the human nervous system with major emphasis on the cause-effect relationships between lesions and their symptoms. Emphasis on the neural mechanisms controlling movement.
PREREQ: PHYT622 RESTRICTIONS: Open to physical therapy graduate students only or by permission of instructor.

PHYT 624  BASIC EVALUATION TECHNIQUES  2
Provides an understanding of the philosophy and practice of patient evaluation and physical therapy diagnosis. Muscle performance testing and measurement of joint motion of the extremities emphasized. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 626  ADVANCED REGIONAL ANATOMY  3
Structural and functional aspects of regions of the body under study are emphasized by means of a dissection of a specific region of the human body.
PREREQ: PHYT622.

PHYT 630  HUMAN MOVEMENT CONTROL  3
Examines theoretical, methodological and empirical issues required for 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 crosslisted with BMS653.

PHYT 631  PHYSICAL THERAPY IN THE ACUTE CARE ENVIRONMENT  4
Presents diagnoses commonly seen in the acute care environment. The pathological, anatomical, evaluation, documentation and treatment considerations in managing these diagnoses are discussed. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 632  APPLIED PHYSIOLOGY I  3
In-depth analysis of the physiological mechanisms of the cardio-pulmonary system. Lectures in normal and abnormal function of this system. Emphasis on cardiopulmonary testing and rehabilitation techniques including stress tests and pulmonary function tests.
PREREQ: PHYT622 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 633  APPLIED PHYSIOLOGY II  3
Discusses the research on the effects of exercise on the various patient populations (not including cardiopulmonary). Emphasis placed on the musculoskeletal system and on exercise prescription and progression.
PREREQ: PHYT632 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 634  ELECTROTHERAPY  3-4
Provides an understanding of the physiological basis for the use of physical agents and electrotherapy. Emphasis placed on patient evaluation and clinical applications of modalities used in physical therapy clinics.
PREREQ: All prior physical therapy graduate courses. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 635  THERMAL AGENTS AND SOFT TISSUE TECHNIQUES  2
An introduction to thermal modalities and soft tissue mobilization techniques commonly used in current physical therapy practice.
PREREQ: PHYT622 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 640  SEMINAR IN MOTOR SYSTEMS NEUROSCIENCE  0-3
Students present and lead discussion of influential articles in the field of motor systems neuroscience, with an emphasis on supraspinal control of movement. May be crosslisted with BMS6640. RESTRICTIONS: Class size limited to 8. Permission to enroll required by course coordinator. Previous course work in basic neuroanatomy and neurophysiology strongly recommended. Course is designed for graduate students, but very strong undergraduates student may enroll.

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

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

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

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

PHYT 801  MEDICAL SCIENCE I: GENERAL MEDICINE  3
Lectures in pathology, clinical medicine, cardiology and pharmacology across the lifespan. Implications for physical therapy are emphasized.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 802  MEDICAL SCIENCE II: ORTHOPEDICS AND MUSCULOSKELETAL IMAGING  4
Focuses on orthopedic pathology, medical and surgical management of musculoskeletal conditions across the lifespan with implications for physical therapy intervention and musculoskeletal imaging. Strengthens physical therapist clinical expertise in comprehensive patient evaluation, diagnosis, treatment planning, and physician interaction.

PHYT 803  MEDICAL SCIENCE III: NEUROLOGY  2-3
Lectures of basic principles of neurology throughout the lifespan. Emphasis placed on medical principles related to diseases most frequently encountered in physical therapy practice.
PREREQ: PHYT623. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 804  NEUROPHYSIOLOGIC EVALUATION AND TREATMENT  4
Basic evaluation and treatment methods for managing patients with neurological dysfunctions. Analysis of these methods in light of current issues and theories of motor control, motor learning and neurobehavioral plasticity. Emphasis on learning strategies for treatment rather than through details of specific approaches.
PREREQ: PHYT623 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 805  REHABILITATION  4
Advanced instruction in the theory, research and clinical skills necessary for the comprehensive management of clients in a rehabilitation setting with an emphasis on building evidence-based program plans.
PREREQ: PHYT623 and PHYT631 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 806  GERIATRICS  3
Personal-social, biological, socioeconomic and physiological factors accompanying the aging process examined and their impact on physical therapy intervention explored.
PREREQ: All prior physical therapy graduate courses RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 807  ADVANCED SEMINAR  3-5
Lectures pursue various topics in greater depth and develop advanced clinical skills. Topics include emergency response, wound care, informatics, genomics, women's health, and specialty populations.
PREREQ: All prior physical therapy graduate courses. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 808  SPINE MANAGEMENT  4
Discusses the biomechanics, pathophysiology and disability associated with spine pain and dysfunction. Includes an understanding of the role of physical therapy evaluation in the determination and implementation of physical therapy interventions.
PREREQ: PHYT604, PHYT608, PHYT622, and PHYT624 RESTRICTIONS: Open to physical therapy graduate students only.
PHYT 809  PSYCHOSOCIAL ASPECTS OF HEALTH AND DISEASE  3
Discusses the psychosocial characteristics of patient populations and therapists that impact on the rehabilitation process. Death and dying, social implications of illness diagnosis and other topics are discussed.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 810  CLINICAL MANAGEMENT  2
Discusses concepts of administration and issues in the management of hospital clinics, private practice and consultative ventures. Students introduced to current trends in billing and reimbursement strategies used by clinicians.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 811  PEDIATRICS  4
Instruction in the theory, research and clinical skills necessary for the comprehensive management of pediatric clients and their families. Emphasis on the incorporation of modern developmental science into evidenced-based program plans.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 812  PEDIATRIC INTEGRATED CLINICAL EXPERIENCE  1
Mentored clinical experience in pediatric healthcare facilities. Students will be involved in the care of every client and accrue a variety of experiences in pediatrics.
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 on orthopedic with some exposure to other clinical settings. 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 the University of Delaware Neurologic and Older Adult Physical Therapy Clinic or a local clinical facility. Emphasis on evaluating and treating a mixed caseload of older clients and/or those with neurologic diagnoses.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 830  INTRODUCTION TO CLINICAL EDUCATION  2 PF
Prepares students for academic progression into their clinical affiliations. Overview of clinical education process and reviews all required paperwork. Reviews components of clinical education that will be assessed on their clinical affiliations (such as professionalism and communication). Instructed in proper documentation related to patient care. Provide knowledge and skills necessary to prevent, recognize, and provide care for sudden cardiac or respiratory distress. Review current federal privacy laws. Topics include how to handle infectious, hazardous materials and the process of state required background checks to protect the public.
PREREQ: All previous professional courses.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 831  CLINICAL INTERNSHIP: MULTISYSTEM COMPLEXITY  4
A ten-week, 40-hour experienced clinical experience wherein students will participate in the PT management of patients with acute health and/or complex multisystem needs. Preference will be given to inpatient hospital placement, though settings with patients containing multisystem and fluctuant health needs will also be considered.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 832  CLINICAL INTERNSHIP II OUTPATIENT  3 PF
A six-week, full-time clinical experience in an outpatient physical therapy setting. Direct participation in all aspects of patient care under the supervision of a licensed physical therapist. Students involved in all aspects of patient care including, but not limited to, evaluation, treatment, patient and family education, charting, billing, and discharge planning.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 833  CLINICAL INTERNSHIP: REHABILITATION  4
A ten-week, full-time clinical experience wherein students will participate in the physical therapy management of patients in a multidisciplinary, rehabilitation setting. Preference will be given to neurologic rehabilitative settings, though facilities containing patients with other multidisciplinary needs will also be considered.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: All prior physical therapy graduate courses.

PHYT 834  CLINICAL INTERNSHIP: ELECTIVE  4
A ten-week, extended, full-time clinical experience wherein students may participate in physical therapy research, teaching, administration, and/or the provision of skilled physical therapy services. Students may choose from a range of practice settings and patient populations.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

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

PLANT AND SOIL SCIENCES

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

PLSC 101  BOTANY  I  3
Introductory botany stressing fundamental concepts and processes in plants. Topics include cell structure and function, anatomy, genetics, reproduction, physiology, taxonomy, phylogeny and ecology.

PLSC 103  LANDSCAPE AND FIELD SKETCHING  4
Introduction to various field sketching and nature documentation techniques of landscape subjects. Emphasis on nature journaling using mixed media.

PLSC 104  BOTANY  I LABORATORY  1
Laboratory exercises for introductory botany, PLSC101.
PREREQ: PLSC101.

PLSC 105  INTRODUCTORY FORESTRY  3
Distribution, ecology, value, measurement and management of forest systems.

PLSC 120  FLOWER ARRANGING FOR BEGINNERS  1
Hands-on learning about floral supplies and mechanics, basic skills of preparing and arranging flowers and how to maximize an arrangement's lasting quality. Design techniques discussed.

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

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

PLSC 151  INTRODUCTION TO CROP SCIENCE  3
Plant structure and plant processes with practical application to the production and management of commercial crops.
RESTRICTIONS: Credit not allowed if preceded by PLSC401.

PLSC 154  TOPICS IN PRODUCTION AND MANAGEMENT OF ORNAMENTAL PLANTS  1-6
Topics combine theory and practice in the areas of turf and ornamental horticulture.
RESTRICTIONS: Not for major credit except as elective.

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

PLSC 171  NEW STUDENT COLOQUIUM  1 PF
Focuses on academics, careers and resources as important components in achieving success in the plant and soil sciences. Practical skills helpful in mastering the first year in the plant and soil sciences majors.
RESTRICTIONS: Open to first year majors only.
PLSC 201  BOTANY II  4
Sexual and vegetative characters of algae, bacteria, fungi, liverworts, mosses, ferns, horsetails, club mosses, quillworts, gymnosperms and angiosperms. Selected genera within these divisions considered in detail. PREREQ: PLSC105 or BISC207.

PLSC 202  HISTORY OF LANDSCAPE DESIGN  3
Overview of the history of landscape design from pre-history through the Modern and Post Modern Eras.

PLSC 203  PORTFOLIO REVIEW  1
Students present their work pertinent to the study of landscape design for critique by professional landscape designers. This includes work completed in design related courses including PLSC103,202 and 232. The work may also include samples of the student’s independent work in artistic expression and landscape design projects. PREREQ: PLSC103, PLSC202, and PLSC232.

PLSC 204  INTRODUCTION TO SOIL SCIENCE  3
Fundamentals of soil including origin, composition and classification; physical, chemical and biological properties; significance of soil properties to use and management, and to soil-plant relationships. PREREQ: CHEM101 or CHEM 103.

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

PLSC 206  FARM TO TABLE  3
How does food get from the farm to your table? Explore traditional agriculture and contemporary food production models like Community Supported Agriculture (CSA), community gardens and the local food movement. Learn about new crops and dietary strategies that can be incorporated into the way people eat today. Examine cultural influences on food production and consumption patterns, and biocultural aspects of nutrition. Students will complete several projects that include interviews, research, food shopping excursions, film critiques and menu planning. Students will volunteer at the Delaware Food Bank and/or Gardens for the Community. May be crosslisted with ANTH206, BIAN206.

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

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

PLSC 214  INDIGENOUS WOODY PLANTS OF THE EASTERN UNITED STATES  4
Focus on Eastern native United States and broad-leaf and coniferous plants used in the landscape. Topics include native habitat, ornamental features, potential pest problems and taxonomy using cut samples as well as landscape specimens.

PLSC 222  INTRODUCTION TO SURVEYING  3
Emphasizes concepts and methods of plane surveying for construction applications. Provides field experience with modern surveying instruments. Topics include: distance measurement, leveling, angle measurement, error analysis, coordinate systems, mapping, traversing, and calculation of land areas and earth volumes. May be crosslisted with CIEG222. RESTRICTIONS: Requires knowledge of trigonometry.

PLSC 232  FOUNDATIONS OF LANDSCAPE DESIGN  4
Application of design process to local landscape sites. Emphasis on creative problem-solving and aesthetic and ecological principles of design.

PLSC 253  TRIAD INTERNSHIP  3
On-site experience that introduces students to three regional institutions of public horticulture. For sophomores and juniors, giving them a broad orientation to the leaders, practices and operations of different botanic gardens, arboretum and other established sites of public horticulture.

PLSC 270  BIOTECHNOLOGY: SCIENCE AND SOCIOECONOMIC ISSUES  3

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

PLSC 300  PRINCIPLES OF ANIMAL AND PLANT GENETICS  3
Introduction to the theory and application of genetics as related to the improvement of plants and animals. Crosslisted with ANFS300. PREREQ: PLSC101 or BISC207 or BISC208.

PLSC 301  CAD FOR LANDSCAPE DESIGNERS  3
Introduction to the application of computer assisted drafting (CAD) and 3-D modeling programs useful in the landscape industry.

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

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

PLSC 305  SOIL FERTILITY AND PLANT NUTRITION  4
Practical application of the basic principles of soil chemistry, physics and microbiology to modern land use programs. Covers basic principles of nutrient management (availability and cycling in soils, roles in plant nutrition), soil acidity and liming, soil testing, environmental fate of non-essential elements and organic chemicals, and role of risk assessment in soil management. PREREQ: CHEM102 or CHEM104 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 310  ANIMAL AND PLANT GENETICS LABORATORY  1
Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems. Crosslisted with ANFS310. COREQ: ANFS300.

PLSC 313  TURF ESTABLISHMENT AND MAINTENANCE  4
Factors affecting the establishment and maintenance of fine and utility turf; emphasis on the management of golf courses, athletic fields and sod farms.

PLSC 330  LANDSCAPE CONSTRUCTION DETAILS  4
Introduction to principles involved in the design and installation of landscape elements: stone, brick, concrete, wood and metal.

PLSC 331  SITE ENGINEERING  4
Introduction to land grading, site layout, drainage, earthwork volumes and erosion and sediment control for landscape and construction sites.

PLSC 333  ESTIMATING AND BIDDING  1
Overview of the various estimating techniques used by landscape professionals to produce accurate bids and proposals.

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.

PLSC 364  LANDSCAPE HORTICULTURE INTERNSHIP  1-6
Supervised, faculty-monitored, career-related experience in one or more aspects of the ornamental horticulture industry.

PLSC 366  INDEPENDENT STUDY  1-6

PLSC 390  HONORS COLLOQUIUM  3
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.
PLSC 399  TEACHING EXPERIENCE  1-2 PF
Practical teaching experience assisting in instruction of an undergraduate course. 
REQUIREMENTS: Requires overall GPA of 2.75 and 3.0 in major. Must have taken the course in which assisting or have equivalent experience.

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

PLSC 403  NURSERY AND GARDEN CENTER MANAGEMENT  4
Production, maintenance and marketing of plants relative to the establishment and management of a nursery or garden center. PREREQ: PLSC101 or PLSC151.

PLSC 404  PLANT TAXONOMY  3
Identification, classification and nomenclature of vascular plants, including plant recognition as well as use of alternative-statement keys. Emphasis on economic plant families of eastern United States.

PLSC 408  ADVANCED LANDSCAPE DESIGN  4
Advanced design studio projects including small and large-scale landscapes, investigating issues pertinent to both residential and non-residential settings.

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.

PLSC 415  VASCULAR PLANT ANATOMY  3
A developmental and comparative study of the cells, tissues and organs of vascular plants. Readings in the current anatomical literature.

PLSC 419  SOIL MICROBIOLOGY  4
Characterization of microorganisms and microbial habitats in soil environments. Processes and interactions involving soil microorganisms with respect to agricultural productivity and environmental quality. Introduction to laboratory techniques for the observation, enumeration and isolation of soil microorganisms and measurement of associated activities.

PLSC 421  NONPOINT SOURCE POLLUTION  3
Understanding sources, transport pathways, and transformations of important pollutants and toxic chemicals generated by anthropogenic activities. Topics include transport, transformation, and fate of these pollutants in watersheds. Impacts of these pollutants on soil, forest, and aquatic ecosystems using specific case studies. PREREQ: BREG321 or CIEG440 and permission of instructor.

PLSC 422  PLANT PROPAGATION  3
Practical and physiological aspects of the propagation of economic plants including both sexual and asexual methods.

PLSC 429  INTRODUCTION TO THE FUNGI  4
Introduction to the terminology, structures, and classification of the fungi, through the study of representative cultures and specimens. Fungi, mushrooms and molds as food, in industry, plant pathology, and in human health and wellness. Practical laboratory experience emphasized.

PLSC 433  PUBLIC GARDEN MANAGEMENT  3
Introduces the history and principles of public horticulture institutional development within the United States. Comparisons of institutional initiation strategies, collections management, mission development and planning, revenue streams and budgeting, university and non university settings, and public and private considerations for operations.

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 437  COLLECTIONS MANAGEMENT AND CURATION  3
Organization and maintenance of curatorial records; including: plant records and labeling, organization of seed plants (phylogeny), nomenclature, policy statements and management concerns.

PLSC 438  FATE/TRANSPORT SOIL CONTAMINANTS  3
Fundamental concepts and mechanisms of contaminant fate and transport in porous media. Includes overview of soil and groundwater as resources; types of soil and groundwater contaminants; transformation and attenuation of contaminants; solute transport in saturated and unsaturated systems. PREREQ: MATH221.

PLSC 441  FORAGE RESOURCE MANAGEMENT  3
Exploration of the various grasses, legumes, and forbs that have a potential as forage crops. Discussions will cover characteristics of each species that make it suitable for a particular type of forage use. Cultural practices for successful plantings, maintenance, harvest and storage and preservation will be covered. May be crosslisted with ANFS402.

PLSC 442  STORMWATER MANAGEMENT  4
Hydrology and water quality for small urban/suburban/rural watersheds. Design of culverts, vegetated waterways, conventional and distributed stormwater management systems. May be crosslisted with CIEG442. PREREQ: CIEG305 or PLSC331 or permission of instructor.

PLSC 450  PLANTING DESIGN  3
Comprehensive solution of landscape problems. Field application of principles of construction and design. PREREQ: PLSC211, PLSC212 and PLSC232.

PLSC 451  DESIGN PROCESS PRACTICUM  3
Students engage in real-world design/installation projects with the goal of making a difference. Explore the foundations of design process while considering social impact and the application of design principles to spatial and interactive exhibits, with strong focus on user experience (UX) design.

PLSC 453  PUBLIC HORTICULTURE PRACTICUM  3
Focused on-site experience at a public horticulture institution that exposes students to specific management styles, administration structures and decision making situations. Students work with Longwood Graduate Program Fellows to coordinate this experience. PREREQ: PLSC253.

PLSC 455  ISSUES IN PLANT AND SOIL SCIENCES  3
An introduction to current and emerging issues facing the plant and soil sciences professions. Ethics, professionalism, environment, politics, technology and practices will be the foci of discussion groups, student oral and written presentations, case studies, guest lecturers and field trips.

PLSC 466  INDEPENDENT STUDY  1-6

PLSC 601  AGRONOMIC CROP SCIENCE  3
Production and management of the major grain and forage crops, with emphasis on diagnosis of production problems and decision making. PREREQ: PLSC151.

PLSC 603  SOIL PHYSICS  3
Examines the importance of soil physics in relation to other disciplines of soil and environmental sciences. Topics include status of water in soil, fundamental principles of water flow; differences between saturated and unsaturated water flow, water balance in the field, infiltration, evapotranspiration, heat, gas and solute (contaminant) transport in soil. May be crosslisted with BREG603.

PLSC 604  PLANT TAXONOMY  3
Identification, classification and nomenclature of vascular plants, including plant recognition as well as use of alternative-statement keys. Emphasis on economic plant families of eastern United States.

PLSC 608  ENVIRONMENTAL SOIL CHEMISTRY  3
Principles of soil chemical reactions and their application to environment including: inorganic and organic soil components, soil solution-solid phase equilibria, sorption phenomena, ion exchange reactions, kinetics of soil chemical processes, redox chemistry, soil acidity and salinity. May be crosslisted with CHEM608. PREREQ: CHEM102 or CHEM104.

PLSC 615  VASCULAR PLANT ANATOMY  3
A developmental and comparative study of the cells, tissues and organs of vascular plants. Readings in the current anatomical literature.
PLSC 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 the observation, enumeration and isolation of soil microorganisms, and measurement of associated activities.

PLSC 620  NONPOINT SOURCE POLLUTION  
Understanding sources, transport pathways, and transformations of important pollutants and toxic chemicals generated by anthropogenic activities. Topics include transport, transformation, and fate of these pollutants in watersheds. Impacts of these pollutants on soil, forest, and aquatic ecosystems using specific case studies. PREREQ: BREG321 or CIEG440 or permission of instructor.

PLSC 629  INTRODUCTION TO THE FUNGI  
Introduction to the terminology, structures, and classification of the fungi, through the study of representative cultures and specimens. Fungi, mushrooms and molds as food, in industry, plant pathology, and in human health and wellness. Practical laboratory experience emphasized.

PLSC 633  PUBLIC GARDEN MANAGEMENT  
Introduces the history and principles of public horticulture institutional development in the United States. Comparisons of institutional initiation strategies, collections management, mission development and planning, revenue streams and budgeting, university and non-university settings, and public and private considerations for operations.

PLSC 635  PLANT DEVELOPMENTAL BIOLOGY  
An anatomical and molecular analysis of plant growth and development with a focus on how genes regulate pattern formation and cellular differentiation.

PLSC 636  PLANT GENES AND GENOMES  
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 637  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.

PLSC 641  FORAGE RESOURCE MANAGEMENT  
Exploration of the various grasses, legumes, and forbs that have potential as forage crops. Discussions will cover characteristics of each species that make it suited for a particular type of forage use. Cultural practices for successful plantings, maintenance, harvest and storage and preservation will be covered. May be crosslisted with ANFS602.

PLSC 671  PARADIGMS IN CELL SIGNALING  
Overview of important signaling paradigms in animal and plant cells. Primarily literature based, with class discussion and presentations. Topics include direct cell-cell interactions, cell-matrix interactions and various ligand-receptor signaling paradigms. Crosslisted with ANFS671. RESTRICTIONS: Familiarity with Genetics, Molecular and Cell Biology.

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

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

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

PLSC 805  INSECT-PLANT CHEMICAL ECOLOGY  
Chemically mediated interactions between insects and plants and other organisms involved in the relationship. Perceptual organs, behavioral and physiological response, plant-insect interactions, insect and plant defense, and intraspecific interactions that relate to natural chemicals produced by plants and insects. Presentation-discussion format. Crosslisted with ENVC805.

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

PLSC 830  BOTANIC GARDEN MANAGEMENT  
Lecture and laboratory format conducted at Longwood Gardens to familiarize Longwood Fellows with the operations and purposes of all areas of Longwood Gardens and other botanic gardens. RESTRICTIONS: May be repeated for up to ten credits.

PLSC 833  SEMINAR: SOIL SCIENCE  
Current topics in soil science discussed from the literature.

PLSC 864  SEMINAR PLANNING AND DEVELOPMENT  
Planning, developing and hosting a major seminar series: topic and speaker selection, format and schedule development, marketing, local arrangements and hosting.

PLSC 865  SEMINAR  
1

PLSC 868  RESEARCH  
1-9

PLSC 869  MASTER'S THESIS  
1-6

PLSC 874  TOPICS IN MOLECULAR BIOLOGY  
Provides a forum for the discussion of current topics in molecular biology, with critical reading of relevant primary literature. Crosslisted with ANFS874. RESTRICTIONS: Requires permission of instructor.

PLSC 964  PRE-CANDIDACY STUDY  
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 207  BRAZIL: PAST AND PRESENT  
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 216  PORTUGUESE FOR SPANISH SPEAKERS I  
Covers the basic structures and vocabulary of Portuguese in a concentrated manner covering all of the material in PORT105 and PORT106 in one single semester. 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  
Continuation of PORT 216. Continued refinement of Portuguese grammar and further development of listening and speaking skills. Includes a reading and writing component. PREREQ: PORT216 or equivalent. RESTRICTIONS: Not open to native speakers of Portuguese.

PORT 366  SPECIAL PROBLEM  
1-3
POSC 102 Civics and Economics for Teachers 3
Provides teacher candidates with an understanding of the fundamental content and concepts embedded within the core social studies subjects of civics and economics as they relate to K-8 standards-based instruction. Focuses on developing an understanding of the content in the two subject areas and how that content might be taught effectively. May be crosslisted with ECON102. RESTRICTIONS: Elementary teacher education majors only. Cannot be taken for credit toward economics major or minor or political science major or minor.

POSC 150 Introduction to American Politics 3
The foundations, principles and processes of American politics. Topics include the Constitution, political institutions (Congress, presidency, courts), parties, interest groups, campaigns, elections, public opinion and political participation.

POSC 220 Introduction to Public Policy 3
Emphasis on what government does, with a focus on substantive policy areas as well as the mechanisms of policy making. Case studies of policy areas (e.g., health policy, environmental policy, social welfare policy, etc.) used to illustrate processes of agenda setting, decision making and policy implementation.

POSC 240 Introduction to Global Politics 3
Introduction to key concepts and theories for understanding politics on a global level. Topics include the structure of the international system, causes of war and peace, economic globalization, international organizations and other issues and processes that cross national borders.

POSC 270 Introduction to Comparative Politics 3
Introduction to key concepts and patterns in comparative politics. Topics include democratic processes and democratization, economic and political development, political institutions, and civil society. Cases from different parts of the world are examined to provide a grounding in comparative analysis.

POSC 285 Introduction to Political Theory 3
Basic introduction to political philosophy, organized not around particular historical periods or specific philosophers, but around some of the most important, enduring questions of political theory: What is the nature of the state? What are the obligations and responsibilities of citizens?

POSC 300 Research Methods for Political Science 3
Introduction to research methods including research design and data analysis.

POSC 301 State and Local Government 3
American federalism with emphasis on government and politics, with special attention to Delaware.

POSC 304 Islam, Identity and Governance 3
Theology, philosophy and history of Islam. Includes Quran, Traditions of Prophet Muhammad, Islam law and jurisprudence. Explores different interpretations and manifestations of Islam, both historically and contemporaneously. Surveys rapid globalization of Islam and Muslim communities.

POSC 311 Politics of Developing Nations 3
Discusses major political and economic trends in the developing world in recent decades, including struggles with neoliberal economic development policies and efforts to establish working democracies. Country cases from Latin America, Africa, the Middle East and South East Asia.

RESTRICTIONS: Only one of either POSC211 or POSC311 can count for degree credit.

POSC 312 Politics of East Asian Development 3
Examines contemporary issues and questions of political legitimacy and economic development in East and Southeast Asia. Traditional patterns of authority, impact of Western colonialism, emergence of new Southeast Asian states and the political and economic development of selected countries are covered.

POSC 313 American Foreign Policy 3
The theory, policies and administration of U.S. foreign policy.

POSC 316 International Political Economy 3
Interaction of international political and economic phenomena. Considers history and development of political economy, and the political underpinnings and effects of global monetary, trade, financial and investment systems. Both relations among advanced countries, and between the advanced and poor countries will be considered.

POSC 317 Gender and Politics 3
Engages gender as a useful lens for the broad study of politics. Includes analysis of gender in shaping personal, group, national and international interactions. May be crosslisted with WOMS317.

POSC 318 Public Opinion 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 319 Topics in Politics and Broadcast Journalism 3
Topics vary and may include the influence of the media on foreign policy, the responsibility of the media on foreign policy or for policy failures or successes. Crosslisted with COMM319. RESTRICTIONS: May be repeated up to three times for credit when topics vary.

POSC 320 Parties and Interest Groups 3
Examines the role parties and interest groups play in the American political system, particularly the ways in which they attempt to shape public policy and public opinion.

POSC 322 Race and Politics 3
Provides an insight and understanding of race as an intricate part of the political process in the United States. 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 crosslisted with BAM522.

POSC 324 Voting and Elections 3
Examines various aspects of political behavior including political socialization, the formation of political attitudes and opinion, electoral behavior and political participation. Attention also given to the relationship of political behavior and public policy.

POSC 329 International Migration 3
Interdisciplinary introduction to alternative/complementary disciplinary approaches to the study of human movement between states. Offered on a rotational basis by faculty involved in the University of Delaware migration group. May be crosslisted with GEOG329, HISTR332, SOC329.

POSC 330 Political Terrorism 3
Selectively examines cases, trends and organizations which have made the violence termed terrorism so salient. Also examines whether governments, including the U.S., are responding appropriately to the challenge.

RESTRICTIONS: Not open to 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, postcolonial and postmodern political theories. Students read the original sources of these positions while considering their historical development and application to contemporary politics.

