University of Delaware
Course Descriptions
2000-2001
1. Subject area and course number.
2. Course title.
3. Credit hours
   a. When only one number is printed it is a fixed credit hour course.
   b. When two numbers are printed it is a variable credit hour course.
   c. R, RP – Not for baccalaureate credit.
   d. NR – No grade required.
4. Grade types:
   a. When blank the course is a letter graded course.
   b. Course for which the grade is either pass or fail.
5. Brief description of the course.
6. Prerequisites may be satisfied by the course or courses indicated or by equivalent preparation.
7. Corequisite course or courses should be taken in the same semester as the course.
8. Special requirements for the course.

Interpretation of course numbers:
001-099 Below baccalaureate degree.
100-199 Introductory level courses.
200-299 Introductory and intermediate courses, usually requiring some previous knowledge or experience in the discipline.
300-399 Courses with a more concentrated focus on the subject matter in a particular discipline.
400-499 Advanced courses for majors and other qualified students.
500-599 Graduate-level courses for the nonspecialist.
600-699 Graduate-level courses, also open to advanced undergraduates.
700-899 Graduate-level courses.
900-999 Ph.D. level courses.
X66 Special problems and independent study.
X67 Experimental course (may be offered twice).

Codes for Subject Areas:

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ACCOUNTING

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

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 costing, contribution margin, and cost-volume-profit analysis, and decision making.

ACCT 207  ACCOUNTING I  3

ACCT 208  ACCOUNTING II  3

ACCT 261  INTRODUCTION TO BUSINESS INFORMATION SYSTEMS II  3
Introduction to management information systems. Structured programming techniques for problem solving with business productivity tools and software. Emphasis on business applications.

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 the analysis, design, development, and audit of computer-based accounting systems. Includes some computer work.

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.

ACCT 316  INTERMEDIATE ACCOUNTING II  3
Continuation of ACCT 315. Topics include: recognition and measurement of investments, long-term liabilities and stockholders’ equity, distributive securities and earnings 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.

ACCT 327  COST ACCOUNTING  3
Process, job order and standard costing; direct and absorption costing; budgeting decentralization and transfer pricing; and cost analysis for managerial applications.

ACCT 350  BUSINESS LAW I  3
The 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.

ACCT 351  BUSINESS LAW II  3
Covers a variety of areas of the law, including agency, partnerships, corporations, unfair competition, debtor-creditor relationships, bankruptcy, secured transactions, real and personal property, wills and trusts.

ACCT 352  LAW AND SOCIAL ISSUES IN BUSINESS  3
Focuses on the legal environment of business, including objectives of the law, sources of the law, the regulatory and judicial process, and the effect of government and society on the formation and evolution of the law.

ACCT 366  INDEPENDENT STUDY  1-6

ACCT 383  INTRODUCTION TO INTERNATIONAL ACCOUNTING  3
Introduces students to foreign currency transactions, financial statement translation, inflation, auditing and taxation. Current issues are covered as appropriate.

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

ACCT 413  INCOME TAX ACCOUNTING  3
Analysis of recent revenue acts; use of federal law and regulations to determine tax liability.

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

ACCT 415  ADVANCED ACCOUNTING  3
Introduction to branch accounting, consolidations, partnerships, and accounting for state and local governments, and accounting for international transactions. Other relevant topics may also be covered.

ACCT 417  AUDITING  3
Introduction to the 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.

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 will be 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.

ACCT 466  INDEPENDENT STUDY  1-6

ACCT 614  FEDERAL TAX RESEARCH AND PLANNING  3
Introduces the master’s student to the techniques and tools of technical tax research. Using these developing skills, the student begins exploration of the corporate and partnership taxation area.

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.

ACCT 801  MANAGEMENT CONTROL SYSTEMS  3
Critically examines traditional financial measures as management control devices in the contemporary context. Explores ways that the management control system can explicitly support strategic objectives. Includes methods of cost measurement, decision support using cost information, and how these measures of performance affect the organization.

ACCT 803  ACCOUNTING SYSTEMS: ANALYSIS AND IMPLEMENTATION  3
Identifying accounting systems requirements and designing systems to meet these requirements. Topics include design proposals, cost/benefit considerations, output and input design, file structures and record handling, data communication and internal control.

ACCT 804  INFORMATION MANAGEMENT  3
Overview of data management concepts and technologies and how they fit into a modern information processing environment. Focus areas include organizational data resource management, database models, design and development of a database application, and emerging database management systems (DBMS) technologies and issues.
ACCT 805 Current Issues in Management Information Systems
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.
PREREQ: BUAD810 or BUAD820
RESTRICTIONS: Open to Business and Accounting graduate students only

ACCT 811 Advanced Management Accounting
Examination of concepts and rationale underlying managerial accounting methods. Advanced topics in decision analysis, standard costing and performance measurement.
PREREQ: ACC 237

ACCT 812 Corporate Tax Planning and Decision Making
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; non-transferable transaction; and family tax planning.
PREREQ: ACC 417

ACCT 820 Financial Statement Analysis
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: ACC 800

ACCT 840 Contemporary Issues in Accounting
Selected problems of current interest to the accounting profession.
PREREQ: ACC 316 and ACC 327
RESTRICTIONS: Requires permission of instructor

ACCT 868 Research

ACCT 883 International Accounting
Describes the functions of international accounting: foreign currency transactions, financial statement translation, inflation, auditing, and taxation. A comparative approach is stressed. Current issues are covered as appropriate.
PREREQ: ACC 800 or equivalent

AIR FORCE SCIENCE

AFSC 110 The Foundations of the USAF
Introduces the role in our society of the Department of Defense and Air Force. Emphasis is placed on air force doctrine, mission and organization, as well as U.S. strategic offensive forces. Introduces the concept of professionalism and assesses oral and written communication skills.

AFSC 111 The Foundations of the USAF
Continuation of AFSC 110. Emphasis on mission, organization and function of U.S. Air Force strategic, defensive, general purpose and aerospace support forces. Includes understanding the use of atom, naval and reserve forces in achieving national security objectives. Asseesses oral and written communication skills.

AFSC 210 The Evolution of U.S. Air and Space Power
Focuses on development of air power from its beginning through two world wars; evaluates air power concepts, doctrine and role of technology in growth of air power; considers air power development in military and non-military operations in support of national objectives. Asseesses oral and written communication skills.

AFSC 211 The Evolution of U.S. Air and Space Power
Continuation of AFSC 210. Focuses on growth and development of air power since 1945 in response to Korea, the Cold War, Southeast Asia, the Persian Gulf and the Space Age. Also includes peaceful employment of aerospace forces for relief and civic action programs. Asseesses oral and written communication skills.

AFSC 311 Leadership Studies II
Focuses on applying concepts in leadership and management by comprehending leadership styles and managerial functions, concepts of individual motivation and organizational group dynamics, and decision-making processes. Emphasizes oral and written communication skills, leadership research and behavior.

AFSC 410 National Security Affairs
Focuses on political, economic and social constraints in the international environment and their effects on the formulation of U.S. defense policy. Also includes the impact of technology, doctrine, alliances, arms control and terrorism on national security policy. Emphasizes oral and written communication skills.

AFSC 411 National Security Affairs
Continuation of AFSC 410. Focuses on role and function of the professional officer in a democratic society; the socialization processes, prevailing public attitude and value orientations associated with military service; principal requires for maintaining national security forces; and the military justice system. Continued emphasis on oral and written communication skills.

AGRICULTURE EDUCATION

AGED 266 Special Problem

AGED 366 Independent Study

AGED 380 Agricultural Education Materials and Approaches
Teaching methods, treatment of aims, materials, unit organization, evaluation and teaching techniques. Participation in FFA activities and systematic observation of a cross-section of agricultural education classes required.

AGED 466 Independent Study

AGED 666 Special Problem

AGRICULTURE

AGRI 165 Mastering the Freshman Year
Focuses 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
Introduces basic communication principles and provides a series of communication experiences to develop skills needed for oral presentations, using visual aids and other appropriate technology. Students will give several performances using a variety of approaches.
RESTRICTIONS: Not open to freshmen.

AGRI 212 Oral Communication in Agriculture and Natural Resources
Introduces basic communication principles and provides a series of communication experiences to develop skills needed for oral presentations, using visual aids and other appropriate technology. Students will give several performances using a variety of approaches.
RESTRICTIONS: Limited to majors only.

AGRI 300 Dean's Scholar Seminar
Consists of seven two-hour seminars. Students discuss ideas and topics relevant to agricultural sciences.
RESTRICTIONS: Requires 2.75 GPA and an invitation to participate

AMERICAN MATERIAL CULTURE STUDIES

AMCS 216 Introduction to Material Culture Studies
See AMTH 216 for course description.

AMCS 402 American Material Culture Research Seminar
Balanced emphasis on written skills, research strategies and interpretation related to the study of American material culture. Students will develop research projects drawing on the collections of local and regional museums, libraries and historical agencies.

AMCS 464 Museum Studies Internship
See MSST 464 for course description.
PREREQ: MSST 403
ANIMAL SCIENCE

ANSC 101 INTRODUCTION TO ANIMAL SCIENCE 3
An introduction to the practical nature of animal agriculture. Discusses similarities and differences in the vital life processes and management practices with emphasis on cattle, sheep, swine, horses and poultry.
COREQ: ANSC111.
RESTRICTIONS: Corequisite mandatory for majors, optional for nonmajors. Offered in Fall only.

ANSC 111 ANIMAL SCIENCE LABORATORY 1
Laboratory providing the opportunity to handle animals and to become familiar with common management practices.
COREQ: ANSC101.
RESTRICTIONS: Corequisite mandatory for majors, optional for nonmajors. Offered in Fall only.

ANSC 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.

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

ANSC 201 BEHAVIOR OF DOMESTICATED ANIMALS 3
Feeding, reproductive and social patterns of domesticated mammals and birds. Relationships between physical environment and behavior. Use of telemetry and recording systems.
RESTRICTIONS: Offered in Spring of even-numbered years.

ANSC 221 NUTRITION AND FEEDING OF HORSES 2
Study of proper feeding and use of quality feedstuffs to maintain health and productivity of horses.

ANSC 251 LIVESTOCK NUTRITION AND FEEDING 3
Study of nutrients and their metabolism, nutrient requirements of livestock, nutritional value of feedstuffs and principles of ration formulation.
PREREQ: ANSC101 and ANSC140.

ANSC 262 PRACTICAL VETERINARY EXPERIENCE 1-3 PF
Opportunity to gain experience by working with a veterinarian. Student is responsible for making contact with the veterinarian.
RESTRICTIONS: Not for major credit. Offered in Winter only.

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

ANSC 270 BIOTECH SCIENCE AND SOCIOECONOMIC ISSUES 3
Introduction to agricultural biotechnology and socioeconomic 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 cross-listed with CREC270 and/or PLSC270.

ANSC 300 PRINCIPLES OF ANIMAL AND PLANT GENETICS 3
Introduction to the theory and application of genetics as related to the improvement of plants and animals. May be cross-listed with ENTO300 and/or PLSC300.
PREREQ: ANSC101 and ANSC140, or PLSC101.

ANSC 304 DAIRY CATTLE JUDGING AND SELECTION 1
Characteristics of breeds, relationship of form to function in young stock and mature animals.
RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 305 FOOD SCIENCE 3
See FOSC305 for course description.

ANSC 310 ANIMAL AND PLANT GENETICS LABORATORY 1
Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems. May be cross-listed with ENTO310 and/or PLSC310.
COREQ: ANSC300.

ANSC 322 HORSEMANSHIP 3
Practical application of principles of equine husbandry, techniques of horsemanship and methods used in selection and evaluation.

ANSC 328 FOOD CHEMISTRY 4
See FOSC328 for course description.

ANSC 329 FOOD ANALYSIS 4
See FOSC329 for course description. PREREQ: CHEM214 or CHEM216 or CHEM227.

ANSC 332 INTRODUCTION TO ANIMAL DISEASES 3
Nature and mechanisms of disease processes with emphasis on their prevention and control. PREREQ: ANSC140.

ANSC 342 EXERCISE PHYSIOLOGY AND CONDITIONING OF HORSES 2
Introduction to equine structure at rest and in motion. Includes anatomical, physiological, and management factors pertinent to the development of horses into sound and fit athletes. PREREQ: ANSC140.

ANSC 345 COMPARATIVE PHYSIOLOGY OF DOMESTIC ANIMALS 4
Comparative approach to the study of the physiology of domestic animals of economic importance in animal agriculture. Emphasis on cardiovascular physiology, the immune system, excretion, respiration, stress physiology and the control and coordination of body functions via the nervous and endocrine system.
PREREQ: ANSC140.

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

ANSC 399 TEACHING ASSISTANT 1-2 PF
Practical teaching experience. Students participate and assist in instruction of an undergraduate course.

ANSC 404 DAIRY PRODUCTION 3
Principles of modern dairy production units emphasizing breed characteristics, genetic principles, sire evaluation and mathematical considerations. PREREQ: ANSC101 and ANSC251.

ANSC 406 PRACTICAL VETERINARY EXPERIENCE 1-3 PF
Opportunity to gain experience by working with a veterinarian. Student is responsible for making contact with the veterinarian.
RESTRICTIONS: Not for major credit. Offered in Spring of odd-numbered years. Laboratory requires some out-of-class time for hands-on experience in animal production.

ANSC 417 BEEF CATTLE AND SHEEP PRODUCTION 4
Principles of modern beef cattle and sheep production; nutrition, reproduction, housing, health and management. PREREQ: ANSC101 and ANSC251.
RESTRICTIONS: Offered in Spring of odd-numbered years. Laboratory requires some out-of-class time for hands-on experience in animal production.

ANSC 482 SWINE PRODUCTION 4
Principles of modern swine production; nutrition, reproduction, housing, health and management.
PREREQ: ANSC101 and ANSC251.
RESTRICTIONS: Offered in Spring of even-numbered years. Laboratory requires some out-of-class time for hands-on experience in animal production.

ANSC 420 EQUINE MANAGEMENT 4
History and importance of the horse industry; anatomy, reproduction, physiology, disease and parasites, applied nutrition, marketing, buildings, and facilities. PREREQ: ANSC140 and ANSC251.

ANSC 421 POULTRY PRODUCTION 4
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. Additional hands-on experience outside of class is required. PREREQ: ANSC101 and ANSC140.

ANSC 431 INFECTION AND IMMUNITY IN ANIMAL DISEASES 4
Study of the relationships of domestic animals with particular infectious agents and the nature of the immune response. PREREQ: BISC371.
RESTRICTIONS: Offered in Fall of even-numbered years.

ANSC 441 REPRODUCTIVE PHYSIOLOGY OF DOMESTIC ANIMALS 3
Emphasis on physiology and endocrinology of reproductive function in males and females, comparative aspects of reproductive function and opportunity for enhancing production through newer management practices. Discussion and laboratory involves both classic and current state of knowledge in mammalian and avian reproduction. PREREQ: ANSC345.

ANSC 464 ANIMAL SCIENCE FIELD EXPERIENCE 1-3 PF
Opportunity to gain work experience in a field related to the animal sciences and to explore potential occupational areas. RESTRICTIONS: May be repeated once for credit. Separate application form for industry (off campus) or campus courses.

ANSC 470 ANIMAL SCIENCE FIELD EXPERIENCE 1-3 PF
Opportunity to gain work experience in a field related to the animal sciences and to explore potential occupational areas. RESTRICTIONS: May be repeated once for credit. Separate application form for industry (off campus) or campus courses.
ANSC 465 Seminar 1-6
Development and presentation of oral reports on selected topics related to animal science. Proper selection, design, production and use of visual aids. Emphasis on the development of communication skills.
Restrictions: Senior status recommended.

ANSC 466 Independent Study 1-6
Restrictions: Contract must have department chair signature. Independent study to involve library or lab research.

ANSC 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. Prerequisites: BISC301 and ANSC300 or PLSC300 or ENT0300. Restrictions: 400-level section meets with a 600-level section.

ANSC 624 Monogastric Nutrition 3
Advanced study of the digestion, absorption and metabolism of nutrients in terms of the needs of monogastrics. Application of principles to swine, poultry and equine nutrition. May be crosslisted with NTD624.
Prerequisites: ANSC452 or NTD7400, and CHEM214.
Restrictions: Offered in Spring of odd-numbered years.

ANSC 630 Trace Minerals and Vitamins 3
See NTD630 for course description.

ANSC 632 Elements of Pathology 3
Microscopic and gross changes in cells, tissues and organs as a result of a disease process. Prerequisites: ANSC332 or ANSC633.
Restrictions: Offered in Spring of even-numbered years.

ANSC 633 Poultry Pathology 3
Study of poultry diseases with emphasis on their causes, prevention, treatment and control.
Prerequisites: ANSC332, ANSC431 and ANSC635.
Restrictions: Offered in Spring of odd-numbered years.

ANSC 635 Introduction to Virology 3
Biological properties and processes of animal viruses influencing the pathogenesis, diagnosis and control of disease. Laboratory emphasis on standard methods of detecting viral activity.
Prerequisites: ANSC431 or BISC217.
Restrictions: Offered in Fall of odd-numbered years.

ANSC 637 Avian Immunology 4
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 Fall of odd-numbered years.

ANSC 639 Food Microbiology 4
See FOSC639 for course description.