POSC 340 Islamic Traditions in International Relations 3
Introduces students to the political and cultural traditions of Islam as they have been embedded in international relations. Explores the diversity among Islamic traditions and its impact on international relations. May be crosslisted with HISTR352, GEOG352, WIVB352.

RESTRICTIONS: Only one of either POSC240 or POSC340 can count for degree credit.

POSC 341 International Peace and Conflict Resolution 3
Examines and assesses practical approaches to solving major international conflicts and prevents the recurrence of conflict. May be crosslisted with HISTR341, GEOG341, WIVB341.

RESTRICTIONS: Only one of either POSC241 or POSC341 can count for degree credit.

POSC 344 International Law and Organizations 3
Examines the nature and role of international law and international organizations. May be crosslisted with HISTR344, GEOG344, WIVB344.

RESTRICTIONS: Only one of either POSC244 or POSC344 can count for degree credit.

POSC 345 International Finance 3
Examines the nature of international financial systems, the ongoing concerns over the global financial system and its impact on international relations. May be crosslisted with ECON345, HISTR345, GEOG345, WIVB345.

RESTRICTIONS: Only one of either POSC245 or POSC345 can count for degree credit.

POSC 346 Comparative Political Systems 3
Examines the political systems of various countries, with an emphasis on political democracy, federalism, and social democracy. May be crosslisted with HISTR346, GEOG346, WIVB346.

RESTRICTIONS: Only one of either POSC246 or POSC346 can count for degree credit.

POSC 347 Comparative Political Development 3
Examines the political histories and present conditions of various countries and regions. May be crosslisted with HISTR347, GEOG347, WIVB347.

RESTRICTIONS: Only one of either POSC247 or POSC347 can count for degree credit.

POSC 349 Public Policy: Issues and Techniques 3
Examines practical strategies and techniques used to evaluate public policy questions, including event study, matching, regression discontinuity, and difference-in-differences models. May be crosslisted with ECON349.

RESTRICTIONS: Only one of either POSC249 or POSC349 can count for degree credit.

POSC 350 Political Institutions and the Media 3
Examines theoretical and empirical approaches to analyzing the influence of political institutions on the media and the media on political institutions. May be crosslisted with HISTR350, GEOG350, WIVB350.

RESTRICTIONS: Only one of either POSC250 or POSC350 can count for degree credit.

POSC 351 Political Parties and Leaders 3
Examines political parties and leaders in the United States and other democracies. May be crosslisted with HISTR351, GEOG351, WIVB351.

RESTRICTIONS: Only one of either POSC251 or POSC351 can count for degree credit.

POSC 352 Interest Groups and Social Movements 3
Examines the political and social dynamics of interest groups and social movements in the United States and other democracies. May be crosslisted with HISTR352, GEOG352, WIVB352.

RESTRICTIONS: Only one of either POSC252 or POSC352 can count for degree credit.

POSC 353 Political Communication 3
Examines the role of communication in politics in the United States and other democracies. May be crosslisted with HISTR353, GEOG353, WIVB353.

RESTRICTIONS: Only one of either POSC253 or POSC353 can count for degree credit.

POSC 354 Political Economy 3
Examines the political and economic relationship between the state and the economy in the United States and other democracies. May be crosslisted with ECON354, HISTR354, GEOG354, WIVB354.

RESTRICTIONS: Only one of either POSC254 or POSC354 can count for degree credit.

POSC 355 Political Culture 3
Examines the political culture of the United States and other democracies. May be crosslisted with HISTR355, GEOG355, WIVB355.

RESTRICTIONS: Only one of either POSC255 or POSC355 can count for degree credit.

POSC 356 Foreign Policy 3
Examines the foreign policy of the United States and other democracies. May be crosslisted with HISTR356, GEOG356, WIVB356.

RESTRICTIONS: Only one of either POSC256 or POSC356 can count for degree credit.
POSC 337  POLI COMM LECTURE SERIES 1 PF
This lecture series focuses on various thematic issues in political communication and campaign politics to highlight the University of Delaware’s place at the epicenter of politics. The lectures are given by UD scholars and national political practitioners in a variety of fields. Crosslisted with COMM337.

POSC 339  EUROPEAN UNION 3
The European Union is an economic and political union that binds together twenty-seven European countries. This course provides an overview of the history, institutions, policies and controversies surrounding the European Union.

POSC 340  POLITICS AND THE MEDIA 3
Political roles of the media in socialization, political agenda setting, the electoral process and political crises. Emphasis on media-political system interaction and its import in a democratic society. May be crosslisted with COMM340. RESTRICTIONS: Open to majors only.

POSC 350  POLITICAL AND THE ENVIRONMENT 3
The political context of environmental issues; air and water pollution, population control, and conservation.

POSC 355  URBAN POLITICS 3
Discusses the emergence, foundation, and nature of politics in urban areas. Topics include the evolution of urban communities, the framework for urban governance and politics, power structures and leadership, and the impact of social and economic problems on development in urban society.

POSC 361  FEMINIST POLITICAL THEORY 3
Overview of feminist political theory examining the ways that gender has shaped politics including topics such as the public/private distinction, family politics, economics, sexual violence, and exclusion. Considers how questions of gender intersect with other forms of identity in the U.S. and globally. May be crosslisted with WOMS361.

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 3
Introduction to the development, structure, and processes of international law.

POSC 368  POLITICS OF DIFFERENCE 3
Explores how the social construction of difference informs our access to material and symbolic resources and is thus political. Engages with four structures of difference and their intersections: ethnicity/race, class, gender, and sexualities.

POSC 377  ARAB-ISRAELI POLITICS 3
Development of the Arab-Israeli conflict analyzed from the Dreyfus Affair and the Balfour Declaration to current events. May be crosslisted 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 crosslisted 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 LAW AND POLITICS 3
Critical topics in law and politics. Topics will vary. May be crosslisted with WOMS402. RESTRICTIONS: May be taken twice for credit when topics vary.

POSC 402  THE FIRST AMENDMENT 3
Constitutional issues of freedom of speech, press, religion, and separation of church and state.

POSC 403  CIVIL LIBERTIES 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 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  TOPICS IN WORLD POLITICS 3
Topics in world politics. Topics will vary. RESTRICTIONS: May be taken twice for credit 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 capability of government to cope with problems arising from overpopulation and socio-economic differences.

POSC 413  TOPICS IN AMERICAN POLITICS 3
Contemporary topics in American government and politics. May be crosslisted with WOMS413. RESTRICTIONS: May be taken twice for credit when topics vary.

POSC 414  TOPICS IN AMERICAN FOREIGN POLICY 3
Contemporary topics in American foreign policy and policy making. RESTRICTIONS: May be taken twice for credit 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 416  ETHNIC CONFLICT AND CONFLICT RESOLUTION 3
What are “ethnic” groups and why do these ethnic groups compete politically, and sometimes fight or even commit genocide, against each other? What can be done to prevent or end such violence? This course will center around a number of case studies of ethnic conflicts and conflict management across Europe, Africa and western Asia.

POSC 417  NATIONAL SECURITY POLICY 3
This course focuses on grand strategy, the basic national security strategy of the United States. Questions addressed include policy to combat terrorism and nuclear proliferation; the rise of China; peacekeeping; the process of making national security decisions; and the history of U.S. grand strategy.

POSC 419  INTERNATIONAL RELATIONS HISTORY 1-3
Looks and examines key themes in the history of international relations across time and the globe (Europe, Asia, Africa, the Americas) like development of a states system and sovereignty, patterns in the practices of war and peace, and development of key institutions of international relations.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSC 421</td>
<td>POLITICAL PSYCHOLOGY</td>
<td>3</td>
<td>Political psychology examines how psychological processes, concepts, and theories help to shape our understanding of politics. Major topics include social identity, attitudes and opinions, personality, prejudice, stereotyping, conflict, nationalism, emotion, information processing, and political behavior.</td>
<td>PREREQ: POSC150, POSC300.</td>
</tr>
<tr>
<td>POSC 423</td>
<td>CONGRESS</td>
<td>3</td>
<td>Examination of U.S. House and U.S. Senate organization including committees and parties, the lawmaking process, campaigns and elections, inter-branch relationships, interest groups and representative democracy.</td>
<td></td>
</tr>
<tr>
<td>POSC 425</td>
<td>ADVANCED TOPICS IN POLITICS AND BROADCAST JOURNALISM3-9</td>
<td>3</td>
<td>Topics vary and may include influence of crisis news on national and international politics, effectiveness of political documentaries and ethical and historical underpinnings of broadcast journalism. Crosslisted with COMM425. RESTRICTIONS: Not open to COMI majors. May be repeated for nine credits when topics vary. When topic is News Documentary, COMM324 suggested prerequisite.</td>
<td></td>
</tr>
<tr>
<td>POSC 426</td>
<td>LATIN AMERICAN POLITICS</td>
<td>3</td>
<td>An examination of the dynamics that explain current politics in the region.</td>
<td></td>
</tr>
<tr>
<td>POSC 427</td>
<td>POLITICS OF CHINA</td>
<td>3</td>
<td>General introduction to politics and modernization efforts of the People's Republic of China. Topics include the dilemmas of economic reform, China's regime challenges, the changing relationship between state and society, and the future of the Chinese Communist Party.</td>
<td></td>
</tr>
<tr>
<td>POSC 428</td>
<td>TOPICS IN ASIAN POLITICS</td>
<td>3</td>
<td>Topics in Asian politics. Topics will vary. RESTRICTIONS: May be taken twice for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>POSC 429</td>
<td>SOUTHEAST ASIA AND THE WORLD</td>
<td>3</td>
<td>Course examines the international relations of Southeast Asia. Topics include Southeast Asia's relations with major powers (China, the United States, and Japan); the forces of economic regionalism; and the politics of regional organizations.</td>
<td></td>
</tr>
<tr>
<td>POSC 430</td>
<td>INTERMESTIC RELATIONS OF ISLAM AND AMERICA</td>
<td>3</td>
<td>Capstone experience for political science and international relations majors. Explores intermestic (international and domestic) relations between Islam and United States. Integrates and applies prior learning about American domestic politics, America's foreign relations, world politics and existing global crisis between United States and Muslim World in wake of attacks of September 11, 2001 and subsequent United States invasion and occupation of Iraq.</td>
<td></td>
</tr>
<tr>
<td>POSC 433</td>
<td>AFRICAN POLITICS</td>
<td>3</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>POSC 434</td>
<td>POLITICAL THOUGHT I</td>
<td>3</td>
<td>From Plato to Machiavelli.</td>
<td></td>
</tr>
<tr>
<td>POSC 435</td>
<td>POLITICAL THOUGHT II</td>
<td>3</td>
<td>From Machiavelli to present.</td>
<td></td>
</tr>
<tr>
<td>POSC 436</td>
<td>POLITICS AND LITERATURE</td>
<td>3</td>
<td>Explores the contributions of literature in various forms including the literary genre of film to the study of politics. Facilitates a better understanding of national or international politics through the voices of acclaimed authors. Regional or temporal focus will vary. May be crosslisted with FLIT436, WOMS3436. RESTRICTIONS: May be repeated once for credit when topics/countries differ.</td>
<td></td>
</tr>
<tr>
<td>POSC 438</td>
<td>TOPICS IN POLITICAL THEORY</td>
<td>3</td>
<td>Focuses on selected topics in political theory. Topics vary by instructor. RESTRICTIONS: May be taken twice for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>POSC 439</td>
<td>TOPICS IN AFRICAN POLITICS</td>
<td>3</td>
<td>Examination of selected topics in contemporary African politics. Topics will vary. May be crosslisted with BAMS439. RESTRICTIONS: May be taken twice for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>POSC 440</td>
<td>COMPARATIVE PUBLIC OPINION</td>
<td>3</td>
<td>Examines theories, sources, characteristics, and impact of public opinion across different regions. Topics include public opinion and democracy, support for political institutions, media and public opinion, economic conditions and public opinion, and political culture and values.</td>
<td>PREREQ: POSC150, POSC300.</td>
</tr>
<tr>
<td>POSC 441</td>
<td>CONTEMPORARY POLITICS BY COUNTRY</td>
<td>3</td>
<td>Study of contemporary politics by country. Course is only taught abroad. May be repeated for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>POSC 442</td>
<td>TOPICS IN EUROPEAN POLITICS</td>
<td>3</td>
<td>Examination of current trends in European politics. Topics will vary. RESTRICTIONS: May be taken twice for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>POSC 443</td>
<td>CHINA AND THE WORLD</td>
<td>3</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>POSC 444</td>
<td>GLOBAL AGENDA</td>
<td>3</td>
<td>Seminar survey of current geopolitical problems facing the US government and global news media. Guest lecturers and practitioners in diplomacy and the international media explore the problems, US foreign policy and media influence upon both. May be crosslisted with COMM444. RESTRICTIONS: May be repeated for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>POSC 445</td>
<td>HUMAN RIGHTS AND WORLD POLITICS</td>
<td>3</td>
<td>Alternative theories of human rights examined in cross-cultural and international contexts. Internal documents, contemporary cases (e.g. South Africa) and U.S. foreign policies also examined and evaluated.</td>
<td></td>
</tr>
<tr>
<td>POSC 446</td>
<td>INTERNATIONAL HUMAN RIGHTS ON FILM</td>
<td>3</td>
<td>A study of the history, evolution and current status of universal human rights using film as a primary medium. Content covers origins of the international human rights movement during and after WWII. A series of feature films and documentaries also highlights recent and current human rights violations in foreign nations.</td>
<td></td>
</tr>
<tr>
<td>POSC 447</td>
<td>NATIONAL AGENDA</td>
<td>3</td>
<td>Seminar offered in conjunction with speaker series focused on current policy and political problems facing the United States. Guest lecturers, office holders and candidates, political and media practitioners explore the problems and their implications for the nation and for campaigns and decision making. May be crosslisted with COMM447.</td>
<td></td>
</tr>
<tr>
<td>POSC 448</td>
<td>THEORIES OF INTERNATIONAL RELATIONS</td>
<td>3</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>POSC 449</td>
<td>ETHICS AND POLITICS</td>
<td>3</td>
<td>Address ethical issues directly related to national and international politics. Primary focus on international level, primary medium film (feature and documentaries). Topics realpolitik, idealism, pacifism, torture, just war theory, genocide, impunity for mass murder, and international justice.</td>
<td></td>
</tr>
<tr>
<td>POSC 450</td>
<td>TOPICS IN LATIN AMERICAN POLITICS</td>
<td>3</td>
<td>Current political issues in selected Latin American countries. RESTRICTIONS: May be taken twice for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>POSC 452</td>
<td>TOPICS IN URBAN POLITICS</td>
<td>3</td>
<td>Course will cover topics in Urban Politics. Topics will vary. RESTRICTIONS: May be taken twice for credit when topics vary.</td>
<td></td>
</tr>
<tr>
<td>POSC 453</td>
<td>COMPARATIVE POLITICAL ECONOMY</td>
<td>3</td>
<td>Overview of debates in Comparative Political Economy, with a focus on Europe and advanced industrial countries. Topics include different analytical tools and approaches for studying CPE, debates over Varieties of Capitalism, and capitalism itself. RESTRICTIONS: May be taken twice for credit when topics/countries vary.</td>
<td></td>
</tr>
</tbody>
</table>
**POSC 457** **Political Science Careers and Practice** 3
Introduction to profession of academic research in the social sciences, and focus on the fundamental tenets of scientific inquiry, research design and empirical analysis, scientific writing and presentation. Students interested in post-graduate education should especially consider this course.
PREREQ: Students should have taken Introduction to Data Analysis (POSC 300), or an equivalent course; and, students should have also completed their second writing course requirement.

**POSC 458** **Post-Soviet Union** 3
Examines the political history, politics and economy of contemporary Russia. Topics include why the Soviet Union broke up, how Putin dominated the nominally democratic Russian political system, Russian political culture and ethnic diversity, Russia’s economic problems, and its foreign policy.

**POSC 459** **Sexuality and Law** 3
Examines the regulation of sexual practices and identities through the law with a specific focus on how the development of political policy and legal norms at the state and federal level reflects changes in sexual norms as a consequence of social movement activity.
May be crosslisted with WOMS459.

**POSC 461** **Topics in Gender and Politics** 3
Topics in gender and politics. Topics will vary. May be crosslisted with WOMS461.

**POSC 462** **Climate Change: Policy, Equity and Mitigation** 3
Focuses on climate change equity, international compliance mechanisms, and US initiatives. It is designed for graduate students and advanced undergraduates who seek to gain substantive understanding of climate change policy and the means, impediments and opportunities to reaching resolution of complex international questions.
Crosslisted with MAST462.

**POSC 463** **United Nations** 3
Examines the development, institutional structure, and prospects of the United Nations and UN system.

**POSC 464** **Internship in Political Science and International Relations** 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 466** **Independent Study** 1-6
Opportunity for students to undertake mutually agreed upon independent study with selected faculty.

**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 471** **Polling Research and Analysis** 3
Applied experience conducting research using polling data. Develop, implement, and report on a research project based on actual polling data. When taught during the spring semester the course will conduct the Blue Hen Poll, examining undergraduate opinion at UD.
PREREQ: Enrollment for this course will be capped at 20 students, but future decisions about size will be based on demand. To maximize the effectiveness of the course, there will be two prerequisites. Students should have taken Introduction to Data Analysis.

**POSC 472** **Democratic Theory** 3
Examines some of the most influential attempts to provide the theoretical foundations of democracy. Explores various critical perspectives that highlight the limitations and dangers of democracy.

**POSC 473** **Gender, Sex and Law** 3
Examines the utilization of the law for the purposes of gender equity examining how the courts at the federal and state levels have been used to challenge sex-based discrimination, gender norms, and political inequality.
May be crosslisted with WOMS473.

**POSC 475** **Model United Nations** 3
Intensive preparation for effective participation in the National Model United Nations held in New York City each spring.

**POSC 476** **Election Law** 3
Explores the legal structure of the political process in America. Addresses topics such as voting rights, voter representation, campaign speech, redistricting and gerrymandering, the role of political parties, campaign finance law, and election administration.
PREREQ: POSC402 or POSC403 or POSC405 or POSC380. RESTRICTIONS: Must attend the first class. Participation in class is mandatory, as is consistent attendance.

**POSC 480** **Topics in Environmental Politics** 3
Focuses on selected topics in politics of the environment in the USA and/or internationally. Topics will vary.

**POSC 482** **America in the Middle East** 3
Examines history of America’s engagement with an emphasis on issues since 1979. After brief intro portion on the mechanics of American foreign policy-making and America’s global political and strategic position over time, we will spend most of the semester on America’s involvement in regional oil politics, Middle East peace process, first and second Iraq Wars, relations with Iran, plans for Middle East democratization and the Bush II administration. Evaluation will be based upon a mid-term and final exam, a medium-length research paper, and one or two short writing assignments.
May be crosslisted with JWST482.

**POSC 483** **Washington D.C. Policy Practicum** 3-6
Students will live in Washington D.C. and be placed in intern positions. Class will include lectures and site visits and discussions with practitioners and instructors. Crosslisted with UAPP433. RESTRICTIONS: Approval of instructor.

**POSC 802** **Seminar: Comparative Politics of the Global South** 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 nationalism and ethnic conflict, and international systemic influences on all the above.

**POSC 804** **Seminar: Comparative Politics of Post-Industrial Polities** 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** **Topics in Law and Politics** 3
Focuses on selected topics in law and politics.
RESTRICTIONS: Graduate students only. May be taken twice for credit when topics vary.

**POSC 806** **Normative Issues in Global Governance** 3
Examines normative issues in contemporary global governance from perspective of diverse ethical traditions and/or political philosophy.

**POSC 807** **American Political Behavior** 3
Introduces students to the literatures on political participation, voting behavior, and public opinion in the U.S. Major topics include inequalities in political involvement, the sources and structure of public attitudes, the influence of the media and campaigns, and the criteria citizens use to make vote choices.

**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 811** **Topics in Comparative Politics** 3
Focuses on selected topics in Comparative Politics.
RESTRICTIONS: May be taken twice for credit when topics vary.

**POSC 812** **Topics in International Relations** 3
Focuses on selected topics in international relations. May be taken twice for credit when topics vary.
**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
Reviews major theories developed over the last half century to explain nature-society relations. Policy case studies on environmental justice, trade and environment, global climate change, and sustainable development used to evaluate current range of political-economic explanations of nature-society relations. International, national and local responses to these problems are analyzed.

Crosslisted with ENEP 810.

**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** Philosophy of Science and Research Design 3
Provides advanced training in philosophy of science and research design. Intended to provide students with the training and skills necessary to design dissertation proposals and write dissertations.

**POSC 818** Environmental Politics and Policy 3
U.S. 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 crosslisted with MAST 871, UAPP 818.

**POSC 822** Topics in Political Theory 3
Focuses on selected topics in political theory.

RESTRICTIONS: May be repeated once when topics vary.

**POSC 824** Comparative Political Economy 3
The economy is political, and there are several ways to organize a capitalist economy. This seminar explores varieties of capitalism across the world. Focuses on theoretical approaches and on empirical questions: how did different varieties originate? Are they converging? Can egalitarian varieties survive?

**POSC 826** Islam in Global Affairs 3
Explores three main elements of political Islam - epistemological, reformative and militant, and examines how the struggle to construct Islam is reconstructing the international system.

**POSC 828** Feminist International Relations 3
Surveys feminist International Relations literature from classic works to contemporary research, problematizing how gender permeates the study and practices of global politics. Class intersects/engages postcolonial, poststructural and other critical approaches while also providing an introduction to the variety of feminist methodologies in the field.

**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 836** Democratic Theory 3
Examines some of the most influential attempts to provide the theoretical foundations of democracy. Explores various critical perspectives that highlight the limitations and dangers of democracy.

**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.

**POSC 844** International Security 3
Introduction to the theoretical, empirical and policy-relevant literatures connected with international security affairs, defined as issues connected with the use or threat of force in international affairs. Topics include nuclear deterrence and proliferation, grand strategy, ethnic violence, peacekeeping, and terrorism and counterterrorism.

**POSC 845** Human Rights and Global Governance 3
A seminar that surveys international human rights issues with a special focus on those dimensions of rights most relevant to global governance. Topics include (but are not limited to) cosmopolitan ethics, just war theory, cultural relativism, and human rights regimes.

**POSC 850** Colloquium on Global Governance and Society 1-3
Departmental speaker series.

RESTRICTIONS: First and second year students enroll for one credit and attend the speaker series. Third year Ph.D. students enroll for three credits and the speaker series accompanies a research colloquium.

**POSC 868** Research 3
To be taken by M.A. students seeking to satisfy the program's research requirement through the research paper option.

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

**POSC 899** Research Paper for Master of Arts 0 PF
MA student works independently with a supervising faculty member to complete the master of arts research paper.

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

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

**POSC 969** Doctoral Dissertation 1-12 PF

---

**Preservation Studies**

**Pres 801** Research Presentation Seminar 0 PF
Seminar for presentation of research in progress.

RESTRICTIONS: Required for three semesters.

**Pres 866** Special Problem 1-12

**Pres 868** Research 1-12 PF

**Pres 964** Pre-Candidacy Study 1-12 PF

**Pres 969** Doctoral Dissertation 1-12 PF

---

**Psychology**

**PSYC 100** General Psychology 3
Introduction to the process of psychological science. Includes coverage of research methods, biological bases of behavior, sensation and perception, cognitive psychology, abnormal behavior and treatment, developmental psychology, and social and personality psychology.
PSYC 105 **POSITIVE PSYCHOLOGY** 3
Positive Psychology is a branch of psychology that focuses on the empirical study of the attributes that enable individuals and communities to thrive. The course will help students learn how to optimize personal health and happiness and that of communities and organizations.

PSYC 120 **ECOLOGICAL PSYCHOLOGY** 3
Examines how the brain interacts with the environment in generating behavioral outcomes. Focuses on neuro-anatomy, and psychological, ecological, and behavioral principles.

PSYC 207 **RESEARCH METHODS** 3
Reviews the major issues involved in the design of psychological experiments. Includes measurement issues, internal and external validity of experiments, research with single subjects, and research ethics. Discusses both laboratory and field research.
PREREQ: Grade of C- or better in PSYC100. RESTRICTIONS: Majors and minors only.

PSYC 209 **MEASUREMENT AND STATISTICS** 3
Theory and the application of statistical techniques to psychological data.
PREREQ: Grade of C- or better in PSYC100 or NSCI100 and one course in basic college mathematics. RESTRICTIONS: Open to majors and minors in Psychology and Neuroscience majors.

PSYC 301 **PERSONALITY** 3
A survey of data and theories of human personality and affect.
PREREQ: PSYC100

PSYC 303 **INTRODUCTION TO SOCIAL PSYCHOLOGY** 3
Analysis of interpersonal behavior with special emphasis on problems of conformity and influence; the organization and dynamics of social groups; and the development of opinions and attitudes.
PREREQ: PSYC100

PSYC 310 **SENSATION AND PERCEPTION** 3
Theories and experimental study of sensation and perception.
PREREQ: Grades of C- or better in PSYC207 and in PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301), except for Neuroscience majors.
RESTRICTIONS: Open to psychology majors and minors and Neuroscience majors.

PSYC 312 **LEARNING AND MOTIVATION** 3
Experimental study of contemporary theories of learning and motivation.
PREREQ: Grades of C- or better in PSYC207 and in PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301), except for Neuroscience majors.
RESTRICTIONS: Open to psychology majors and minors and Neuroscience majors.

PSYC 314 **BRAIN AND BEHAVIOR** 3
Surveys the neural bases of phenomena such as perception, learning, memory, motivation, anxiety, and depression from a psychobiological perspective. May be crosslisted with CGSC314.
PREREQ: Grade of C- or better in PSYC100 or NSCI100.

PSYC 320 **INTRODUCTION TO NEUROSCIENCE** 3
Survey of the basic sciences of the brain in relation to behavioral phenomena, including perception, memory, fear and aggression, and several mental disorders. Crosslisted with NSCI320.
PREREQ: C- or better in PSYC100 or NSCI100.

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 332 **HEALTH PSYCHOLOGY** 3
This course is an introduction to the field of clinical health psychology, focusing on the biopsychosocial model of health. The topics include stress and coping, cancer, diabetes, and cardiovascular disease.
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 crosslisted with WOMS333.
PREREQ: PSYC100

PSYC 334 **ABNORMAL PSYCHOLOGY** 3
Disorders of behavior and consciousness including the various psychoses, psychoneuroses, mental deficiency, and other conditions.
PREREQ: PSYC100. RESTRICTION: Credit cannot be received for both PSYC334 and PSYC380.

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
Examination of how the mind works, covering topics such as perception, vision, attention, memory, language, concepts and decision making. Major themes include understanding the mind/brain relationship, using empirical data to develop and evaluate cognitive theories, and understanding the implications of cognitive research for everyday life.
May be crosslisted with CGSC340.
PREREQ: Grades of C- or better in PSYC207 and in PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301), except for Neuroscience majors.
RESTRICTIONS: Open to psychology majors and minors and Neuroscience majors.

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 PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301) or CGSC170.

PSYC 350 **DEVELOPMENTAL PSYCHOLOGY** 3
An analysis of theory and research in developmental psychology including the topics of developmental processes, developmental risk, systems theory and contemporary social issues.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).
RESTRICTIONS: Open to psychology majors and minors only.

PSYC 365 **PSYCHOLOGY FIELD PLACEMENT** 1-6
Course requires students to apply information from previous courses to field work in a psychology-related community agency. Requirements include a minimum of nine hours per week working in a community agency, institution or business, weekly reflective writing assignments, and a final paper. Students must attend two organizational meetings during the first two weeks of the semester.
PREREQ: Grades of C- or better in PSYC207 and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).
RESTRICTIONS: Open to majors and minors only.

PSYC 366 **INDEPENDENT STUDY** 1-6
Participation in research program of a faculty member.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).
RESTRICTIONS: Open to Majors and Minors Only. Requires permission of faculty member.

PSYC 369 **RESEARCH SEMINAR** 3-6
Research experiences in faculty laboratories and meet for one hour a week. Focuses on analysis of articles, and presentation and critique of on-going research.
PREREQ: PSYC100, PSYC207, PSYC209. RESTRICTIONS: Open to Majors only.

PSYC 370 **RESEARCH IN PERSONALITY** 3
An analysis of contemporary issues and research in personality including the assessment of personality traits, the personality situation interaction and the social and biological bases of individual differences.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).
RESTRICTIONS: Open to 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 or substitutes (MATH202, MATH205, STAT200, SOC1301).
RESTRICTIONS: Open to majors and minors only. Credit cannot be received for both PSYC334 and PSYC380.

PSYC 390 **SOCIAL PSYCHOLOGY** 3
An analysis of theory and research in social psychology including the topics of social cognition, attitudes, interpersonal, group and intergroup relations. Student-designed research projects including data analysis.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).
RESTRICTIONS: Open to majors and minors only.
PSYC 394 CULTURAL PSYCHOLOGY 3
Introduction to 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 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.

PSYC 403 PSYCHOLOGY OF NONVERBAL BEHAVIOR 3
Seminar on social psychological implications of 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 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to 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 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.

PSYC 407 EMOTIONS AND PREVENTIVE INTERVENTION 3
Emotions: their neural, endocrine, 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 a child.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.

PSYC 408 PSYCHOLOGY OF PREJUDICE 3
Conduct research on prejudice as a team and also become familiar with the relevant scholarly literature that provides a backdrop for the research.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only. Requires permission of instructor.

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 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.

PSYC 414 DRUGS AND THE BRAIN 3
Topics covered include drug treatment of mental illness, and drug abuse/addiction.
May be crosslisted with NSCI414. PREREQ: PSYC209.

PSYC 415 HISTORY AND SYSTEMS OF PSYCHOLOGY 3
Psychology from a social history perspective, focusing on models explaining human behavior at both group and individual levels.
PREREQ: C- or better in PSYC100 or NSCI100.

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 crosslisted with BAMS416. 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: C- or better in PSYC100 or NSCI100.

PSYC 423 APPLIED BEHAVIORAL ANALYSIS 3
ABBA is the science of bringing about positive behavior change. Potential applications include behavioral healthcare, self-modification, parenting, business, and training non-human animals. Both Operant and Respondent techniques are reviewed, as well as behavioral assessment, observation, and recording.
PREREQ: PSYC100.

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 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.

PSYC 425 FAMILY CONFLICT AND THE CHILD 3
Analysis of conflicted relationships within family and their implications for developmental outcomes. Topics include transition to parenthood, spanning and coercive relationships, maltreatment, and marital conflict and disruption. The approach consists of assessment of risk models.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.

PSYC 428 NATURE VS NURTURE 3
Examines the contribution of biological and environmental determinants to individual differences in behavior and disease.

PSYC 430 THE SOCIAL SELF 3
Explores the self-concept as studied by contemporary social and personality psychologists. Topics include self-knowledge, implicit and explicit cognition, self-esteem, and self-regulation.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.

PSYC 431 HORMONES AND BEHAVIOR 3
Examines how hormones produce changes in behavior over the life course. Topics include mating and parental behavior, aggression, stress and depression, and learning and memory.
PREREQ: PSYC100 or NSCI100, PSYC209. RESTRICTIONS: Restricted to Psychology majors and minors and Neuroscience (NSCI) majors.

PSYC 432 ADVANCED HEALTH PSYCHOLOGY 3
This course is an introduction to the field of clinical health psychology, focusing on the biopsychosocial model of health. The topics include stress and coping, cancer, diabetes, and cardiovascular disease.
PREREQ: PSYC100, PSYC207, PSYC209. RESTRICTIONS: Open to Majors and Minors only.

PSYC 433 COGNITIVE NEUROSCIENCE 3
Examines brain mechanisms responsible for cognitive functions such as perception, memory, and language. Surveys methods for relating mind and brain, including brain-damaged patients, and brain imaging techniques.
May be crosslisted with NSCI433. PREREQ: PSYC209.

PSYC 436 NATURE VS NURTURE 3
Examines the contribution of biological and environmental determinants to individual differences in behavior and disease.
PREREQ: PSYC209. RESTRICTIONS: Open to PSYC majors and minors and NSCI majors and minors.

PSYC 438 HUMAN COMPUTER INTERACTION 3
Explores the design, implementation and evaluation of interactive computing systems for human use. Hands-on project examples include the design of web pages and mobile devices. Basic concepts and applied techniques necessary for the design of user-friendly interfaces are presented. Course structure allows application of creative abilities, with knowledge gained in the course, to design user-centric innovative technologies. Previous computer programming experience is not a prerequisite.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.

PSYC 440 TOPICS IN PSYCHOLUMINISTICS 3
Advanced study in psychology of language. Topics may include linguistic and conceptual development, language and space, acquisition of the lexicon, biology and environment in language learning, and language comprehension.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.

PSYC 442 PERCEPTION, MEMORY AND IMAGINATION 3
Addresses controversial issues about what it means to perceive, remember, and imagine our world. Examines research from cognitive psychology, cognitive science, and neuropsychology and includes in-class demonstrations of perceptual illusions, memory distortions, and imagery.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC3101). RESTRICTIONS: Open to majors and minors only.
PSYC 443  TOPICS IN ORGANIZATIONAL COMMUNICATION  3-9
Focuses on significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships.
Crosslisted with CONM442.  RESTRICTIONS: May be repeated for up to nine credits when topics vary.

PSYC 445  TOPICS IN ADOLESCENT PSYCHOLOGY  3
Analysis of physiological, psychological and social factors influencing psychological development from late childhood through adolescence.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).  RESTRICTIONS: Open to Majors and Minors only.

PSYC 446  PSYCHOLOGY OF MUSIC  3
Explores how subdisciplines in Psychology and Music interrelate. Topics include auditory perception, memory for music, music in therapy, development of musical abilities and social aspects of music.
PREREQ: C- or better in PSYC100.

PSYC 451  PROBLEMS IN YOUTH MENTAL HEALTH  3
Group work and problem-based learning are the teaching methods. Topics include prevention, child welfare, treatment, and the continuum of care in youth mental health. Grading is based on the ability to work collaboratively with others on group projects to achieve course requirements.
PREREQ: PSYC100, PSYC207, PSYC209.  RESTRICTIONS: Open to Majors and Minors only.

PSYC 462  LANGUAGE ACQUISITION  4
The factors which distinguish human language from animal communication, as well as the development of many facets of language (semantics, syntax and phonology). To supplement reading and discussion, students gain research experience by working approximately eight hours per week on the on-going language acquisition projects.
Crosslisted with EDUC462.

PSYC 466  ADVANCED RESEARCH  3
Participation in research program of a faculty member. Expected to contribute to conceptualization of research problems, design and methodological discussions. Normally follows PSYC366.
PREREQ: Overall GPA of 3.0 and at least 18 credits in psychology.  RESTRICTIONS: Requires permission of faculty member.

PSYC 468  THESIS RESEARCH  3
Independent work on research project in collaboration with faculty. Prepare and defend a formal research report.
PREREQ: Overall GPA of 3.0 and at least 18 credits in psychology. 6 credits in PSYC366 and/or PSYC466.  RESTRICTIONS: Requires permission of instructor.

PSYC 481  CLINICAL PSYCHOLOGY  3
Introduction to clinical theories, research and practices. Diagnosis, classification and treatment of behavior disorders.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).  RESTRICTIONS: Open to Majors and Minors only.

PSYC 484  SOCIAL MOTIVATION  3
Analysis of theory and research in the social psychology of motivation. Students may choose to study either leisure behavior or work motivation.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).  RESTRICTIONS: Open to Majors and Minors only.

PSYC 490  SOCIAL INTERDEPENDENCE  3
Presents theoretical and empirical approaches of social psychology to the study of conflict versus cooperation between mutually dependent people. Cooperation/conflict is analyzed in terms of effects of environmental influence, reward structure of the relationship, and interpersonal values of participants.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).  RESTRICTIONS: Open to Majors and Minors only.

PSYC 491  PSYCHOLOGY OF TEMPORAL ORIENTATION  3
Scientific study of how temporal frames of reference regarding the past, present and future affect a variety of basic human processes, especially human behavior.
PREREQ: Grades of C- or better in PSYC207, and PSYC209 or substitutes (MATH202, MATH205, STAT200, SOC1301).  RESTRICTIONS: Open to Majors and Minors only.

PSYC 612  HUMAN PSYCHOPHYSIOLOGY  3
Introduction to psychophysiological recording techniques. Elementary anatomy and physiology of the human nervous system. Application of psychophysiological techniques to the investigation of psychopathology, information processing and social psychology. Laboratory demonstration of polygraphic measurement of autonomic and CNS variables with small computer analysis.
RESTRICTIONS: Requires permission of instructor.

PSYC 626  ADVANCED NEUROANATOMY  3
Covers the functional organization of the nervous system from a clinical perspective, with emphasis on the brain stem, cranial nerves, limbic system, and cerebral cortex. Also surveys basic etiology, signs and symptoms of injury to spinal pathways, sensory-motor systems, methods of neurologic testing, and the Mental Status Exam.
Crosslisted with NSC1626.

PSYC 627  ADVANCED NEUROPHYSIOLOGY  3
Study of the physiology of the central nervous system, with an emphasis on the cellular and molecular basis of signal transmission in the brain.
Crosslisted with BISC627.

PSYC 628  ADVANCED NEUROPHARMACOLOGY  3
Examines the actions of psychoactive drugs on neurons, neural circuits, and behavior. Focus is on drugs used in mental health, neurological disorders, and drug abuse.
Crosslisted with NSC1628.

PSYC 642  MENTAL REPRESENTATION AND MEMORY  3
Human memory can be conceptualized in terms of representation and information storage within various interrelated mental systems. Critically evaluates research on human memory and representation within the context of major cognitive models.
May be crosslisted with CGSC642.  RESTRICTIONS: Requires permission of instructor.

PSYC 668  RESEARCH  1-6

PSYC 675  LANGUAGE ACQUISITION  4
Examines the factors which distinguish human language from animal communication as well as the development of many facets of language (semantics, syntax and phonology). Main emphasis on how children in the first three years acquire language.
Crosslisted with EDUC675.

PSYC 806  SOCIAL COGNITION  3
Focuses on the major research topics in social cognition, including their theoretical and historical roots. Topics include implicit and explicit attitudes, dual-process models of cognition and their behavioral consequences, and systematic biases in social perception.
RESTRICTIONS: Requires permission of instructor.

PSYC 807  GROUP AND INTERPERSONAL PROCESSES  3
Addresses basic theoretical and empirical knowledge of group processes, structures and interactions.
RESTRICTIONS: Requires permission of instructor.

PSYC 808  PERSONALITY IN SOCIAL CONTEXTS  3
Examines temporally stable individual differences ("traits") from a variety of perspectives including their origins, assessment, and relationships to behavior in social settings. Special attention is given to the interaction of trait and environmental influences on social behavior.
RESTRICTIONS: Requires permission of instructor.

PSYC 809  RESEARCH DESIGN  3
An overview of methodological issues in the conduct of psychological research, including correlational, experimental, and quasi-experimental studies. Special emphasis on clinical and personality research.
RESTRICTIONS: Requires permission of instructor.

PSYC 812  SEMINAR IN SOCIAL INTERDEPENDENCE  3
Examines theory and research on the conflict between self interest and collective welfare. Special attention is given to the interaction between intrapersonal motivation and features of the interdependent environment as a model for understanding the resolution of this conflict.
RESTRICTIONS: Requires permission of instructor.

PSYC 813  SEMINAR IN INTERGROUP RELATIONS  3
Cognitive, motivational and cultural factors involved in the creation of and reduction of intergroup bias and conflict. Emphasis on theoretical and applied perspectives.
RESTRICTIONS: Requires permission of instructor.

PSYC 814  SEMINAR IN EMPLOYEE MOTIVATION  3
Examines current research on the motivation of people at work. Special emphasis is given to the application of social psychological theory and empirical findings. Examples of topics are organizational commitment, perceived organizational support, self-efficacy, goal setting, and creativity.
RESTRICTIONS: Requires permission of instructor.

PSYC 819  CHILD PSYCHOTHERAPY: ETHICS, DIVERSITY, TREATMENTS  3
The focus is on evidence-based treatments for a range of psychological disorders affecting children and adolescents.
RESTRICTIONS: Requires permission of instructor.
PSYC 820  PSYCHODIAGNOSIS: OBJECTIVE TRAIT AND BEHAVIORAL ASSESSMENT  3

PSYC 821  INTELLIGENCE AND ACHIEVEMENT TESTING  3
Administration and interpretation of major individually administered intelligence and achievement tests used in school and child clinical psychology. Five tests will be highlighted: the Stanford Binet, ISEE-R, WPPSI, WAIS-R and K-ABC. RESTRICTIONS: Requires permission of instructor.

PSYC 823  LEARNING AND DEVELOPMENT  3
The study of contemporary theory and research in human development, with an emphasis on issues of educational significance, and mechanisms that affect development. Crosslisted with EDUC823.

PSYC 827  ADULT PSYCHOTHERAPY: EMPIRICALLY-SUPPORTED TREATMENTS  3
Schools, theories and techniques focusing on empirically-supported treatments in adult psychotherapy. PREREQ: PSYC819. RESTRICTIONS: Requires permission of instructor.

PSYC 829  ADVANCED PSYCHOPATHOLOGY  3
Nosology and etiology of the behavior disorders of non-organic origin. Theories of psychopathology, including various modes of conceptualizing psychopathology, i.e., medical vs. behavioral and psychosocial models. Reliability and validity of psychodiagnosis; and relevant research and problems of experimental clinical research with institutionalized populations. RESTRICTIONS: Requires permission of instructor.

PSYC 834  SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY I  1-3 PF
Limited diagnostic and therapeutic practice in clinical setting under professional supervision. RESTRICTIONS: Requires permission of instructor.

PSYC 835  SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY II  1-3 PF
Continuation of PSYC834. RESTRICTIONS: Requires permission of instructor.

PSYC 836  SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY III  1-3 PF
Continuation of PSYC834 and PSYC835. PREREQ: PSYC834 and PSYC835. RESTRICTIONS: Requires permission of instructor.

PSYC 837  SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY IV  1-3 PF
Continuation of PSYC834, PSYC835 and PSYC836. PREREQ: PSYC836 RESTRICTIONS: Requires permission of instructor.

PSYC 839  ETHICS AND DIVERSITY IN CLINICAL PSYCHOLOGY  2
Familiarizes students with APA’s Ethical Principles of Psychologists and Code of Conduct and explores how diversity issues impact psychological functioning and the therapeutic process. RESTRICTIONS: Requires permission of instructor. Open to Psychology graduate students.

PSYC 840  TEACHING PRACTICUM  3
Preparation for being instructor of record for first course in psychology. Topics include course planning, writing syllabi, writing and grading exams, developing lesson plans, teaching writing, handling academic problems, and integrating teaching into an academic career. Read and discuss empirical research on effective teaching of psychology. Required for graduate students who wish to teach their own courses in the psychology department. RESTRICTIONS: Open only to graduate students in psychology.

PSYC 841  TEACHING FELLOWSHIP  1
Supervised teaching in psychology. Open to graduate students teaching a first course as an instructor of record. Activities include weekly 1 hour discussion and class visitations by faculty supervisor. PREREQ: PSYC840 RESTRICTIONS: Requires permission of instructor.

PSYC 843  DEVELOPMENTAL SEMINAR  3
Seminar on recent issues and developments in developmental psychology.

PSYC 845  CHILDHOOD PSYCHOPATHOLOGY  3
Survey of various developmental and behavioral disorders in childhood. Seminar will examine the issues of diagnosis and treatment theoretical perspectives. Special emphasis on current major psychological research. Crosslisted with EDUC813. RESTRICTIONS: Requires permission of instructor.

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 follow-up to ANOVA focusing on an introduction to applied regression for the behavioral and social sciences. 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 865  EMOTIONS SEMINAR  1
Discusses articles that interest students in different specialties and that have the potential to help set new directions in emotion science. Articles for discussion are selected on the basis of members' interests. RESTRICTIONS: Open to Psychology graduate students only. Need permission of instructor.

PSYC 868  RESEARCH  1-6

PSYC 869  MASTER’S THESIS  1-6
RESTRICTIONS: Requires department permission.

PSYC 878  HIERARCHICAL LINEAR MODELING  3
Introduction to the basic concepts and theory underlying hierarchical linear modeling.

PSYC 879  STRUCTURAL EQUATION MODELING  3
Introduction to theory and application of structural equation models and a foundation in SEM methodology. Uses LISREL software to perform the statistical analyses. RESTRICTIONS: Prior course in multiple regression. Requires permission of instructor.

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 20th-century Russian short stories and novellas. Several short compositions. Grammar review where appropriate. PREREQ: RUSS107

RUSSIAN
SCEN 107 SNACK SCIENCE
An overview of topics from introductory biology, chemistry, and physics focusing on their applications to food and cooking. Emphasis will be placed on the use of the scientific method as a critical thinking tool through the use of laboratory experiments and problem based learning. May be crosslisted with APEC107.

SCEN 109 ART OF BOTANY
An introduction to how plants are intimately linked with the visual arts through exploration of their aesthetic value and the biological, chemical, and physical properties of plant-derived compounds and materials used as artistic media.

SCEN 111 REVOLUTIONARY SCIENCE
Student-centered exploration of six of the most revolutionary scientific controversies and resulting theories that changed our lives and the future of the human race forever. Students’ exploration will be encouraged through activities such as reading primary literature and debates as well as hands-on laboratory investigations.

SCEN 115 ORIGAMI SCIENCE FABLAB/MAKERSPACE
Learn origami and its application in science and technology. Expressions, using origami, of select concepts and methods in Mathematics, Computer Science, Physics, Biology, and Chemistry will be engaged in the classroom. Students will create structures, write about them, and present them in a gallery.

SCEN 117 CITIZEN SCIENCE
Engages diverse participants on local, regional, national, and global scales in the collection, interpretation, and use of scientific data on a particular scientific problem. We will engage students in a variety of citizen science projects including at least one of their own.

SCEN 119 TRANSFORMING SOLAR ENERGY
Lab- and project-focused exploration of solar energy and its uses. Biology, chemistry and physics concepts are introduced in context, leading to critical analysis of efficiency and economics of different technologies.

SCEN 210 SCIENCE OF COLOR PHENOMENA
Introduction to basic physical and chemical principles which describe nature of light and the phenomena of color. Targeted for non-science majors who seek a descriptive understanding of scientific principles underlying formation of color phenomena found in nature and works of art. Crosslisted with ARTC210. PREREQ: High school chemistry and algebra.

SCEN 340 ADVANCED SCIENCE FOR TEACHERS
Provides advanced background study for students in the Elementary Teacher Education Milford Program. Topics are drawn from physical, earth and biological sciences and build on science courses previously taken in the program. The areas of science outlined in the State Science Performance Indicators are covered. Along with lecture/discussion, students have hands-on laboratories (including the Smithsonian kits used by the District). RESTRICTIONS: Offered to students in the Milford ETE program.

SCEN 344 SCIENCE AND RELIGION
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. Crosslisted with PHIL344.

SCEN 466 INDEPENDENT STUDY 1-12

SCEN 491 TEACHING SCIENCE IN SECONDARY SCHOOLS
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.

SCEN 650 SCIENTIFIC INQUIRY FOR CURRENT AND FUTURE TEACHERS 3
Advanced problem-based learning and scientific research course for Elementary Teacher Education majors seeking a second licensure area in middle school science. May also be taken by current middle school and high school teachers. Topics rotate among life, earth, and physical sciences.

SEXUALITIES AND GENDER STUDIES

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

SGST 208 CURRENT ISSUES IN SEXUALITY AND GENDER LECTURE SERIES1-3
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 crosslisted with WOMS208. RESTRICTIONS: May be repeated for credit when topics vary.

SGST 266 SPECIAL PROBLEM 1-3

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 characterizations, and explore the differences between sex and sexuality. May be crosslisted with WOMS301.

SGST 308 THEORIES OF SEXUALITY AND GENDER 3
Examines the major theoretical approaches to the study of sexuality and gender with an emphasis on queer theory and intersections between sexuality, gender, race, class, and nationality.
May be crosslisted with POSC308, WOMS308.

SGST 366 INDEPENDENT STUDY 1-6

SGST 387 HISTORY OF SEXUALITY IN THE U.S. 3
A survey of American sexual ideals, practices, and identities, from the Colonial period to the present. How anxieties about interracial sex shaped life in the American South, how the advent of more reliable contraceptives provoked both social movements and political debate, and how the emergence of a scientific discourse of sexual difference simultaneously propelled the gay rights movement and enabled scientists to categorize same-sex love as pathology and perversion. Crosslisted with HIST387.

SGST 420 RACE AND SEXUALITY 3
Examine sexuality as a structure of power and identity. Study how race is sexualized and sexuality is racialized. Explore the impact of binary thinking (white/non-white, straight/gay) on social relationships. The perspective of racial minorities, particularly African-Americans, is emphasized. Review research on culture, history, and policy.
Crosslisted with SOCI420. PREREQ: SOCI201

SGST 425 SOCIOLOGY OF THE BODY 3
Examines the body, not through the lens of the biological sciences, but as the product of complex social arrangements and processes. Considers: What is ‘natural’ about bodies? How are bodies commodified? How are bodies categorized and constituted by discourses of race, class, gender, sexuality, and biomedicine?. Crosslisted with SOCI425. RESTRICTIONS: Not open to freshmen.

SGST 466 SPECIAL PROBLEM 1-6

SGST 498 INTERNSHIP IN WOMEN’S STUDIES 3
Students work 115 hours per semester in an agency or program associated with women’s and/or gender issues. Academic knowledge is applied to actual work situations. Seminar discussions focus on service learning in light of research and theory.
Crosslisted with WOMS498. PREREQ: Any 200-level women’s studies course. RESTRICTIONS: Requires permission of instructor. May be repeated once for credit.

SOCIOLOGY

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

SOCI 203 SELF AND SOCIETY 3
An introduction to one of Sociology’s major microtheoretical perspectives—symbolic interactionism (SI)—to look at the micro-level building blocks of society by focusing on situated interaction and the meanings it conveys, creating patterns of behavior and collective understandings.
PREREQ: SOCI201

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 crosslisted with BAM204.

SOCIOLOGY 206 WOMEN AND WORK 3
Covers a variety of topics including women in traditional and non-traditional occupations, gender-based discrimination (wage inequities, sexual harassment, exclusionary policies), the contributions of women to the economy and the role of law in shaping conditions for women in the workplace.
Crosslisted with WOMS206.

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

SOCIOLOGY 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.
Crosslisted with WOSM211.

SOCIOLOGY 213 MEN AND WOMEN IN AMERICAN SOCIETY 3
Designed to provide students with a sociological framework for analyzing sex and gender relations in contemporary American society. Topics include the social construction of gender, patterns of sex-role socialization, gender stratification in the paid work force, gender relations in the family and other social institutions.
May be crosslisted with WOSM213.

SOCIOLOGY 215 RACE IN SOCIETY 3
Examination of the social construction of race and its importance in institutions and social identity. History of race in the United States, including access to rights and privileges and how groups worked for racial equality, 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 crosslisted with BAM215.
SOCI 220  **SOCIOLOGY OF POPULAR CULTURE**  3
Study the political economy of production; textual analysis; consumption and celebrity and fandom. Also, examine advertising, the effect of popular culture on violence and misogyny, and the effect of popular culture on identity, especially that of women and racial and sexual minorities.

SOCI 266  **SPECIAL PROBLEM**  1-3

SOCI 270  **FAMILIES AND DEVELOPMENTAL DISABILITIES**  3
Focuses on people with developmental disabilities in the context of their family and culture from a multidisciplinary perspective. Covers disabilities and their causes; changing needs across the lifespan, gender, cross-cultural and legal issues; and information about prevention/intervention, employment, inclusion, and empowerment. Crosslisted with HDFS5270.

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.

SOCI 302  **SOCIAL DEVIANCY**  3
Defining deviance, research on deviance and explaining deviance. May be crosslisted with CRJU302.

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

SOCI 304  **CRIMINOLOGY**  3
The nature, kinds and causes of crime. Criminal liability, criminal careers and organized racketeering. May be crosslisted with CRJU304. PREREQ: SOCI201 or SOCI209.

SOCI 305  **SOCIAL CLASS AND INEQUALITY**  3
This course investigates the social structural hierarchical positions groups hold relative to the economic, political, social, and cultural resources of the society. PREREQ: SOCI201.

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 HEALTH & ILLNESS**  3
Overview of the many contributions medical sociologists have made to our understanding of the determinants of health, the organization and implications of medical care, the roles of doctors and patients, and the intersections between social change in society and in medicine.

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 313  **MENTAL HEALTH & WELL-BEING**  3
This course will explore major concepts and measurements within mental health research, contemporary mental health services and treatments, the role of stigma and the social context of mental illness, as well as practices within positive psychosocial well-being.

SOCI 315  **CHILDHOOD AND SOCIETY**  3
This course takes a sociological view of childhood and children's lives, including topics such as: historical development and variability of the category of childhood, inequality among children, educational systems, children's experiences with social institutions and childhood peer relations.

SOCI 319  **SOCIOLOGY OF LATIN AMERICA**  3
Survey of sociology of Latin America, with sections on geography, population, urbanization, history, politics, family, religion, economy, and education and on race, class, and gender relations.

SOCI 322  **CROWDS, CULTS AND REVOLUTIONS**  3
Analysis of forms of behavior in relatively unstructured situations such as crowds, panics, riots and demonstrations; and processes of interaction: susceptibility, contagion, polarization and communication. May be crosslisted with CRJU322. PREREQ: SOCI201

SOCI 323  **SOCIOLOGY OF RISK**  3
Focuses on how individuals, organizations, and government agencies assess various types of risk and act with respect to those assessments. Topics include: risk perception, risk assessment, risk management under conditions of scientific uncertainty, and public debates about safety. PREREQ: SOCI201

SOCI 324  **ISSUES IN EMERGENCY MANAGEMENT**  3
Overview of the development of emergency management in the United States as a profession. Issues associated with emergency management are also discussed with reference to the disaster research literature. PREREQ: SOCI325.

SOCI 325  **DISASTERS AND SOCIETY**  3
Sociological introduction to the field of disaster studies, including the ways in which societies attempt to prepare for, respond to, and recover from their impacts. PREREQ:SOCI201.

SOCI 328  **SOCIOLOGY OF WORK**  3
The organization of work, including social, institutional, and cultural influences. Special emphasis on problem areas such as technology, labor relations, and the challenges of a global economy. PREREQ: SOCI201

SOCI 329  **INTERNATIONAL MIGRATION**  3
Interdisciplinary introduction to alternative/complementary disciplinary approaches to the study of human movement between states. Offered on a rotational basis by faculty involved in the University of Delaware migration group. Crosslisted with POSC329.

SOCI 336  **THE DETECTIVE IN FILM AND FICTION**  3
Study of detective fiction and film has applications to a liberal arts approach to crime and justice. Blends literary analysis with the insights of social science research on the work of private and police detectives. Crosslisted with CRJU336.

SOCI 340  **GLOBAL POLICY AND INEQUALITY**  3
Explores the relationship between social policy and social inequality in the U.S. and comparable societies. Focuses on public policy and the role of NGOs in social service delivery. Specific social policy areas include employment, family, health care, education, social security, welfare, and affirmative action policies.

SOCI 341  **WELFARE AND SOCIETY**  3
Review of social welfare provision including state interventions, private charitable service delivery, and non-profit social services. Methods of social work practice and the administration and evaluation of social welfare provisions.

SOCI 343  **SOCIETY, POLITICS AND HEALTHCARE**  3
Interdisciplinary study of socio-political and humanistic issues of healthcare and health policy, in the US and abroad. Students will engage with how policy and politics influence the healthcare delivery system and its consumers.

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 crosslisted with CRJU345.

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 349  **AGING & SOCIETY**  3
Historical, social, and cultural context influence everything from the meaning of growing old, the rate of development and the rate of age-related decline, to the meaning and significance of death and dying. Introduces students to the nature and the study of human aging. May be crosslisted with HDFS349.

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
Introduction to challenges in addressing crime in multicultural, multiethnic, class-stratified society. This context serves as backdrop for inquiry into crime causation, operations of the criminal justice system, and experiences of relevant actors. Crosslisted with CRJU355.
SOCI 360 SOCIOLOGY OF RELIGION 3
Sociological analysis of religious practices and beliefs that are practiced in the contemporary United States, including changes in religious affiliation and the effect of religion on social change, political behavior, gender roles, sexuality, racial inequality, and cultural membership. May be crosslisted with JWST360.