ANSC 643 Molecular Endocrinology 3
Brief overview of endocrinology covering hormone types and hormone systems. Detailed discussion of molecular aspects of hormone action including hormone-receptor interactions, second messengers and gene regulation by hormone. Presents methodologies used to approach current topics in endocrinology.
Prerequisites: ANSC345 or ANSC441.
Restrictions: Offered in Spring of odd-numbered years.

ANSC 644 Bioinformatics 3
Examine computer applications to biological sciences with emphasis placed upon genomics and proteomics applications. No computer programming experience required.

ANSC 645 Avian Physiology 4
Systemic and comparative physiology of birds. Nervous, respiratory, digestive, excretory, endocrine and thermoregulatory systems.
Prerequisites: ANSC345.
Restrictions: Offered in Fall of odd-numbered years.

ANSC 654 Ruminant Nutrition and Metabolism 3
Basic aspects of nutrition and metabolism of ruminant animals with emphasis on ruminum microbiology, lactation, physiology and growth. May be crosslisted with NTD654.
Prerequisites: ANSC452 or NTD7400 and CHEM214.

ANSC 668 Research 1-6

ANSC 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.
Prerequisites: BISC301 and ANSC300 or PLSC300 or ENT0300.
Restrictions: 400-level section meets with a 600-level section.

ANSC 842 Avian Microanatomy 3
Study of avian histology using microscopy. Examines the microscopic structure, cytochemical and functional aspects of cells, tissues and organ systems using domestic fowl as the prototype species. Lectures supplemented with laboratory examination of tissue sections.
Prerequisite: Basic physiology.

ANSC 851 Special Topics in Animal Nutrition 1-3
Advanced study in selected current topics of ruminant and/or nonruminant nutrition.
Prerequisites: Course in advanced nutrition.
Restrictions: May be repeated for credit when topics vary.

ANSC 865 Seminar 1

ANSC 868 Research 1-9

ANSC 869 Master's Thesis 1-6

ANSC 870 Molecular Biology in Agriculture 2
Illustrates principles of recombinant DNA technology and the application of these methods in plant and animal agricultural research. Exercises focus on construction of plasmids and lambda libraries, screening of libraries and characterization of recombinant clones.
Corequisites: ANSC670.

ANSC 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.

ANSC 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 core work.
Restrictions: Not open to students who have been admitted to candidacy.

ANSC 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: Only one of either ANTH102 or ANTH104 can count for degree credit.

ANTH 103 Introduction to Prehistoric Archaeology 3
Fundamental concepts and research procedures of archaeology. The history of archaeology, methods of fieldwork and artifact analysis, and theories of human behavior in archaeological research.
Restrictions: Only one of either ANTH103 or ANTH104 can count for degree credit.

ANTH 104 Introduction to Archaeology and Biological Anthropology 3
The 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: Degree credit for ANTH102 and ANTH103 not 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 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.

ANTH 205 Anthropology and Human Nature 3
Archaeological, biological and cultural anthropology organized around the theme of human nature.
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 approach-
es, concepts, and methods of numerous disciplines that investigate material culture. May be
cross-listed with AMCS216 and/or HIST216.

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 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 con-
trol 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 pre-
historic 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 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 251 INTRODUCTION TO ETHNIC ARTS 3
General survey of the ethnoarts from Africa, the Americas and the Pacific, including sculp-
ture, 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 259 HUNTING SOCIETIES 3
The role of hunting in human evolution, especially as biobehavioral adaptation; the tech-
nology and political, social, economic and religious behavior and institutions of a sample
of hunting peoples

ANTH 261 PEOPLES AND CULTURES OF THE MIDDLE EAST 3
Cultures, institutions and ethnic groups of the Middle East. Description and analysis of
major cultural traditions and social institutions.

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 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 278 HISTORIC CULTURES OF THE MIDDLE ATLANTIC REGION 3
Explores the development of American culture utilizing the Middle Atlantic region - today's
states of Delaware, Maryland, New Jersey, Pennsylvania, New York and Virginia - as a
microcosm. Takes a comparative and synthetic approach, drawing on the work of schol-
ars in several disciplines. May be cross-listed with HIST278

ANTH 298 HONORS TOPICS 1
Weekly meetings with faculty to expand on topics treated in 200 level courses in which the
student is currently enrolled.

ANTH 300 PRIMATEOLOGY 3
Survey of the nonhuman primates, including their taxonomy and biological characteris-
tics, and the study of their behavior and how it relates to human behavior

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 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 cross-listed with WOMS305.

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 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 Americas, 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 his-
torical development.

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.

ANTH 337 SOUTH AMERICAN INDIANS 3
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 3
Arts and crafts technological processes invented by or available to tribal societies of South
America. Artistic and technical achievements in ceramic and textile.

ANTH 342 ISSUES IN AMERICAN CULTURE: ARCHAEOLOGICAL
PERSPECTIVES 3
Archaeological perspectives on issues of concern in contemporary American culture,
including the environment, multiculturalism, war, gender, technology and production, and
class.

ANTH 363 WOMEN IN CROSS-CULTURAL PERSPECTIVE 3
See WOMS363 for course description.

ANTH 366 INDEPENDENT STUDY 1-6

ANTH 370 CULTURE OF FOOD PRODUCTION AND ECONOMIC
DEVELOPMENT 3
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 375 PEOPLES AND CULTURES OF MODERN LATIN AMERICA 3
Contemporary cultures and societies of Latin America, with emphasis on historical per-
spective. Rural and urban populations, the elite, the military, the church, students and
workers.

ANTH 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
and extending to the present day. May be crosslisted with HIST379.

ANTH 380 PEOPLES AND CULTURES OF MEXICO AND CENTRAL AMERICA 3
Cultures, institutions and ethnic groups of contemporary Mexico and Central America.
Description and analysis of major cultural traditions and social institutions of Indian
and non-Indian groups.

ANTH 390 HONORS COLLOQUIUM 3
See ARSC990 for description.

ANTH 398 HONOR TOPICS 1
Weekly meetings with faculty to expand on topics treated in 300 level courses in which the
student is concurrently enrolled.

ANTH 401 THE IDEA OF RACE 3
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.

ANTH 404 HUMAN OSTEOLOGY 4
The identification of the human skeleton, including complex and fragmentary materials
Basic bone growth, bone pathology, paleopathology and forensic identification.

Restrictions: Requires permission of instructor.
ANTH 424 INTRODUCTION TO ARCHAEOLOGICAL FIELD METHODS  6
Excavation at selected sites; laboratory work and field trips to museum sites

ANTH 444 TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS  3
See MSST444 for course description

ANTH 445 TECHNOLOGY OF CULTURAL MATERIALS: METALS  3
See MSST445 for course description.

ANTH 451 MYTH AND CULTURE  3
The relationships between world views, cosmology, mythology and social institutions, illustrating the analytic methods of structuralist and functional anthropology.
PREREQ: 15 hours of anthropology
RESTRICTIONS: Requires permission of instructor-teaching the introductory course. Tutorial and primarily for majors.

ANTH 457 SURVEY OF AFRICAN ART  3
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  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. May be crosslisted with HIST463.

ANTH 466 INDEPENDENT STUDY  1-6

ANTH 475 THE TEACHING OF ANTHROPOLOGY  3
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
RESTRICTIONS: Requires permission of instructor-teaching the introductory course. Tutorial and primarily for majors.

ANTH 486 TUTORIAL IN SOCIAL AND CULTURAL ANTHROPOLOGY  3
History, theory and method in the field of social and cultural anthropology.
RESTRICTIONS: Open to majors only. Requires permission of instructor.

ANTH 487 TUTORIAL IN ARCHAEOLOGY  3
History, theory and method in the field of archaeology
RESTRICTIONS: Open to majors only. Requires permission of instructor.

ANTH 488 TUTORIAL IN PHYSICAL ANTHROPOLOGY  3
History, theory and method in the field of physical anthropology
RESTRICTIONS: Open to majors only. Requires permission of instructor.

ANTH 498 HONOR TOPICS  1
Weekly meetings with faculty to expand on topics treated in 400-level courses in which the student is concurrently enrolled

ANTH 606 HUMAN OSTEOLOGY 4
The identification of the human skeleton, including complex and fragmentary materials, including bone growth, bone pathology, paleopathology and forensic identification
RESTRICTIONS: Requires permission of instructor

ANTH 644 TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS  3
See MSST644 for course description.

ANTH 645 TECHNOLOGY OF CULTURAL MATERIALS: METALS  3
See MSST645 for course description.

ANTH 657 SURVEY OF AFRICAN ART  3
Major African art styles, their interrelationships, the context of usage and the meanings of African artworks. May be crosslisted with ARTH657

ANTH 663 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. May be crosslisted with HIST663.

ARTS AND SCIENCE

ARSC 293 HONORS FORUM  1
Topics vary

ARSC 295 HONORS ARTS FORUM  1
Attendance at, and critical appreciation of, performing arts events and visual arts events

ARSC 296 HONORS FORUM: MULTICULTURAL  1
Approved topics are: Women in Western Thought; Roots and Reflections-issues in Contemporary Afro-American Culture; Playing with Stories; Myth and Expression. Counts toward the three-credit multicultural requirement.

ARSC 316 PEER TUTORING/ADVANCED COMPOSITION  3
Course trains a selected group of upper-division students in writing techniques by applying recent composition theories to students' own writing. Will explore and evaluate fundamental theories of teaching writing. May be crosslisted with ENGL116

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 869 MASTER'S THESIS  1-6

ART

ART 110 FOUNDATION DRAWING I  3
Basic elements of visual thinking through the manipulation of various drawing media, including pencil, charcoal, ink wash and pastel; and techniques, including contour and gesture drawing. Emphasis on perspective, line, form and spatial relationships through observation.
COREQ: ART111 or ART113

ART 111 FOUNDATION 2D DESIGN  3
Development of craftsmanship, use of media and techniques for the application of two dimensional design principles. Study includes point, line, plane and volume to indicate form and the exploration of the effect of value, saturation and hue in the perception of color.
COREQ: ART110 or ART112

ART 112 FOUNDATION DRAWING II  3
Continuation of work in tonality and exploration of drawing media in both black and white and color. Problems include both representation and abstraction.
COREQ: ART110
COREQ: ART111 or ART113

ART 113 FOUNDATION 3D DESIGN  3
Introduction to shaping space dynamically using various working styles and artistic research. Assignments stress integration of expressive content in the following: 3D elements and organizing principles, scale and impact, personal and physical interaction, form and function, methods/materials and craftsmanship of construction.
COREQ: ART110 or ART112

ART 114 FOUNDATION COLLOQUIUM  0 PF
A weekly forum for the discussion of issues common to beginning level art students concurrently enrolled in foundation art courses. Presentations will include overviews of disciplines within the Art Department and examinations of professional art practices.
COREQ: ART110, 111, 112 or 113

ART 115 FOUNDATION COLLOQUIUM  0 PF
A weekly forum for the discussion of issues common to beginning level art students concurrently enrolled in foundation art courses. Presentations will include overviews of disciplines within the Art Department and examinations of professional art practices.
COREQ: ART110, 111, 112 or 113

ART 129 DESIGN IN VISUAL ARTS  3
Introduction to design through the physical application of various art media, including charcoal, pencil, ink wash and paint. Study of design criteria and artistic objectives as they relate to the environment.
RESTRICTIONS: Open to nonmajors and nonminors only

ART 130 DRAWING II: TOOLS AND TECHNIQUES  3
Projects involving black and white and color studies in a variety of media, including pencil, charcoal, ink and pastels.
RESTRICTIONS: Open to nonmajors and nonminors only

ART 138 ELEMENTARY DRAWING AND PAINTING I  3
Representation drawing and painting from still lifes, landscapes and the human head in a variety of media including charcoal, pastel and paint.
RESTRICTIONS: Open to nonmajors and nonminors only

ART 180 INTRODUCTION TO PHOTOGRAPHY  3
Study of photographic imagery and processes. Photography as a fine art medium and its uses past and present. Considerable camera work with slide processing done by students, nondarkroom.
RESTRICTIONS: Open to nonmajors and nonminors only

321
ART 200  VISUAL COMMUNICATIONS PROCESS I  3
An introduction to communicating visually through conceptual thinking in the visual design process with the use of typography, imagery and layout, and an introduction to computer page layout and imaging.
COREQ: ART210
RESTRICTIONS: Requires permission of instructor.

ART 201  VISUAL COMMUNICATIONS PROCESS II  3
Continuation of the introduction to communicating visually through conceptual thinking in the visual design process and the use of typography, imagery and layout. Continuation of computer page layout and imaging.
PREREQ: ART200
COREQ: ART211
RESTRICTIONS: Requires permission of instructor.

ART 210  VISUAL COMMUNICATIONS IMAGEMAKING I  3
Introduction to imagemaking principles and techniques as applied to design, visual thinking and communication problem solving through both photographic and illustration techniques. Includes various films and light sources for color and b/w photography with basic use of illustration media and techniques.
COREQ: ART200
RESTRICTIONS: Requires permission of instructor.

ART 211  VISUAL COMMUNICATIONS IMAGEMAKING II  3
Continuation of imagemaking principles and techniques as applied to design, visual thinking and communication problem solving through both photographic and illustration techniques.
PREREQ: ART210
COREQ: ART201
RESTRICTIONS: Requires permission of instructor.

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

ART 231  BEGINNING PAINTING  3
An introduction to color theory as related to oil painting and an examination of both traditional and experimental painting methods as a means for providing students a foundation for discovering their unique potential for self-expression.

ART 241  BEGINNING LITHOGRAPHY  3
Introduction to basic lithographic processes including stone and plate lithography.

ART 243  INTRODUCTION TO PRINTMAKING  3
Introduction to a variety of print techniques including silkscreen, lithography, etching, woodcut and monoprinting and to the development of multiple and one-of-a-kind images.

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

ART 250  BEGINNING SCULPTURE  3
Introduction to basic tools, processes and safety employed in the creation of sculptural ideas. Past and current concepts are studied through library, slides, videos, exhibitions and field trips. Students learn how to best display and present their work through regular class critiques and exhibitions in the sculpture building viewing space. Individual expression is encouraged.

ART 274  COMMON THREADS: MULTICULTURAL SURVEY OF FIBER PROCESSES  3
In nonwestern cultures, basic life sustaining necessities, e.g., food preparation, clothing, spiritual and/or actual shelter, often involve textile processes which give actual, symbolic and transformational meaning over time. Studio assignments using weaving, surface design and off-loom techniques will probe both process and content.

ART 280  BEGINNING PHOTOGRAPHY  3
Introduction to the tools, techniques, processes and aesthetics of black and white photography.

ART 290  BEGINNING CERAMICS  3
Introduction to the tools, processes and aesthetics of ceramics.

ART 302  GRAPHIC DESIGN I  3
Exploration of visual systems, conceptual principles and procedures underlying the practice of graphic design. In particular the process of problem solving through visual design: the visualization of problems and solutions; and the correlation of forms with their content, function and context.
PREREQ: ART201 and ART211.
COREQ: ART304

ART 303  GRAPHIC DESIGN II  3
Development of sound visual concepts and economy of thought in basic graphic forms. Emphasis on the medium and message of design through the integration of typography and Images.
PREREQ: ART302
COREQ: ART305

ART 304  GRAPHIC DESIGN I  3
Introduction to the design of advertising, emphasizing the responsibilities of the art director. Projects stress development of creative strategies, evaluation of marketing strategies, conceptual thinking and creative composition for solutions to consumer and trade magazines, newspapers and outdoor advertising.
PREREQ: ART201 and ART211.
COREQ: ART302

ART 305  GRAPHIC DESIGN II  3
Application of the principles of concept and design to more complex advertising problems. Development of basic presentation and communication skills as well as the analysis and implementation of creative strategies.
PREREQ: ART304
COREQ: ART303

ART 306  TV COMMERCIALS TO MTV  3
An introduction to multimedia course involving the conceptualizing, sequencing and editing of still and video images with sound. Utilizing computer programs such as Adobe Premiere, projects can include movie trailers, television commercials, film graphics, animation and rock videos.
RESTRICTIONS: Only offered during Winter Session.

ART 307  MULTIMEDIA AND INTERACTIVE DESIGN  3
Introduction to multimedia and interactive design involving organizational strategies, interactivity, sequencing, imagery and page design using still images, video images and sound. Projects can include Web sites, games, training and educational applications.
RESTRICTIONS: Junior level. Requires permission of instructor. May be repeated for up to six credit hours.

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

ART 310  APPLIED PHOTOGRAPHY  3
The development of conceptual and technical skills emphasizing both studio and location assignments for graphic and advertising design projects including editorial, annual reports, print advertising, posters, collateral materials, books, book jackets and packaging.
PREREQ: ART211 or ART380, ART381
RESTRICTIONS: Requires permission of instructor.

ART 311  APPLIED PHOTOGRAPHIC ILLUSTRATION  3
The development of conceptual and technical skills emphasizing photographic applications in an editorial context. Projects include a wide variety of subjects along with the manipulation of images through the use of computers.
PREREQ: ART211 and ART310, or ART380 and ART381
RESTRICTIONS: Requires permission of instructor.

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 62 credit hours.

ART 320  ILLUSTRATION I  3
Introduction of color through watercolor, gouache, acrylic, oil painting and dry color media. Emphasis on approaches to illustrated visual imagery in editorial, book, institutional and advertising.
PREREQ: ART211
RESTRICTIONS: Requires permission of instructor.