SOCI 361 RACIAL INEQUALITY 3
A detailed examination of racial inequality, including the social construction of race, the nature of oppression and advantage, government policies and resistance strategies. There will be attention to the status of men and women and social class diversity within racial-ethnic communities. May be crosslisted with BAMSS61. 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
Examines alcohol, drugs and crime, including societal response to offenders who commit alcohol/drug related offenses and offenders who engage in crime over drug markets. Crosslisted with CRJU369. PREREQ: CRJU110 or SOCI201

SOCI 370 PRISON AND PRISON SUBCULTURES 3
Provides an intensive examination of the social organization of prisons. Mainly examines how the prisoner subculture shapes and is shaped by social institutions. Special emphasis on how gender and race contribute to differential patterns of adjustment to incarceration. Crosslisted with CRJU370.

SOCI 375 SOCIOLOGY OF DIAGNOSIS 3
Diagnosis is central to medicine. Sociologists are interested in how diagnoses and illness categories are socially constructed, applied, and serve to organize society into the healthy and the ill. This class examines the way that medical diagnoses are shaped and their powerful role in society.

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 SENIOR SEMINAR 3
Culminates the legal studies minor by requiring an independent research project resulting in a term paper. Seminar focused on a specific substantive issue, provides guidance from professor and chance to share ideas and problems with fellow students. Crosslisted with LEST401.

SOCI 407 SOCIOLOGY OF SEX AND GENDER 3
Seminar on sex and gender relations from a sociological perspective. Surveys current research on gender stratification in the paid work force, the feminization of poverty, gender relations in the family, sexual violence, and feminism as a social movement. Special attention given to current theoretical debates on the origins and persistence of sexual inequality and the intersection of gender with race and class in patterns of social stratification. May be crosslisted with WOMS407. PREREQ: SOCI201, and either SOCI213 or WOMS201. RESTRICTIONS: Restricted to junior and senior sociology and women's studies majors.

SOCI 408 DOMESTIC VIOLENCE POLICY AND PREVENTION 3
Reflects the current state of policy and practice among policy makers and practitioners in the field of domestic violence including legal issues; policy development, primary prevention, and models of best practice. Addresses the role of federal and state law. May include economic justice, mental health and trauma, and alternative models. Crosslisted with WOMS408. PREREQ: Any 200-level Women's Studies course.

SOCI 410 HEALTH SERVICES PRACTICUM AND SEMINAR 4 PF
Field experience and related seminar. Placement in health service settings where student works for approximately 160 hours under supervision of health service administrators. Students meet in a weekly seminar with coordinator.

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 crosslisted with BAMSS415, WOMS415.

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

PREREQ: SOCI312

SOCI 417 SEX CRIMES AND PUNISHMENTS 3
Discuss controversial topics surrounding sex crimes and punishments to develop students’ abilities to think critically about connections between three areas: how we as a society respond to crime through our criminal justice systems; what we believe about crime and punishment; and what empirical research tells us. Crosslisted with CRJU417.

SOCI 418 RACE, GENDER, AND POVERTY 3
An examination of contemporary American poverty with attention to race and gender as fundamental dimensions of inequality. Social policy, employment and family composition are key topics. May be crosslisted with BAMSS418, WOMS418. PREREQ: SOCI201.

SOCI 420 RACE AND SEXUALITY 3
Examine sexuality as a structure of power and identity. Study how race is sexualized and sexuality is racialized. Explore the impact of binary thinking (white/non-white, straight/gay) on social relationships. The perspective of racial minorities, particularly African-Americans, is emphasized. Review research on culture, history, and policy.

May be crosslisted with BAMSS420, SGST420, WOMS412. PREREQ: SOCI201

SOCI 425 SOCIOLOGY OF THE BODY 3
Examines the body, not through the lens of the biological sciences, but as the product of complex social arrangements and processes. Considers: What is 'natural' about bodies? How are bodies commodified? How are bodies categorized and constituted by discourses of race, class, gender, sexuality, and biomedicine? May be crosslisted with SGST425, WOMS425. RESTRICTIONS: Not open to freshmen.

SOCI 426 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: SOCI324, SOCI392 or SOCI470. RESTRICTIONS: Approval of the area coordinator.

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 crosslisted with CRJU428.

SOCI 433 COMPARATIVE SOCIOLOGY 3-6
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 crosslisted 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 432 HIV/AIDS AND CRIME IN SOUTH AFRICA 3
Examines two major social problems in South Africa: crime and HIV/AIDS. Explore the problems historically, as well as their current prevalence and implications for the country. Examines sociological theories to broaden our understanding of the social problems which are compared with the US. May be crosslisted with CRJU432.

SOCI 433 GENDER AND HEALTH 3
Why are women sicker, but men die younger? In this course we will critically examine the relationship between gender and health. In doing so, we will also consider the contribution of race, class and sexuality in shaping that relationship. May be crosslisted with WMS433. RESTRICTIONS: Not open to Freshmen due to the rigorous seminar format, higher-order thinking, and writing requirements in the course.

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  
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: SOCI/CRJU345. 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 449  SOCIOLOGY OF ART AND CULTURE  3  
This course is designed as an introduction to sociological perspectives on culture and the arts. Topics include the role of culture in the creation of social inequality, fashion, the social production of art, the culture industry, and outsider art. May be crosslisted with M CST449.

SOCI 450  POLITICS AND SOCIETY  3  
Analysis of political organization and action, including evaluation of major approaches. Case studies of political structures and behavior.  
PREREQ: SOCI101.

SOCI 452  DRUGS AND THE CRIMINAL JUSTICE SYSTEM  3  
Covers both drug and criminal justice issues, focusing on the drugs-crime nexus and the criminal justice system response. Examines issues of race, gender, victimization, international policy, and new policy responses including drug treatment, harm reduction, and restorative justice. Class is held at a local correctional facility, and half the students are inmates. Crosslisted with CRJU452. RESTRICTIONS: Permission of instructor.

SOCI 455  YOUTH STREET OUTREACH  4  
Implements an outreach program to youth in a low income, urbanized community in Wilmington. Students trained and monitored as outreach workers by their professor and by community volunteers. Outreach workers trained to approach youth hanging out on the street, engage them (through conversation and recreational activities), identify their needs, and direct them to resources. Students keep journals to record their observations and feelings. The goal of the class is to increase social capital among youth by encouraging and facilitating youth participation in community educational, recreational, and social support services/activities.  
May be crosslisted with BAMS455, CRJU455, UAPP455.

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

SOCI 466  INDEPENDENT STUDY  1-3  

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

SOCI 471  DISASTERS, VULNERABILITY & DEVELOPMENT  3  
Introduces students to social vulnerability analysis of disaster. Students examine how social, geographical, and cultural factors as well as patterns of development put people differentially at risk to disasters. Emphasizes the intersection of gender, race, class, age, and ability. Disasters in the US are compared and contrasted to international disasters. Students will explore how vulnerable social groups are affected by and cope with hazardous conditions and events, as well as study the capacities of these groups to increase resiliency. Readings draw from disaster studies, feminist studies, and development studies.

SOCI 485  FIELD EXPERIENCE IN CRIMINAL JUSTICE  4  PF  
Practicum involving actual field experience in a criminal justice agency; e.g., law enforcement, courts or correctional agencies. Emphasis on relating the field experience to academic work.  
Crosslisted with CRJU495. RESTRICTIONS: Requires permission of instructor. Not for major credit.

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

SOCI 605  DATA COLLECTION AND ANALYSIS  3  
A survey of methods and techniques for defining research problems and for gathering and analyzing data in sociological research.  
RESTRICTIONS: Requires permission of instructor.

SOCI 606  QUALITATIVE méthodology  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‐positivist research strategies and techniques.

SOCI 607  SOCIOLOGY OF GENDER  3  
Reviews current research and theory in the sociology of gender with particular attention to issues arising from the gender division of labor, feminism and social change, gender and the structure of social institutions, and the interaction of gender, race, class and sexuality. Introduces sociological theory and methodology as used and revised by scholars working on gender issues.

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

SOCI 612  DEVELOPMENT OF SOCIOLOGICAL THEORY  3  
Historical survey of the development of sociology and sociological theory beginning with the period of the Social Contract theorists through the classic European theorists of the 19th century.

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

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

SOCI 621  THEORIES AND APPROACHES IN SOCIAL DEVIANCÉ  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 625  ADVANCED SOCIAL STATISTICS  3  
The application of advanced statistics to social science research questions and data, including the use of longitudinal modeling, multilevel modeling, structural equation modeling, cluster solutions, models for categorical and limited dependent variables, and others as appropriate.  
PREREQ: SOCI 614 or Instructor Consent.

SOCI 630  JUVENILE JUSTICE AND INEQUALITY  3  
In this course students use a sociological perspective to study the punishment of and inequality among youth. There is a particular focus on how youth are treated within social institutions such as schools, families, courts, and correctional facilities, and how their treatment affects social inequality.  
RESTRICTIONS: This course is open to all graduate students in Arts & Sciences. Other students can enroll with permission of instructor.

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 crosslisted with HIST637.

SOCI 647  DISPARITIES IN HEALTH & HEALTHCARE  3  
The HRSA define health disparities as population-specific differences in presence of disease, health outcomes, or access to health care, and we will explore these issues as they relate to race, gender, and age.

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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCI 658</td>
<td>TOPICS IN LAW AND SOCIETY</td>
<td>3</td>
<td>Examines the relationship between society and law. Reviews the use of cross-disciplinary theory and/or social science research to understand the operation and impact of law and the legal system. Specific topic will vary according to professor’s specialization.</td>
</tr>
<tr>
<td>SOCI 661</td>
<td>RACIAL STRATIFICATION</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>SOCI 666</td>
<td>SPECIAL PROBLEM</td>
<td>1-12</td>
<td></td>
</tr>
<tr>
<td>SOCI 671</td>
<td>DISASTERS, VULNERABILITY &amp; DEVELOPMENT</td>
<td>3</td>
<td>Introduces students to social vulnerability analysis of disaster. Students examine how social, geographical, and cultural factors as well as patterns of development put people differentially at risk to disasters. Emphasizes the intersection of gender, race, class, age, and ability. Disasters in the US are compared and contrasted to international disasters. Students will explore how vulnerable social groups are affected by and cope with hazardous conditions and events, as well as study the capacities of these groups to increase resiliency. Readings draw from disasters studies, feminist studies, and development studies.</td>
</tr>
<tr>
<td>SOCI 676</td>
<td>ADVANCED QUALITATIVE METHODS</td>
<td>3</td>
<td>This course explores popular methods of data collection in qualitative research (interviewing, observations, content analysis, etc.), the analysis strategies associated with them, and proper professional writing-up techniques. PREREQ: Evidence of previous graduate, introductory-level qualitative methods course and/or extensive qualitative work in the field.</td>
</tr>
<tr>
<td>SOCI 698</td>
<td>TEACHING IN THE SOCIAL SCIENCES</td>
<td>1 PF</td>
<td>Seminar for graduate students in Sociology and Criminology, focusing on issues that arise from the teaching of these disciplines. RESTRICITONS: Requires approval of instructor.</td>
</tr>
<tr>
<td>SOCI 813</td>
<td>CURRENT ISSUES IN SOCIAL THEORY</td>
<td>3</td>
<td>Deals with current controversies in social theory such as the public/private distinction, the development of symbolic interactionism and Neo-Marxism. RESTRICITONS: Must have completed one graduate-level course.</td>
</tr>
<tr>
<td>SOCI 815</td>
<td>MICROTHEORIES IN SOCIOLOGY</td>
<td>3</td>
<td>Advanced graduate seminar focusing on microtheoretical approaches in Sociology-sympolistic interactionism, social constructionism, and sociological social psychology. PREREQ: SOCI612. RESTRICITONS: Graduate students only. Strongly advised for students taking the doctoral exam in Social Theory.</td>
</tr>
<tr>
<td>SOCI 835</td>
<td>THEORETICAL CRIMINOLOGY I</td>
<td>3</td>
<td>Examines classical and contemporary theories of crime and crime control by focusing on various explanations for why select types of conduct are categorized and treated as criminal, as well as why people engage in criminal behavior. Specific deviant and criminal activities are described and explained using established theoretical frameworks. Provides a comprehensive background in the disciplinary development of criminology.</td>
</tr>
<tr>
<td>SOCI 836</td>
<td>APPLICATION OF CRIMINOLOGICAL THEORY AND EMPIRICAL TESTS</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>SOCI 837</td>
<td>CRIMINOLOGY AND SYSTEMS OF CRIMINAL JUSTICE</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>SOCI 866</td>
<td>SPECIAL PROBLEM</td>
<td>1-12</td>
<td></td>
</tr>
<tr>
<td>SOCI 868</td>
<td>RESEARCH</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>SOCI 869</td>
<td>MASTER’S THESIS</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>SOCI 964</td>
<td>PRE-CANDIDACY STUDY</td>
<td>3-12 PF</td>
<td>Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICITONS: Not open to students who have been admitted to candidacy.</td>
</tr>
<tr>
<td>SOCI 969</td>
<td>DOCTORAL DISSERTATION</td>
<td>1-12 PF</td>
<td></td>
</tr>
<tr>
<td>SPAN 101</td>
<td>ELEMENTARY SPANISH I</td>
<td>3</td>
<td>Introduction to the Spanish language and a development of speaking, listening, reading and writing skills through the use of basic texts.</td>
</tr>
<tr>
<td>SPAN 102</td>
<td>ELEMENTARY SPANISH II</td>
<td>3</td>
<td>Completion of basic Spanish. PREREQ: SPAN101 or SPAN105.</td>
</tr>
<tr>
<td>SPAN 105</td>
<td>SPANISH I - ELEMENTARY</td>
<td>4</td>
<td>Introduction to the Spanish language and a development of speaking, listening, reading and writing skills through the use of basic texts.Restricted: No Spanish background, two or fewer years of high school Spanish.</td>
</tr>
<tr>
<td>SPAN 106</td>
<td>SPANISH II - ELEMENTARY/INTERMEDIATE</td>
<td>4</td>
<td>Completion of basic Spanish. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: SPAN105. RESTRICTIONS: Two to three years of high school Spanish acceptable in lieu of prerequisite.</td>
</tr>
<tr>
<td>SPAN 107</td>
<td>SPANISH III - INTERMEDIATE</td>
<td>4</td>
<td>Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: SPAN106 or SPAN111. RESTRICTIONS: Four years of high school Spanish acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.</td>
</tr>
<tr>
<td>SPAN 111</td>
<td>INTERMEDIATE SPANISH I</td>
<td>3</td>
<td>Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: SPAN102 or SPAN106. RESTRICTIONS: Three years of high school Spanish acceptable in lieu of prerequisite.</td>
</tr>
<tr>
<td>SPAN 112</td>
<td>INTERMEDIATE SPANISH II</td>
<td>3</td>
<td>Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed. PREREQ: SPAN111 or SPAN106. RESTRICTIONS: Four years of high school Spanish acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.</td>
</tr>
<tr>
<td>SPAN 200</td>
<td>SPANISH COMPOSITION AND GRAMMAR</td>
<td>3</td>
<td>First part of a thorough grammar review and intensive practice, targeting structure, essential vocabulary, speaking, listening and extensive writing. PREREQ: SPAN107 or SPAN112.</td>
</tr>
<tr>
<td>SPAN 201</td>
<td>SPANISH READING AND COMPOSITION</td>
<td>3</td>
<td>Reading, discussion, and analysis of various genres of Hispanic literature. Several short compositions. Grammar review where appropriate. PREREQ: SPAN200. RESTRICTIONS: Not intended for students who have already taken 300 and 400 level literature courses in Spanish.</td>
</tr>
<tr>
<td>SPAN 203</td>
<td>SPANISH FOR HERITAGE SPEAKERS</td>
<td>3</td>
<td>For native and heritage speakers of Spanish with oral proficiency but little or no formal training in the language. Designed to build on the language base students already possess, the course’s primary purpose is to develop reading and writing skills. PREREQ: SPAN107 or more than 4 years in high school, AP credit or exemption exam. RESTRICTIONS: Must be a heritage or native speaker of Spanish. SPAN203 exempts students from taking SPAN200, 205, 300, and 305.</td>
</tr>
<tr>
<td>SPAN 205</td>
<td>SPANISH CONVERSATION</td>
<td>3</td>
<td>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, SPAN112, SPAN200 or SPAN201. RESTRICTIONS: A minimum grade of B is required in SPAN107 or SPAN112. Not intended for native speakers of Spanish. Students may not receive credit for both SPAN205 and SPAN206.</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SPAN 206</td>
<td>CULTURE THROUGH CONVERSATION</td>
<td>3</td>
<td>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: SPAN 107 or SPAN 112. RESTRICTIONS: Taught abroad only. Students may not receive credit for both SPAN 205 and SPAN 206.</td>
</tr>
<tr>
<td>SPAN 207</td>
<td>CONTEMPORARY LATIN AMERICA I</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>SPAN 208</td>
<td>SPAIN: PAST AND PRESENT</td>
<td>3</td>
<td>Introduction to Spanish cultural studies, with a focus on Spain's development as a political, social, and cultural entity. RESTRICTIONS: Taught abroad in English and Spanish. Not for minor credit. Does not satisfy College of Arts and Sciences language requirement.</td>
</tr>
<tr>
<td>SPAN 300</td>
<td>ADVANCED SPANISH COMPOSITION AND GRAMMAR I</td>
<td>3</td>
<td>Second part of a thorough review and intensive practicing, targeting structure, essential vocabulary, speaking, listening and extensive writing. PREREQ: SPAN 200.</td>
</tr>
<tr>
<td>SPAN 301</td>
<td>SURVEY OF SPANISH LITERATURE</td>
<td>3</td>
<td>Development of Spanish literature from its origins through the 17th century. Study of representative works, discussions and collateral readings. PREREQ: SPAN 201.</td>
</tr>
<tr>
<td>SPAN 302</td>
<td>SURVEY OF SPANISH LITERATURE</td>
<td>3</td>
<td>Spanish literature from the 18th century to the present. Selection of representative works, discussions and collateral readings. PREREQ: SPAN 201.</td>
</tr>
<tr>
<td>SPAN 303</td>
<td>SURVEY OF SPANISH-AMERICAN LITERATURE</td>
<td>3</td>
<td>Representative works in all genres of Latin American literature from pre-Columbian to Modernism. PREREQ: SPAN 201.</td>
</tr>
<tr>
<td>SPAN 304</td>
<td>SURVEY OF SPANISH-AMERICAN LITERATURE</td>
<td>3</td>
<td>Representative works in all genres of Latin American literature in the 20th century. PREREQ: SPAN 201.</td>
</tr>
<tr>
<td>SPAN 305</td>
<td>ORAL COMMUNICATION</td>
<td>3</td>
<td>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: SPAN 200. RESTRICTIONS: Not intended for native speakers. Students may not receive credit for both SPAN 305 and SPAN 306.</td>
</tr>
<tr>
<td>SPAN 306</td>
<td>PRACTICAL ORAL/WRITTEN EXPRESSION</td>
<td>3</td>
<td>Strengthens skills in grammar and vocabulary in preparation for advanced courses. Includes oral exposés, discussion of articles and videos, textual analysis and compositions. PREREQ: SPAN 200. RESTRICTIONS: Taught abroad only. Students may not receive credit for both SPAN 305 and SPAN 306.</td>
</tr>
<tr>
<td>SPAN 307</td>
<td>TOPICS IN CONTEMPORARY LATIN AMERICAN CULTURE</td>
<td>3</td>
<td>Discussion and study of issues related to contemporary cultural, political and social developments in Latin America. May be repeated for credit when topic changes. PREREQ: SPAN 200.</td>
</tr>
<tr>
<td>SPAN 308</td>
<td>CONTEMPORARY SPAIN II</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>SPAN 325</td>
<td>SPANISH CIVILIZATION AND CULTURE</td>
<td>3</td>
<td>Survey of geography, history, art and society of Spain. PREREQ: SPAN 200.</td>
</tr>
<tr>
<td>SPAN 326</td>
<td>LATIN AMERICAN CIVILIZATION AND CULTURE</td>
<td>3</td>
<td>Survey of geography, history, art and society of Latin American lands. PREREQ: SPAN 200.</td>
</tr>
<tr>
<td>SPAN 352</td>
<td>INTRODUCTION TO BUSINESS SPANISH</td>
<td>3</td>
<td>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 students with basic policies and practices of the Hispanic business community. Includes writing, conversation, grammar and culture. PREREQ: SPAN 200 and SPAN 201.</td>
</tr>
<tr>
<td>SPAN 355</td>
<td>SPECIAL TOPICS</td>
<td>3-12</td>
<td>Explores an area of special interest in Hispanic literature. See <a href="http://primus.nss.udel.edu/CoursesSearch/">http://primus.nss.udel.edu/CoursesSearch/</a> for topics. PREREQ: SPAN 201. RESTRICTIONS: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>SPAN 366</td>
<td>INDEPENDENT STUDY</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>SPAN 401</td>
<td>ADVANCED SPANISH COMPOSITION AND GRAMMAR II</td>
<td>3</td>
<td>Study and practice of selected problems of written and oral Spanish syntax and vocabulary as well as textual analysis. PREREQ: One 300-level Spanish course.</td>
</tr>
<tr>
<td>SPAN 403</td>
<td>HISTORY OF THE SPANISH LANGUAGE</td>
<td>3</td>
<td>History of the language from Latin to the present. Historical phonology and morphology. PREREQ: One 300-level Spanish course</td>
</tr>
<tr>
<td>SPAN 406</td>
<td>ADVANCED SPANISH LANGUAGE</td>
<td>3</td>
<td>Advanced grammatical structure and stylistics with special attention given to technical vocabulary and discourse (e.g., business, law, science, agriculture). PREREQ: One 300-level Spanish course. RESTRICTIONS: Taught abroad only.</td>
</tr>
<tr>
<td>SPAN 415</td>
<td>LATIN AMERICAN LITERATURE AND ITS POLITICAL CONTEXT</td>
<td>3</td>
<td>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 SPAN 300-level survey of literature</td>
</tr>
<tr>
<td>SPAN 416</td>
<td>CERVANTES: DON QUIJOTE</td>
<td>3</td>
<td>The reading of Don Quijote in Spanish; major themes of the book. The life and times of Cervantes. Antecedents to Don Quijote in Spanish literature. The purpose of Don Quijote. Introduction to the language of Cervantes. PREREQ: One SPAN 300-level survey of literature</td>
</tr>
<tr>
<td>SPAN 420</td>
<td>TOPICS: MEDIEVAL LITERATURE</td>
<td>3</td>
<td>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. May be repeated for credit when topics vary. PREREQ: One SPAN 300-level survey of literature</td>
</tr>
<tr>
<td>SPAN 421</td>
<td>SPANISH MEDIEVAL LITERATURE</td>
<td>3</td>
<td>Survey of the major authors and genres of Spanish medieval literature from the early lyric poetry through narrative poetry, short story, drama, novel to the 15th century. PREREQ: One SPAN 300-level survey of literature course</td>
</tr>
<tr>
<td>SPAN 436</td>
<td>TOPICS: LITERATURE OF THE SPANISH GOLDEN AGE</td>
<td>3</td>
<td>Works of one or more authors or of a special theme or genre within Spanish literature of the Golden Age (16th and 17th centuries). May be repeated for credit when topics vary. PREREQ: One SPAN 300-level survey of literature course</td>
</tr>
<tr>
<td>SPAN 439</td>
<td>POSTWAR SPANISH NARRATIVE</td>
<td>3</td>
<td>The Spanish novel from 1962 to the present. Focuses on novels by leading authors such as Luis Martín-Santos, Juan Goytisolo, Juan Benet, Carmen Martín Gaite, Ana María Moix and Esther Tusquets. Analysis of these works grounded in international literary theory and criticism. PREREQ: One SPAN 300-level survey of literature</td>
</tr>
<tr>
<td>SPAN 440</td>
<td>TOPICS: EIGHTEENTH AND NINETEENTH CENTURY SPANISH LITERATURE</td>
<td>3</td>
<td>Works of one or more authors or of a special theme or genre within Hispanic literature of the 18th and 19th centuries. May be repeated for credit when topics vary. PREREQ: One SPAN 300-level survey of literature course</td>
</tr>
<tr>
<td>SPAN 447</td>
<td>CONTEMPORARY SPANISH FICTION BY WOMEN</td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SPAN 450</td>
<td>Topics: Modern Hispanic Literature 1898-1936</td>
<td>3</td>
<td>Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1898 to 1936. May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>SPAN 452</td>
<td>Advanced Business Spanish</td>
<td>3</td>
<td>Refines business knowledge, business/mercantile terminology by helping students realize the importance of cultural awareness in doing business in Hispanic countries or with Hispanics in the United States.</td>
</tr>
<tr>
<td>SPAN 454</td>
<td>Introduction to Spanish Cinema</td>
<td>3</td>
<td>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 to films of Spanish culture, politics, history, and European film theory and analysis.</td>
</tr>
<tr>
<td>SPAN 455</td>
<td>Selected Authors, Works and Themes</td>
<td>3-12</td>
<td>Works of one or more outstanding authors or on a special theme.</td>
</tr>
<tr>
<td>SPAN 460</td>
<td>Topics: Contemporary Hispanic Literature 1936-present2</td>
<td>3</td>
<td>Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1936 to the present. May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>SPAN 462</td>
<td>Topics: Hispanic Short Fiction</td>
<td>3</td>
<td>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. May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>SPAN 464</td>
<td>Contemporary Spanish American Literature by Women</td>
<td>3</td>
<td>Explores twentieth-century fiction by women authors from diverse regions of Spanish America. Analyses selected works as individual literary creations and situates each author in her specific socio-cultural, historical and literary contexts.</td>
</tr>
<tr>
<td>SPAN 466</td>
<td>Independent Study</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>SPAN 471</td>
<td>Latin American Film</td>
<td>3</td>
<td>A study of cinematographic representation, with a focus on the techniques and tendencies, used by modern directors, of the history, politics, and culture of Latin America.</td>
</tr>
<tr>
<td>SPAN 472</td>
<td>Sugar, Salsa &amp; Santeria</td>
<td>3</td>
<td>Sugar, Salsa and Santeria: A study of culture through the film, music, and literature of the Hispanic Caribbean.</td>
</tr>
<tr>
<td>SPAN 473</td>
<td>From Amazonas to Zombies</td>
<td>3</td>
<td>“From Amazonas to Zombies: The Power of Monsters in Latin American Cultures: studies representations and concepts of the monstrous from the age of discovery to contemporary society.</td>
</tr>
<tr>
<td>SPAN 474</td>
<td>Hispanic Cities</td>
<td>3</td>
<td>Hispanic Cities: Struggle, Space &amp; Representation.</td>
</tr>
<tr>
<td>SPAN 475</td>
<td>Topics in Hispanic Culture and Civilization</td>
<td>3</td>
<td>Study of topics in Hispanic culture and civilization, ranging through the geography, history, art and society of Spain and Latin American countries.</td>
</tr>
<tr>
<td>SPAN 476</td>
<td>Media-Savvy Populism from Che to Chavez</td>
<td>3</td>
<td>Media-Savvy Populism from Che to Chavez: Discourse and Politics in Contemporary Latin America.</td>
</tr>
<tr>
<td>SPAN 477</td>
<td>Drug Culture in Latin America</td>
<td>3</td>
<td>Drug production, trafficking, and consumption has had an enormous impact on Latin American Culture, affecting regional politics, everyday life, art and literature. The course examines the highs and lows built on drug commerce, from the psychedelic experiments of the 1960s to Pablo Escobar’s Colombian cocaine empire in the 1980s, to the wave of today’s Mexican drug trade violence.</td>
</tr>
<tr>
<td>SPAN 478</td>
<td>Graphic Transgressions</td>
<td>3</td>
<td>Graphic Transgressions: Breakthrough Movements in Latin American Visual Arts and Culture.</td>
</tr>
<tr>
<td>SPAN 479</td>
<td>Resurrecting Mexico’s Dead</td>
<td>3</td>
<td>Death and resurrection have been used as tropes in various media in Mexican culture to discuss social, political, and economic concerns. These recurring tropes hold symbolic power, evinced in festive Dia de los Muertos celebrations as well as in violent drug trafficking wars.</td>
</tr>
<tr>
<td>SPAN 490</td>
<td>Capstone Seminar in Hispanic Literature</td>
<td>3</td>
<td>Intensive seminar conducted in Spanish and devoted to the study of a selected aspect of transatlantic Hispanic literature over time. Synthesize prior literary and cultural studies in Spanish through immersion in an area that integrates and expands student’s existing knowledge. Emphasizes independent research and intensive critical writing. PREREQ: One of SPAN 301, 302, 303, 304, 355 or 370 and one SPAN 400-level course. RESTRICTIONS: This capstone course is designed for Spanish majors in their senior year of study.</td>
</tr>
<tr>
<td>SPAN 491</td>
<td>Latin American Studies Capstone</td>
<td>3</td>
<td>Through intensive research and study of texts and artifacts on a single theme, students will integrate and focus their knowledge of Latin American cultures across several disciplines. Taught in Spanish. May be crosslisted with LAM5491. PREREQ: SPAN326.</td>
</tr>
<tr>
<td>SPAN 601</td>
<td>Advanced Spanish Grammar</td>
<td>3</td>
<td>Study and practice of selected problems of written and oral Spanish syntax and vocabulary as well as textual analysis.</td>
</tr>
<tr>
<td>SPAN 603</td>
<td>History of the Spanish Language</td>
<td>3</td>
<td>History of the language from Latin to the present. Historical phonology and morphology.</td>
</tr>
<tr>
<td>SPAN 615</td>
<td>Latin American Literature and Its Political Context</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>SPAN 616</td>
<td>Cervantes: Don Quijote</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>SPAN 618</td>
<td>God, Man and Woman</td>
<td>3</td>
<td>Analysis of the presentation of God, man and woman in a selection of narrative poems, dramas and novels from the 15th to the 17th centuries. Authors studied include Santillana, Diego de San Pedro, Luis de Leon, Zayas and others.</td>
</tr>
<tr>
<td>SPAN 620</td>
<td>Topics: Medieval Literature</td>
<td>3</td>
<td>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. May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>SPAN 621</td>
<td>Spanish Medieval Literature</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>SPAN 636</td>
<td>Topics: Literature of the Spanish Golden Age</td>
<td>3</td>
<td>Works of one or more authors or of a special theme or genre within Spanish literature of the Golden Age (16th and 17th centuries). May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>SPAN 639</td>
<td>Postwar Spanish Narrative</td>
<td>3</td>
<td>Covers the Spanish novel from 1962 to the present. Focuses on novels by leading authors such as Luis Martin-Santos, Juan Goytisolo, Carmen Martin Gaite, and Esther Tusquets. Analysis of these works is grounded in international literary theory and criticism.</td>
</tr>
</tbody>
</table>
**SPAN 640**  **TOPICS: EIGHTEENTH AND NINETEENTH CENTURY HISPANIC LITERATURE**  
3  
Works of one or more authors or of a special theme or genre within Hispanic literature of the 18th and 19th centuries. May be repeated for credit when topics vary.

**SPAN 647**  **CONTEMPORARY HISPANIC FICTION BY WOMEN**  
3  
Explores current fiction by women in Spain and Spanish America. Analyzes selected works as individual literary creations, and also 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. May be repeated for credit when topics vary.

**SPAN 655**  **SELECTED AUTHORS, WORKS AND THEMES**  
3-12  
Works of one or more outstanding authors or on a special theme. 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. May be repeated for credit when topics vary.

**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. May be repeated for credit when topics vary.

**SPAN 664**  **CONTEMPORARY SPANISH-AMERICAN LITERATURE BY WOMEN**  
3  
Explores 20th century fiction by major women authors from diverse regions of Spain, and the Hispanic world. 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 665**  **SPANISH READING WORKSHOP**  
3  
Introduction to Hispanic culture through literature, is designed to enhance the cultural proficiency of elementary school teachers through literary readings. Give students the tools required to analyze these readings from different social and educational perspectives, and to adapt them to their elementary school classes.

**SPAN 668**  **HISPANIC CHILDREN’S LITERATURE**  
3  
Introduction to the literature produced specifically for children in Spain, Latin America and the United States. Participants will analyze a series of literary works from theater, to fables and short stories, and develop strategies for integrating them into their elementary school curriculum.

**SPAN 675**  **TOPICS: HISPANIC CULTURE AND CIVILIZATION**  
3  
Study of topics in Hispanic culture and civilization, ranging through the geography, history, art and society of Spain and Latin American countries. May be repeated for credit when topics vary.  
PREREQ: Either SPAN326 or SPAN326

**SPAN 869**  **MASTER’S THESIS**  
1-6

**SPAN 875**  **SEMINAR: TOPICS IN SPANISH LITERATURE**  
3-12  
Study of selected topics, authors and works in the various fields of Spanish literature. Variable content. Emphasizes preparation of seminar presentations and term papers. May be repeated for credit when topics vary.

---

**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.  
RESTRICTIONS: Credit may be awarded for only one of STAT200, APEC408, MATH201, and MATH205.

**STAT 266**  **SPECIAL PROBLEM**  
3-12

**STAT 366**  **INDEPENDENT STUDY**  
1-6

**STAT 408**  **STATISTICAL RESEARCH METHODS**  
3  
An introductory statistics course for advanced undergraduate and graduate students with applications for life sciences, business, health, engineering, and the social sciences. The course managing and describing data; the normal, t, F and chi squared distributions; the logic of inference; inferential statistics for one and two sample problems; analysis of table data; analysis of variance; and multiple regression. The course is taught using statistical software. May be crosslisted with APEC408.

**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 APEC408 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 appropriate procedures. Non-parametric techniques of estimation testing and curve smoothing.  
PREREQ: STAT371

**STAT 466**  **INDEPENDENT STUDY**  
1-6

**STAT 470**  **INTRO TO STAT ANALYSIS I**  
3  
Basic probability, De Morgan's laws, conditional probabilities, Bayes' rule; discrete and continuous distributions; Bernoulli, Binomial, Poisson, Normal, Gamma and Cauchy distributions; transformations; joint and marginal distributions; moment generating functions; sums of independent normal and Gamma random variables; Chi-squared distributions; the Central Limit Theorem.  
PREREQ: MATH222 or MATH242.

**STAT 471**  **INTRO TO STAT ANALYSIS II**  
3  
Definition of a statistic; distribution of common statistics; sampling, maximum likelihood and moment estimators, unbiased estimators; hypothesis testing, Type I and Type II errors, one- and two-sample tests for the mean; categorical data, the Chi-Squared test; simple linear regression, ANOVA table.  
PREREQ: MATH222 or MATH242.

**STAT 474**  **APPLIED DATA BASE MANAGEMENT**  
3  
Provides an in-depth understanding of using computers to manage data using programs such as SAS and Microsoft Access.

**STAT 475**  **ENVIRONMENTAL STATISTICS**  
3  
Introduction to statistical methods for analyzing environmental data. Relevant probability and sampling theory is introduced, as well as procedures for summarizing, modeling and estimating and making inferences from environmental data. A computer-based statistical package is used to explore behavior of different statistical techniques with a variety of environmental data sets.  
May be crosslisted with ENSC475. RESTRICTIONS: If STAT475 is taken, degree credit cannot be given for any of the following courses: MATH300, STAT470, STAT471 or MATH450.

**STAT 601**  **PROBABILITY THEORY FOR OPERATIONS RESEARCH AND STATISTICS**  
3  
Provides the basic background in probability theory for further work in statistics and operations research. Basic topics: sample spaces and axioms of probability; conditional probability and independence; Bayes theorem; random variables; moments and moment generating functions; transformations of random variables; common families of distributions; multivariate distributions, covariance and correlation; probability inequalities and limit theorems.  
PREREQ: MATH243 and requires permission of instructor.

**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, 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
An introductory statistics course for advanced undergraduate and graduate students with applications for life sciences, business, health, engineering, and the social sciences. The course managing and describing data; the normal, t, F and chi squared distributions; the logic of inference; inferential statistics for one and two sample problems; analysis of table data; analysis of variance; and multiple regression. The course is taught using statistical software.

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 613  Applied Multivariate Statistics  3
Explores the main topics of multivariate statistics, including principal components, discrimination, classification procedures, and clustering techniques. Emphasis on how to identify the correct technique for a given problem, computer packages for its computation, and how to interpret the results.

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, quasiexponential 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: STAT602 and permission of instructor.

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 the Box and Jenkins techniques of fitting time series data. Includes an 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 the analysis of censored data including the Kaplan-Meier estimator, the analysis of one, two and k sample problems, and regression analysis based on the Cox proportional hazards model. RESTRICTIONS: Requires permission of instructor.

STAT 624  Advanced Topics in Statistics  3
Current statistical and research techniques not covered in other courses. RESTRICTIONS: Requires permission of instructor.

STAT 635  Statistical Quality Control  3
Process variation, sequence plotting, control charts, cumulative sum process control procedures; process capability studies, acceptance sampling, quality management and organization, and trouble shooting using graphical techniques. PREREQ: STAT371

STAT 640  Statistical Consulting  3
Topics include the client/consultant relationship; effective communication; identifying the question, developing a plan and presenting the results; following up; actual consulting experience.

STAT 641  Statistical Laboratory  1
Requires attendance at the weekly statistical laboratory meetings.

STAT 656  Biostatistics  3
Research designs, review of inference and regression, categorical data, logistic regression, rates and proportions, sample size determination. Additional topics such as nonparametric methods, survival analysis, longitudinal data analysis, and randomized clinical trial may be covered. PREREQ: STAT608 or STAT611

STAT 657  Statistics for Earth Sciences  3
Multiple regression and time series analysis; model validation; sampling; principal components; factor analysis; cluster analysis; discriminant analysis; and statistical software routines. May be crosslisted with GEO657. PREREQ: MATH201 or STAT 475 or STAT 200. RESTRICTIONS: Cannot be taken for credit in the Statistics master's degree program.

STAT 659  Spatial Statistics  3
Some research applications require inferences to be drawn from point, line, or areal data, rather than from the traditional univariate or multivariate framework. A number of such techniques have been developed including adaptations from classical statistical methods and novel approaches to account for the spatial nature of data. Explore the emerging literature on statistical methodologies that have been explicitly developed for the solution of spatial problems. May be crosslisted with GEO659. PREREQ: MATH201 or STAT475 or STAT200. RESTRICTIONS: Can not be taken for credit in the Statistics Master's Degree program.

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

STAT 668  Research Project  3-6
All students in the M.S. Biostatistics Program must participate in a research project as part of the degree requirements. RESTRICTIONS: Approval by Biostatistics Advisor.

STAT 669  Masters Thesis  3-6
Thesis credits for work done over several semesters to complete and defend a Masters Thesis.

STAT 670  Intro to Stat Analysis I  3
Basic probability, De Morgan’s laws, conditional probabilities, Bayes’ rule; discrete and continuous distributions; Bernoulli, Binomial, Poisson, Normal, Gamma and Cauchy distributions; transformations; joint and marginal distributions; moment generating functions; sums of independent normal and Gamma random variables; Chi-squared distributions; the Central Limit Theorem. PREREQ: MATH222 or MATH242.

STAT 671  Intro to Stat Analysis II  3
Definition of a statistic; distribution of common statistics; sampling, maximum likelihood and moment estimators, unbiased estimators; hypothesis testing, Type I and Type II errors, one- and two-sample tests for the mean; categorical data, the Chi-Squared test; simple linear regression, ANOVA table. PREREQ: MATH222 or MATH242.

STAT 674  Applied Data Base Management  3
Provides an in-depth understanding of using computers to manage data using programs such as SAS and Microsoft/Access. May be offered concurrently with STAT 474. RESTRICTIONS: Requires permission of instructor.

STAT 675  Logistic Regression  3
Practical and computational introduction to logistic regression and related topics. Applications include financial, marketing and biomedical research. The use of SAS and other statistical packages will be emphasized. RESTRICTIONS: Requires permission of instructor.
STAT 800  ESTIMATION AND STATISTICAL INFERENCE I  3
Selected topics in estimation and inference such as uniformly most powerful tests, uniformly most powerful unbiased tests, similarity and completeness, sufficiency, likelihood ratio tests, invariant tests, permutation test.
PREREQ: STAT602, MATH622

STAT 801  ESTIMATION AND STATISTICAL INFERENCE II  3
Further topics in estimation and inference will be covered.
PREREQ: STAT800

STAT 815  LINEAR STATISTICAL INFERENCE I  3
Vector random variables, matrix operations, multivariate normal distributions, distribution of functions of vector random variables, topics from multivariate analysis and specific linear models.
PREREQ: STAT602, STAT615

STAT 816  LINEAR STATISTICAL INFERENCE II  3
Topics from general linear hypotheses of full rank and not full rank.
PREREQ: STAT815

STAT 818  MULTIVARIATE ANALYSIS  3
Likelihood estimation, vector random variables, Hotelling's T-squared distribution of correlation coefficients, classification and discrimination, distribution of sample covariance matrix and generalized variance, and testing multiple hypotheses.
PREREQ: STAT800

STAT 824  ADVANCED TOPICS IN STATISTICS I  3
A presentation of a current area of statistical application or research. Examples of topics which may be covered include: biometry, bootstrapping, data analysis, response surfaces, survival analysis and time series.
PREREQ: STAT816

STAT 831  TIME SERIES ANALYSIS  3
Introduction to fundamental topics in time series analysis featuring analysis in both time and frequency domains. The Box and Jenkins technique of fitting data to autoregressive moving average models will be used in time domain. Emphasis on model building, evaluation and forecasting. Analysis in frequency domain includes such topics as digital filtering and methods of estimating and interpreting the spectrum.
PREREQ: STAT816

STAT 832  TOPICS IN DATA ANALYSIS  3
Topics: graphical analysis; model evaluation, robust procedures; influence functions; dimensional 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: STAT612 and either STAT611 or STAT617

STAT 840  STATISTICAL COMPUTING  3
PREREQ: STAT602.

STAT 852  ADVANCED TOPICS IN MATHEMATICAL STATISTICS  3
Selected topics: Sequential methods, reliability theory, multivariate contingency tables, large sample theory, density estimation, robust and nonparametric estimation.
RESTRICTIONS: Requires permission of Department.

STAT 969  DOCTORAL DISSERTATION  1-12 PF

THEA 106  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 design specifically based on observed performances. RESTRICTIONS: Taught abroad.

THEA 200  INTRODUCTION TO THEATRE PRODUCTION  3
Processes involved in the production of scenery, properties, lighting, sound and costumes for live performance events. Plays read and analyzed for production requirements. RESTRICTIONS: Mandatory attendance at performance events.

THEA 202  INTRODUCTION TO THEATRE DESIGN  3
Survey of the evolution of design theory and aesthetics for live production. Elements include the design of scenery, properties, costumes, lighting and sound. Plays read and analyzed for design requirements. RESTRICTIONS: Mandatory attendance at performance events.

THEA 203  INTRODUCTION TO COSTUMING  3
Explores the evolution of costume design and technology. Discusses and analyzes all aspects of costuming through reading of plays.

THEA 204  INTRODUCTION TO VOICE AND SPEECH  3
The use of voice and speech in performance. Includes exercises to develop relaxation, breath support, resonance, vocal strength, optimum pitch and articulatory precision, as well as studies in basic vocal anatomy. Studio format. RESTRICTIONS: Involves some strenuous physical activity.

THEA 205  INTRODUCTION TO STAGE MOVEMENT  3
Introduction to a variety of physical skills and techniques for the actor. Topics may include exercises to develop strength, flexibility, control, awareness, rhythm, balance, and expressiveness.

THEA 207  TECHNICAL PRODUCTION PRACTICUM  1-4
Laboratory for the non-minor 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 for the non-minor for the production of costumes and costume crafts for public performances of the Professional Theatre Training Program productions.

THEA 212  SHOW BIZ: A JEWISH PERSPECTIVE  3
As the Jewish population of America grew rapidly during the early decades of the 20th century, Jews brought with them a rich and diverse tapestry of dramatic and theatrical modes. This course will examine the development of this extraordinary creative and commercial phenomenon. May be crosslisted with JWST212.

THEA 214  HEALTHCARE COMMUNICATION:UDSP  3
Nursing and Theater course where students will learn to be standardized patients and patient family members. Students will then be used in mock real life scenarios to assess the medical and communication skills of student health care providers. Crosslisted with NURS214.

THEA 226  FUNDAMENTALS OF ACTING I  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 227  FUNDAMENTALS OF ACTING II  3
Continuation of THEA226 in the exploration of the actor's art and craft. May utilize theatre games, basic text analysis, improvisation, and scene study. PREREQ: THEA226 or permission of instructor.

THEA 241  WESTERN THEATRE: LIVE ON STAGE  3
An historical view of theatre starting with the Greeks through late 20th century plays with examples performed live on stage by professional actors from UD's Resident Ensemble Players. An added value course with some classes taken out of the lecture hall and moved into the theatre.

THEA 242  PAGE TO STAGE: MAKING THEATRE  3
Intended for the general university student as an introduction to how all theatre, as a collaborative art form, is made, from its genesis to its opening night. Provides a deeper understanding and appreciation of this form of creative arts and will be broad enough to include drama, comedy, and musical theatre. An added value, reality theatre course with many classes taken out of the lecture hall and moved into the theatre.
THEA 300  FUNDAMENTALS OF STAGECRAFT  3
Concentrates on traditional techniques used in the construction and rigging of
t scenery and properties for the stage. Demonstrates basic techniques and
processes through a combination of classroom lecture and laboratory experience.

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.

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.

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.

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.

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.

THEA 306  FUNDAMENTALS OF PATTERNMaking FOR THE STAGE  3
Teaches basic patterning techniques required in costuming through lectures,
demonstrations, and laboratory experience. Includes how to recreate historical
details used for period theatrical garments.

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.

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.

THEA 309  FUNDAMENTALS OF STAGE MANAGEMENT  3
Study of the techniques and procedures used in managing theatrical productions
from conception through performance.

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.

THEA 311  FUNDAMENTALS OF SCENE DESIGN  3
Introduction to the exploration of conceptual principles underlying the practice of
scene design. Explore elements of visual thinking through the manipulation of
drafting and drawing with emphasis on line, form, color, and spatial relationships
as they relate to the play. Some artistic ability is helpful.

THEA 312  CAD AND COMPUTER APPLICATIONS FOR THEATRE PRODUCTION  3
Examine various ways of applying computer technology to the production of live
theatre. Emphasis placed on CAD and graphic software in addition to Power Point,
spreadsheets, databases, and the internet.
PREREQ: THEA200, or THEA202, or by permission of instructor.

THEA 340  AFRICAN AMERICAN THEATRE  3
Introduction to African American Theatre and the impact of African Americans in
theatre performance. Critical discussions of plays and historical events, and allows
students to uncover how non-traditional casting affects the playing and
development of a theatrical performance. Explore the similarities and differences
of theatrical styles and tactics as they pertain to African American theatre and
performance.

THEA 341  THEATRE/DRAMA: CLASSIC/MEDIEVAL  3
Survey of major historical and theoretical developments in theatre practice and
dramaturgy during the period. Readings in primary and secondary historical
sources, major critical and theoretical texts, and representative plays of the
period.  
May be crosslisted 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 crosslisted 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 crosslisted 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 crosslisted with CMLT344.

THEA 345  HISTORY OF THEATRE: AMERICAN MUSICAL THEATRE  3
Musical-dramatic forms of the 18th, 19th and 20th centuries in the United States
and their impact on the modern musical theatre. Complete works read and
compared to a series of criteria that are found in successful modern shows.
Comparison of older and current works. Crosslisted with MUSC345.  
RESTRICTIONS: Offered fall semester only.

THEA 347  SPECIAL TOPICS IN THEATRE HISTORY  3
A series of changing topics in history and theory. Topics range from studies of
significant movements in theatre to the study of theoretical issues and individual
playwrights and genres.

THEA 348  SPECIAL TOPICS IN THEATRE PERFORMANCE  3
Series of changing topics in theatre performance. Topics may include Audition
Preparation and Introduction to Professional Theatre Practices.

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 361  ACTING TECH FOR BUSINESS PROFESSIONALS  3
Opportunity to increase effectiveness in presentation situations. Introduction to
a variety of acting techniques, including body and vocal use, dramatic structure
and having an awareness of, and listening and responding to, the audience.

THEA 366  INDEPENDENT STUDY  1-6

THEA 408  THEATRE PRACTICUM FOR MINORS  1-4
Production responsibilities assigned on departmental productions in the areas of
lighting, sound, scenery, properties, costuming, stage management, painting, and
theatre management.

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.

THEA 466  INDEPENDENT STUDY 1-6

THEA 490  SEMINAR IN THEATRE AND DRAMA 3
Seminars in the theatre and drama. Topics will be announced.
RESTRICTIONS: Requires permission of instructor.

THEA 600  DISTINCTIONS OF PROFESSIONAL THEATRE PRACTICE 1-3
Inquiry into the nature of the theatre as an art form; techniques and issues of communication, organization, management, leadership, team participation and creativity necessary to the pursuit and accomplishment of fulfilling careers in institutional and commercial theatres. Explores how the nature and purpose of the theatre as an art informs the day-to-day practices, values and behavior of the individual artist.
RESTRICTIONS: Requires enrollment in Professional Theatre Training Program. May be repeated up to 12 credit hours.

THEA 601  DYNAMICS 1
A vocal/physical warmup. Exercises designed to prepare student for the day's work.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to six credit hours.

THEA 602  VOICE DEVELOPMENT IA 1
Basic breath control and tone production to develop strength, control, flexibility and awareness.
RESTRICTIONS: Requires enrollment in the Professional Theatre Program/Acting or Directing.

THEA 603  VOICE DEVELOPMENT IB 1
Continuation of THEA602.
PREREQ: THEA602

THEA 604  VOICE DEVELOPMENT IIA 1
Continuation of THEA603, with an emphasis on range extension and the development of greater variety in expressiveness.
PREREQ: THEA603

THEA 605  VOICE DEVELOPMENT IIB 1
Continuation of THEA604.
PREREQ: THEA604

THEA 606  VOICE DEVELOPMENT IIIA 1
Individual instruction to identify habitual vocal patterns and to strengthen individual weaknesses in voice.
PREREQ: THEA605

THEA 607  VOICE DEVELOPMENT IIIB 1
Continuation of THEA606.
PREREQ: THEA606

THEA 608  STAGE MOVEMENT IA 1
Exercises and assignments to develop alignment, strength, flexibility, control, awareness, endurance, rhythmic sensitivity, balance and expressiveness.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting or Directing.

THEA 609  STAGE MOVEMENT IB 1
Continuation of THEA608.
PREREQ: THEA608

THEA 610  STAGE MOVEMENT IIA 1
Continuation of THEA609, with an emphasis on stage combat, tumbling, circus and other advanced movement techniques.
PREREQ: THEA609

THEA 611  STAGE MOVEMENT IIB 1
Continuation of THEA610.
PREREQ: THEA610

THEA 612  STAGE MOVEMENT IIIA 1
Individual instruction to identify habitual movement patterns and to strengthen individual weaknesses in stage movement.
PREREQ: THEA611

THEA 613  STAGE MOVEMENT IIIB 1
Continuation of THEA612.
PREREQ: THEA612

THEA 614  STAGE SPEECH IA 1
Ear training and phonetics. Corrective work on regional speech habits.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting or Directing.

THEA 615  STAGE SPEECH IB 1
Continuation of THEA614. Beginning work on verse scanlan.
PREREQ: THEA614

THEA 616  STAGE SPEECH IIA 1
Continuation of THEA615 with an emphasis on phrasing and verse scanlation.
PREREQ: THEA615

THEA 617  STAGE SPEECH IIB 1
Continuation of THEA616.
PREREQ: THEA616

THEA 618  STAGE SPEECH IIIA 1
Stage movement and advanced work in phrasing and verse scanlation. Individual tutoring in problem areas.
PREREQ: THEA617

THEA 619  STAGE SPEECH IIIB 1
Continuation of THEA618.
PREREQ: THEA618

THEA 620  REHEARSAL AND PERFORMANCE/ACTING 1-6
Practical instruction and assignments in the preparation, rehearsal and performance of theatrical productions.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting. May be repeated up to 24 credit hours.

THEA 621  VERSE SPEAKING, RHETORIC, AND COMMUNICATION IA 1
Consists of exercises and assignments to develop power, freedom, beauty, clarity, presence, and self-expression in communication in classic plays, particularly those of William Shakespeare, as well as in prose writing of all periods. Particular emphasis placed on cultivating ability to recognize and embody the changing structures and rhythms of speech which have been codified in the scripts of plays.
REQUIRES ENROLLMENT IN THE PROFESSIONAL THEATRE TRAINING PROGRAM/ACTING.

THEA 622  VERSE SPEAKING, RHETORIC, AND COMMUNICATION IB 1
Consists of exercises and assignments to develop power, freedom, beauty, clarity, presence, and self-expression in communication in classic plays, particularly those of William Shakespeare, as well as in prose writing of all periods. Particular emphasis placed on cultivating ability to recognize and embody the changing structures and rhythms of speech which have been codified in the scripts of plays.
PREREQ: THEA621

THEA 623  VERSE SPEAKING, RHETORIC, AND COMMUNICATION IIA 1
Consists of exercises and assignments to develop power, freedom, beauty, clarity, presence, and self-expression in communication in classic plays, particularly those of William Shakespeare, as well as in prose writing of all periods. Particular emphasis placed on cultivating ability to recognize and embody the changing structures and rhythms of speech which have been codified in the scripts of plays.
PREREQ: THEA622

THEA 624  VERSE SPEAKING, RHETORIC, AND COMMUNICATION IIB 1
Consists of exercises and assignments to develop power, freedom, beauty, clarity, presence, and self-expression in communication in classic plays, particularly those of William Shakespeare, as well as in prose writing of all periods. Particular emphasis placed on cultivating ability to recognize and embody the changing structures and rhythms of speech which have been codified in the scripts of plays.
PREREQ: THEA623

THEA 633  STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IA 1-2
Development of organizational and communication techniques for the administration of stage managerial projects.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage Management.

THEA 634  STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IB 1-2
Further development of organizational and communication techniques for the administration of stage managerial projects.
PREREQ: THEA633

THEA 635  STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIA 1-2
Development of organizational and communication techniques for the administration of stage managerial projects.
PREREQ: THEA634
THEA 636  STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIB 1-2
Further development of organizational structuring and communication techniques for the administration of stage managerial projects. PREREQ: THEA635

THEA 638  STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIIB 1-2
Further development of organizational structuring and communication techniques for the administration of stage managerial projects. PREREQ: THEA637

THEA 639  STAGE MANAGEMENT PRODUCTION SKILLS IA 1-2
Development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage Management.

THEA 640  STAGE MANAGEMENT PRODUCTION SKILLS IIB 1-2
Further development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. PREREQ: THEA639

THEA 641  STAGE MANAGEMENT PRODUCTION SKILLS IIIA 1-2
Development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. PREREQ: THEA640

THEA 642  STAGE MANAGEMENT PRODUCTION SKILLS IIIB 1-2
Further development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. PREREQ: THEA641

THEA 644  STAGE MANAGEMENT PRODUCTION SKILLS IIIC 1-2
Further development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. PREREQ: THEA643

THEA 645  REHEARSAL AND PERFORMANCE/STAGE MANAGEMENT 1-5
Practical instruction and assignments in the preparation, rehearsal and performance of theatrical productions. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage Management. May be repeated up to 24 credit hours.

THEA 648  COSTUME CONSTRUCTION 1
Introductory exploration of the mechanics and technology of the art of costuming. Surveys all aspects of the costumer's craft including practical work in the costume shop. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Construction.

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

THEA 665  THEATRE LITERACY 1
Discussion, research, and practicum in theatre terminology, literature and history. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to 12 credit hours.

THEA 668  RESEARCH 1-6

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

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

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

THEA 677  PROPERTIES PRODUCTION II 1
Tools, materials and methods for upholstery and drapery, casting, mold-making, and other properties techniques. PREREQ: THEA675

THEA 680  LIGHTING PRODUCTION 1

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 685  STAGE RIGGING, MECHANICS, AND AUTOMATION I 1
Theory and practice in rigging stage scenery to fly, creating mechanical systems to actuate scenic units, and utilizing control systems to automate scenic shifting. Emphasis on stage rigging systems and proper techniques to utilize them as well as an introduction to fluid power mechanics. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

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 689  STAGE RIGGING, MECHANICS AND AUTOMATION II 1
Continuation of THEA685, with added emphasis on horizontal scenic shifting techniques and motion control systems. PREREQ: THEA685.

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.
UAPP 110  CHANGING THE WORLD AND PUBLIC POLICY 3
“Going Green”, the haves and have nots, relevant politics - all huge contemporary issues. Can you get a job AND make a difference? Public Policy addresses such issues and begins with you. Examines basic policy concepts/strategies used by citizens, government and other societal institutions.