ART 321  ILLUSTRATION II  3
Application of creative illustration concepts to editorial, book, institutional and advertising projects.
PREREQ: ART200
RESTRICTIONS: Requires permission of instructor.

ART 330  ADVANCED FIGURE DRAWING  3
Continued studies in figure drawing. Emphasis on advanced media techniques, description and personal expression.
PREREQ: ART230
RESTRICTIONS: May be repeated for up to nine credit hours.

ART 331  INTERMEDIATE PAINTING  3
Identifying and exploring ideas and abilities in painting by examining the context of modern and contemporary works. Emphasis on the role of professional quality studio practices in realizing student painting goals.
PREREQ: ART231
RESTRICTIONS: May be repeated for up to six credit hours.

ART 333  FIGURE STUDIO  3
Advanced conceptual and technical issues in depicting the human figure. Topics include figurative descriptions through the exploration of a wide range of media with special emphasis on color and related concerns.
PREREQ: ART230 and ART231
ART 334  INTERMEDIATE PAINTING: THE FIGURE  
A technical and conceptual guide to interpreting the human figure in oils, with an emphasis on the use of the figure as a vehicle for expression in contemporary painting.
PREREQ: ART230 and ART231.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 335  PAINTING III  
Continuation of the theory and practice of painting with an emphasis on exploring an individual direction. Criticism and research are important aspects of this course.
PREREQ: ART235.

ART 341  WOODCUT AND ETCHING  
Introduction to basic woodcut and/or linoleum block relief processes. Introduction to intaglio processes including drypoint, line etching, soft ground, liftground, and aquatint techniques.

ART 342  INTRODUCTION TO MONOPRINTING AND PAPERMAKING PROCESSES  
Introduction to western and eastern papermaking and cast paper processes. Introduction to monoprinting and collage processes to produce one of a kind prints.

ART 350  INTERMEDIATE SCULPTURE I  
Continues to emphasize all goals of ART250 and introduces more advanced techniques and information on sculpture. Students strongly encouraged to find and pursue individual goals and are guided in seeking choices of media and types of artistic expressions that best suit each individual. Researching modes of contemporary sculptural expression is required.
PREREQ: ART250.

ART 351  INTERMEDIATE SCULPTURE II  
At this intermediate level, less emphasis is given to tools and techniques, and more attention is given to the student’s search for personal artistic expression. Participation in student and local exhibitions is expected. For those interested in a concentration in sculpture, time will be given to portfolio preparation. Research into sculpture is intensified.
PREREQ: ART350.

ART 366  INDEPENDENT STUDY 1-6

ART 380  INTERMEDIATE PHOTOGRAPHY: BLACK & WHITE  
Use of the medium for artistic communication. Advanced technical and aesthetic concepts as related to fine and applied art problems.
PREREQ: ART280.

ART 381  INTERMEDIATE PHOTOGRAPHY: COLOR  
Shooting and processing of color slides and negatives, producing color prints from each. Examines color theory, color emulsions and contemporary ideas in color photography.
PREREQ: ART380.

ART 382  ALTERNATIVE PHOTOGRAPHIC PROCESSES  
Non-silver photographic processes such as cyanotype, gum-bichromate, photo transfer, and van-eyceke brown. Using existing negatives, students will create, alter, and manipulate images.
PREREQ: ART280.
RESTRICTIONS: Ability to work independently.

ART 383  PHOTOGRAPHIC FACILITIES MANAGEMENT  
Firsthand experience of operating and maintaining a photographic facility, including equipment operation for both black/white and color photography labs, course and out-of-class scheduling, on-loan equipment and materials, ordering and mixing of chemicals and keeping associated faculty abreast of developments.
RESTRICTIONS: Art major or minor or permission of instructor.

ART 390  INTERMEDIATE CERAMICS I  
Continuation of Beginning Ceramics.
PREREQ: ART290.

ART 391  INTERMEDIATE CERAMICS II  
Continuation of Intermediate Ceramics I with emphasis on the technical properties of clay and glazes.
PREREQ: ART390.

ART 402  ADVANCED APPLIED DESIGN I  
Continuation of mastering the advanced principles of effective conceptual design through solutions involving advertising design or graphic design problems as they would occur in advertising agencies, design studios or corporate design departments.
PREREQ: ART303 and ART305.
COREQ: ART403.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 403  PORTFOLIO PREPARATION I  
Directed toward the production of a portfolio which accurately and effectively defines the student’s conceptual and practical skills in advertising design or graphic design situations.
PREREQ: ART303 and ART305.
COREQ: ART402.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 404  ADVANCED APPLIED DESIGN II  
Continuation of mastering the advanced principles of effective conceptual design through solutions involving advertising design or graphic design problems as they would occur in advertising agencies, design studios or corporate design departments.
PREREQ: ART402 and ART403.
COREQ: ART405.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 405  PORTFOLIO PREPARATION II  
Continuation of the production of a portfolio which accurately and effectively defines the student’s conceptual and practical skills in advertising design or graphic design situations.
PREREQ: ART402 and ART403.
COREQ: ART404.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 408  VISUAL COMMUNICATIONS INTERNSHIP  
Field experience in an advertising agency, design studio, illustration studio, or commercial photography studio in the student’s discipline concentration.
PREREQ: ART300 and ART305, or ART310 and ART311, or ART320 and ART321.
RESTRICTIONS: Requires permission of instructor. May be repeated for up to six credit hours.

ART 412  ADVANCED IMAGEMAKING I  
Advanced principles of effective communication through imagery applied to graphic and advertising design, including work with advanced graphic and advertising students in developing complete project solutions.
PREREQ: ART305, ART306, ART311, or ART321.
COREQ: ART413.
RESTRICTIONS: Requires permission of instructor.

ART 413  IMAGEMAKING PORTFOLIO I  
Development toward production of a portfolio that accurately and effectively defines the student’s conceptual and practical skills in applied photography or illustration.
PREREQ: ART303, ART305, ART311, or ART321.
COREQ: ART412.
RESTRICTIONS: Requires permission of instructor.

ART 414  ADVANCED IMAGEMAKING II  
Continued work with advanced principles of effective communication through imagery applied to graphic and advertising design, including work with advanced graphic and advertising design students in developing complete project solutions.
PREREQ: ART412.
COREQ: ART415.
RESTRICTIONS: Requires permission of instructor.

ART 415  IMAGEMAKING PORTFOLIO II  
Continued development toward production of a portfolio that accurately and effectively defines the student’s conceptual and practical skills in applied photography or illustration.
PREREQ: ART413.
COREQ: ART414.
RESTRICTIONS: Requires permission of instructor.

ART 416  PROFESSIONAL PRACTICES  
Students who plan to work and exhibit in a fine arts studio discipline will learn how to prepare for a professional career. Topics include making application to galleries, residencies and graduate school, grant writing, tax issues, taking slides, etc.
RESTRICTIONS: BFA Seniors 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 418  FINE ARTS INTERNSHIP  
Field experience related to a current fine art discipline offered in the Art Department through a hands-on involvement at an art studio, gallery, museum or related industry.
PREREQ: Junior or Senior level in a discipline.
COREQ: Requires permission of instructor.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 424  STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST  
See MSST480 for course description.

ART 425  SEMINAR IN MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN  
See ARTC481 for course description.

ART 426  COLOR MIXING AND MATCHING  
See MSST485 for course description.

323
ART 427  
**STUDIO MATERIALS AND TECHNIQUES OF PAINTING I**  
3  
See MSST488 for course description

ART 428  
**STUDIO MATERIALS AND TECHNIQUES OF PAINTING II**  
3  
See MSST489 for course description

ART 429  
**STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I**  
3  
See MSST490 for course description

ART 430  
**DRAWING STUDIO**  
3  
Drawing as unique works on paper using traditional or non-traditional media. Works produced will be determined by each student as an extension of their studio concentration.  
PREREQ: ART230.  
COREQ: 400 level Art course.  
RESTRICTIONS: May be repeated for up to six credit hours

ART 432  
**ADVANCED PAINTING**  
3  
Provides maturing process through experience. Emphasis on identifying and shedding undue influences in painting in favor of evolving a more personal artistic direction and vision.  
PREREQ: Six credits of ART331 or three credits of ART334 and three credits of ART334.  
RESTRICTIONS: May be repeated up to nine credit hours

ART 433  
**PAINTING STUDIO**  
3  
The execution of a mature body of work. Emphasis placed on distilling individual painting ideas down to their essence through a process of rigorous group and self criticism.  
PREREQ: ART432.  
RESTRICTIONS: May be repeated for up to nine credit hours

ART 440  
**PRINTMAKING STUDIO**  
3  
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.  
PREREQ: ART241, and ART341 or ART342.  
RESTRICTIONS: May be repeated up to nine credit hours

ART 441  
**ADVANCED PRINTMAKING**  
3  
Advanced techniques in lithography and screenprinting or papermaking, monoprinting, etching and woodcut. Processes vary according to instructor.  
PREREQ: ART241, and ART341 or ART342.  
RESTRICTIONS: May be repeated for up to nine credit hours

ART 450  
**SCULPTURE STUDIO**  
3  
Designed to assist the student in finding the best materials and means of personal expression in sculpture and the relationship of differing fields of artistic expression. An increasing emphasis on involvement in the sculpture profession.  
PREREQ: ART351.  
RESTRICTIONS: May be repeated up to for to nine credit hours

ART 451  
**ADVANCED SCULPTURE**  
3  
At this level, students are expected to have put together a solid body of work with a clear direction. Advanced studio work is based on agreements between the student and the instructor regarding content and quality of work requirements. Each student receives personal instruction and attention in what is planned to become the student’s profession.  
PREREQ: ART351.  
RESTRICTIONS: May be repeated for up to nine credit hours

ART 466  
**INDEPENDENT STUDY**  
1-6

ART 481  
**PHOTOGRAPHY STUDIO**  
3  
Advanced studio and conceptual work based on agreement between student and instructor as to content and quantity of work required. Students taking the course for repeating credit will be engaged in the development of a professional photography portfolio along with the other course requirements.  
PREREQ: ART381.  
RESTRICTIONS: May be repeated for up to nine credit hours

ART 483  
**PORTFOLIO & EXHIBITION TECHNIQUE**  
3  
Emphasis on professional methods involved in presenting a portfolio for publication or exhibition. Organization, editing and sequencing, as well as attitudes and strategies form the basis of study.  
PREREQ: ART380.  
RESTRICTIONS: Previous photographic experience

ART 486  
**PHOTOGRAPHIC ELECTRONIC IMAGING**  
3  
Use of computer technology and techniques to create digital photography and imagery. Students use electronic technology to manipulate, retouch, adjust color, make multiple images and explore other creative techniques.  
PREREQ: ART380.  
RESTRICTIONS: Previous photographic experience. May be repeated for up to nine credit hours

ART 490  
**ADVANCED CERAMICS**  
3  
Continuation of Intermediate Ceramics II with emphasis on individual development of design and form.  
PREREQ: ART391.  
RESTRICTIONS: May be repeated for up to nine credit hours

ART 491  
**CERAMICS STUDIO**  
3  
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.  
PREREQ: ART391.  
RESTRICTIONS: May be repeated for up to nine credit hours

ART 601  
**APPLIED PHOTOGRAPHY TUTORIAL**  
3  
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than applied photography or where the work in applied photography has been with an aspect of the medium that is substantially different from what is now being studied.  
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 602  
**DRAWING TUTORIAL**  
3  
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than drawing or where the work in drawing has been with an aspect of the medium that is substantially different from what is now being studied.  
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 603  
**PAINTING TUTORIAL**  
3  
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than photography or where the work in printmaking has been with an aspect of the medium that is substantially different from what is now being studied.  
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 604  
**PRINTMAKING TUTORIAL**  
3  
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than printmaking or where the work in printmaking has been with an aspect of the medium that is substantially different from what is now being studied.  
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 605  
**SCULPTURE TUTORIAL**  
3  
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than sculpture or where the work in sculpture has been with an aspect of the medium that is substantially different from what is now being studied.  
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 608  
**PHOTOGRAPHY TUTORIAL**  
3  
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than photography or where the work in photography has been with an aspect of the medium that is substantially different from what is now being studied.  
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 609  
**CERAMICS TUTORIAL**  
3  
Studio experience for those students whose principal mode of artistic expression and prior studies are primarily in disciplines other than ceramics or where the work in ceramics has been with an aspect of the medium that is substantially different from what is now being studied.  
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 610  
**ADVANCED APPLIED PHOTOGRAPHY**  
3  
Emphasis on the development of a portfolio and the understanding of the role of the applied photographer. Includes introduction to large format techniques and equipment and the professional studio.  
PREREQ: ART411.  
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 611  
**ADVANCED APPLIED PHOTOGRAPHY**  
3  
Continuation of ART610 directed toward the production of a portfolio which accurately and effectively defines the student’s conceptual and practical capabilities in applied photography situations.  
PREREQ: ART411.  
RESTRICTIONS: May be repeated for up to twelve credit hours

ART 630  
**DRAWING STUDIO**  
3  
Works on paper using traditional and non-traditional media. The nature of work is an extension of student’s creative direction.  
RESTRICTIONS: May be repeated for up to six credit hours
ART 632 Painting 3-6
Advanced problems in the media and aesthetics of painting.
RESTRICTIONS: May be repeated for up to eighteen hours.

ART 633 Painting Studio 3-6
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

ART 640 Printmaking Studio 3-6
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

ART 641 Printmaking 3-6
Provides independent work in a chosen print area. Course requirements will be determined by agreement of the student and the teacher.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

ART 650 Sculpture Studio 3-6
Concentrates on professional studio practice and the creation of individual sculptural expressions. Advanced studio work is based on agreement with the instructor regarding content and quality of work.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

ART 651 Sculpture 3-6
Advanced level course focusing on becoming professionals. Beyond the studio and the creation of artistic expression, the student artist learns ways voices can be hard. Focuses on all the peripherals involved in the profession of sculpture.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

ART 677 Seminar: The Business of Art 3
Examination of some of the practical aspects of being a practicing studio artist, including promotion, copyrighting artwork, art-related tax and business law, building a reputation, pricing of art works, and grant writing.

ART 678 Seminar: Studio Instruction Practicum 3
Planning, instruction and evaluation of art disciplines at the college or equivalent level.
RESTRICTIONS: Requires permission of instructor. May be repeated for up to nine credit hours.

ART 679 Seminar: Issues in Contemporary Art 3
Examination of current issues of content and form: developments in technology, social, political and cultural issues affecting visual art and artists; studio visits.
RESTRICTIONS: Requires permission of instructor. May be repeated for up to nine credit hours.

ART 681 Materials and Techniques of the Contemporary Painter and Draftsman 3
See MSST681 for course description.

ART 682 Studio in the Materials and Techniques of Drawing in the West 3
See MSST680 for course description.

ART 683 Photography 3-6
Individual problems in still photography applied to art education, fine arts, or applied design.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

ART 684 Photography Studio 3-6
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

ART 685 Color Mixing and Matching 3
See MSST685 for course description.

ART 686 Electronic Imaging 3
Use of computer technology and techniques to create digital photography and imagery. Students use electronic technology to manipulate,retchu, adjust color, make multiple images and explore other creative techniques.
RESTRICTIONS: May be repeated for up to six credit hours.

ART 688 Studio Materials and Techniques of Painting I 3
See MSST688 for course description.

ART 689 Studio Materials and Techniques of Painting II 3
See MSST689 for course description.

ART 690 Studio in the Materials and Techniques of Printmaking I 3
See MSST690 for course description.

ART 691 Ceramics 3-6
Problems in throwing, glazing and firing techniques.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

ART 692 Ceramics Studio 3-6
Advanced studio work based on agreement between student and instructor as to content and quantity of work required.
RESTRICTIONS: May be repeated for up to eighteen credit hours.

ART 698 MFA Exhibition 3
Selection, presentation and installation of art work in an exhibition space culminating the studio component of graduate study.
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 CONSERVATION

ARTC 301 Care and Preservation of Cultural Property I 3
Examines philosophy, ethics, practice of conservation and the issues pertaining to collection management of cultural property. Typical deterioration characteristics and preservation alternatives for a variety of materials including photographs, works of art on paper, archival and library materials, and magnetic media will be presented and discussed.
PREreq: ARTC301

ARTC 444 Technology of Cultural Materials: Ceramics and Glass 3
See MSST444 for course description.

ARTC 445 Technology of Cultural Materials: Metals 3
See MSST445 for course description.

ARTC 464 Conservation Internship 3

ARTC 466 Independent Study 1-6

ARTC 480 Studio in the Materials and Techniques of Drawing in the West 3
See MSST480 for course description.

ARTC 481 Seminar in Materials and Techniques of the Contemporary Painter and Draftsman 3
Twentieth-century artists' materials. Topics: acrylic emulsion, acrylic solution, alkyd resin, and PVA paints; collage-assemblage; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, leaflet markers, colored ink pencils; airbrush spray gun; and nonwoven materials. Potential health hazards: Conservation topics: pH, lightfastness, adhesion and storage environments. May be cross-listed with ARTC425 and/or ARTC481.
RESTRICTIONS: Requires permission of instructor.

ARTC 485 Color Mixing and Matching 3
See MSST485 for course description.

ARTC 488 Studio Materials and Techniques of Painting I 3
See MSST488 for course description.

ARTC 489 Studio Materials and Techniques of Painting II 3
See MSST489 for course description.

ARTC 490 Studio in the Materials and Techniques of Printmaking I 3
See MSST490 for course description.