UAPP 211  INTRODUCTION TO PUBLIC HEALTH 3
Overview of public health, addressing the history, epidemiological principles, social and behavioral factors, and environmental, political and medical-care issues concerning public health practice. Exploration of the practicality of public health as portrayed through current events, guest speakers, and case studies. Crosslisted with HLPR211.

UAPP 220  CITIZENS, COMMUNITY AND CHANGE 3
Active citizenship is essential for sustaining democracy. Focuses on exposing students to structures and dynamics of government work to create and implement policies; the reciprocal obligations between individuals and government; and social/political contexts in which policy choices are made and affect community change.

UAPP 222  INTRODUCTION TO EPIDEMIOLOGY 3
Introduces the basic concepts of epidemiology and biostatistics as applied to public health problems. Emphasis is placed on the principles and methods of epidemiologic investigation, appropriate summaries and displays of data, and the use of classic statistical approaches to describe the health of populations. Crosslisted with HLPR222. COREQ: STAT200 or MATH201 or PSYC209 or BIAN326.

UAPP 225  CRAFTING PUBLIC POLICY 3
Explores how the processes of public policy operate from agenda setting through formulation and legitimation, to implementation and eventual evaluation with examples drawn from several areas of policy (e.g., health, education, environment). Focus primarily on domestic public policy.

UAPP 230  LAW AND PUBLIC POLICY 3
This course examines how the executive, judicial and legislative branches of the federal government interact to establish, shape and implement public policy. Using court cases, this course will explore the interactions of the three branches in the context of ongoing debates on a range of important policy issues.

UAPP 233  INTRODUCTION TO GLOBAL HEALTH 3
Introduces key diseases and conditions which affect the health of different populations including basic biological and varying social aspects which cause major global health issues. Emphasis on the developing world, the health of the poor, and possible solutions. Crosslisted with HLPR233.

UAPP 235  THE FUTURE OF CITIES IN A GLOBAL AGE 3
This course examines the future of cities in the world and their potential for creating a more sustainable global society. More than half of the world's population live in cities, and two thirds of the world's projected nine billion inhabitants will be city-dwellers by 2050.

UAPP 325  PUBLIC POLICY ANALYSIS 3
Introduction to the basic principles and concepts of policy analysis. Practice application through problem solving and critical examination of analyses conducted by prominent research groups within the field as well as through case study problem-solving.

UAPP 330  PUBLIC AND NONPROFIT ADMINISTRATION 3
This course examines major topics in public and nonprofit administration, including how policy is transformed into action and services. It also examines key administrative processes and ethical issues facing public and nonprofit leaders.

UAPP 333  RESEARCH METHODS FOR POLICY ANALYSIS 3
Examines research methods and their applications in policy analysis. Demographic analysis, survey research and geographic information systems are applied to policies in such areas as transportation, health, energy and economic development.

UAPP 334  FINANCIAL MANAGEMENT PUBLIC & NONPROFIT 3
This course introduces the practical tools and concepts of financial management for public and nonprofit organizations. Topics include budgeting, capital budgeting, cost analysis, financial planning, investment decisions, debt management, financial reporting, financial statement analysis, and financial condition analysis.

UAPP 337  POLICY COMM LECTURE SERIES 1 PF
This lecture series focuses on various thematic issues in political communication and campaign politics to highlight the University of Delaware's place at the epicenter of politics. The lectures are given by UD scholars and national political practitioners in a variety of fields. Crosslisted with COMM137.

UAPP 366  INDEPENDENT STUDY 1-6

UAPP 390  TEACHING ASSISTANT 1-3 PF
Practical teaching experience. Students participate and assist in instruction of an undergraduate UAPP course. Students must work 28 hours for each credit hour. RESTRICTIONS: Must have a 3.0 GPA, have completed the course for which they assist in good standing, and be available the entire semester.

UAPP 401  PUBLIC POLICY 3
Examines the political economy of public policy, including the intersection of policy with politics and markets, and the institutional and structural dimensions of the policymaking process. The course also explores the challenges of policy implementation, and modes of policy assessment and choice.

UAPP 402  RESEARCH METHODS IN URBAN AND PUBLIC POLICY 3
Exposes students to how high quality research in the field of urban and public policy is designed and conducted, and how it can be utilized for making important decisions about the design, implementation and evaluation of projects, programs and policies.

UAPP 405  METROPOLITAN PLANNING AND GOVERNANCE 3
Contemporary issues like sprawl, growth management, and sustainability are inherently wicked, complex, and require the coordinated action of several governmental and non-governmental actors. This course will focus on the roles of government and governance institutions in fostering the cooperation of these actors and the coordination of their activities. This course will also provide you with a history of regional and metropolitan planning.

UAPP 406  PLAN SUSTAINABLE COMMUNITIES & REGIONS 3
Examines theory and methods for planning for more sustainable communities and regions in a global context in the twenty-first century. Sustainable development is defined and theories of sustainable planning presented that meet goals in the areas of environment, economy, and equity (the Three Es). After discussion of issues central to sustainable planning, course looks at tools for sustainable planning and how current land use and regional planning is and can become more oriented to sustainability. The University of Delaware is featured as an example of sustainable planning. Crosslisted with GEOG434.

UAPP 407  SEMINAR IN COMMUNITY DEVELOPMENT AND NONPROFIT LEADERSHIP 1
Overview of the philosophical and conceptual foundations of Community Development and the Nonprofit Sector, with a special focus on Leadership approaches that are utilized in both areas. Through a survey of policy topics such as housing, family support and poverty, and social and economic development, examine how each field approaches addressing these issues.
UAPP 408  POVERTY, NEIGHBORHOODS AND COMMUNITY DEVELOPMENT
3
Examines social science literature through which multidisciplinary analysts have
described and explained poverty, analyzed neighborhoods, and categorized
community development efforts. Focusing on the United States, particular
attention is paid to analyses from 1960 to the present.

UAPP 410  POLITICS & THE DELIVERY OF PUBLIC POLICY
3
Focuses on challenges in implementing and delivering policy decisions focusing on
key processes including legislative, budget and public information and key players
including elected officials, bureaucrats, media, and stakeholders. Students develop
skills related to preparing decision memos, press releases and press events in support of a policy implementation plan.

UAPP 411  REGIONAL WATERSHED MANAGEMENT
3
Reviews the practical applications of watershed planning as a tool to manage land,
water and ecosystem resources. Explores public policies and practices of
watershed planning by examining case studies. Uses a multidisciplinary approach
involving the fields of geography, environmental science, geology, public policy,
land planning, geographic information systems (GIS) and engineering.

UAPP 412  URBAN HOUSING POLICY AND ADMINISTRATION
3
Examines problems associated with providing adequate and affordable housing in
the United States. Covers the structure and dynamics of the housing market;
supply and demand factors; market failure; financing methods; federal, state and
local public policy affecting housing, including taxation, regulation, subsidy
programs, and land use controls.

UAPP 413  PLANNING THEORY AND URBAN POLICY
3
Provides an overview of the development and current conceptual normative and
methodological issues in planning theory as applied to urban regions.
PREREQ: UAPP 325 Public Policy Analysis

UAPP 415  MEDIA, CITIZENSHIP & PUBLIC POLICY
3
This course examines the structure, role, influence, and effect that the media have
on public policies and the implications for citizenship.

UAPP 418  TRADITIONAL ARCHITECTURAL MATERIALS
3
Overview of composition, fabrication methods, deterioration mechanisms, and
preservation needs of stone, ceramic, metal, glass, mortar, plaster, paint, and
wood components of traditional architecture from a variety of cultural contexts.

UAPP 419  POLICY LEADERSHIP AND ETHICS
3
Advanced examination of the theory and practice of leadership in public policy,
specifically emphasizing ethical issues and implications with and between multiple
sectors. May be crosslisted with LEAD419.

UAPP 420  INTRODUCTION TO ARCHITECTURAL PHOTOGRAPHY
1
Applies principles of architectural photography to the photographic
documentation of historic architecture, structures, and landscapes. Emphasizes
how to identify and photograph character-defining features of architecture and
engineering structures. Reviews protocols of the Historic American Building Survey
and Historic American Engineering Record. Student will learn in field
photographing architecture.

UAPP 421  CONTEMP ISSUES IN URBAN AFFAIRS
3
Overview of the origins of urban affairs and public policy and its current academic
role and status as a profession. Students meet with and engage in discussions with
leading scholars and policy makers invited to the campus to talk about their
current research and interests.

UAPP 423  URBAN SOCIETY AND PUBLIC POLICY
3
Focuses on how individuals and groups contribute to the metropolitan
environment and how they react and adapt to their communities. It begins with
an examination of city life in early decades of the twentieth century and concludes
with a consideration of how globalization is transforming metropolitan
communities.

UAPP 424  COMPARATIVE PUBLIC POLICY
3
This course examines public policy and administration in a global context,
highlighting the distinctive features of policies in different nations in such areas as
health, education, social services, housing, and economic development. The
course compares U.S. policies and public institutions with those of other nations.

UAPP 425  ENERGY POLICY AND ADMINISTRATION
3
Analyzes energy use and energy policy with respect to politics, society, economics,
political economy, technology, resources, and environment. Focuses on
interrelationships among energy, environment, economy and equity (EA). It
considers the energy policy options needed to achieve a more sustainable world.
Crosslisted with ENEP425.

UAPP 427  EVALUATING PUBLIC POLICY
3
Exploration and application of evaluation techniques as they relate to the study of
public programs and policies. Explores multiple empirically-based approaches to
critical examination of intentions and effects of public policy.

UAPP 428  WORLD HERITAGE SITES
1
Goals and political context of UNESCO’s World Heritage program, UNESCO
activities related to that program, process of nomination of new sites for the
World Heritage List, and cultural and preservation issues presented by world
heritage sites in a variety of regions and countries.

UAPP 429  THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING
3
Examines the historic preservation planning process, the theory supporting this
process and contemporary practices. Case studies used to demonstrate the
integration of theory and practice.

UAPP 430  METHODS IN HISTORIC PRESERVATION
3
Introduces students to the critical skills and methodologies employed in the field
of historic preservation. Organization is based on the steps used in preservation
planning, including survey and identification of historic resources, evaluation of
significance, development of historic context, and creation of preservation
treatment alternatives.

UAPP 431  DOCUMENTATION OF HISTORIC STRUCTURES
2
Focuses on the process of creating a physical record of a historic structure,
including preparation of scaled, annotated field notes for measured drawings
(plans, sections, elevations and details), writing architectural descriptions, and
learning to “read” the critical features of a historic resource.

UAPP 433  WASHINGTON D.C. POLICY PRACTICUM
3-6
Students will live in Washington D.C. and be placed in intern positions. Class will
include lectures and site visits and discussions with practitioners and instructors.
May be crosslisted with POSC483. RESTRICTIONS: Approval of instructor.

UAPP 436  RESEARCH TOPICS IN HISTORIC PRESERVATION
3
Seminar addresses a specific research issue within historic preservation including
hypothosis construction, design of research methodology and evaluation of
results. Emphasis on use of primary sources and application of data-base
techniques.

UAPP 439  COMMUNITY DEVELOPMENT THEORY, CONCEPTS AND PRACTICE
3
Explores the evolution of core principles and concepts associated with community
development, examines various models of practice, and identifies and assesses
current challenges and issues confronting the field in the United States.

UAPP 440  CONTEMPORARY POLICY ISSUES
3
Capstone course serves as a concluding learning experience for students during
their senior year. Involves an integration of the policy skills that they have
developed within applied contexts related to their minors or areas of interests and
their UAPP 300 Field Experience.

UAPP 441  TOPICS IN NONPROFIT MANAGEMENT AND LEADERSHIP
3
Offers an additional and advanced opportunity to delve into nonprofit
management and leadership in the context of the current sociopolitical and
economic environment. Expands knowledge and understanding of the issues
confronting the sector as a whole and builds analytic and problem-solving skills.

UAPP 442  STRATEGIC PLANNING FOR PUBLIC AND NONPROFIT
1
Organizations
Provides an introduction to the process of strategic planning and attempts to build
the skills and knowledge required for carrying out strategic planning in private
nonprofit and public agencies. Focuses on the organizational environments in
which planning takes place, examines the theories which underlie planning in
general and strategic planning in particular and presents a usable model for
strategic planning.
University of Delaware Course Catalog (as of 7/24/15) anticipating Fall-2015

UAPP 448  ENVIRONMENTAL ETHICS  3
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format. Crosslisted with PHIL448.

UAPP 449  CIVIL RIGHTS LAW AND POLICY  3
Examines the origin and evolution of the laws and policies that govern the rights of African-Americans and other people of color in the United States. Examines emerging approaches to civil rights scholarship and considers the implications of the Supreme Court's recent embrace of a conservative posture in civil rights issues.

UAPP 452  INTERNATIONAL DEVELOPMENT POL & ADMIN  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.

UAPP 453  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.

UAPP 455  YOUTH STREET OUTREACH  4
Implements an outreach program to youth in a low income, urbanized community in Wilmington. Students trained and monitored as outreach workers by their professor and by community volunteers. Outreach workers trained to approach youth hanging out on the street, engage them (through conversation and recreational activities), identify their needs, and direct them to resources. Students keep journals to record their observations and feelings. The goal of the class is to increase social capital among youth by encouraging and facilitating youth participation in community educational, recreational, and social support services/activities. Crosslisted with SOC455.

UAPP 456  POLITICS AND DISASTER  3
The politics and public administration of governmental preparedness for, and response to, natural and human-caused disasters and emergency incidents.

UAPP 457  HEALTH POLICY  3
Provides students with a basic understanding of the U.S. health system and gives them practical experience in analyzing how healthcare reform and health policy more generally affect various sectors of the economy.

UAPP 458  CONTEMPORARY ISSUES IN PUBLIC ADMINISTRATION  1-3
Focus on "cutting edge" issues in the field of public administration and public affairs, including the response of those in public administration as they seek to establish more clearly the role of administrators in the governance process.

UAPP 461  CONFLICT RESOLUTION COLLAB PROB SOLVING  3
This course is will examine the nature of interpersonal conflicts in organizations and communities, and methods of resolution through negotiation and collaborative problem-solving. Students will learn how to select and apply appropriate conflict management techniques.

UAPP 465  CLIMATE CHANGE: POLICY, EQUITY AND MITIGATION  3
Focuses on climate change equity, international compliance mechanisms, and US initiatives. It is designed for graduate students and advanced undergraduates who seek to gain substantive understanding of climate change policy and the means, impediments and opportunities to reaching resolution of complex international questions. Crosslisted with MAST462.

UAPP 466  INDEPENDENT STUDY  1-6

UAPP 468  UNDERGRADUATE RESEARCH  1-3
Undergraduate research conducted on or off campus, out of class, and under the supervision of a UAPP faculty member. Students must keep a log of activities, meet regularly with their faculty sponsor, and submit a final report. One credit requires a minimum of 40 hours of research.

UAPP 472  NONPROFIT ORGANIZATIONS: SCOPE, FRAMEWORKS AND DYNAMICS  3
Addresses the size, scope, subcomponents, and legal framework of the nonprofit sector, as well as the traditions, values, roles and functions of nonprofits in today's environment.

UAPP 473  GOVERNING NONPROFIT ORGANIZATIONS  3
Addresses governance issues facing nonprofit executives and governing boards. Topics include board relationships and voluntary leadership, board development, advocacy, records management and the use of information technology in management and governance, and other key challenges to the nonprofit sector.

UAPP 474  STRATEGIC FUNDRAISING AND MARKETING FOR NONPROFITS  3
Prepares students for advanced practice with nonprofit organizations in the interrelated areas of strategic marketing and fundraising. Provides an integrated approach to strategy, marketing and resource development with current and emerging nonprofit organizations.

UAPP 475  LAND USE AND TRANSPORTATION LINKAGES  1
Explores the linkages between land use planning and the provision of transportation infrastructure. Discussions include guest speakers who are recognized practitioners in the fields of land use and transportation planning. Land development techniques and patterns which influence transportation needs are covered. Shows how the interplay between land use patterns and transportation infrastructure influences travel and development characteristics.

UAPP 476  PERFORMANCE MANAGEMENT  3
Increases knowledge of techniques and definitions used in managing-for-results movement; introduces indicators used by government and their use for accountability and improved effectiveness; furthers competence in areas of strategic planning, benchmark indicators, performance-based budgeting, and performance measurement; and explores linkages and alignments of systems for improved efficiency and effectiveness.

UAPP 477  STATE GOVERNMENT POLICY AND MANAGEMENT  3
Focuses on roles and functions of United States state government. Topics include legislative policy making and operations, executive branch organization and functions, structure and role of state courts, and the role of the governor and the states in intergovernmental policy making. State government in the mid-atlantic region will receive special attention.

UAPP 478  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 479  INTRODUCTION TO COMPREHENSIVE PLANNING  1
Overview of the comprehensive planning process. Description of goals, objectives and components behind the development of a comprehensive plan and methods for preparing and understanding the value of a comprehensive plan to the community.

UAPP 480  INTRODUCTION TO ZONING AND LAND USE CONTROLS  1
Survey of the theories underlying land use patterns and description of the legal structure and methods surrounding public sector control and management of land use including police power, eminent domain, zoning, subdivision control, and master plans.

UAPP 481  LEADERSHIP IN ORGANIZATIONS  3
Understanding the process of change and positively affecting change in organizations through the exercise of leadership skills and knowledge.

UAPP 482  METROPOLITAN PLANNING AND GOVERNANCE  3
Issues like sprawl, growth management, and sustainability are complex and require the coordinated action of governmental and non-governmental actors. This course focuses on government and governance institutions and their roles in fostering regional cooperation on urban planning issues.

UAPP 483  LOCAL ECONOMIC DEVELOPMENT: POLICY AND PRACTICE  3
Examines theory and contemporary practice for promoting the economic development of local communities. Reviews alternative ways of understanding the dynamics of local economic development and devising strategies that will benefit community residents.
UAPP 607  SEMINAR IN COMMUNITY DEVELOPMENT AND NONPROFIT LEADERSHIP  1
Overview of the philosophical and conceptual foundations of Community Development and the Nonprofit Sector, with a special focus on leadership approaches that are utilized in both areas. Through a survey of policy topics such as housing, family support and poverty, and social and economic development, examines how each field approaches addressing these issues. May be crosslisted with HDFS607.

UAPP 608  POVERTY, NEIGHBORHOODS AND COMMUNITY DEVELOPMENT  3
Examines social science literature through which multidisciplinary analysts have described and explained poverty, analyzed neighborhoods, and categorized community development efforts. Focusing on the United States, particular attention is paid to analyses from 1960 to the present. May be crosslisted with HDFS608.

UAPP 609  FINANCIAL STATEMENT ANALYSIS FOR NONPROFITS  1
Geared toward graduate students with little or no background in accounting or reading financial statements. Gives basic understanding of financial statement analysis. Covers basic accounting concepts with an emphasis on understanding the financial statements of nonprofit organizations.

UAPP 610  BLACK COMMUNITY STUDIES  3-6
Investigation and analysis of various topics and developments of interest and significance to the Black community. Crosslisted with BAM560. RESTRICTIONS: May be repeated for credit when topics vary.

UAPP 611  REGIONAL WATERSHED MANAGEMENT  3
Reviews the practical applications of watershed planning as a tool to manage land, water and ecosystem resources. Explores public policies and practices of watershed planning by examining case studies. Uses a multidisciplinary approach involving the fields of geography, environmental science, geology, public policy, land planning, geographic information systems (GIS) and engineering. May be crosslisted with APEC611.

UAPP 612  URBAN HOUSING POLICY AND ADMINISTRATION  3
Examines problems associated with providing adequate and affordable housing in the United States. Covers the structure and dynamics of the housing market; supply and demand factors; market failure; financing methods; federal, state and local public policy affecting housing, including taxation, regulation, subsidy programs, and land use controls.

UAPP 613  PLANNING THEORY AND URBAN POLICY  3
Provides an overview of the development and current conceptual normative and methodological issues in planning theory as applied to urban regions.

UAPP 617  CONTEMPORARY ISSUES IN ENVIRONMENTAL AND ENERGY POLICY  3
Links students with leading energy and environmental policy scholars on a bi-weekly basis to debate key issues such as global warming, ozone layer deterioration, environmental justice, sustainable development and ecological democracy. International, national and community dimensions of these and other policy issues are explored through seminar discussion. Crosslisted with ENEP617.

UAPP 618  TRADITIONAL ARCHITECTURAL MATERIALS  3
Overview of composition, fabrication methods, deterioration mechanisms, and preservation needs of stone, ceramic, metal, glass, mortar, plaster, paint, and wood components of traditional architecture from a variety of cultural contexts.

UAPP 619  CONTEMPORARY ISSUES IN URBAN AFFAIRS AND PUBLIC POLICY  3
Overview of the origins of urban affairs and public policy and its current academic role and status as a profession. Students meet with and engage in discussions with leading scholars and policy makers invited to the campus to talk about their current research and interests.

UAPP 621  CONFLICT RESOLUTION  1
Introduction to conflict resolution skills. Provides communication and problem solving skills designed to de-escalate conflicts and create win-win solutions. Students learn new ways of approaching conflict while gaining an understanding of their own conflict management style. Examines how these skills transfer to the workplace. RESTRICTIONS: Requires permission of instructor.

UAPP 622  RESOURCES, DEVELOPMENT AND THE ENVIRONMENT  3
Focuses on food, resources, energy and population issues in relationship to economic development and the global environment. Engages students in discussion and debate on sustainable development policies. Crosslisted with GEO662.

UAPP 623  INDEPENDENT STUDY IN GEOGRAPHICAL INFORMATION SYSTEMS  1
Students complete self-paced individualized tutorials and apply knowledge in a project of their choice. Material addressed includes creation and display of digital maps and data bases, preparation of data sets, sources of data and GIS standards.

UAPP 625  ENERGY POLICY AND ADMINISTRATION  3
Examines energy use and energy policy with respect to politics, society, economics, political economy, technology, resources, and environment. Focuses on interrelationships among energy, environment, economy and equity (E4). It considers the energy policy options needed to achieve a more sustainable world. Crosslisted with ENEP625.

UAPP 627  WORLD HERITAGE SITES  1
Goals and political context of UNESCO’s World Heritage program, UNESCO activities related to that program, process of nomination of new sites for the World Heritage List, and cultural and preservation issues presented by world heritage sites in a variety of regions and countries.

UAPP 629  THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING  3
Examines the historic preservation planning process, the theory supporting this process and contemporary practices. Case studies used to demonstrate the integration of theory and practice. May be crosslisted with ARTH628, HIST652, MSST629.

UAPP 630  METHODS IN HISTORIC PRESERVATION  3
Introduces students to the critical skills and methodologies employed in the field of historic preservation. Organization is based on the steps used in preservation planning, including survey and identification of historic resources, evaluation of significance, development of historic context, and creation of preservation treatment alternatives.

UAPP 631  DOCUMENTATION OF HISTORIC STRUCTURES  2
Focuses on the process of creating a physical record of a historic structure, including preparation of scaled, annotated field notes for measured drawings (plans, sections, elevations and details), writing architectural descriptions, and learning to “read” the critical features of a historic resource. May be crosslisted with HIST638.

UAPP 636  RESEARCH TOPICS IN HISTORICAL PRESERVATION  3
Seminar addresses a specific research issue 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, GEO6636, HIST636.

UAPP 638  WORLD CITIES IN COMPARATIVE PERSPECTIVE  3
World city as a new and distinctive geographic urban form in the world economy. Case studies explore common features of internal structure and external relationships of world cities, their growing environmental problems and extent to which they have decoupled from national cultures and economies. Crosslisted with GEO6638.

UAPP 639  COMMUNITY DEVELOPMENT THEORY, CONCEPTS AND PRACTICE  3
Explores the evolution of core principles and concepts associated with community development, examines various models of practice, and identifies and assesses current challenges and issues confronting the field in the United States.

UAPP 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.

UAPP 641  TOPICS IN NONPROFIT MANAGEMENT AND LEADERSHIP  3
Offers an additional and advanced opportunity to delve into nonprofit management and leadership in the context of the current sociopolitical and economic environment. Expands knowledge and understanding of the issues confronting the 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  1
Provides an introduction to the process of strategic planning and attempts to build the skills and knowledge required for carrying out strategic planning in private nonprofit and public agencies. Focuses on the organizational environments in which strategic planning takes place, examines the theories which underlie planning in general and strategic planning in particular and presents a usable model for strategic planning.
UAPP 643  HISTORIC ROADSIDE ARCHITECTURE  3
Examines various historic hospitality and retail venues with emphasis on their development throughout this automobile based century. Hotels, motels, diners, fast food and full service restaurants, roadside attractions and retail outlets are discussed as they relate to travel and tourism. May be crosslisted with HRIM643.

UAPP 644  GRANTSMANSHIP AND PROPOSAL WRITING  1
Helps public and nonprofit managers hone their abilities to successfully secure grant funding. Sessions cover currently available resources for identifying promising targets for one's grant proposal, do's and don'ts in dealings with foundations, what grantmakers really look for in a winning grant proposal, and strategies for transforming an idea into a feasible proposal capable of effectively attracting grant support.

UAPP 648  ENVIRONMENTAL ETHICS  3
Ethical problems associated with environmental protection, local, national, and international. Relations of social and political movements. Seminar format. Crosslisted with PHIL648.

UAPP 649  CIVIL RIGHTS LAW AND POLICY  3
Examines the origin and evolution of the laws and policies that govern the rights of African-Americans and other people of color in the United States. Examines emerging approaches to civil rights scholarship and considers the implications of the Supreme Court’s recent embrace of a conservative posture in civil rights issues. May be crosslisted with BAM5649, LEST649.

UAPP 652  GEOGRAPHIC INFORMATION SYSTEMS IN PUBLIC POLICY  1
Hands-on introduction to Geographic Information Systems (GIS) and their uses in public policy areas. Content varies. Exercises focus on using geographic data in fields such as environmental analysis, land use planning, and socio-economic analysis.

UAPP 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.

UAPP 654  VERNACULAR ARCHITECTURE  3
Study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship. May be crosslisted with ARTH654, HIST654, MSST654.

UAPP 655  GEOGRAPHIC INFORMATION SYSTEMS IN THE PUBLIC AND NONPROFIT SECTORS  3
Introduction to the 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 657  HEALTH POLICY  3
Provides students with a basic understanding of the U.S. health system and gives them practical experience in analyzing how healthcare reform and health policy more generally affect various sectors of the economy.

UAPP 658  CONTEMPORARY ISSUES IN PUBLIC ADMINISTRATION  1-3
Focus on “cutting edge” issues in the field of public administration and public affairs, including the response of those in public administration as they seek to establish more clearly the role of administrators in the governance process.

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

UAPP 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. Crosslisted with MAST663.

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

UAPP 665  CLIMATE CHANGE: POLICY, EQUITY AND MITIGATION  3
Focuses on climate change equity, international compliance mechanisms, and US initiatives. It is designed for graduate students and advanced undergraduates who seek to gain substantive understanding of climate change policy and the means, impediments and opportunities to reaching resolution of complex international questions. Crosslisted with MAST662.

UAPP 666  SPECIAL PROBLEM  1-12

UAPP 668  GOVERNMENT BUDGETS AND FISCAL FEDERALISM  3
Examines policy and management of U.S. fiscal institutions and practices, including process and politics of government budgeting; intergovernmental grants and fiscal relationships; long-term fiscal planning, entitlements, and debt finance; and the analysis and design of governmental and intergovernmental fiscal institutions.

UAPP 672  NONPROFIT ORGANIZATIONS: SCOPE, FRAMEWORKS AND DYNAMICS  3
Addresses the size, scope, subcomponents, and legal framework of the nonprofit sector, as well as the traditions, values, roles and functions of nonprofits in today’s environment.

UAPP 673  GOVERNING NONPROFIT ORGANIZATIONS  3
Addresses governance issues facing nonprofit executives and governing boards. Topics include board relationships and voluntary leadership, board development, advocacy, records management and the use of information technology in management and governance, and other key challenges to the nonprofit sector.

UAPP 674  STRATEGIC FUNDRAISING AND MARKETING FOR NONPROFITS  3
Prepares students for advanced practice with nonprofit organizations in the interrelated areas of strategic marketing and fundraising. Provides an integrated approach to strategy, marketing and resource development with current and emerging nonprofit organizations.

UAPP 675  LAND USE AND TRANSPORTATION LINKAGES  1
Explores the linkages between land use planning and the provision of transportation infrastructure. Discussions include guest speakers who are recognized practitioners in the fields of land use and transportation planning. Land development techniques and patterns which influence transportation needs are covered. Shows how the interplay between land use patterns and transportation infrastructure influences travel and development characteristics.

UAPP 684  PERFORMANCE MANAGEMENT AND PROGRAM EVALUATION  3
Increases knowledge of tools, techniques, and definitions for performance management, and program evaluation. Introduces indicators used by government and nonprofits and their use for accountability and improved effectiveness; furthers competence in areas of strategic planning, benchmark indicators, performance measurement, and evaluation; and explores linkages and alignments of systems for improved efficiency and effectiveness.

UAPP 687  STATE GOVERNMENT POLICY AND MANAGEMENT  3
Focuses on roles and functions of United States state government. Topics include legislative policy making and operations, executive branch organization and functions, structure and role of state courts, and the role of the governor and the states in intergovernmental policy making. State government in the mid-Atlantic region will receive special attention.

UAPP 689  INFORMATION TECHNOLOGY & MANAGEMENT OF PUBLIC & NP ORGS  3
Considers the role of technology in the planning and administration of public and nonprofit organizations. Topics include technology planning and budgeting, data processing and analysis, databases, change strategy, policy issues with current and emerging technology tools for planning and management.
UAPP 690  SEMINAR: PUBLIC ADMINISTRATION  3
Introduction to the field through the scope and evolution of public administration; the institutional, structural and political contexts of policy making; the role of nonprofit organizations in public service; the relationships and values of the public and nonprofit sectors.

UAPP 691  QUANTITATIVE ANALYSIS IN PUBLIC AND NONPROFIT SECTORS  3
Study of basic research design and data analysis techniques stressing applications in the public and nonprofit sectors. Includes research design, data acquisition, measurement, descriptive statistics, data collection, probability, exploratory data analysis, hypothesis testing, simple and multiple regression, correlation, and graphical procedures.

UAPP 692  ENVIRONMENTAL VALUES, MOVEMENTS AND POLICY  3
Examines citizens' beliefs and values, voluntary environmental groups and the ways in which individuals and groups affect environmental policy. Shows how research in areas such as environmental sociology and ecological anthropology can inform policy. Crosslisted with MAST692.

UAPP 693  ECONOMICS IN PUBLIC & NONPROFIT SECTORS  3
Develops microeconomics concepts and applies them to public issues, policies, and programs. Applications deal with a wide variety of topics, including health care, education, transportation, housing, community development, energy, and the environment. Emphasizes how microeconomic analysis can enhance decision making.

UAPP 694  FINANCIAL MANAGEMENT IN PUBLIC & NONPROFIT SECTORS  3
Introduction to practical tools and concepts of financial management for public and nonprofit organizations. Topics include budgeting, capital budgeting, cost analysis, financial planning, investment decisions, debt management, financial reporting, financial statement analysis, and financial condition analysis.

UAPP 695  ADMINISTRATIVE AND EMPLOYMENT LAW  1
Understanding of the regulatory process including the rule-making and adjudicatory (order-making) powers of government agencies. Explores the legal rights and responsibilities of employees in the public, nonprofit, and private sectors.

UAPP 696  HUMAN RESOURCES IN PUBLIC AND NONPROFIT ORGANIZATIONS  2
Addresses strategic human resource planning and management issues in public and nonprofit organizations by linking critical activities like job design, recruitment/selection and compensation while strengthening performance management and productivity through appraisal and professional development. Also addresses competencies to lead a diverse workforce, including volunteers.

UAPP 697  LEADING ORGANIZATIONS IN PUBLIC & NP SECTORS  3
Addresses the knowledge and competencies necessary to lead organizations in a networked environment that included public, nonprofit, and for profit organizations in implementing public policy and public services. Explores the evolution of the study of organizations and leadership, as well as aligning the values and ethics of multiple organizations and sectors in the networks that now shape public governance.

UAPP 698  MANAGEMENT DECISION MAKING IN PUBLIC & NP SECTORS  3
Focuses on analytical decision making within public and nonprofit organizations. Examines processes by which decisions can be made and evaluated. Emphasis on conceptual factors that provide a guide to decisions and evaluations of decision methodologies, e.g., logic models, performance measurement, program evaluation, cost-benefit/cost-effective analysis, PERT/critical path analysis.

UAPP 699  POLICY/MANAGEMENT BRIEF  1
Students write a policy or management brief which includes a statement of the problem, a review of the relevant research addressing the problem, and a proposal for action(s). Specific guidelines approved by the MPA faculty for the brief are posted on the School's web site.

UAPP 700  HISTORIC PRESERVATION CAPSTONE STUDIO  3
Capstone experience for masters students in historic preservation. Focuses on completion of a group project solving a real-world problem in historic preservation, drawing on a variety of skills such as architectural documentation, evaluation, archival research, and policy development.

UAPP 701  PUBLIC POLICY  3
This course examines the political economy of public policy, including the intersection of policy with politics and markets, and the institutional and structural dimensions of the policymaking process. The course also explores the challenges of policy implementation, and modes of policy assessment and choice.

UAPP 702  RESEARCH METHODS IN URBAN AND PUBLIC POLICY  3
This course exposes students to how high quality research in the field of urban and public policy is designed and conducted, and how it can be utilized for making important decisions about the design, implementation and evaluation of projects, programs and policies.

UAPP 703  URBAN SOCIETY AND PUBLIC POLICY  3
The course focuses on how individuals and groups contribute to the metropolitan environment and how they react and adapt to their communities. It begins with an examination of city life in early decades of the twentieth century and concludes with a consideration of how globalization is transforming metropolitan communities.

UAPP 704  STATISTICS FOR POLICY ANALYSIS  3
Advanced training in applied multivariate regression for social and health science research. Topics: OLS review, limited dependent variables: various Logit and Probit models, Count Data Models, Selection and Truncated Models (Heckman, Tobit and Censored Models), Longitudinal Modeling (Panel Data, Multi-level Analysis, Survival Analysis).

UAPP 706  PLAN SUSTAINABLE COMMUNITIES & REGIONS  3
Examines theory and methods for planning for more sustainable communities and regions in a global context in the twenty-first century. Sustainable development is defined and theories of sustainable planning presented that meet goals in the areas of environment, economy, and equity (the Three Es). After discussion of issues central to sustainable planning, course looks at tools for sustainable planning and how current land use and regional planning is and can become more oriented to sustainability. The University of Delaware is featured as an example of sustainable planning. Crosslisted with GEOG634.

UAPP 707  PUBLIC POLICY ANALYSIS  3
Develops skills in conducting and critiquing professional policy analysis. Practice application of research methodologies to analyze contemporary public problems and potential policy solutions.

UAPP 714  POLICY STUDIO  3
Capstone project for the MA in Urban Affairs and Public Policy program that will draw upon knowledge and skills developed in the first three semesters and culminate in a policy studio paper.

UAPP 715  MEDIA, CITIZENSHIP & PUBLIC POLICY  3
This course examines the structure, role, influence, and effect that the media have on public policies and the implications for citizenship.

UAPP 716  APPLIED CREATIVITY  3
Provides foundational knowledge in research and practice of creativity theory and creative problem-solving in entrepreneurial contexts. Topics include creativity processes, including creative problem solving models and methods, idea-generating techniques, and developing a creative disposition. Crosslisted with ENTR616.

UAPP 717  DESIGN THINKING AND INNOVATION  3
Addresses the integration and application of design processes and design thinking to enhance innovation. Students engage in multidisciplinary exploration of design theory and practice, specifically applying design ideas, principles and approaches. The role of user-centered research, divergent thinking, and iteration to enhance innovation are emphasized. Crosslisted with ENTR617.

UAPP 720  INTRODUCTION TO ARCHITECTURAL PHOTOGRAPHY  1
Applies principles of architectural photography to the photographic documentation of historic architecture, structures, and landscapes. Emphasizes how to identify and photograph character-defining features of architecture and engineering structures. Reviews protocols of the Historic American Building Survey and Historic American Engineering Record. Student will learn in field photographing architecture.
UAPP 724  COMPARATIVE PUBLIC POLICY  3
This course examines public policy and administration in a global context, highlighting the distinctive features of policies in different nations in such areas as health, education, social services, housing, and economic development. The course compares U.S. policies and public institutions with those of other nations.

UAPP 730  TOPICS IN PUBLIC POLICY  1-3
Special topics in public policy and administration. Topics will vary. Offers an additional and advanced opportunity to delve into public policy and administration in the context of the current sociopolitical and economic environment. Expands knowledge and understanding of the issues confronting the sector as a whole and builds analytic and problem-solving skills. RESTRICTIONS: May be repeated for nine credits when topics vary.

UAPP 733  WASHINGTON D.C. POLICY PRACTICUM  3-6
Students will live in Washington D.C. and be placed in intern positions. Class will include lectures and site visits and discussions with practitioners and instructors. RESTRICTIONS: Approval of instructor.

UAPP 739  RENEW ENERGY AND CLIMATE: LAW AND REGULATION  1-3
This course is an introduction to US laws and regulations pertaining to greenhouse gases and the generation, transmission, and integration of renewable energy into the electrical, transportation and building heat systems. The course primarily draws on judicial opinions but also considers technical and scientific sources. Crosslisted with MAST639.

UAPP 755  EVALUATION MODELS AND APPROACHES  3
Using a case-based approach, the course covers major evaluation models and approaches and their implications for evaluation planning, design, implementation, and use. Provides a foundation for thoughtful, credible, and ethical evaluation practice. Crosslisted with EVAL755. PREREQ: HDFS637 or permission of instructor.

UAPP 756  ADVANCED SEMINAR IN EVALUATION  3
The seminar provides the opportunity to study selected areas of evaluation theory and practice in depth. Potential topics include mixed-method evaluation, culturally-responsive evaluation, systems theory for evaluation, evaluation in different contexts (public, private, non-profit), and others. Crosslisted with EVAL756. PREREQ: EVAL755 or permission of instructor.

UAPP 761  CONFLICT RESOLUTION COLLAB PROB SOLVING  3
This course is to examine the nature of interpersonal conflicts in organizations and communities, and methods of resolution through negotiation and collaborative problem-solving. Students will learn how to select and apply appropriate conflict management techniques.

UAPP 800  RESEARCH METHODS AND DATA ANALYSIS  4
Focuses on concepts, issues and techniques related to research design, data acquisition and data analysis in the fields of urban affairs and public policy.

UAPP 801  PROCESSES OF SOCIAL INQUIRY  3
Explores philosophical underpinnings of social inquiry and epistemological and methodological issues surrounding development and use of social research. Encourages students to consider role of critical analysis in social change. Students prepare research designs on topics of their choosing and are assisted by instructors in developing them into thesis and dissertation proposals.

UAPP 802  ELECTRICITY POLICY AND PLANNING  3
Analyzes the technological and regulatory policy evolution of the electricity industry. Considers how technology innovations and policy/regulatory actions have guided the planning of the industry from its early days. Crosslisted with ENEP802.

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. RESTRICTIONS: Enrollment limited to 15.

UAPP 810  POLITICAL ECONOMY OF THE ENVIRONMENT  3
Reviews major theories developed over the last half century to explain nature-society relations. Policy case studies on environmental justice, trade and environment, global climate change, and sustainable development used to evaluate current range of political-economic explanations of nature-society relations. International, national and local responses to these problems are analyzed. Crosslisted with ENEP810.

UAPP 818  ENVIRONMENTAL POLICIES AND POLICY  3
U.S. 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. Crosslisted with POSCS18.

UAPP 820  INTERNATIONAL PERSPECTIVES ON ENERGY AND ENVIRONMENT  3
Policy analysis and political economy at international energy and environmental issues and problems. Encompasses international and multi-national government and private sector organizations, as well as non-governmental, non-profit organizations. Crosslisted with ENEP820.

UAPP 821  PROSEMINAR: TECHNOLOGY, ENVIRONMENT AND SOCIETY  3
Over the last two centuries, forces of industrialization and urbanization have transformed economic, social and political life and the natural environment. Examines theories that explain and assess these transformations, with the goal of fostering critical analysis of social and environmental transformation in international, national and local contexts. Crosslisted with ENEP821.

UAPP 822  PROSEMINAR IN GOVERNANCE, PLANNING AND POLICY  3
Deals with policy and research issues concerning the making, administering and outcomes of public policies affecting urban populations and with how urban governance, planning and management processes are influenced by the interaction of the public, private and third sectors at the local, national and international scales.

UAPP 823  PROSEMINAR: SOCIAL AND URBAN POLICY  3
Social policy attempts to promote the well-being of individuals, families and communities through public action. Explores efforts to address social and economic problems in urban society. Considers differential policy impacts by social class, race/ethnicity, gender and age. Topics: welfare, housing, social security, health, education, criminal justice and employment. May be crosslisted with EDUC825, HDF823.

UAPP 824  SUSTAINABLE ENERGY POLICY AND PLANNING  3
Analyzes sustainable energy strategies in terms of their technology, economics, impacts on the environment and governance attributes. Also analyzes policy options to facilitate a sustainable energy future. Crosslisted with ENEP824. RESTRICTIONS: Graduate students with a background in policy, economics and/or technology. Senior-level undergraduates only with permission of the instructor.

UAPP 830  PROSEMINAR PUBLIC MANAGEMENT AND LEADERSHIP  3
Reviews theories, concepts, and research in the fields of public management leadership and focuses on emerging areas of scholarship and practice. Draws from interdisciplinary literature in the areas of public administration, organizational behavior and leadership, and management science and practice. Attention is focused on organizational performance, management effectiveness, organizational change and institutional responsiveness. Addresses the linkages of public management leadership to democratic and participatory institutions at all levels of community, from organizations to nations.

UAPP 860  INTERNSHIP SEMINAR  1
Involves the submission of a work plan supervisory assessment and reflective paper following the completion of a three-month (or equivalent) fieldwork experience that has been approved by the SPPA Internship Coordinator. An MPA requirement.

UAPP 861  ACADEMIC AND PROFESSIONAL DEVELOPMENT FOR UAPP DOCTORAL STUDENTS  1 PF
Explores a range of topics related to academic processes and professional development for doctoral students. Topics may include: strategies for successful graduate study, advisor/committee strategies, topic selection, the research experience, writing skills, time/stress management strategies, conference presentation, publishing, job searches, professional organizations and networking. Guest speakers include various faculty members, students and alumni. RESTRICTIONS: Open only to UAPP doctoral students.

UAPP 862  TEACHING PRACTICUM IN URBAN AFFAIRS AND PUBLIC POLICY  3 PF
In consultation with a SUAPP faculty member and based on the student's long-term goals and professional background, the student participates in the development (or revision) and teaching of a course. Exposes Ph.D. students who anticipate teaching careers to the pedagogical issues, and planning and implementation of course instruction. PREREQ: One semester of Ph.D. graduate study. RESTRICTIONS: Requires permission of academic advisor and faculty member sponsoring practicum.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIV 100</td>
<td>HONORS FIRST YEAR EXPERIENCE</td>
<td>0 PF</td>
<td>Students are asked to reflect upon changes in their knowledge, skills, and attitudes that occur during their Honors First Year Experience.</td>
</tr>
<tr>
<td>UNIV 101</td>
<td>FIRST YEAR EXPERIENCE I</td>
<td>1 PF</td>
<td>Provides an integrated, content-based, co-curricular experience for first year students. Fosters academic and social competencies necessary for university success and provides structured, regular time for first year students to meet with faculty and peer mentors. RESTRICTIONS: For freshmen only.</td>
</tr>
<tr>
<td>UNIV 102</td>
<td>FIRST YEAR EXPERIENCE II</td>
<td>1 PF</td>
<td>Continuation of UNIV101. PREREQ: UNIV101.</td>
</tr>
<tr>
<td>UNIV 103</td>
<td>FIRST YEAR EXPERIENCE III</td>
<td>1 PF</td>
<td>Continuation of UNIV102. PREREQ: UNIV102.</td>
</tr>
<tr>
<td>UNIV 104</td>
<td>SOPHOMORE SEMINAR</td>
<td>1 PF</td>
<td>To give students a better understanding of academic skills and interests so that they can develop a plan of action in selecting a major. To help students redefine academic skills necessary for success in junior and senior level courses. Introduce additional Newark Campus resources.</td>
</tr>
<tr>
<td>UNIV 110</td>
<td>ETE SCIENCE SEMESTER</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>UNIV 112</td>
<td>SKILMOD: ACADEMIC SELF MANAGEMENT</td>
<td>1 PF</td>
<td>Focuses on self-organization and growth in a college environment. Students investigate the nature of a university, learn how to maximize their productivity through time-management and careful decision-making and examine what a liberal arts education can mean to them.</td>
</tr>
<tr>
<td>UNIV 113</td>
<td>SKILMOD: STUDY SKILLS</td>
<td>1 PF</td>
<td>Teaches strategies for understanding and remembering college lectures and text materials. Strategies include identifying the underlying discourse structure of the field, summarizing, comprehension monitoring and transforming notes into test formats. Students practice on their own course materials.</td>
</tr>
<tr>
<td>UNIV 114</td>
<td>SKILMOD: CRITICAL THINKING</td>
<td>1 PF</td>
<td>Teaches strategies of good reasoning in humanities, social sciences and other liberal arts areas. Students learn how to become independent, well-informed thinkers and how to make persuasive arguments, using their own course materials.</td>
</tr>
<tr>
<td>UNIV 115</td>
<td>SKILMOD: PROBLEM SOLVING</td>
<td>1 PF</td>
<td>Teaches problem-solving strategies for college courses in chemistry, physics, economics, engineering, etc. Students learn methods for breaking problems into manageable components and for using example problems strategically. Students apply these techniques to courses they are currently taking.</td>
</tr>
<tr>
<td>UNIV 116</td>
<td>FYE: STRATEGIES FOR ACADEMIC SUCCESS</td>
<td>1 PF</td>
<td>The first-year seminar for Associate in Arts freshmen, this course addresses the freshman transition. Topics include information on UD resources as well as effective study skills and time management techniques. RESTRICTIONS: Enrollment restricted to first-year Associate in Arts students. Cannot be repeated for credit. Duplicate credit with UNIV101.</td>
</tr>
<tr>
<td>UNIV 117</td>
<td>EXPLORING YOUR ACADEMIC PATH</td>
<td>1 PF</td>
<td>Assists students experiencing difficulty with selecting a major. Self-exploration exercises, a review of academic resources and exposure to the many majors at UD enable each student to understand the components that lead to appropriate academic decisions. Students are also given the tools to develop a plan of action for selecting and seeking admission to their desired major. RESTRICTIONS: Open to University Studies Freshmen.</td>
</tr>
<tr>
<td>UNIV 118</td>
<td>LEARNING, SERVING, GIVING BACK</td>
<td>1</td>
<td>Instruction centers on developing critical thinking and leadership skills in Student Support Services Program students. Collaborative community service projects will encourage them to connect their responses to the challenges they encounter as a result of these activities with the academic challenges they face as students. RESTRICTIONS: Course is limited to participants in Student Support Services Program (SSSP), with preference given to freshmen and sophomores. Maximum enrollment of 10. May be repeated one time for credit.</td>
</tr>
<tr>
<td>UNIV 120</td>
<td>EXPERIENTIAL TEACHING</td>
<td>0-3 PF</td>
<td>Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process. RESTRICTIONS: Requires permission of instructor. May not substitute major courses required in department curriculum.</td>
</tr>
<tr>
<td>UNIV 121</td>
<td>EXPERIENTIAL LEARNING</td>
<td>0-6</td>
<td>Learning experience on or off campus under supervision of 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 major courses required in department curriculum.</td>
</tr>
<tr>
<td>UNIV 126</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. RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.</td>
</tr>
</tbody>
</table>
UNIV 301 PEER PRACTICUM I 1 Seminar for peer mentors working in the FYE program. Covers issues of peer activities in FYE seminars.

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

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

UNIV 304 PEER PRACTICUM IV 1 Continuation of UNIV303. PREREQ: UNIV303

UNIV 305 PEER PRACTICUM V 1 Continuation of Peer Mentor Practicum IV. PREREQ: UNIV304

UNIV 320 CONTEMPORARY ISSUES FOR RESIDENT ASSISTANTS I 1 Designed to provide new RAs with opportunities to explore topics that are relevant to their jobs but which are beyond the scope of traditional RA training. In partnership with faculty lecturers, students are provided with opportunities to understand a variety of issues facing the students they work with on their floors; explore how experiences shape their views of others; and explore concepts of citizenship and community. RESTRICTIONS: Must be a resident assistant.

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

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

UNIV 340 PEER TUTOR PRACTICUM II 0-1 PF Continuation of UNIV240. PREREQ:UNIV240. RESTRICTIONS: requires permission of instructor.

UNIV 355 SEMESTER IN WOLVERHAMPTON 0

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

UNIV 361 SERVICE-LEARNING 0 PF Students are asked to reflect upon changes in their knowledge, skills, and attitudes that occur as a result of participation in their service-learning experience.

UNIV 362 EXPERIENTIAL LEARNING 0-6 Learning experience on or off campus under supervision of 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 major courses required in department curriculum.

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

UNIV 364 EXPERIENTIAL INTERNSHIP 3 Internship experience of a minimum of fifty hours combined with a seminar emphasizing career development, reflection and personal assessment. Internship must be arranged and Learning Contract signed by internship supervisor prior to first class meeting. Open to major and non-major related internships. RESTRICTIONS: Class may be taken a second time for additional three elective credits with a different internship and a different instructor. Distance option may be available if student is pursuing an internship at a distance of fifty or more miles from campus. May not

UNIV 366 INDEPENDENT STUDY 1-6

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

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

UNIV 370 STUDY ABROAD WINTER / SUMMER 0 PF Students are asked to reflect upon changes in their knowledge, skills, and attitudes that occur due to their study abroad experience.

UNIV 371 DOMESTIC TRAVEL STUDY 0 PF Students are asked to reflect upon changes in their knowledge, skills, and attitudes that occur due to their domestic travel study experience.

UNIV 372 INTERNATIONAL EXCHANGE 0 PF Reflect upon changes in knowledge, skills, and attitudes that occur due to international exchange experience.

UNIV 373 STUDY ABROAD FALL / SPRING 0 PF Students are asked to reflect upon changes in their knowledge, skills, and attitudes that occur due to their study abroad experience.

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

UNIV 402 SENIOR THESIS 2-4

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

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

UNIV 462 EXPERIENTIAL LEARNING 0-6 Learning experience on or off campus under supervision of 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 major courses required in department curriculum.

UNIV 468 UNDERGRADUATE RESEARCH 0-6 Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member. RESTRICTIONS: Requires permission of instructor and approval of the Coordinator of Undergraduate Research. May not fulfill course requirements in a major curriculum except by departmental permission.
UNIV 490  HONORS TUTORIAL: HUMANITIES  3
Designated faculty direct the studies of up to four students per semester. Readings of classical works in the humanities described. Group as well as individual discussions.
RESTRICTIONS: Requires 3.4 GPA, junior standing or above, and permission of the Honors Program.

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

UNIV 495  HONORS SEMINAR 3-6
Topics vary; usually interdisciplinary. RESTRICTIONS: Requires 3.4 GPA, junior status or above, and permission of the Honors Program. May be repeated for credit with a different topic and instructor.

UNIV 500  LEAVE OF ABSENCE  0

UNIV 554  GRADUATE INTERNSHIP SEMESTER  0

UNIV 555  ADVANCED GRADUATE STUDY  1-3

UNIV 566  SPECIAL PROBLEM  1-12

UNIV 600  LEARNING  0 PF
Explores cognitive, affective and social aspects of the learning process through research and reflection on learning and teaching literature in higher education. Students develop skills to facilitate learning in their respective disciplines. Modern technology and library resources access essential.

UNIV 601  PEDAGOGY  0 PF
Presents research-based teaching principles and innovative teaching methodologies. Offers practice orientation to enhance pedagogical effectiveness in respective disciplines. Opportunity to observe and reflect on outstanding UD faculty's instructional practices. Modern technology and library resources access essential.

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

UNIV 609  DISSERTATION DISCUSSION  0 PF
writing retreat designed to develop the writers' ability to set effective goals or writing intentions and to track and understand their writing process. In addition to providing a dedicated space for writing and providing tips on various dissertation writing topics, the course helps students find sustainable writing habits that move their work forward. In addition, the course develops a community of writers committed to completing their dissertations on schedule, supporting and cheering each other on, and sharing strategies and experiences to help each other navigate the dissertation process with sanity intact.

UNIV 613  RAISE: RESEARCH ETHICS  0-3 PF
The RAISE (Responsibility and Integrity in Science and Engineering) seminar provides graduate instruction on research ethics and professional practice. The seminar prepares participants as future leaders of professional integrity in their fields. Issues include attribution of authorship, data falsification, conflicts of interest, plagiarism, and whistleblowing. Crosslisted with PHIL613. RESTRICTIONS: Consent of instructor.

UNIV 666  SPECIAL PROBLEM  1-12

UNIV 866  SPECIAL PROBLEM  1-12

UNIV 895  MASTER'S SUSTAINING: NON-THESIS  0

UNIV 899  MASTER'S SUSTAINING  0

UNIV 999  PH.D. SUSTAINING  0

---

**Women's Studies**

**WOMS 200  CULTURAL INTRODUCTION TO SEXUALITIES AND GENDER STUDIES  3**
An exploration of the variations in the social construction of lesbian, gay, bisexual, heterosexual, transsexual, transgender and queer identities and communities in contemporary American society through study of gay literature, history, theory, religious and legal issues and the arts including film, music, television, and visual arts. Crosslisted with SGST200.

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

**WOMS 202  WOMEN'S STUDIES IN GLOBAL CONTEXT  3**
Examines how policies and laws promoted by national, international and transnational systems affect women's lives. Asks how race, ethnicity, gender, region and culture influence women's experience from the local to the transnational level. Explores the range of women's voices, including resistance and activism.

**WOMS 203  CONTEMPORARY MORAL PROBLEMS  3**
The application of philosophical techniques to contemporary moral problems such as abortion, punishment, biomedical ethics, reverse discrimination and sexual morality. Crosslisted with PHIL202.

**WOMS 204  GENDER AND COMMUNICATION  3**
Deals with gender differences in communication in varied contexts, such as conflict, marriage, family, friendship, and work. Crosslisted with COMM204.

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

**WOMS 206  WOMEN AND WORK  3**
Covers a variety of topics including women in traditional and non-traditional occupations, gender-based discrimination (wage inequities, sexual harassment, exclusionary policies), the contributions of women to the economy and the role of law in shaping conditions for women in the workplace. May be crosslisted with SOC206.

**WOMS 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. Crosslisted with SGST208. RESTRICTIONS: May be repeated for credit when topics vary.

**WOMS 210  WOMEN AND RELIGION  3**
Explores the relationship between sacred text and women's religious and societal roles within Christianity, Judaism, Islam, Hinduism and Buddhism during diverse historical moments. Examine the experience of women operating within the confines of their various traditions as well as consider those who pushed the boundaries of their faith communities. Utilize a variety of feminist approaches to the study of religion. May be crosslisted with PHIL210.

**WOMS 211  MEN, CONFLICT AND SOCIAL CHANGE  3**
Examination of male roles and images in society, utilizing an interdisciplinary social science perspective. Topics include the family, work, military, violence and the implications of feminism for men. Issue oriented. May be crosslisted with SOC211.

**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" as also, efforts to avoid motherhood through contraception and abortion and related legal controversies.
WOMS 213 MEN AND WOMEN IN AMERICAN SOCIETY 3
Designed to provide students with a sociological framework for analyzing sex and gender relations in contemporary American society. Topics include the social construction of gender, patterns of sex-role socialization, gender stratification in the paid work force, gender relations in the family and other social institutions. Crosslisted with SOC123.

WOMS 216 INTRODUCTION TO FEMINIST THEORY 3
This course explores the various theoretical explanations for and solutions to gender inequality. The development of feminist theory will be presented as an intellectual history placing each theoretical framework in conversation with the others covered during the course of the semester. Students will become familiar with a variety of feminist theories including: liberal, Marxist, socialist, transnational, radical, homosexual, multicultural, psychoanalytic, cultural, standpoint, social construction, multiethnic/racial, postmodern, and queer. Our understanding of these theoretical perspectives will be aided by the inclusion of current case studies and class debates. May be crosslisted with PHIL216.