ARTC 615 Properties and Structure of Art Materials 3
Introduction to 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: ARTC515
RESTRICTIONS: Full-time fellowship students only.

ARTC 616 Conservation Research Methods 3
Examinations 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: ARTC515
RESTRICTIONS: Full-time fellowship students only.
ARTC 644 Technology of Cultural Materials: Ceramics and Glass 3
See MSST644 for course description

ARTC 645 Technology of Cultural Materials: Metals 3
See MSST645 for course description

ARTC 650 Seminar in Art Conservation 1
Oral reports on current work in the fields of art conservation, art history, ethics, philosop-
hy and museum science
PREREQ: ARTC560
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, and decorative, ethnographic, and archaeological 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, and decorative, ethnographic and archaeological objects under
the supervision of conservation faculty
PREREQ: ARTC654
RESTRICTIONS: Full-time fellowship students only.

ARTC 658 Topics in Advanced Apprenticeship and Research in Art 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, and decorative, ethnog-
ographic, and archeological materials. Requirements for this course may be fulfilled by
work in cooperating institutions outside the Winterthur Museum.
PREREQ: ARTC654 and ARTC655
RESTRICTIONS: Full-time fellowship students only.

ARTC 659 Topics in 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, and decorative, ethnog-
graphic, and archeological materials. Requirement for this course may be fulfilled by work
in institutions outside the Winterthur Museum.
PREREQ: ARTC655 and ARTC658
RESTRICTIONS: Full-time fellowship students only.

ARTC 666 Independent Study 1-6

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: ARTC670
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: ARTC670 and ARTC671
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: ARTC670, ARTC671 and ARTC672
RESTRICTIONS: Full-time fellowship students only.

ARTC 680 Studio in the Materials and Techniques of Drawing in the West 3
See MSST680 for course description

ARTC 681 Materials and Techniques of the Contemporary Painter and Draftsman 3
See MSST681 for course description

ARTC 685 Color Mixing and Matching 3
See MSST681 for course description

ARTC 688 Studio Materials and Techniques of Painting I 3
See MSST688 for course description

ARTC 689 Studio Materials and Techniques of Painting II 3
See MSST689 for course description

ARTC 690 Studio in the Materials and Techniques of Printmaking I 3
See MSST690 for course description

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
PREREQ: ARTC690.
RESTRICTIONS: Full-time fellowship students only. May be repeated for up to eighteen
credits when topics vary.

ARTC 964 Pre-Candidacy Study 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examina-
tions 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.

ARTC 969 Doctoral Dissertation 1-12 PF

ART HISTORY

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 mythical and religious images, types, attributes and sym-
boles on a comparative basis from many ages throughout the world includes archetypal
images, such as the Great Mother, the Great Father, the hero, images with supernatural
powers and satirical images.

ARTH 152 Design and Expression in the Visual Arts 3
An introduction to visual analysis of painting, sculpture and architecture. Principles of two-
and three-dimensional design, spatial composition, color and technical methods used by
artists to create emotional and aesthetic effects. Examples chosen from a variety of peri-
ods and places.

ARTH 153 Introduction to Art History I 3
Painting, sculpture and architecture from Prehistoric times through ancient Egypt, Greece,
Rome and the Middle Ages studied in historical and cultural context
RESTRICTIONS: Usually offered in Fall semester.

ARTH 154 Introduction to Art History II 3
Painting, sculpture and architecture of Western Europe from the Renaissance to the pre-
sent studied in historical and cultural context
RESTRICTIONS: Usually offered in Spring semester.

ARTH 155 Asian Art 3
Introduction to the artistic traditions of China, Japan, India, Korea and Southeast Asia
Emphasis on historical, religious and social context. Focuses on the arts of Buddhism; also
covers Hindu, Confucian, Taoist and other localized religious and cultural influences
on the visual arts.

ARTH 161 Art in East and West 3
Similarities and differences between works of art typical of Asian and Western traditions
and examination of their points of contact, emphasizing such themes as nature, human-
ity and the divine, world of the ruler, religious art and private art.

ARTH 162 History of Architecture 3
Major buildings and architects from the ancient world to the present. Elements of archi-
tectural design and the influence of social, economic, political, religious and technologi-
cal factors on the art of building. Architecture as cultural expression.

ARTH 166 Special Problem 1-3

ARTH 205 Science and the Detection of Art Forgeries 3
See MSST205 for course description

ARTH 207 Origins of Art 3
Art and architecture of the Stone Age, the Near East, Egypt, Crete, Mycenaean Greece
and Barbarian peoples. Includes politics and religion as factors influencing artistic
change. Ancient literature used to clarify the meaning of the works.
ARTH 208 GREEK AND ROMAN ART 3
Development of Greek art and architecture from the Geometric period through the Orientalizing, Archaic, Classical and Hellenistic eras. Roman art and architecture from its Etruscan and Greek origins through the Republican period and the stages of the Empire until the time of Constantine the Great.

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
Survey of the art of Japan from Neolithic times to the 20th century. Emphasis on the interaction of beliefs and their Chinese expressions, and the search for harmony with the natural environment, beginning with the mid-18th century break from Renaissance tradition to Art Nouveau and the end-of-19th century rise of the skyscraper. Architects such as Ledoux, Soane, Richardson, Sullivan, Horta and Gaudi.

ARTH 217 EARLY RENAISSANCE ART 3
Italian art of the 14th and 15th centuries. Special emphasis on the founders of the Renaissance tradition in central Italy such as Giotto, Donatello, Masaccio, Fra Angelico, Botticelli, Brunelleschi and Alberti.

ARTH 218 HIGH RENAISSANCE AND MANNERIST ART 3
Italian art in the 16th century. Emphasis on such artists as Leonardo da Vinci, Raphael, Michelangelo, Bronzino, Titian, Tintoretto and El Greco. Also treats the spread of Italian style to France and Spain.

ARTH 220 ITALIAN RENAISSANCE ARCHITECTURE 3
Italian architecture and cities from the 14th to the 16th centuries. Emphasis on the social, economic and religious background and in relationship to European art and the spread of Indic culture.

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 rise of genre, still-life and landscape painting, as well as the role of patronage.

ARTH 223 BAROQUE AND ROCOCO ARCHITECTURE AND URBANISM 3
Architecture and urban design in Europe from 1580 to 1750, in its religious, political and cultural context. Studies Italy, France, England and Germany. Architects such as Bernini, Borromini, Le Vau, Mansart and Neumann.

ARTH 224 EIGHTEENTH CENTURY ART 3
Examine major trends and artists in 18th-century European painting, sculpture and architecture in the framework of the social, ideological and cultural currents of the time. Artists such as Watteau, Hogarth, Blake, Chardin, Canova, David and Goya.

ARTH 227 MODERN ART I 3
Important 19th-century European movements in art such as Neo-Classicism, Romanticism, Realism and Impressionism studied in their cultural and sociopolitical context. Artists such as David, Delacroix, Turner, Courbet and Monet.

ARTH 228 MODERN ART II 3
Art and theory of major movements from 1890 to the present: Post-Impressionism, Fauvism, Cubism, Futurism, Constructivism, Dada, Surrealism, Abstract Expressionism, Pop Art, Minimalism, Conceptualism, Neo-Expressionism and Post-Modern developments. Painting, sculpture, photography, environments and performance art.

ARTH 230 AMERICAN ART: 1607-1865 3
Architecture, painting, sculpture and decorative arts of the United States from the first Colonial settlements to the Civil War. American art examined in the light of its political, social, economic and religious background and in relationship to European art and the spread of Indic culture.

ARTH 231 AMERICAN ART: 1865-PRESENT 3
Architecture, painting, sculpture, photography and decorative arts in the United States from the Civil War to American art in a political, social, economic and cultural framework. The rise of the United States to a position of global power and emergence as an international artistic center.

ARTH 234 ART OF JAPAN 3
Survey of the art of Japan from Neolithic times to the 20th century. Emphasis on the interaction between imported ideas and native sensibilities, the development of Buddhist imagery and the influence of literature, drama and political change on the visual arts.

ARTH 235 ART OF INDIA 3
Survey of the art of India from the prehistoric culture of the Indus Valley through the development of Buddhist, Hindu and Islamic religious structures and imagery. Emphasizes the interrelationships of philosophical, religious and aesthetic concepts in shaping Indian art and the spread of Indic culture.

ARTH 236 ARTS OF ISLAM 3
Formation and diffusion of a distinctive artistic tradition from the eighth to the sixteenth century. Considers architecture, painting, metalwork and other media, especially in the Mediterranean world and western Asia.

ARTH 237 ART OF TIBET 3
Survey of Tibetan art including sculpture, paintings, textiles, jewelry, ritual objects, architecture and ephemeral art. Emphasis on relationship of art to religious and philosophical tenets of Buddhist and Bon-po traditions; development of regional styles in Tibet; and artistic connections to northern India, Nepal, and China.

ARTH 242 WOMEN AS IMAGE AND IMAGE-MAKER 3
Examines the depiction of women in art from prehistory 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. May be cross-listed with WOMS242.

ARTH 245 THE AMERICAN HOME 3
Explores the history and design of the most intimate and public of objects—the house. Our residences are powerful statements about how we see ourselves and how we perceive others. Includes a variety of cultural experiences and investigates the significance of those experiences.

ARTH 250 RULERS' IMAGES FROM AUGUSTUS TO GEORGE III 3
Survey of the art of India from the prehistoric culture of the Indus Valley through the development of Buddhist, Hindu and Islamic religious structures and imagery. Emphasizes the interrelationships of philosophical, religious and aesthetic concepts in shaping Indian art and the spread of Indic culture.

ARTH 251 RULERS' IMAGES FROM AUGUSTUS TO GEORGE III 3
Survey of the art of India from the prehistoric culture of the Indus Valley through the development of Buddhist, Hindu and Islamic religious structures and imagery. Emphasizes the interrelationships of philosophical, religious and aesthetic concepts in shaping Indian art and the spread of Indic culture.

ARTH 301 RESEARCH AND METHODOLOGY IN ART HISTORY 3
Methods and major approaches to advanced art historical study, together with the practical aspects of research and work in art historical professions, such as education, historic preservation, museums and galleries. Experience with original works of art.

ARTH 302 PRINTS AND SOCIETY 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. Photographers such as Negrin, Emerson, Stieglitz, Cunningham, Weston and Arbus.

ARTH 322 INTRODUCTION TO HISTORIC PRESERVATION 3
Research and methodology in art history. Emphasis on the social, economic and political background and in relationship to European art and the spread of Indic culture.

ARTH 327 INTRODUCTION TO HISTORIC PRESERVATION 3
Research and methodology in art history. Emphasis on the social, economic and political background and in relationship to European art and the spread of Indic culture.
ARTH 330  REGIONAL ARTS AND ARCHITECTURE  
Exploring historical and cultural background of traditional material culture. Each seminar focuses on a particular theme such as the Pennsylvania-German, Carolina Low Country or New England Settlements. Topics include architecture, landscape, decorative arts and material life.

ARTH 335  ARTS AND ARCHITECTURE OF PENNSYLVANIA-GERMANS  
The distinctive regional culture of the Pennsylvania-Germans in the 18th and 19th centuries examined through the study of their cultural landscapes, houses and other buildings, decorative arts, gravestones, and manuscript traditions. Explores themes of ethnic aesthetic expression, sectarian culture, community identity, and the functions of art in everyday life.

ARTH 339  ART AND ARCHITECTURE OF EUROPE  
Primary focus on painting, sculpture and architecture in Europe from the Romanesque to the Modern era. Subject matter determined by country in which overseas program is conducted.

RESTRICTIONS: Offered in a foreign language and only in conjunction with a foreign study program. May be repeated for credit when topics vary.

ARTH 351  INTRODUCTION TO DECORATIVE ARTS  
An examination of interior architecture, furniture, metalwork, ceramics, glass, and textiles from the Renaissance to the present in Europe and America, with investigation of the relationship to architecture and the other arts during this period.

ARTH 360  HUMANITIES COLLOQUIUM  
See ARSC360 for course description.

ARTH 366  INDEPENDENT STUDY 1-6

ARTH 402  UNDERGRADUATE SEMINAR IN THE HISTORY OF ART  
Emphasis on art historical reading and research. Student oral reports. Recent seminar topics include The Age of Tuttlemien; Places of Delight: The Villa from Antiquity to the Present; The Art and Science of Leonardo da Vinci; Caravaggio.

RESTRICTIONS: For undergraduates only. May be repeated for credit when topics vary.

ARTH 403  HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS  
See MSTM403 for course description.

ARTH 405  SEMINAR IN GREEK AND ROMAN ART  
The art and architecture of antiquity from the origins of Greek civilization to the fall of Rome. Recent topics include Archaic Greek Vase Painting, Hellenistic Greek Sculpture, Late Roman Portraiture and Roman Architecture.

PREREQ: ARTH208

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 406  SEMINAR IN MEDIEVAL ART  
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  SEMINAR IN NORTHERN RENAISSANCE ART  
The arts in Northern Europe from 1300 to 1600. Topics may change with each time of offering.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 413  SEMINAR IN ITALIAN RENAISSANCE ART  
Italian art from 1300 to 1600. Recent topics include Leonardo da Vinci, Michelangelo, Titian and Medici Patronage in the Golden Age.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 414  SEMINAR IN ITALIAN RENAISSANCE ARCHITECTURE  
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  
Painting, sculpture and architecture in Italy in the 17th century. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Poetics and Imagery, Caravaggio, and Origins of the Baroque. The Correracchi and their Academy.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 417  SEMINAR IN NORTHERN BAROQUE ART  
Seventeenth-century art in northern Europe. Recent topics include Rembrandt and Rubens, Vermeer and Dutch Genre Painting, Northern Baroque Portraiture, and Prints in the Age of Rembrandt.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 421  SEMINAR IN NINETEENTH-CENTURY ART  
Art from David to Impressionism. Recent topics include Courbet, Delacroix, Cezanne, Art and Politics, The Theory and Practice of Romanticism, Historicism from David to Gerome, and Orientalism.

PREREQ: ARTH227

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 422  FOLK AND Outsider ART  
Focuses on the traditional and popular arts of the United States. Topics covered include colonial Pennsylvania-German decorative arts, Victorian Welsh gravestones, African-American textile and basketry crafts, and contemporary Inuit graphic arts. Discussions and research will focus on the relationship of folk arts to questions of ethnicity, class, popular culture, and community aesthetics.

ARTH 423  SEMINAR IN TWENTIETH-CENTURY ART  
Art in Europe, with some reference to American art, from Post-Impressionism to the present. Recent topics include Symbolism, Picasso, Dada and Surrealism, Cubism and Its Influence, and Post-Modernism.

PREREQ: ARTH227 or ARTH228

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 424  SEMINAR IN NINETEENTH-CENTURY PHOTOGRAPHY  
Aspects of the history and aesthetics of 19th-century photography. Topics change with each time of offering. Recent topics include Photography and Art, Documentary Photography, and "Art" Photography.

PREREQ: ARTH227 or ARTH228 or ARTH230 or ARTH311

RESTRICTIONS: Usually offered in fall semester, every other year.

ARTH 427  SEMINAR IN TWENTIETH-CENTURY PHOTOGRAPHY  
Aspects of the history and aesthetics of 20th-century photography. Topics change with each time of offering. Recent topics include Photography and Art, and Photography and Criticism.

PREREQ: ARTH227 or ARTH228 or ARTH230 or ARTH311

RESTRICTIONS: Usually offered in the fall semester, every other year.

ARTH 428  INDEPENDENT STUDY 1-6

ARTH 429  SEMINAR IN MODERN ARCHITECTURE  
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 431  SEMINAR IN AMERICAN ARCHITECTURE  

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 435  SEMINAR IN AMERICAN ART  
American art from the Colonies to the present. Recent topics include Eakins and American Realism, Early American Modernism, and American Painting and Sculpture after World War II.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 434  SEMINAR IN VERNACULAR ARCHITECTURE  
See HIST454 for course description.

ARTH 457  SURVEY OF AFRICAN ART  
See ANTH457 for course description.

ARTH 466  INDEPENDENT STUDY 1-6

ARTH 480  STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST  
See MSTM480 for course description.

ARTH 481  SEMINAR IN MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN  
See ARTC481 course description.

ARTH 488  STUDIO MATERIALS AND TECHNIQUES OF PAINTING I  
See MSTM488 for course description.

ARTH 489  STUDIO MATERIALS AND TECHNIQUES OF PAINTING II  
See MSTM489 for course description.

ARTH 490  STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I  
See MSTM490 for course description.

ARTH 605  STUDIES IN GREEK AND ROMAN ART  
The art of antiquity from the origins of Greek civilization to the fall of Rome. Recent topics include Archaic Greek Vase Painting, Hellenistic Greek Sculpture, Late Roman Portraiture, and Roman Architecture.

RESTRICTIONS: May be repeated for credit when topics vary.
ARTH 606 STUDIES IN MEDIEVAL ART 3
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 Medieval Ivories.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 611 STUDIES IN ITALIAN RENAISSANCE ART 3
Italian art from 1300 to 1600. Recent topics include Renaissance Villas and Gardens, Brunelleschi and Alberti, Roman Architecture in the Age of Michelangelo, and Palladio.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 614 STUDIES 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.
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, and Origins of the Baroque: The Carracci and their Academies.
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 Rembrandt and Rubens, Vermeer and Dutch Genre Painting, Northern Baroque Portraiture, and Prints in the Age of Rembrandt.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 621 STUDIES IN NINETEENTH-CENTURY ART 3
Art from David to Impressionism. Recent topics include Gericault, Delacroix, Cezanne, Art and Politics (1780-1980). The Theory and Practice of Romanticism, Historicism from David to Géricault, and Orientalism.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 622 RESEARCH TOPICS IN HISTORIC PRESERVATION 3
See UAPP636 for course description.