WOMS 222 LANGUAGE AND GENDER 3
Explores various ways in which gender is reflected in language. Topics include sexism in language, sexist language and differences in the structural aspects of men's and women's language and conversational style. Emphasis on the social implications of these differences. Crosslisted withLING222.

WOMS 223 FOOD, GENDER AND CULTURE 3
Explores how preparing, eating, and thinking about food demonstrates culturally determined gender and power relations in different societies. Using cross-cultural and interdisciplinary perspectives, explores various understandings of issues such as nutrition, eating disorders, body images, and gender differences around food. Crosslisted with ANTH223.

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
Analyzes the depiction of women in art from pre-history to the present in light of recent feminist studies. Topics correspond with particular periods in history. Each class includes a brief discussion of women artists and their works. Crosslisted with ARTH242.

WOMS 250 TOPICS IN INTERNATIONAL WOMEN’S STUDIES 3-6
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 been 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 284 GENDER, CULTURE AND DIGITAL MEDIA 3
Explores the relationship between gender, culture, and digital media. May be crosslisted with CMCM284.

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 will view and discuss a variety of documentary films on women and read materials related to topics covered in the films. Films will deal with historical and contemporary issues in the United States and internationally. May be crosslisted 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 crosslisted with BAM5298. 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, sciences, health, etc. RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 300 WOMEN IN AMERICAN HISTORY 3
The position of women in American life viewed from a historical perspective including such topics as home and family life, women in the work force, women as agents of social change and feminism. Crosslisted with HIST300.

WOMS 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. Crosslisted with SGST301.

WOMS 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. Crosslisted with MUSC302.

WOMS 303 WOMEN IN THE HOLOCAUST 3
Examines the role of women who encountered the Holocaust. Such information has often been overlooked in the study of the Holocaust. Adding the perspective of gender will enrich our understanding and offer a more complete picture of what happened. Students will read a variety of texts, engage in group work and create a final project that demonstrates both what they have learned and what they want to learn about women in the Holocaust. Crosslisted with JWST303.

WOMS 304 ADOLESCENT GIRLS IN MULTICULTURAL PERSPECTIVE 3
Explores key writings on contemporary girlhood and examines various aspects of female adolescent experience across race, class, and culture in both the US and in a global context. PREREQ: Any WOMS 200-level course.

WOMS 305 THE EVOLUTION OF HUMAN SEX ROLES AND REPRODUCTION 3
Survey of the evolution of human reproduction and sex differences. Evidence derived from the human fossil record, living non-human primates, modern biological differences between human males and females and cross-cultural comparisons of reproductive behavior and sex roles. Crosslisted with ANTH305.

WOMS 308 THEORIES OF SEXUALITY AND GENDER 3
Examines the major theoretical approaches to the study of sexuality and gender with an emphasis on queer theory and intersections between sexuality, gender, race, class, and nationality. Crosslisted with SGST308.

WOMS 309 POLITICAL CULTURE BY COUNTRY 3
Introduction to the political and civic cultures underpinning and supporting different political systems. Topics may vary depending on host country. Crosslisted with POSC309. RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be taken twice for credit when countries vary.

WOMS 310 ASIAN WOMEN’S LIVES 3
Using examples from China, Japan, Southeast Asia, South Asia, and the Middle East, examines how lives of Asian women have been constructed by cultural, historical, and international forces and seeks to understand and challenge culturally pervasive stereotypes that define their lives. Crosslisted with ANTH310.

WOMS 311 WOMEN, SOCIETY AND THE ARTS 3
Focuses on the role of women in art and society throughout the ages. Interdisciplinary and feminist readings emphasize a variety of approaches. Topics vary. Examples: Women in Antiquity, Renaissance Women, etc. Crosslisted with ARTH311. RESTRICTIONS: May be repeated for credit once when topics vary.

WOMS 312 ASIAN WOMEN IN THE GLOBALIZED WORKPLACE 3
Focuses on relationship between work, gender, and social, cultural, and economic transformations associated with globalization in East and Southeast Asia. Crosslisted with ANTH312.
Examines WOMS Special WOMS WOMS Focuses WOMS Crosslisted Taught traces communities emphasis representations writers varies. Topics vary. Myths; feminism Crosslisted PREREQ: Any 200-level WOMS or SGST course. WOMS 315 ANTHROPOLOGY OF TOURISM 3 Views tourism as an international industry, a cultural practice and a phenomenon of globalization. Examines such topics as tourism and modernity, sexual and romantic tourism, ecotourism and environmental tourism, tourism and "authenticity". Crosslisted with ANTH311. WOMS 316 ISLAM AND GENDER 3 Uses anthropological case studies and historical material to comprehend ideals, practices, and themes of gender and gender relations in Islam. Introduces representations of Islamic belief in doctrinal, historical, and contemporary contexts. Crosslisted with ANTH316. WOMS 317 GENDER AND POLITICS 3 Engages gender as a useful lens for the broad study of politics. Includes analysis of gender in shaping personal, group, national and international interactions. Crosslisted with POSC317. WOMS 318 STUDIES IN FILM 3 Special topics such as film genres, major directors and Soviet cinema. Crosslisted with ENGL318. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary. WOMS 319 TOPICS: FRENCH LITERATURE IN TRANSLATION 3 Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced prior to the registration period. Crosslisted with FLLT319. WOMS 320 VARYING AUTHORS AND GENRES 3 Cultural, especially cross-cultural and/or interdisciplinary studies with primary emphasis on the aesthetic context of the announced topic, e.g., Nordic Saga and Myth; Courtly Love; and the European Postwar Novel. Crosslisted with FLLT320. RESTRICTIONS: May be repeated for credit when topics vary. WOMS 321 TOPICS: CHINESE LITERATURE IN TRANSLATION 3 Study of the works of one or more outstanding authors or of a special theme. Taught in English. See http://primus.nss.udel.edu/CoursesSearch/ for topics. Crosslisted with FLLT321. RESTRICTIONS: May be repeated for credit when topics vary. WOMS 322 TOPICS: CLASSICAL LITERATURE IN TRANSLATION 3 Special topics in Greek and Roman culture and civilization. Particular areas and writers to be announced, e.g., ancient epic, ancient drama, Greek literature in translation. Crosslisted with FLLT322. RESTRICTIONS: May be repeated for credit when topics vary. 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. PREREQ: Any WOMS 200-level course. WOMS 325 TOPICS: GERMAN LITERATURE IN TRANSLATION 3 Study of the works of one or more outstanding authors or of a special theme. Taught in English. See http://primus.nss.udel.edu/CoursesSearch/ for topics. Crosslisted with FLLT325. RESTRICTIONS: May be repeated for credit when topics vary. WOMS 326 TOPICS: HISPANIC LITERATURE IN TRANSLATION 3-12 Study of the works of one or more outstanding authors or of a special theme. Taught in English. See http://primus.nss.udel.edu/CoursesSearch/ for topics. Crosslisted with FLLT326. RESTRICTIONS: May be repeated for credit when topics vary. WOMS 327 RACE, GENDER, SCIENCE 3 Critically examines a number of metaphysical, epistemological, and ethical issues related to science of race, gender, and sexual orientation. Topics may include (a) evolution of sex and gender, (b) gender and cognition, (c) biological basis, or lack thereof, of sexual orientation/preference (d) evolutionary, cognitive, historical, and political origins of race thinking, (e) relationship between everyday conceptions of race and gender as compared with scientific conceptions of race and gender, (e) ethical issues raised by human kind classification schemes. Crosslisted with PHIL327. WOMS 328 TOPICS: JAPANESE LITERATURE IN TRANSLATION 3-6 Study of the works of one or more outstanding authors or of a special theme. Taught in English. See http://primus.nss.udel.edu/CoursesSearch/ for topics. Crosslisted with FLLT328. RESTRICTIONS: May be repeated for credit when topics vary. WOMS 329 TOPICS: ITALIAN LITERATURE IN TRANSLATION 3 Study of the works of one or more outstanding authors or of a special theme. Taught in English. Crosslisted with FLLT329. RESTRICTIONS: May be repeated for credit when topics vary. WOMS 330 VARYING AUTHORS, THEMES, AND MOVEMENTS 3 Cultural, especially cross-cultural, study with primary emphasis on the historical development of the announced area, e.g., The Faust Theme in Western Literature, Dante Through the Ages, Don Juan, and the Transformation of a Myth. See http://primus.nss.udel.edu/CoursesSearch/ for topics. Crosslisted with FLLT330. RESTRICTIONS: May be repeated three times for credit when topics vary. WOMS 332 WOMEN, RACE, AND ETHNICITY 3 Examines intersection of gender with issues of racial and ethnic identity in either national or transnational context. PREREQ: Any WOMS 200-level course. WOMS 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. Crosslisted with PSYC333. PREREQ: PSYC100. WOMS 334 AFRICAN AMERICAN WOMEN'S HISTORY 3 Explores the diversity of African American women's lives and development of women, work, and culture from the colonial era through the late 20th century. Examines the social, political, religious and economic factors affecting change and transformation in the lives of African American women. Provides a broad introduction to the interdisciplinary field of African American and Women's Studies. Crosslisted with HIST334. WOMS 336 FEMINIST CULTURAL STUDIES 3 Situates cultural forms created by women in historical context. Novels, poems, television, plays, rituals, film, paintings, music, electronic media, technology, sculpture, food, clothing and/or architecture reveal perspectives of women's time, class, nation, race, and ethnicity. Relates feminism, gender and the production of culture. PREREQ: Any WOMS 200-level course. WOMS 337 STUDIES IN VICTORIAN LITERATURE 3 Studies of significant British texts from the nineteenth century, the social forces they shaped, and those by which they were shaped. Content varies by expertise of instructor. Crosslisted with ENGL338. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary. WOMS 350 GENDER AND CRIMINAL JUSTICE 3 Reviews historical and contemporary explanations for women's participation in crime and evaluates these explanations in light of current research on gender. Other topics include treatment of women offenders by judicial and correctional systems, women as victims of crime and women as criminal justice personnel. Crosslisted with CJRU350. WOMS 352 STUDIES IN NINETEENTH CENTURY LITERATURE 3 Special topics in an author or authors, a genre, literary movement, or an idea. Crosslisted with ENGL352. PREREQ: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary. WOMS 353 TWENTIETH CENTURY BRITISH LITERATURE 3 Broadly focused study of literature in several genres, including a variety of eras and movements such as turn-of-the-century realism, war poetry, modernism, and post-colonial writing. Crosslisted with ENGL353. PREREQ: ENGL110
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOMS 361</td>
<td>FEMINIST POLITICAL THEORY</td>
<td>3</td>
<td>Overview of feminist political theory examining the ways that gender has shaped politics including topics such as the public/private distinction, family politics, economics, sexual violence, and exclusion. Considers how questions of gender intersect with other forms of identity in the U.S. and globally. Crosslisted with POSC361.</td>
</tr>
<tr>
<td>WOMS 362</td>
<td>BLACK FEMINIST THEORY</td>
<td>3</td>
<td>Explores black women and their struggles to define and re-define themselves in the US, from slavery to the modern era. Examines the historical evolution of black feminist theory starting with slave narratives and ends with contemporary readings. Crosslisted with BAM5352.</td>
</tr>
<tr>
<td>WOMS 363</td>
<td>WOMEN IN CROSS-CULTURAL PERSPECTIVE</td>
<td>3</td>
<td>Social realities of women within the cultures of Asia, Africa and Latin American societies. How institutions such as motherhood, the family, sexuality and work structure women's lives within the dominant social ideologies. May be crosslisted with ANTH363.</td>
</tr>
<tr>
<td>WOMS 366</td>
<td>INDEPENDENT STUDY</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>WOMS 370</td>
<td>PRISON AND PRISON SUBCULTURES</td>
<td>3</td>
<td>Provides an intensive examination of the social organization of prisons. Mainly examines representations of women by male as well as female writers. Variable in historical range, geography, and genre. Crosslisted with ENGL380. REQURED: ENGL110.</td>
</tr>
<tr>
<td>WOMS 372</td>
<td>JAPAN'S GLOBAL POP CULTURE</td>
<td>3</td>
<td>The course asks the question, what is Japanese about global popular culture? It explores the theory and practice of global popular culture as it emerges from the history of popular culture in Japan from the eighteenth to the twenty-first century. Topics include entertainment, sports, mass media, tourism, fashion, consumerism, sexuality and gender. The course combines lecture and discussion with intensive reading and writing. Crosslisted with HIST372.</td>
</tr>
<tr>
<td>WOMS 375</td>
<td>TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION</td>
<td>3</td>
<td>Special topics in Russian and Soviet culture. Taught in English. See <a href="http://primus.nss.udel.edu/CoursesSearch/">http://primus.nss.udel.edu/CoursesSearch/</a> for topics. Crosslisted with FLIT375. RESTRICTIONS: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>WOMS 380</td>
<td>WOMEN WRITERS</td>
<td>3</td>
<td>Study of a variable set of women writers. Addresses such topics as the idea of a women's tradition, formation of the canon, use of genre, language and form. Crosslisted with ENGL380. REQURED: ENGL110.</td>
</tr>
<tr>
<td>WOMS 381</td>
<td>WOMEN IN LITERATURE</td>
<td>3</td>
<td>Cultural representations of women by male as well as female writers. Variable in historical range, geography, and genre. Crosslisted with ENGL381. REQURED: ENGL110. RESTRICTION: May be taken up to two times when topics vary.</td>
</tr>
<tr>
<td>WOMS 382</td>
<td>STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH</td>
<td>3</td>
<td>Consideration of multiculturalism as it pertains to American culture or literature in English from Africa and other non-European societies. Variable in historical range, geography, and genre. Crosslisted with ENGL382. REQURED: ENGL110. RESTRICTIONS: May be taken up to three times when topics vary.</td>
</tr>
<tr>
<td>WOMS 383</td>
<td>CHINESE CULTURE IN TRANSLATION</td>
<td>3</td>
<td>Special topics in Chinese culture. Taught in English. See <a href="http://primus.nss.udel.edu/CoursesSearch/">http://primus.nss.udel.edu/CoursesSearch/</a> for topics. Crosslisted with FLIT383. RESTRICTIONS: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>WOMS 385</td>
<td>WOMEN AND THE ECONOMY</td>
<td>3</td>
<td>Examines a wide range of economic issues relating to women’s lives, with special emphasis on family, work and income. Public policy applications and international comparisons are stressed. Crosslisted with ECON385. REQURED: ECON101.</td>
</tr>
<tr>
<td>WOMS 387</td>
<td>HISTORY OF SEXUALITY IN THE U.S.</td>
<td>3</td>
<td>A survey of American sexual ideals, practices, and identities, from the Colonial period to the present. How anxieties about inter racial sex shaped life in the American South, how the advent of more reliable contraceptives provoked both social movements and political debate, and how the emergence of a scientific discourse of sexual difference simultaneously propelled the gay rights movement and enabled scientists to categorize same-sex love as pathology and perversion. Crosslisted with HIST387.</td>
</tr>
<tr>
<td>WOMS 389</td>
<td>TOPICS: WOMEN AND HEALTH ISSUES</td>
<td>3</td>
<td>Varying special topics related to women’s health. Topics may include, but are not limited to: the relationship between women, health and development; theoretical contributions of feminism to thinking about relationship between gender and health; women’s health system in various parts of the world. May be crosslisted with PHIL389. REQURED: Any WOMS 200-level course. RESTRICTIONS: May be repeated for credit when topics vary.</td>
</tr>
<tr>
<td>WOMS 398</td>
<td>TOPICS IN MEDIEVAL HISTORY</td>
<td>3</td>
<td>Course topics vary and may be chronologically or thematically based. Examples include “Christians &amp; Muslims in the Middle Ages” and “Germany in the Middle Ages.” May be repeated for credit when topics vary. Crosslisted with HIST398.</td>
</tr>
<tr>
<td>WOMS 401</td>
<td>FOUNDATIONS OF HUMAN SEXUALITY</td>
<td>3</td>
<td>A multidisciplinary study of human sexuality focusing on the implications for individuals and society of the biological, psychological and sociocultural determinants of human sexuality. Deals with sexually explicit material. Crosslisted with HDFS401.</td>
</tr>
<tr>
<td>WOMS 402</td>
<td>TOPICS IN LAW AND POLITICS</td>
<td>3</td>
<td>Critical topics in law and politics. Topics will vary. Crosslisted with PSYC401. RESTRICTIONS: May be taken twice for credit when topics vary.</td>
</tr>
<tr>
<td>WOMS 407</td>
<td>SOCIOLOGY OF SEX AND GENDER</td>
<td>3</td>
<td>Seminar on sex and gender relations from a sociological perspective. Surveys current research on gender stratification in the paid work force, the feminization of poverty, gender relations in the family, sexual violence, and feminism as a social movement. Special attention given to current theoretical debates on the origins and persistence of sexual inequality and the intersection of gender with race and class in patterns of social stratification. Crosslisted with SOC1407. REQURED: SOC1201 and either SOC123 or WOMS201. RESTRICTIONS: Restricted to junior and senior sociology and women’s studies majors.</td>
</tr>
<tr>
<td>WOMS 408</td>
<td>DOMESTIC VIOLENCE POLICY AND PREVENTION</td>
<td>3</td>
<td>Reflects the current state of policy and practice among policy makers and practitioners in the field of domestic violence including legal issues, policy development, primary prevention, and models of best practice. Addresses the role of federal and state law. May include economic justice, mental health and trauma, and alternative models. May be crosslisted with CRJU408, HDFS408, SOC1408. REQURED: Any 200-level Women’s Studies course.</td>
</tr>
<tr>
<td>WOMS 409</td>
<td>DOMESTIC VIOLENCE SERVICES</td>
<td>3</td>
<td>Examines issues in providing services to families in which domestic violence is occurring. Multiple service systems are explored, with emphasis on service coordination, service gaps, and public policy. Crosslisted with HDFS409. RESTRICTIONS: Open to juniors and seniors only.</td>
</tr>
<tr>
<td>WOMS 410</td>
<td>THE STUDY OF WOMEN’S STUDIES</td>
<td>3</td>
<td>Capstone for majors. Explores purpose, development, and developing concerns in field of women’s studies. Aims to reflect upon what majors have learned in their WOMS classes, consider ongoing challenges to the field, and help prepare them for a future in which their WOMS major can play a significant and positive role. RESTRICTIONS: Senior majors. Requires approval of women’s studies advisor and instructor.</td>
</tr>
<tr>
<td>WOMS 411</td>
<td>SEMINAR IN AMERICAN HISTORY</td>
<td>3</td>
<td>Topics vary. Recent topics include Jefferson and His Time, Women in 20th-Century America, The Nightmare Years: The U.S. 1960 to 1980, American Religious History and Conservatism in Recent America. Crosslisted with HIST411. REQURED: HIST268 RESTRICTIONS: Majors only, or permission of instructor.</td>
</tr>
<tr>
<td>WOMS 412</td>
<td>RACE AND SEXUALITY</td>
<td>3</td>
<td>Examine sexuality as a structure of power and identity. Study how race is sexualized and sexuality is racialized. Explore the impact of binary thinking (white/non-white, straight/gay) on social relationships. The perspective of racial minorities, particularly African-Americans, is emphasized. Review research on culture, history, and policy. Crosslisted with SOC1420. REQURED: SOC1201</td>
</tr>
<tr>
<td>WOMS 413</td>
<td>TOPICS IN AMERICAN POLITICS</td>
<td>3</td>
<td>Contemporary topics in American government and politics. Crosslisted with PSOC413. RESTRICTIONS: May be taken twice for credit when topics vary.</td>
</tr>
<tr>
<td>WOMS 414</td>
<td>WOMEN AND GENDER IN HEALTHCARE</td>
<td>3</td>
<td>Explores women’s healthcare issues from the perspective of gender needs within our healthcare delivery system. Global issues related to cultural needs, health beliefs and practices, lifespan and lifestyle considerations, wellness goals, and health issues unique to women are the focus of content. Crosslisted with NURS414. RESTRICTIONS: Open to nursing, health studies, and women’s studies majors and minors, or by permission of instructor.</td>
</tr>
</tbody>
</table>
WOMS 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.
Crosslisted with SOCI415.

WOMS 417  SEX CRIMES AND PUNISHMENTS  3
Discuss controversial topics surrounding sex crimes and punishments to develop students' abilities to think critically about connections between three areas: how we as a society respond to crime through our criminal justice systems; what we believe about crime and punishment; and what empirical research tells us.
Crosslisted with CRJU417.

WOMS 418  RACE, GENDER, AND POVERTY  3
An examination of contemporary American poverty with attention to race and gender as fundamental dimensions of inequality. Social policy, employment and family composition are key topics.
Crosslisted with SOCI418. PREREQ: SOCI201.

WOMS 419  SOCIAL PSYCHOLOGICAL ASPECTS OF CLOTHING  3
Study of clothing and appearance as contributors to human interactions; consideration of the importance of clothing in individual and collective behavior. Analysis of how dress reflects self-feelings, establishes social identities and affects interpersonal encounters.
Crosslisted with FASH419. PREREQ: PSYC100 and SOCI201, or permission of instructor.

WOMS 420  WOMEN'S STUDIES SENIOR THESIS  3-6
Senior thesis for women's studies majors or minors. COREQ: Students enrolled in WOMS420 must also take WOMS410 the same semester or the following semester. RESTRICTIONS: Women's studies majors or minors and permission of the WOMS program.

WOMS 425  SOCIOLOGY OF THE BODY  3
Examines the body, not through the lens of the biological sciences, but as the product of complex social arrangements and processes. Considers: What is 'natural' about bodies? How are bodies commodified? How are bodies categorized and constituted by discourses of race, class, gender, sexuality, and biomedicine?. Crosslisted with SOCI425. RESTRICTIONS: Not open to freshmen.

WOMS 430  FAMILY LIFE EDUCATION  3
Investigates curriculum and instructional strategies for use in support, prevention and empowerment-based programs across the lifespan.
Crosslisted with HDFS430. PREREQ: HDFS201 or HDFS202.

WOMS 433  GENDER AND HEALTH  3
Why are women sicker, but men die younger? In this course we will critically examine the relationship between gender and health. In doing so, we will also consider the contributions of race, class and sexuality in shaping that relationship.
Crosslisted with SOCI433. RESTRICTIONS: Not open to freshmen due to the rigorous seminar format, higher-order thinking, and writing requirements in the course.

WOMS 436  POLITICS AND LITERATURE  3
Explores the contributions of literature - in various forms including the literary genre of film - to the study of politics. Facilitates a better understanding of national or international politics through the voices of acclaimed authors. Regional or temporal focus will vary.
Crosslisted with POSC436. RESTRICTIONS: May be repeated once for credit when topics/countries differ.

WOMS 439  WOMEN AND REVOLUTION IN AFRICA  3
Discusses the critical roles played by women in African revolutionary movements. Why did women join these revolutionary movements? What is the relationship between feminism and revolution?
Crosslisted with HIST439. PREREQ: HIST268. RESTRICTIONS: Majors only, or permission of instructor.

WOMS 440  TOPICS IN INTERPERSONAL COMMUNICATION  3
Topics vary and focus on significant areas of theory and research in interpersonal communication. Topics may include nonverbal communication, lifespan communication and communication in intimate relationships.
Crosslisted with COMM440. RESTRICTIONS: May be repeated three times for credit when topics vary.

WOMS 441  CONTEMPORARY POLITICS BY COUNTRY  3
Study of contemporary politics by country. Course is only taught abroad. May be repeated for credit when topics vary.
Crosslisted with POSC441.

WOMS 442  TOPICS IN ORGANIZATIONAL COMMUNICATION  3-9
Focuses on significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships.
Crosslisted with COMM442. RESTRICTIONS: May be repeated for up to nine credits when topics vary.

WOMS 444  SEMINAR: WOMEN IN THE ISLAMIC MIDDLE EAST  3
Examines the major developments, themes and problems in women's history in the Middle East from the advent of Islam to the present. By tracing women's legal status, sexual morality, family and social life, and female economic and political participation, it seeks to shed light on the process of women's roles in society and to challenge the notion that gender divisions and roles have been static over time.
Crosslisted with HIST444. PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

WOMS 459  SEXUALITY AND LAW  3
Examines the regulation of sexual practices and identities through the law with a specific focus on how the development of political policy and legal norms at the state and federal level reflects changes in sexual norms as a consequence of social movement activity.
Crosslisted with POSC459.

WOMS 461  TOPICS IN GENDER AND POLITICS  3
Topics in gender and politics. Topics will vary. Crosslisted with POSC461.

WOMS 466  INDEPENDENT STUDY  1-6

WOMS 472  SEMINAR IN MEDIEVAL HISTORY  3
Topics may include Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.
Crosslisted with HIST471. PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

WOMS 473  GENDER, SEX AND LAW  3
Examines the utilization of the law for the purposes of gender equality examining how the courts at the federal and state levels have been used to challenge sex-based discrimination, gender norms, and political inequality.
Crosslisted with POSC473.

WOMS 475  SEMINAR IN MODERN EUROPEAN HISTORY  3
Topics vary and may include The Holocaust, The Cold War, Hitler's Germany, or The Age of Revolution.
Crosslisted with HIST475. PREREQ: HIST268 RESTRICTIONS: Majors only, or permission of instructor.

WOMS 480  LITERARY STUDIES SEMINAR  3
Intensive capstone seminar employs research presentations as the occasion for students to consolidate skills acquired in 100-, 200-, and 300-level coursework.
Content varies by expertise of instructor.
Crosslisted with ENGL480. PREREQ: ENGL 110 and six ENGL credits at the 300 level or higher or by instructor consent. RESTRICTIONS: Can be repeated once when topics vary. Only counts toward major if taken as senior (after completing 90 credits). Non-seniors are not excluded, but a student who completes the course before senior year must re-take the course as a senior for major credit.

WOMS 483  INJURY CONSIDERATIONS FOR THE FEMALE ATHLETE  3
There are a variety of gender-specific sport-related injuries that involve the female athlete population. Explore gender-specific anatomical, biological, and physiological mechanisms responsible for such injuries and provide specific case studies for discussion.
Crosslisted with KAAP483.

WOMS 484  WOMEN IN SPORTS  3
Historical and contemporary perspectives on the female athlete, encompassing biological, psychological, sociological, and legal issues that are gender dependent and culturally unique.
Crosslisted with KAAP484.

WOMS 498  INTERNSHIP IN WOMEN’S STUDIES  3
Students work 115 hours per semester in an agency or program associated with women's and/or gender issues. Academic knowledge is applied to actual work situations. Seminar discussions focus on service learning in light of research and theory.
May be crosslisted with SGGT498. PREREQ: Any 200-level women's studies course. RESTRICTIONS: Requires permission of instructor. May be repeated once for credit.

WOMS 604  ADVANCED FEMINIST THEORY  3
Advanced Feminist Theory provides an in-depth overview of historical and contemporary debates and philosophical concepts informing feminist theory. It will address issues such as defining the category of women, articulating different feminist paradigms and their implications. It will address key questions that have animated feminist inquiry such as the links between experience, consciousness and politics and theorizing overlapping identities of gender, race, class, sexuality, disability, and nationality.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOMS 605</td>
<td>FEMINIST RESEARCH METHODS</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>This course provides an overview of feminist research methodology providing both a philosophical analysis of feminist research and practical training in methodological approaches. The course texts will address the relationship between knowledge production, the authors producing it, and the knowledge being produced.</td>
<td></td>
</tr>
<tr>
<td>WOMS 606</td>
<td>CRITICAL FEMINIST PEDAGOGY</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Explore the conceptual relationship between critical pedagogy and feminism. The course will use a feminist lens to explore questions involving sex and sexuality, gender, technology, and the possibilities of teaching as praxis involving power, hierarchy, social change, transformation and revolution. 1-credit seminar with an associated 3-credit teaching practicum. Students will lead discussion sessions in conjunction with 200 level Women's Studies classes.</td>
<td></td>
</tr>
<tr>
<td>WOMS 608</td>
<td>CERTIFICATE WRITING REQUIREMENT</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>This course requires students to submit an extended piece of scholarly writing in Women and Gender Studies. This may be part of an MA thesis, a Ph.D. dissertation or an essay of publishable quality.</td>
<td></td>
</tr>
<tr>
<td>WOMS 610</td>
<td>CRITICAL ISSUES IN FEMINIST SCHOLARSHIP</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Provides a survey introduction to women’s studies for graduate students.</td>
<td></td>
</tr>
</tbody>
</table>