ARTH 623 STUDIES IN TWENTIETH-CENTURY ART 3
Art in Europe, with some reference to later American art, from 1900 to the present. Recent topics include Symbolism, Picasso, Dada and Surrealism, and Cubism and French Art.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 624 FOLK AND OUTSIDER ART 3
Focuses on the traditional and popular arts of North America. Topics covered include colonial Pennsylvania-German decorative arts, Victorian-Weishvater gravestones, African-American textile and basketry crafts and contemporary Inuit graphic arts. Discussions and research focus on the relationship of folk arts to questions of ethnicity, class, popular culture and community aesthetics.

ARTH 627 STUDIES IN THE HISTORY OF PHOTOGRAPHY 3
RESTRICTIONS: Usually offered in Fall semester, every other year. May be repeated for credit when topics vary.

ARTH 628 SEMINAR IN HISTORIC PRESERVATION 3
See UAPP629 for course description.

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 HISTORY OF THEORIES IN MATERIAL CULTURE 3
See EAMC605 for course description.

ARTH 631 STUDIES IN AMERICAN ARCHITECTURE OF THE COLONIAL AND FEDERAL PERIODS 3
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 632 MAKING THE AMERICAN CITY 3
See UAPP632 for course description.

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. Includes field trips.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 634 METHODS IN HISTORIC PRESERVATION 3
See UAPP634 for course description.

ARTH 636 STUDIES IN AMERICAN ART: 1875-PRESENT 3
Painting, sculpture and related media from 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 637 STUDIES IN ENGLISH ART AND ARCHITECTURE 3
The art of England, emphasizing the period from the 16th century through the end of the 19th century. Recent topics include the English Country House, British Painting, English Architecture, and Collecting in England.
RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 657 SURVEY OF AFRICAN ART 3
See ARTH657 for course description.

ARTH 660 STUDY IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
See MSST660 for course description.

ARTH 680 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
See MSST660 for course description.

ARTH 681 MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAMATIST 3
See MSST681 for course description.

ARTH 688 STUDY IN MATERIALS AND TECHNIQUES OF PAINTING I 3
See MSST688 for course description.

ARTH 689 STUDY IN MATERIALS AND TECHNIQUES OF PAINTING II 3
See MSST689 for course description.

ARTH 690 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3
See MSST690 for course description.

ARTH 801 INTRODUCTION TO DECORATIVE ARTS IN AMERICA TO 1860 3
See EAMC601 for course description.

ARTH 810 STUDIES IN NINETEENTH- AND TWENTIETH-CENTURY EUROPEAN AND AMERICAN SCULPTURE 3
Academic and non-academic traditions of European and American sculpture of the 19th century and the several phases of modernism. Among the artists treated are Canova, Carpeaux, Rodin, Greenough, Powers, Saint-Gaudens, Calder and Smith.
RESTRICTIONS: Open to graduate students only.

ARTH 812 STUDIES IN AMERICAN PAINTING: 1800-1875 3
Recent topics include Neoclassicism, Romanticism and the Grand Manner in the Art of West, Trumbull, Allston and Vanderlyn, Landscape and Genre Painting in the Work of Cole, Durand, Mount and the Hudson River School.
PREQ: ARTH320
RESTRICTIONS: Open to graduate students only. May be repeated for credit when topics vary.

ARTH 850 BIBLIOGRAPHY AND RESEARCH METHODS IN ART HISTORY 0 PF
An introduction to the art historical resources of the University of Delaware and to the techniques of scholarly research and bibliographical materials in the historical study of the visual arts.
RESTRICTIONS: Offered every Fall semester.

ARTH 860 READING AND RESEARCH 1-9 PF
Readings and conferences on an approved subject under faculty direction.
RESTRICTIONS: Requires permission of Department Chair. Open to Art History Ph.D. students only.

ARTH 869 MASTER'S THESIS 1-6

ARTH 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.

ARTH 969 DOCTORAL DISSERTATION 1-12 PF

BLACK AMERICAN STUDIES

BAMS 110 INTRODUCTION TO BLACK AMERICAN STUDIES 3
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.

BAMS 134 HISTORY OF AFRICA 3
See HIST134 for course description.
BLACK AMERICAN STUDIES

BAMS 204 Urban Communities 3
See SOCI204 for course description

BAMS 205 Contemporary Afro-American Issues 3
The impact of important issues involving Black American people in contemporary American society. Critical theoretical analyses of trends that affect programs of the Black community

BAMS 206 Survey of Afro-American Culture 3
Historic and contemporary aspects of Black American culture. A multi-faceted approach utilizing resources from history, folklore, religion and sociology

BAMS 220 The American Civil Rights Movement 3-4
See HIST220 for course description

BAMS 293 Honors Short Course 1
See ARSC293 for course description.

BAMS 296 Honors Forum 1
See ARSC296 for course description.

BAMS 298 Research: Race Ethnicity and Culture 1 PF
See WOMS298 for course description.

BAMS 304 History of Black America to the Civil War 3
Black historical impact on culture and politics to the Civil War. May be cross-listed with HIST325
PREREQ: BAMS110

BAMS 305 Images of Race and Ethnicity in American Culture 3
See HIST305 for course description

BAMS 306 History of Black America Since the Civil War 3
Survey of the broad social, political and economic developments that shaped the Black experience during this period: the rise of segregation in the South, the migration from plantation to ghettos and the struggle for civil rights. May be cross-listed with HIST326.

BAMS 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 cross-listed with PHIL307
PREREQ: PHIL201

BAMS 308 Delaware Black History 3
A survey course in Delaware Black history: The Black American in Delaware from colonial times to recent developments
PREREQ: HIST305

BAMS 313 African American Literature I 3
See ENGL344 for course description

BAMS 322 Race and Politics 3
See POSC322 for course description

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
See HIST331 for course description.

BAMS 332 History of Caribbean II 3
See HIST332 for course description.

BAMS 355 Race, Class and Crime 3
See CRJU355 for course description.

BAMS 361 Race, Power and Social Conflict 3
See SOCI361 for course description.

BAMS 395 Pan Africanism 3
See HIST395 for course description.

BAMS 415 Race, Class and Gender 3
See SOCI415 for course description

BAMS 418 Race, Gender and Poverty 3
See SOCI418 for course description
PREREQ: SOCI201

BAMS 432 Psychological Perspectives on the Black American 3
See PSY416 for course description

BAMS 439 Topics in African Politics 3
See POSC439 for course description

BAMS 440 Topics in Black American Studies 3
Analysis of important themes in the study of Afro-American life and history. Themes may vary each time the course is offered
RESTRICTIONS: Open to Juniors and Seniors only

BAMS 650 Black Community Studies 3
Investigation and analysis of various topics and developments of interest and significance to the Black community
RESTRICTIONS: May be repeated for credit when topics vary

BAMS 660 Research and Black American Studies 1-6

BIOLOGICAL SCIENCES

BISC 100 Freshman Seminar 1 PF
Five to seven carefully selected primary journal articles analyzed in discussion format. Emphasis on development of a sophisticated appreciation of the experimental frontier in an important area of modern biological research by examination of both classical and current papers
RESTRICTIONS: Open to Freshman majors by faculty invitation only

BISC 103 General Biology 3
The nature of science and biology as a science, origin of life, and structure and function of cells and multicellular organisms
RESTRICTIONS: Open to non-majors only

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 human; mechanisms of maintenance and reproductive behavior
RESTRICTIONS: Open to non-majors only

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

BISC 115 Human Heredity and Development Laboratory 1
Laboratory exercises dealing with probability, selection, karyotyping and pedigrees of humans
COREQ: BISC105

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

BISC 117 Elementary Evolutionary Ecology Laboratory 1
Laboratory exercises to compliment the subject matter of BISC107
COREQ: BISC107
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 explanation of the modern theory of evolution and the contributions it makes to other biological disciplines, and philosophical issues related to evolution.
RESTRICTIONS: Open to non-majors only.

BISC 207 Introductory Biology I 4
Biological science, including both structure and function. The perpetuation of life: cell division, genetics, and development. Lastly, the origin and diversity of life. Laboratory focuses on experimentation, data analysis, and an introduction to diversity.
COREQ: CHEM101, CHEM103, CHEM105 or CHEM111.
RESTRICTIONS: Non-majors may not take both BISC103 and BISC207 to fulfill the group D requirement in Arts and Science.

BISC 208 Introductory Biology II 4
The physiology of multicellular organisms: fungi, plants, and animals. The biology of populations, including behavior, evolution, and ecology. Laboratory deals with diversity, structure, function, and behavior, and using representatives of the major phyla.
PREREQ: BISC207
COREQ: CHEM102, CHEM104, CHEM106 or CHEM112.

BISC 276 Human Physiology and Anatomy 4
Physiology and anatomy of the basic organs of the human body. Emphasis on local fields, forests, and streams.
PREREQ: BISC207 or BISC208; and CHEM101, CHEM103, CHEM105 or CHEM111.
RESTRICTIONS: Open to non-majors only.

BISC 301 Molecular Biology of the Cell 4
Introduction to the molecular biology of eukaryotes and prokaryotes. Topics include structure and function of proteins and nucleic acids; replication and repair of DNA; biosynthesis of RNA and proteins; membranes, transport, replication, and function of the mitotic cell cycle, chromosomes, viruses, the immune system, and recombinant DNA.
PREREQ: BISC207 and one semester of organic chemistry.

BISC 302 General Ecology 3
Interactions between organisms and their environments, population dynamics and interactions, communities, energy transfer within an ecosystem, and components of the ecosystem.
PREREQ: BISC208.
RESTRICTIONS: Either BISC302 or BISC321, but not both, will count toward Biology major.

BISC 303 Genetic and Evolutionary Biology 4
The physical and chemical basis of heredity, the nature and mechanisms of gene action, and genes in populations. Laboratory included.
PREREQ: BISC207 and one semester of organic chemistry.

BISC 305 Cell Physiology 4
The structure and function of eukaryotic 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: BISC207, BISC208, CHEM103 and CHEM104.

BISC 306 General Physiology 4
Principles underlying function of organisms at the organism level, such as energy, metabolism, and immunopathologies. Laboratory included.
PREREQ: BISC208 and two semesters of chemistry.

BISC 311 Molecular Biology of the Cell 3
Introduction to the molecular biology of eukaryotes and prokaryotes. 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 mitotic cell cycle, chromosomes, viruses, the immune system, and recombinant DNA.
PREREQ: BISC207 and one semester of organic chemistry.
RESTRICTIONS: Chemical Engineering majors only.

BISC 312 General Ecology Laboratory 1
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.
COREQ: BISC302.

BISC 317 Tropical Ecology 3
Basic aspects of tropical ecology including climatic, geological and adaptive components. Focused on species interactions and ecosystems. Includes at least two field trips.
PREREQ: BISC207 and BISC208.

BISC 318 Tropical Amphibians and Reptiles 3
Topics in worldwide herpetology with a major focus on Costa Rica. Topics include evolution, extinct groups, and the orders Gymnophiona, Caudata, Anura, Terapontidae, Crocodylia, and others. Field trips included.
PREREQ: BISC107 or BISC207.
RESTRICTIONS: Taught in Costa Rica.

BISC 321 Environmental Biology 3
Basic ecological and physical principles with major emphasis on the effect of human-caused environmental changes on populations, communities, and ecosystems.
PREREQ: BISC207 and BISC208 or permission of instructor.

BISC 326 General Physiology Discussion 1
Discussion of selected topics in physiology with emphasis on experimental evidence.
COREQ: BISC306.

BISC 330 Biology of Vision 3
An integrative approach to the study of vision. Topics include the physics of light, the biochemistry of visual pigments, the electrophysiology of the visual pathway, the psychophysics of visual perception and robotic vision. Emphasis on an interdisciplinary approach.
PREREQ: BISC207 and BISC208.

BISC 366 Independent Study 1-6

BISC 371 Introduction to Microbiology 4
Major groups of microorganisms (algal, protozoan, fungal, and bacterial) 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 and BISC208.

BISC 390 Honors Colloquium 3
See ARSC390 for course description.

BISC 408 Mammalian Histology 4
Microscopic organization, identification, and functional anatomy of mammalian organ systems and tissues.
PREREQ: BISC207 or 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 442 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: BISC207 or BISC208.

BISC 444 Cooperative Education: Work Experience 1-9 PF
Supervised off-campus work experience that integrates academic learning with practical experience. Coop placements range from research and laboratory positions to actual field work.
RESTRICTIONS: Major for major credit: Faculty sponsorship and application to Coop Program required.

BISC 450 Proseminar in Environmental Science 3
See GEOG450 for course description.

BISC 466 Independent Study 1-6

BISC 471 Introductory Immunology 3
The biological basis of adaptive immunity including participating cells, cellular interactions, cytokines, and immunopathologies.
PREREQ: BISC207, BISC208, BISC301 or BISC305, BISC371.

BISC 480 Vertebrate Natural History 4
Biology of vertebrate organisms dealing specifically with adaptations to the environment, morphology, physiology, and taxonomy.

BISC 492 Human and Mammalian Cytogenetics 3
Introduction to the structure, function, and behavior of eukaryotic chromosomes with special emphasis on those in man and mammalian species. Covers methods of chromosome study, gene mapping and medical cytogenetics.
PREREQ: BISC207 and BISC208.
COREQ: BISC493.
RESTRICTIONS: BISC303 recommended in addition to Prerequisites. Offered in Spring of odd-numbered years.

BISC 493 Human and Mammalian Cytogenetics Laboratory 3
Teaches chromosome analysis in both clinical and research labs using modern techniques. Trains students to obtain preparations from human and experimental animals by culture methods and direct processing. Current banding techniques, microscopic analysis, karyotyping, tissue culture, microphotography and special cytotochemical procedures.
COREQ: BISC492.

BISC 495 Evolution 3
Present status of the theory of biological evolution and its implications in the different areas of biology.
PREREQ: BISC207 or BISC208.
BISC 498 Topics in Biology 3
In this multisection course, topics may vary from section to section. Information about each section is available in the Biology Office prior to registration. May be cross-listed with CSCC498.
PREREQ: BISC207 and 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 601 Immunobiology 4
Methods as basic as immunization and as complex as developing monoclonal antibodies. Methods used to investigate the genetics and protein structure of Galactosidase.
PREREQ: BISC301 or Biochemistry
RESTRICTIONS: Requires permission of instructor.

BISC 602 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: BISC301 and BISC303.

BISC 604 Nucleic Acids Laboratory 4 PF
Introduces techniques of gene cloning, amplification, manipulation and expression.
PREREQ: BISC301 and BISC653.
RESTRICTIONS: Biochemistry recommended. Senior or graduate status required. Offered in Winter Session.

BISC 605 Advanced Mammalian Physiology 4
Systemic mammalian physiology: neuromuscular, nervous and cardiovascular systems.
PREREQ: BISC306.

BISC 606 Advanced Mammalian Physiology 4
Continuation of BISC305. Systemic mammalian physiology: respiratory, renal, gastrointestinal, and reproductive systems and metabolism.
PREREQ: BISC605.

BISC 608 Genetic Toxicology 2
Chemical mutagenesis and carcinogenesis at the cellular and molecular level. Human genetic monitoring for chemical exposure. Mutagenic risk assessment.
PREREQ: BISC303 or Biochemistry.

BISC 617 Laboratory Techniques for Electron Microscopy 3
Techniques of electron microscopic study of mammalian tissues, including fixation, embedding, thin sectioning, staining, observation and interpretation.
RESTRICTIONS: Requires permission of instructor.

BISC 619 Gene Expression Laboratory 4
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 invivo DNA replication, DNA footprinting, DNA melting and/or unwinding and gel retardation.
PREREQ: BISC301.
RESTRICTIONS: Limited to ten students. Preference given to Bachelor of Science degree students with a concentration in biotechnology.

BISC 626 Neuroscience I 4
Structure and function of the sense organs, nervous system and motor systems in relation to integrated behavior. May be cross-listed with PSYC626.
PREREQ: BISC306 or BISC406, PSYC314 or BISC314, and PSYC310 or PSYC312.

BISC 627 Neuroscience II 3
Further study of the structure and function of the nervous system with emphasis on molecular, cellular, and network neurophysiology. May be cross-listed with PSYC627.
PREREQ: BISC306 or BISC406, PSYC310 or PSYC312, and PSYC314 or BISC314.

BISC 630 Ichthyology 4
Study of fishes including structure and function, reproduction, development, behavior, geographic distribution and systematics.
PREREQ: Physiology course.

BISC 637 Population Ecology 3
Theoretical and experimental aspects of single species growth and multispecies interactions.
PREREQ: BISC302.

BISC 641 Microbial Ecology 3
Principles of microbial interactions in natural environments, including applications to industrial microbiology and certain types of pollution.
PREREQ: BISC371.

BISC 642 Advanced Vertebrate Anatomy 4
An in-depth investigation of a specific aspect of vertebrate anatomy using dissection and other laboratory techniques. Each student will carry out an independent project.
PREREQ: BISC442.
RESTRICTIONS: Requires permission of instructor.

BISC 648 Bioremediation: Laboratory and Field Considerations 2
Provides students with an understanding of bioremediation as it is carried out in a field situation. The physical, chemical and microbiological factors and regulations that must be considered when carrying out this process will be covered.
RESTRICTIONS: Requires permission of instructor.

BISC 653 Recent Advances in Molecular Biology 2
Focuses on technical and conceptual advances in gene identification, cloning, manipulation, amplification, characterization and expression.
PREREQ: BISC301 or equivalent or one semester survey course in Biochemistry.

BISC 654 Biochemical Genetics 3
Emphasis on operon theory, feedback mechanisms, control of cell division, mutagenesis, isolation of RNA, somatic cell genetics, gene amplification, lysogeny, restriction and modification, and ribosome structure and function.
PREREQ: BISC303 or Biochemistry.

BISC 656 Evolutionary Genetics 3
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: BISC303.

BISC 658 Developmental Genetics 3
How genes control the development of organisms. Emphasis on the regulation of developmental genes and on application of recombinant DNA techniques (gene cloning, etc.) to this problem. Examples include genes in sporulating bacteria, Drosophila, chic, mouse and man.
PREREQ: BISC303.

BISC 660 Environmental Physiology 3
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.

BISC 661 Biology of Striated Muscle 3
Structure and function of striated muscle studied through a review of the literature. Major topics include the organization of the contractile apparatus, the molecular basis of contraction, muscle fiber types, motor units and their relationship to muscle activity, and changes that occur in muscles associated with growth, aging, training and/or injury.
PREREQ: BISC442, and BISC306 or BISC276.

BISC 672 Neuroimmunology 3
Examines reciprocal communication between the nervous and immune systems. Analyzes the influence of humoral (neurotransmitters and neuromodulators) and neural (nerve-muscle anatomical pathways) factors on components comprising the immune system; and the influence of humoral factors (immunoregulators, released by immune system cells) on the central nervous system.
PREREQ: BISC471, BISC670, or BISC671; and BISC306 or BISC406.

BISC 673 Topics in Immunogenetics 3
In-depth analysis of important advances in the field of immunology. Groups discuss and present reviews of the primary literature. Topics may include HIV infection, T-cell function, and cytokine regulation of the immune response.
PREREQ: Course in immunology.
RESTRICTIONS: With instructor's permission, may be repeated once for credit.

BISC 675 Cardiopulmonary Physiology 3
The physiology and biophysics of the mammalian heart, lungs and circulation including gaseous exchange and transport between the circulating medium and the external environment.
PREREQ: A physiology course at or above the 300 level.
COREQ: BISC676.
RESTRICTIONS: Corequisite applies to Biology majors only.

BISC 679 Virology 3
Molecular biology of animal viruses. Virus structure and organization; mechanisms of penetration, replication, maturation and transformation.
PREREQ: BISC301 or Biochemistry.

BISC 693 Human Genetics 3
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 counselling, multifactorial inheritance and the genetics of cancer.
PREREQ: BISC303.

BISC 801 Seminar in Ecology 2
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.
BISC 802 Cell and Genetic Systems 1 PF
Critical evaluation of selected topics in cell and genetic systems through presentations given by researchers from both inside and outside the University community.
RESTRICTIONS: Requires permission of instructor.

BISC 806 Advances in Physiology 2
Colloquium and special studies on a selected aspect of animal physiology
RESTRICTIONS: May be repeated for up to 10 credits when topics vary. Offered only in Spring.

BISC 820 Environmental Research 3
See GEOG820 for course description.

BISC 868 Research 1-12

BISC 869 Master's Thesis 1-6

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

BISC 969 Doctoral Dissertation 1-12 PF

BIOMECHANICS & MOVEMENT SCIENCE

BMSC 865 Seminar 0 PF

BMSC 866 Special Problem 1-6

BMSC 868 Research 3

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

BMSC 969 Doctoral Dissertation 1-12 PF

BIORESOURCES ENGINEERING

BREG 603 Soil Physics 3
Relationship of soil moisture, soil temperature, soil structure, shear strength and compaction to irrigation, drainage, plant growth, tillage and erosion. May be cross-listed with PLSC603.
PREREQ: PLSC204.

BREG 621 Biosources Management Systems 4
Water movement in soil-plant-atmosphere continuum, heat flow in soils, radiant energy in plant environment, groundwater, soil erosion and design of irrigation, drainage and soil erosion control systems.
PREREQ: EGTE321, PLSC204, BISC103

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: EGTE328 or CIEG233

BREG 666 Special Problem 1-6

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
A survey of basic business concepts designed for the non-business major. Topics covered will include business organization, management, marketing, operations research and finance.
RESTRICTIONS: No majors within the Business Administration or Accounting degree programs may receive credit for this course.

BUAD 301 Introduction to Marketing 3
Management of the marketing functions, marketing research, product planning, distribution channels, pricing, personal selling and advertising. Emphasis on consumer and industrial markets.
PREREQ: ECON100 or ECON112.

BUAD 302 Marketing Research 3
Focus on the marketing research process as an aid in making decision making. Defining marketing problems, identifying marketing information needs, developing methods to gather information, and applying research results to marketing problems.
PREREQ: STAT202, BUAD301 and ACCT160.

BUAD 306 Operations Management 3
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: STAT202 and ACCT160.

BUAD 309 Management and Organizational Behavior 3
The processes and procedures used to manage performance effectively, including behavioral implications and an awareness of the individual's impact on others.

BUAD 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. May be cross-listed with ECON341 and/or POSC341.
PREREQ: ECON112
RESTRICTIONS: Counts as a BUAD elective for students receiving a degree in Business Administration. Credit for BUAD/ECON/POSC341 given only once.

BUAD 346 Analysis of Operations Problems 3
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

BUAD 366 Independent Study 1-6

BUAD 382 International Business Management 3

BUAD 383 Seminar on International Business 3
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.

BUAD 385 Administrative Theory 3
Concepts of administration at the individual, group and organizational level of analysis. Emphasis on organizational level of analysis with topics including job design, organization structure and design, and intra- and inter-organizational processes.
PREREQ: BUAD309

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 BSBA 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 BSBA 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 BSBA candidates.

BUAD 420 Industrial 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.
### BUSINESS ADMINISTRATION

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUAD 421</td>
<td>Human Resource Management</td>
<td>3</td>
<td>Emphasizes key human resource management requirements: acquisition of personnel (planning, selecting, recruiting and training) and maintenance of personnel (evaluation, compensation, working conditions and labor relations). PREREQ: BUAD309</td>
</tr>
<tr>
<td>BUAD 427</td>
<td>Information Technology Applications in Management</td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>BUAD 428</td>
<td>Management Systems</td>
<td>3</td>
<td>Concepts of general systems theory, with applications to analysis of management systems, work flows and information flows. Design and analysis of sociotechnical systems, project and program management. PREREQ: BUAD309</td>
</tr>
<tr>
<td>BUAD 429</td>
<td>Seminar on Organizations</td>
<td>3</td>
<td>Topical seminar on such management issues as organizational socialization, work motivation, and organization-environment relations. Development of an individual research project is stressed. PREREQ: Twelve credit hours of management courses</td>
</tr>
<tr>
<td>BUAD 441</td>
<td>Strategic Management</td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>BUAD 444</td>
<td>Small Business Management</td>
<td>3</td>
<td>Principles of managing a small business and differences in approach between large and small companies. Characteristics of the entrepreneur. Interpersonal and skill relationships in partnerships. The functions of accounting, finance, marketing, personnel and production forecasting for the small business. PREREQ: BUAD309</td>
</tr>
<tr>
<td>BUAD 446</td>
<td>Operations Planning and Control</td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>BUAD 447</td>
<td>Quality Management</td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>BUAD 448</td>
<td>Decision Support Systems for Operations</td>
<td>3</td>
<td>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, ACCT240</td>
</tr>
<tr>
<td>BUAD 449</td>
<td>Managing Decision Support Systems Projects</td>
<td>3</td>
<td>Application of the principles of project management to the development and implementation of decision support systems for operations. Students conduct actual projects for local businesses and organizations. PREREQ: BUAD446 and BUAD447</td>
</tr>
<tr>
<td>BUAD 446</td>
<td>Independent Study</td>
<td>1-6</td>
<td>Scheduling as the process of commercial persuasion and as service to the customer. Major operating responsibilities of the sales manager, recruitment, training, motivation, compensation, territory management and manpower planning and control. PREREQ: BUAD301</td>
</tr>
<tr>
<td>BUAD 471</td>
<td>Advertising Management</td>
<td>3</td>
<td>Planning, implementing, and evaluating advertising and sales promotion activities. Determining advertising objectives, selection of campaign themes and media, evaluating advertisements and campaigns, controlling advertising and promotion expenditures, the client-agency relationship, regulation, and the social and economic effects of advertising. PREREQ: BUAD301</td>
</tr>
<tr>
<td>BUAD 473</td>
<td>Buyer Behavior</td>
<td>3</td>
<td>The decision processes associated with buying and consumption. Social, cultural and psychological influences on consumer decisions and consumption patterns. The relationship between buyer behavior and marketing decision making. PREREQ: BUAD301</td>
</tr>
<tr>
<td>BUAD 474</td>
<td>Marketing Channels and Retailing</td>
<td>3</td>
<td>Focus on decision processes involved in establishing the path for the movement of products, titles, payment, and information between producers and users. Emphasis on the decision necessary for successful retail operations. PREREQ: BUAD301</td>
</tr>
<tr>
<td>BUAD 475</td>
<td>International Marketing</td>
<td>3</td>
<td>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: BUAD301</td>
</tr>
<tr>
<td>BUAD 477</td>
<td>Information Technology Applications in Marketing</td>
<td>3</td>
<td>How changes in information technology affect the marketplace and how it should be used to support marketing decision-making. Emerging opportunities that could drastically alter the way organizations market their products and provide service to their customers are presented and discussed. PREREQ: BUAD301</td>
</tr>
<tr>
<td>BUAD 479</td>
<td>Marketing Strategy for the Firm</td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>BUAD 810</td>
<td>Titans, Teams and Technology</td>
<td>3</td>
<td>Focuses on understanding team management within different organizational contexts. Effective communication, including the use of electronic communication technologies for team development and maintenance, is emphasized. Students have the opportunity to practice team work and leadership skills.</td>
</tr>
<tr>
<td>BUAD 820</td>
<td>Data Analysis and Quality Management</td>
<td>3</td>
<td>Emphasizes quality management primarily via statistical process control. Focuses on data analysis for the purpose of measurement, inference, quality and productivity improvement. Descriptive statistics, graphical analysis, exploratory data analysis, applications of common distributions and models such as regression are covered.</td>
</tr>
<tr>
<td>BUAD 831</td>
<td>Design and Management of Operations</td>
<td>3</td>
<td>Overview major concerns in the design and management of operations within a business. Focuses on topics such as product design, layout and process design, job design and measurement, forecasting, project, production and staff scheduling, inventory control, and materials management in both manufacturing and service industries. PREREQ: BUAD820</td>
</tr>
<tr>
<td>BUAD 832</td>
<td>Operations Planning and Control</td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>BUAD 833</td>
<td>International Operations</td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>BUAD 834</td>
<td>Special Topics in Operation Management</td>
<td>1-3</td>
<td>Covers various topics in operations management at all levels of the firm. Individual inquiry stressed. PREREQ: BUAD831</td>
</tr>
<tr>
<td>BUAD 835</td>
<td>Managing New Product Development Projects</td>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>BUAD 836</td>
<td>Problem Structuring and Analysis for Decision Making</td>
<td>3</td>
<td>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</td>
</tr>
</tbody>
</table>
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 SOCIAL, ETHICAL, LEGAL AND POLITICAL ENVIRONMENT OF THE FIRM  3
Examines the social, legal and ethical rights and obligations of the firm, employers and employees, with respect to product safety, sales, advertising, hiring and firing, company loyalty, the environment and the community
PREREQ: BUAD840

BUAD 841 INTERNATIONAL BUSINESS MANAGEMENT  3
Development of business strategies for the multinational business organization. Emphasis on dealing with international governmental constraints and organization structures. Projects focusing on the assessment of the business environment in specific countries.
PREREQ: BUAD810

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.). Course 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 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 870 ORGANIZATIONAL BEHAVIOR AND ADMINISTRATION  3
Develops a knowledge base and requisite skills for managing individual, group, and organizational processes through the use of diagnostic models, cases, and/or experimental exercises. Individual and organizational level topics are emphasized. Some group level topics are also included.
PREREQ: BUAD870

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

BUAD 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

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 reengineering. Individual inquiry is stressed.
PREREQ: BUAD870

BUAD 875 HUMAN RESOURCE ADMINISTRATION  3
Examines the personnel/human resource function focusing on five key areas: 1) procurement, 2) training and development, 3) compensation, 4) security, and 5) labor-management relations. Throughout, attention is paid to international practices and an effort is made to integrate business functions both strategically and operationally.
PREREQ: 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 878 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
Acquaints 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, following. Negotiation is broadly defined to include many varieties of bargaining, third-party dispute intervention and organizational justice.
PREREQ: BUAD870

BUAD 880 COMPETITIVE MARKETING STRATEGY  3
Focuses on developing customer-focused plans and strategies for projects and business units in an increasingly competitive global environment. Emphasizes managerial practices relating to project/service offering, pricing, promotion, and physical distribution and how these are integrated to satisfy industrial and ultimate consumers.
PREREQ: BUAD870 and/or ECON51

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/or 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 retailers, wholesalers, and physical distribution. Governmental and other constraints on channel activities are also studied.
PREREQ: BUAD880

BUAD 886 ADVERTISING STRATEGY  3
Intended 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
BUSINESS ADMINISTRATION

BUEC 325 MODERN BUSINESS COMPUTING  3
Use of higher level contemporary computing languages to structure solutions to business problems. Prototyping applications of systems.
PREREQ: ACCT 160

BUEC 330 SYSTEMS ANALYSIS AND IMPLEMENTATION  3
Provides a conceptual basis for the analysis of business information problems and the design and implementation of systems to solve these problems. Considers alternative methodologies for analyzing, designing and implementing management information systems.

BUEC 366 INDEPENDENT STUDY  1-6

BUEC 430 INFORMATION PLANNING AND DATA MANAGEMENT  3
Emphasis on applying a systems approach to planning information requirements for an organization. Considers both theoretical and practical data base methodologies.
PREREQ: BUEC 330 and BUEC 325

BUEC 431 TECHNOLOGICAL PROBLEM SOLVING  3
Design and implementation of behavioral and quantitative models to aid decision makers. A project designing and implementing an actual decision support system is required. Emphasis on an effective design, implementation and use of existing models of decision support.
PREREQ: BUEC 430
RESTRICTIONS: MI/DSS minors must take BUEC 432 as a corequisite.

BUEC 432 PROBLEM SOLVING PROJECT MANAGEMENT  3
Capstone course in the Business and Economics MI/DSS minor. Emphasis on applying the concepts of project management to real management information problems.
PREREQ: BUEC 430
RESTRICTIONS: MI/DSS minors must take BUEC 431 as a corequisite.

BUEC 466 INDEPENDENT STUDY  1-6

COGNITIVE SCIENCE

CGSC 266 SPECIAL PROBLEM  1-3

CGSC 270 INTRODUCTION TO COGNITIVE SCIENCE  3
Introduces the symbolic view of mind embodied in Cognitive Science. Concentrates on the domains of language and visual perception and role of representation and algorithm in theories of processing and development. Includes alternatives posed by connectionist models of cognition.

CGSC 314 BRAIN AND BEHAVIOR  3
See PSYC 314 for course description.

CGSC 330 PHILOSOPHY OF MIND  3
See PHIL 330 for course description.

CGSC 340 COGNITION  3
See PSYC 340 for course description.

CGSC 366 INDEPENDENT STUDY  1-3

CGSC 411 BRAIN AND COMPUTER  3
See PSYC 411 for course description.

CGSC 441 COMPUTERS AND COGNITION  3
See PSYC 441 for course description.

CGSC 480 COMPUTERS AND THE MIND  3
See CISC 480 for course description.

CGSC 481 ARTIFICIAL INTELLIGENCE  3
See CISC 481 for course description.

CGSC 485 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.

CGSC 496 PSYCHOLINGUISTICS  3
Linguistic approaches to cognition. Issues in the relation of language to thought, universals, language acquisition, and theories of syntactic and semantic processing.
PREREQ: PSYC 610 or equivalent

CGSC 615 HISTORY OF COGNITIVE PSYCHOLOGY  3
See PSYC 615 for course description.

CGSC 616 COMPUTER MODELS OF COGNITION  3
See PSYC 616 for course description.

CGSC 630 NEURONS AND NETWORKS  3
See PSYC 630 for course description.

CGSC 642 MENTAL REPRESENTATION AND MEMORY  3
See PSYC 642 for course description.

CGSC 666 SPECIAL PROBLEM  1-3

CGSC 681 ARTIFICIAL INTELLIGENCE  3
See CISC 681 for course description

CGSC 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.

CGSC 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.
PREREQ: PSYC 610 or equivalent

CGSC 866 INDEPENDENT STUDY  1-3

CGSC 890 STUDIES IN COGNITIVE SCIENCE  3
Varying topics in Cognitive Science, such as mental models, philosophical problems in the study of mind, computational modeling, and development.
RESTRICTIONS: May be repeated for credit as topic changes.

CHEMICAL ENGINEERING

CHEG 009 CHEMICAL ENGINEERING FRESHMAN SEMINAR  0 PF
Defines chemical engineering and presents predictions of the future of the profession in research and development.

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. Stresses the conservation of matter and energy.
COREQ: MATH 243

CHEG 166 SPECIAL PROBLEM  1-3
RESTRICTIONS: Course will not 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.
PREREQ: CHEG 112 and MATH 243
COREQ: CHEG 443

CHEG 266 SPECIAL PROBLEM  1-3
RESTRICTIONS: Course will not count toward graduation in Chemical Engineering.

CHEG 305 APPLIED MATHEMATICS FOR CHEMICAL ENGINEERING  3
See MATH 305 for course description.

CHEG 320 ENGINEERING ECONOMICS AND RISK ANALYSIS  2
Principles of engineering economics, risk assessment and analysis, and environmental and safety issues within the context of chemical engineering design.
PREREQ: MATH 302, CHEG 112

CHEG 325 CHEMICAL ENGINEERING THERMODYNAMICS  4
A continuation of CHEG 231. The thermodynamics of mixtures; phase and chemical equilibrium. Application to staged separation processes, particularly distillation.
PREREQ: CHEG 231

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: CHEG 325, CHEM 444 and MATH 302
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: MATH302 and CHEG231.

CHEG 342 Heat and Mass Transfer 4
Theory of heat transfer in flow and nonflow systems. Fundamentals of mass transfer. Empirical correlations for transfer in free and forced convection; and application to process engineering problems.
PREREQ: CHEG341

CHEG 345 Chemical Engineering Laboratory I 3
Laboratory studies demonstrating the principles of fluid mechanics, heat transfer, mass transfer and thermodynamics. Emphasis on correlation of experimental results and on written and oral presentation.
PREREQ: CHEG235 and CHEG341
COREQ: CHEG342

CHEG 366 Independent Study 1-6
CHEG 401 Chemical Process Dynamics and Control 4
Analysis of transients in chemical processing equipment and chemical reactors. Frequency response analysis, state variable, representation and design of linear control systems. Laboratory demonstrations and exercises.
PREREQ: MATH302, CHEG332 and CHEG444

CHEG 432 Chemical Process Analysis 3
A study of the principles and techniques used to develop a process design. Skills are developed by considering process synthesis case studies.
PREREQ: CHEG320, CHEG332 and CHEG444
COREQ: CHEG401

CHEG 444 Mass Transfer Operations 3
Application of chemical engineering fundamentals to the design of mass transfer processes for separation and purification. Examples in design of distillation, absorption and extraction equipment.
PREREQ: 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 CHEG444. Technical report writing emphasized.
PREREQ: CHEG332, CHEG342 and CHEG345
COREQ: CHEG443

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.

CHEG 474 Chemical Engineering Projects 3
A continuation of CHEG473

CHEG 595 Patent Law 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 POLYMER SCIENCE AND ENGINEERING I 3
Introduction to polymer physics with emphasis on structure-property models for bulk polymers, viscoelasticity, polymer morphology, crystallization and crystallization kinetics, effects of processing on bulk polymers and structure-property correlations for bulk polymers. First course in the polymer science sequence. May be cross-listed with MASC600.

CHEG 601 Structure and Properties of Polymeric Materials 3
See MASC601 for course description

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.

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
Industrial catalytic reactions, mechanisms, kinetics and phase behavior. Theory of catalysis from solutions to non-uniform surfaces.
PREREQ: CHEM331, CHEM332, CHEM443 and CHEM444.

CHEG 610 Industrial and Engineering Chemistry 3
Investigation of the role of chemistry and engineering in important industrial processes. Emphasis on innovations in chemical processing routes based on the interplay between chemistry and engineering. Flow-sheeting of specific routes.
RESTRICTIONS: Requires permission of instructor.

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 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.

CHEG 616 Chemistry and Physics of Surfaces and Interfaces 3
Fundamental and engineering aspects of metal, inorganic and polymer surfaces; their structure and defects, characterization, thermodynamics, adsorption and electronic properties. Applications to catalysis, microelectronics, mechanical properties and environment sensitive behavior. May be cross-listed with MASC616.

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, powder dispersions and supramolecular structures.
PREREQ: CHEG325 and CHEG444

CHEG 620 Biochemical Engineering I 3
Application of chemical engineering principles to design and analysis of biological reactors and product recovery processes. Includes introduction to microbiology, biochemistry and molecular biology with emphasis on recombinant cells.
PREREQ: CHEG332 and CHEG342

CHEG 622 Risks, Hazards, and the Environment 3
Topics include: Risk—reliability engineering, failure analysis, design and operation of hazardous processes; hazard—toxicology and risk assessment, pharmacokinetics, fate and transport of chemical in the environment; environment—dispersion of chemicals and particulates, source models, chemical and biological treatment of wastes.
PREREQ: CHEG325 and CHEG341
COREQ: CHEG342

CHEG 650 Biomedical Engineering I 3
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.

CHEG 801 Process Control and Dynamics 3
Extension of SISO control concepts to MIMO systems appropriate to the chemical industry. Direct synthesis methods, internal model reference control, robust control and control in stochastic systems.
PREREQ: Undergraduate control course.

CHEG 825 Chemical Engineering Thermodynamics 3
Applications of classical and molecular thermodynamics to industrial problems in chemical and phase equilibria. 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 2-3
The application of mathematical methods to the solution of chemical engineering problems. The use of ordinary and partial differential equations and of difference equations in fluid flow, heat transfer, diffusion and other unit operations.
PREREQ: CHEG443 and MATH302.

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.

CHEG 830 Fluid Mechanics 3
Use of field equations of motion and a variety of constitutive assumptions to solve problems involving both laminar and turbulent flows. Emphasizes polymer processing, fluids transport and boundary layer theory.
PREREQ: Undergraduate study in fluid mechanics or transport phenomena.
CHEG 832 TRANSPORT AND RELAXATION PHENOMENA IN POLYMERS
Modelling and key experimental findings of transport and relaxation phenomena in polymer melts and solutions. Macroscopic descriptions are connected to microstructure with emphasis on structure-property relations. Polymer rheology and linear viscoelasticity. Nonisothermal flows, heat transfer and diffusion in polymers stress induced migration, phase transitions and crystallization
PREREQ: Graduate courses in fluid mechanics, thermodynamics and diffusional operations.

CHEG 835 APPLIED CHEMICAL KINETICS
The application of modern methods and recent experimental data to the design of chemical reaction equipment
PREREQ: Requires undergraduate reaction engineering and physical chemistry

CHEG 836 ADVANCED CHEMICAL KINETICS
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 863 DIFFUSIONAL OPERATIONS
Advanced coverage of the latest theoretical and experimental studies in several fields involving mass transfer. These fields include humidification, absorption, extraction, distillation, ion exchange and adsorption
PREREQ: CHEM 444

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

CHEG 969 DOCTORAL DISSERTATION
1-12 PF

CHEMISTRY AND BIOCHEMISTRY

CHEM 100 CHEMISTRY AND HUMAN ENVIRONMENT
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
Fundamental laws of chemical action and the properties, uses and methods of preparation of the more important elements and their compounds. Includes one three-hour laboratory per week that introduces basic experiments in general chemistry
RESTRICTIONS: One year of high school chemistry recommended; high school algebra or concurrent enrollment in MATH 101 or higher mathematics course strongly recommended. Only one course among CHEM 101, CHEM 103, CHEM 105 and CHEM 111 can count toward graduation

CHEM 102 GENERAL CHEMISTRY
A continuation of CHEM 101. Includes one three-hour lab per week that is a continuation of the laboratory experience begun in CHEM 101
PREREQ: CHEM 101
RESTRICTIONS: Only one course among CHEM 102, CHEM 104 and CHEM 112 can count toward graduation

CHEM 103 GENERAL CHEMISTRY
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 one three-hour laboratory per week
COREQ: MATH 114 or higher
RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. One year of high school chemistry strongly recommended. Only one course among CHEM 101, CHEM 103, CHEM 105 and CHEM 111 can count toward graduation

CHEM 104 GENERAL CHEMISTRY
Continuation and application of CHEM 103 with additional emphasis on chemical spontaneity, equilibrium, rates of reactions, electrochemistry and organic chemistry. Includes one three-hour laboratory per week
PREREQ: CHEM 101, CHEM 103 or CHEM 105
RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. Only one course among CHEM 102, CHEM 104 and CHEM 112 can count toward graduation

CHEM 105 GENERAL CHEMISTRY
Nuclear chemistry, periodicity, structure and bonding, classes of reactions, stoichiometry, solution chemistry, chemical equilibria and electrochemistry
COREQ: MATH 110
RESTRICTIONS: For nursing majors who will continue with CHEM 106. High school algebra required in lieu of Corequisites; one year of high school chemistry recommended. Only one course from among CHEM 101, CHEM 103, CHEM 105 and CHEM 111 can count toward graduation

CHEM 106 ELEMENTARY BIOORGANIC CHEMISTRY
Survey of organic chemistry and biochemistry includes one three-hour laboratory per week that deals with selected concepts in biochemistry and biologic organic chemistry
PREREQ: CHEM 105

CHEM 111 GENERAL CHEMISTRY
Fundamental laws of chemical action with emphasis on atomic structure, chemical bonding and the important classes of substances
PREREQ: One year of high school chemistry, two years strongly preferred
COREQ: CHEM 119, and MATH 115 or higher math course
RESTRICTIONS: For biochemistry, chemistry, chemical engineering and environmental engineering majors. Only one course from among CHEM 101, CHEM 103, CHEM 105 and CHEM 111 can count toward graduation

CHEM 112 GENERAL CHEMISTRY
Introduction to most of the major subfields of chemistry: descriptive inorganic chemistry, coordination chemistry, organic chemistry, nuclear chemistry, thermodynamics, kinetics and electrochemistry
PREREQ: CHEM 103 or CHEM 111
COREQ: CHEM 120
RESTRICTIONS: For biochemistry, chemistry, chemical engineering and environmental engineering majors. Only one course from among CHEM 102, CHEM 104 and CHEM 112 can count toward graduation

CHEM 119 QUANTITATIVE CHEMISTRY I
Chemical equilibrium theory applied to basic gravimetric and volumetric analyses. Includes one three-hour laboratory per week
PREREQ: One semester of college chemistry
COREQ: CHEM 111 and MATH 115
RESTRICTIONS: One year of high school chemistry accepted in lieu of Coreq

CHEM 120 QUANTITATIVE CHEMISTRY II
The theory of analytical chemistry with introductory practice in UV-visible spectroscopy, electrochemistry and separation science. Includes two three-hour laboratories per week
PREREQ: CHEM 104, or CHEM 111 and CHEM 119

COREQ: CHEM 112

CHEM 166 SPECIAL PROBLEM
1-3 PF

CHEM 213 ELEMENTARY ORGANIC CHEMISTRY
Fundamentals of organic chemistry. Includes one three-hour laboratory per week that introduces basic laboratory techniques of organic chemistry
PREREQ: CHEM 102 or CHEM 104 or CHEM 105
RESTRICTIONS: Designed for students of agriculture, human resources and medical technology

CHEM 214 ELEMENTARY BIOCHEMISTRY
Principal classes of biomolecules and their structural and metabolic interrelationships.
PREREQ: CHEM 213

CHEM 216 ELEMENTARY BIOCHEMISTRY LABORATORY
1 Basic manipulations and techniques for the characterization of biomolecules
PREREQ: CHEM 213
COREQ: CHEM 214

CHEM 220 QUANTITATIVE ANALYSIS
Chemical equilibria in aqueous solutions; volumetric and gravimetric analysis; and introduction to chromatography and spectrometry
PREREQ: CHEM 102, CHEM 104 or CHEM 105
COREQ: CHEM 221

CHEM 221 QUANTITATIVE ANALYSIS LABORATORY
1 The practice and application of volumetric and gravimetric analysis, as well as basic chromatographic and spectrometric measurements
PREREQ: CHEM 102, CHEM 104 or CHEM 105
COREQ: CHEM 220

CHEM 311 SURVEY OF ORGANIC CHEMISTRY I
Firsthalf of a two-semester survey of the structure, synthesis, and reactions of organic compounds
PREREQ: CHEM 104
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM 311 and CHEM 321 nor CHEM 331 and CHEM 333 can both count toward graduation
CHEM 312 Survey of Organic Chemistry II 3
Second half of a two-semester survey of the structure, synthesis, and reaction of organic compounds.
PREREQ: CHEM311
RESTRICTIONS: Not for credit for CHEM BS majors. Neither CHEM312 and CHEM322 nor CHEM312 and CHEM332 can both be counted toward graduation.

CHEM 321 Organic Chemistry 4
First half of a two-semester survey of the structure, synthesis, and reactions of organic compounds. Includes one three-hour laboratory per week that introduces the basic laboratory techniques of organic chemistry.
PREREQ: CHEM104
RESTRICTIONS: Not for CHEM BS majors. CHEM321 and CHEM331 cannot both be counted toward graduation.

CHEM 322 Organic Chemistry 4
Second half of a two-semester survey of the structure, synthesis, and reactions of organic compounds. Includes one three-hour laboratory per week that introduces the basic laboratory techniques of organic chemistry.
PREREQ: CHEM321
RESTRICTIONS: Not for CHEM BS majors. CHEM322 and CHEM332 cannot both be counted toward graduation.

CHEM 331 Organic Chemistry 3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods.
PREREQ: CHEM104, CHEM112 or CHEM120.
COREQ: CHEM333
RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other students desiring fuller treatment than in CHEM321. Neither CHEM311 and CHEM321, nor CHEM321 and CHEM331 can both count toward graduation.

CHEM 332 Organic Chemistry 3
Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods.
PREREQ: CHEM321, CHEM333.
COREQ: CHEM334
RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other students desiring fuller treatment than in CHEM322. Neither CHEM312 and CHEM322, nor CHEM322 and CHEM332 can both count 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, or preferably CHEM112, or CHEM120.
COREQ: CHEM331
RESTRICTIONS: Registration for two credits involves both a lecture period and a laboratory period each week.

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
Discussion of the nature of scientific research, ethics of science, impact of science on society, role of scientific publication and use of the library. Reading of a series of research papers to gain an understanding of what a biochemist does. Perspectives on the history of biochemistry.
PREREQ: CHEM331.

CHEM 365 Seminar 1 PF

CHEM 366 Independent Study 1-3 PF

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 3
Less mathematical than CHEM443.444. Kinetics and mechanisms of reactions; chemical thermodynamics, states of matter, phase and chemical equilibrium; colloidal properties of solutions; and atomic and molecular structure.
PREREQ: General Chemistry and Calculus (MATH221 and MATH222 or MATH241).
RESTRICTIONS: Course acceptable for B.A. but not B.S. degree in chemistry. CHEM418 and CHEM443 cannot both be counted toward graduation.

CHEM 419 Introductory Physical Chemistry 3
Continuation of CHEM418.
PREREQ: CHEM418.
RESTRICTIONS: CHEM419 and CHEM444 cannot both be counted toward graduation.

CHEM 424 Quantum Mechanics 3
See PHYS424 for course description.

CHEM 437 Instrumental Methods 3
Study of the principles and application of spectroscopic, chromatographic and electroanalytical instrumentation in chemical analysis.
PREREQ: CHEM322 or CHEM332.
COREQ: CHEM443.

CHEM 438 Instrumental Methods Laboratory I 1
Application of spectroscopic, chromatographic and electroanalytical techniques to the solution of chemical problems.
PREREQ: CHEM322 or CHEM334.
COREQ: CHEM444.

CHEM 443 Physical Chemistry 3
Application of the principles and methods of mathematics and physics to the quantitative study of chemical problems.
PREREQ: CHEM120 or CHEM220 and CHEM221, MATH242 (MATH243 recommended), PHYS208 (recommended) or PHYS202.
RESTRICTIONS: CHEM418 and CHEM444 cannot both be counted toward graduation.

CHEM 444 Physical Chemistry 3
Continuation of CHEM443.
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 1
Physical methods for studying properties of matter.
PREREQ: CHEM120 or CHEM220 and CHEM221.
RESTRICTIONS: To be taken concurrently with or subsequent to CHEM443 and CHEM444, or CHEM418 or CHEM419.

CHEM 446 Physical Chemistry Laboratory 1
Continuation of CHEM445.
PREREQ: CHEM120 or CHEM220 and CHEM221.

CHEM 457 Inorganic Chemistry 3
Basic theoretical concepts of inorganic chemistry with emphasis on structure, bonding and reactions.
PREREQ: CHEM418 or CHEM443, and CHEM112.

CHEM 458 Inorganic Chemistry Laboratory I 1
Laboratory synthesis and characterization of inorganic and organometallic compounds and independent study.
COREQ: CHEM457.

CHEM 465 Senior Seminar 1 PF

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 staff.
RESTRICTIONS: Requires permission of instructor (letter grade upon completion of written thesis).

CHEM 527 Introductory Biochemistry 3
A one-semester survey of the fundamentals of biochemistry.
PREREQ: CHEM322 or CHEM332.
RESTRICTIONS: For undergraduate majors in biology and biochemistry, graduate students in agriculture, biology, nutrition, marine sciences and engineering not using biochemistry professionally. BISC103 or BISC207 strongly recommended.

CHEM 608 Environmental Soil Chemistry 3
See PLSC608 for course description.

CHEM 620 Analytical Spectroscopy 3
Experimental aspects of electronic and vibrational spectroscopy. Linear and nonlinear optics; photon counting; Fourier transformation; and topics from the current literature.
PREREQ: CHEM437 and CHEM438.

CHEM 621 Chemical Separations 2
Fundamental description of chemical separations. Zone broadening and separation efficiency; and chemistry of separations. Application of fundamental principles to chromatography, electrophoresis, field-flow fractionation and newly emerging techniques.
PREREQ: CHEM437 and CHEM438.

CHEM 622 Electroanalytical Chemistry 3
Analytical applications of electrochemistry: dynamic and steady-state methods of potentiometry, coulometry, voltammetry, and ancillary techniques.
RESTRICTIONS: Requires Senior or graduate status in chemistry. Offered in Fall of even-numbered years.
CHEM 623 CHEMOMETRICS 3
An introduction to modern methods of reducing and analyzing chemical data using computers. Covers 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

CHEM 624 INTERPRETATION OF MASS SPECTRA 1
Molecular ions and elemental composition from precise mass and isotopic ratios. Fragmentation mechanisms and the correlations of electron ionization mass spectra with molecular structure.
RESTRICTIONS: Requires Junior, Senior or graduate status in chemistry/biochemistry

CHEM 625 CHEMICAL IONIZATION MASS SPECTROMETRY 1
Analytical applications of ion/molecule reactions. Mechanisms and thermochemical kinetics of gaseous ionic reactions. Correlations of spectra with molecular structure.
RESTRICTIONS: Requires Junior, Senior or graduate status in chemistry/biochemistry

CHEM 626 INSTRUMENTAL METHODS IN MASS SPECTROMETRY 2
Experimental techniques in analytical mass spectrometry: ionization mass analysis, tandem mass spectrometry, coupled chromatographic methods and applications.
RESTRICTIONS: Requires Senior or graduate status in chemistry

CHEM 627 PRACTICAL MASS SPECTROMETRY 1
Instrumentation and experiments in gas chromatography/mass spectrometry.
RESTRICTIONS: Requires permission of instructor. CHEM624 recommended as coreq. or Prereq

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: CHEM633

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: CHEM642

CHEM 644 MECHANISMS OF ENZYME CATALYSIS 3
Detailed chemical mechanism of enzyme catalysis for several representatives. Emphasis on kinetic and physical organic methods.
PREREQ: CHEM641 or CHEM527

CHEM 647 BIOCHEMICAL EVOLUTION 3
The origins and evolution of life as reconstructed from geochemical, biochemical and genetic evidence.
PREREQ: CHEM642 or CHEM527

CHEM 648 MEMBRANE BIOCHEMISTRY 3
Recent advances in the structure and function of biomembranes and related model systems, with particular reference to molecular and physiochemical mechanisms.
PREREQ: CHEM527 or CHEM641

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 BIOINORGANIC 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 673 PRACTICAL NMR SPECTROSCOPY 1
Elements of NMR spectroscopic techniques, the practical operation of NMR spectrometers, spectral acquisition and special analysis techniques.
RESTRICTIONS: Requires permission of instructor. CHEM444 recommended as corequisite.

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 680 INTRODUCTORY POLYMER SCIENCE 3
Provides a broad foundation in the basic concepts of polymer science, including syntheses, 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 810 KINETICS AND SURFACE CHEMISTRY OF SOILS 3
See PLSC810 for course description.

CHEM 820 SPECIAL TOPICS IN ANALYTICAL CHEMISTRY 1-3
Advanced topics in analytical methods and techniques from the current literature.
PREREQ: CHEM620, CHEM621, CHEM622 or CHEM623.
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
See MAST850 for course description.

CHEM 856 SEMINAR 0 PF

CHEM 866 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.
CIVIL AND ENVIRONMENTAL ENGINEERING

CIEG 125 INTRODUCTION TO CIVIL ENGINEERING 2
An overview of civil engineering disciplines, including structural, environmental, geotechnical, and transportation engineering. Addresses physical principles, numerical analysis and elementary design problems in each area. Emphasis on computer use, text processing, spreadsheet, graphics. Team design project.

CIEG 135 INTRODUCTION TO ENVIRONMENTAL ENGINEERING 1
Overview of environmental engineering discipline. Physical, chemical, biological interactions within the environment and associated engineering problems. Introduction to common processes for pollution control. Use of computer software for problem solving. Environmental engineering practice and ethics, and an introduction to proper design approach.

CIEG 211 STATICS 3
PREREQ: CIEG212, MATH302
COREQ: MATH302

CIEG 301 ANALYSIS OF STRUCTURES 4
PREREQ: CIEG212, MATH302
COREQ: MATH302

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: MATH243 and MATH311 or MATH321
COREQ: CIEG306

CIEG 306 FLUID MECHANICS LABORATORY 1
Experiments in fluid mechanics.
COREQ: CIEG305

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 337 ENVIRONMENTAL ENGINEERING LABORATORY 1
Introduction to standard techniques for physical, chemical, microbiological analyses of pollution and pollutant control processes. Microbial characterization and enumeration. Physical and aggregate properties; selected specific chemical analyses such as pH, alkalinity, hardness. Quality assessment and quality control.
PREREQ: CHEM120 and CIEG233
COREQ: CIEG432
RESTRICTIONS: Open to majors only.

CIEG 341 ENVIRONMENTAL ENGINEERING LABORATORY 1
Experiments on standard techniques for physical, chemical, microbiological analyses of pollution and control processes. Microbial characteristics and enumeration. Physical and aggregate properties; selected specific chemical analyses such as pH, alkalinity, hardness. Quality assessment and quality control.
PREREQ: CHEM120 and CIEG233
COREQ: CIEG432
RESTRICTIONS: Open to majors only.

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
The study and application of automatic digital computation; the calculus of finite differences; matrices; iterative, numerical and relaxation procedures; and special applications to civil engineering problems.
PREREQ: MATH302

CIEG 401 INTRODUCTION TO THE FINITE ELEMENT METHOD 3
Discussion of approximate solution procedures: finite difference method, weighted residual methods and variational methods. Development of approximate solutions using the finite element method. Application to one- and two-dimensional problems in applied mechanics. Discussion of numerical methods and computer programming techniques applicable to finite element analyses.
PREREQ: CIEG381

CIEG 402 STEEL DESIGN 3
Design of steel structures; connections, tension members, columns, and beams with and without lateral support.
PREREQ: CIEG301

CIEG 403 CONCRETE DESIGN 3
Reinforced concrete structures; ultimate strength design; and related topics.
PREREQ: CIEG301

CIEG 404 PRESTRESSED CONCRETE DESIGN 3
Behavior, analysis and design of prestressed concrete structures. Covers flexure, shear, axial load, bond anchorage design and construction considerations for pretensioned and post-tensioned concrete.
PREREQ: CIEG403

CIEG 405 MATRIX STRUCTURAL ANALYSIS 3
Computer analysis of two and three-dimensional frameworks using matrix methods. Straight, tapered, curved and beam on elastic foundation members; flexible supports, element and temperature loads, partially rigid connections and finite sized joints; material and geometric nonlinearities; stability analyses; and determination of ultimate load capacities.
PREREQ: CIEG301

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: CIEG402 and CIEG403
CIEG 410  EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS  3
See MASC410 for course description.

CIEG 411  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

CIEG 417  ADVANCED STRUCTURAL ANALYSES  3
Nonlinear vs. linear beam analyses. Nonlinear beam bending equations. Structures with
composite cross-section. Structures subjected to mechanical and thermal loads.
Superposition principle. Analysis of problems that partially separate from base.
Generalized functions and their application for the analysis of structures. Method of
initial parameters. Influence line method
PREREQ: CIEG212 and MATH302

CIEG 418  CONTINUOUSLY SUPPORTED STRUCTURES  3
Analytical properties of various elastic, viscoelastic and elasto-plastic foundation models
for describing the base response. Embedded rods subjected to axial forces, torsion and
temperature changes. Gled lap joints, long riveted joints and threaded connections
Continuously supported beams and plates. Analysis of mat foundations, concrete pave-
ments for highways and airports, and railroad tracks. Problems in geophysics and com-
posite materials
PREREQ: CIEG212 and MATH302

CIEG 420  SOIL MECHANICS  4
Soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compres-
sibility, shear strength and lateral earth pressures
PREREQ: CIEG212 and MEC305

CIEG 421  FOUNDATIONS AND SUBSTRUCTURES  3
Design of earth dams, embankments, retaining structures, cafferdams, leatings, caissons
and piles. Numerical methods, combining soil mechanics and structural analysis.
PREREQ: CIEG420

CIEG 422  EARTH STRUCTURES ENGINEERING  3
Properties of soils and methods to determine their water flow through inhomogeneous and
anisotropic earth mass; predictions of pore-water pressures; stresses and settlement predic-
tions; 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: CIEG420.

CIEG 425  GEOREMODELING ENGINEERING  3
Geotechnical aspects of waste disposal facilities including landfills, clay liners, and
geosynthetic liners. Engineering properties of liner materials, geotechnical characteris-
tics of wastes. Cover systems, leachate collection and removal systems. Contaminant trans-
port, Stability and deformation analysis.
RESTRICTIONS: Engineering or science background required

CIEG 431  WATER SUPPLY ENGINEERING  3
Water quality criteria and monitoring, development of water resources, design of water
collection and distribution systems, design of water treatment works, economics of water
supply engineering, treatment of water works sludge and advanced water purification
technology
PREREQ: CIEG233 and MEC305

CIEG 432  WASTEWATER ENGINEERING  3
Source and character of wastes; design and operation of wastewater treatment facilities;
ultimate disposal of wastewater residues and considerations of discharge criteria, and
economic and regulatory aspects.
PREREQ: CIEG233.

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 bio-
logical treatment of toxic and hazardous wastes; remediation of contaminated soil and
groundwater at existing disposal sites
PREREQ: CIEG233.

CIEG 435  INDUSTRIAL WASTES MANAGEMENT  3
Covers industrial survey and treatment technologies for liquid, solid and gaseous wastes.
Emphasis on the applications and design of physical-chemical and biological treatment
processes. Particular removal from industrial emission sources. Resource recovery and
reuse presented as an important option for the management of industrial wastes.
PREREQ: CIEG233 and CIEG235.

CIEG 436  SOLID WASTE MANAGEMENT  3
Regulatory aspects of solid and hazardous wastes management: Characteristics, genera-
tion and collection of solid wastes from an engineering perspective. Landfill regulations;
siting, design, operation, closure; leachate control. Separation processes; composting;
PREREQ: CIEG233 and CIEG325.

CIEG 437  WATER AND WASTEWATER QUALITY  3
Principles and applications of analysis of solids, organic load, dissolved oxygen, disin-
fectors, nutrients, trace metals, trace organic compounds and microorganisms. Lecture
and laboratory.
PREREQ: CIEG233

CIEG 441  HYDROLOGY  3
The fundamentals of climatology, meteorology and hydrologic cycle; their relation to sur-
faced water and groundwater; rainfall runoff characteristics; frequency analysis; flood rout-
ing; flood plain hydrologic; and groundwater flow.
COREQ: CIEG305

CIEG 442  HYDRAULIC ENGINEERING  3
Application of the principles of fluid mechanics to flow in pipelines, open channels, sedi-
ment transport, drainage, hydraulic structure and hydraulic models.
PREREQ: CIEG305

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 high-
ways, 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 454  URBAN TRANSPORTATION PLANNING  3
Characteristics of urban travel demand, travel demand forecasting models, urban trans-
portation 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 459  RAILROAD ENGINEERING  3
Evolution and analysis of railroad track design and components, ballast and subgrade,
rail axial forces, expansion joints, anchors, and track buckling and preventive measures.
Response of tracks to moving loads, track transition problems and track tests. Review of
track standards. Movies on maintenance and construction
PREREQ: CIEG212

CIEG 461  SENIOR DESIGN PROJECT  1-3
Work with advisors from engineering firms and faculty on design projects requiring knowl-
edge and skills acquired in previous courses.
RESTRICTIONS: Requires Senior status in engineering.

CIEG 466  INDEPENDENT STUDY  1-6

CIEG 471  INTRODUCTION TO COASTAL ENGINEERING  3
Problems of design in the ocean and coastal environment. Mechanics of wave motion,
tides and storm surge. Coastal processes, wave forces on structures and design of coastal
structures. Includes observations of hydraulic model tests in the Ocean Engineering
Laboratory.
PREREQ: CIEG305

CIEG 482  SYSTEMS DESIGN AND OPERATION  3
Methodology and technique for the evaluation and design of civil engineering systems.
Modern probabilistic and optimization techniques applied to problems in mechanics,
structures, transportation, water resources, environmental and ocean systems.

CIEG 486  ENGINEERING MANAGEMENT  3
Present worth concept; annual costs, rate of return and break-even studies; replacement
analysis; depreciation, depletion and income tax. Criteria for public works investment
including benefit-cost and marginal analysis and the handling of risk and uncertainty
Applications to engineering projects and problems.

CIEG 601  INTRODUCTION TO THE FINITE ELEMENT METHOD  3
Discussion of approximate solution procedures: finite difference method, weighted residu-
al methods and variational methods. Development of approximate solutions using the
finite element method. Application to one- and twodimensional problems in applied
mechanics. Discussion of numerical methods and computer programming techniques
applicable to finite element analyses
PREREQ: CIEG305

CIEG 604  Prestressed Concrete Design  3
Behavior, analysis and design of prestressed concrete structures. Covers flexure, shear,
axial load, bond anchorage design and construction considerations for pretensioned and
posttensioned concrete.
PREREQ: CIEG403.

CIEG 605  MATRIX STRUCTURAL ANALYSIS  3
Computer analysis of two- and three-dimensional frameworks using matrix methods.
Straight, tapered, curved and beam on elastic foundation members; flexural supports, ele-
ment and temperature loads, partially rigid connections and finite sized joints; material
and geometric nonlinearities; stability analyses; and determination of ultimate load capacities
PREREQ: CIEG301

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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: CIEG402 and CIEG403

CIEG 610 EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS 3
See MASCC610 for course description

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 MATH3102

CIEG 617 ADVANCED STRUCTURAL ANALYSES 3
PREREQ: CIEG212 and MATH3102

CIEG 618 CONTINUOUSLY SUPPORTED STRUCTURES 3
PREREQ: CIEG212 and MATH3102

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: CIEG420

CIEG 621 FOUNDATION ENGINEERING 3
Field investigation techniques; interpretation of data; theory and design of shallow and deep foundations, retaining walls, sheet pile walls, caisson driven excavations and geosynthetically reinforced soil
PREREQ: CIEG421

CIEG 622 EARTH STRUCTURES ENGINEERING 3
Properties of soils and methods to determine their 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: CIEG420

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, flownet simulation, consolidation, specific gravity, direct shear, triaxial (CU, CD, UU) tests simulating various loading paths, and liquid limit.
PREREQ: CIEG420

CIEG 624 SOIL DYNAMICS 3
Wave propagation in elastic media; dynamic soil properties; vibration of foundations; influence of soil type on ground motion characteristics; causes of soil failure during earthquake; soil-structure interaction; lateral earth pressures. Discussion of numerical methods used in dynamic analyses of porous media.
PREREQ: CIEG420

CIEG 625 GEOSYSTEMS ENGINEERING 3
RESTRICTIONS: Engineering or science background required

CIEG 631 WATER QUALITY AND POLLUTION CONTROL 3
Covers water and its impurities, water quality criteria and monitoring, transport and transformation of chemicals in the aquatic environment, steam sanitation, ecological aspects of impoundments and eutrophication processes, groundwater systems, decontamination of subsurface water, and land application of wastewater and current topics in water pollution.

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 interferential 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 PHYSICAL ASPECTS OF ENVIRONMENTAL ENGINEERING 3
Principles and applications of colloid chemistry to environmental systems. Elements of physical chemistry, mass transfer, and phase separation relevant to environmental engineering. Colloid and particle characterization, rheological, diffusive, and settling behavior of colloid systems; adsorption and electrical double layer theory; electrokinetics; particle stability and flocculation.

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.

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. May be crosslisted with MASC691
PREREQ: CIEG630

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 CIEG650
RESTRICTIONS: Requires permission of instructor

CIEG 652 TRANSPORTATION FACILITIES DESIGN 3
Theoretical concepts of general transportation demand, supply and flow analysis. Planning and design of multimodal 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.
RESTRICTIONS: Requires permission of instructor

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 RAILROAD ENGINEERING 3
Evolution and analysis of railroad track design and components, ballast and subgrade, rail axial forces, expansion joints, anchors, and track buckling and preventive measures. Response of tracks to moving loads, track transition problems and track tests. Review of track standards. Movies on maintenance and construction.
PREREQ: CIEG212

CIEG 672 WAVE MECHANICS 4
Primary emphasis on linear water wave theory and its applications. Shoaling, refraction and diffraction of waves as well as wave forces. Finite amplitude waves. Laboratory experiments to verify the theoretical developments.
PREREQ: CIEG630

CIEG 678 TRANSPORT AND MIXING PROCESSES 3
Application of hydrodynamics to mixing and transport processes in the water environment.
PREREQ: CIEG672

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: CIEG630
CIEG 680 LITTORAL PROCESSES 3
Coastal morphology, equilibrium beach profiles, onshore-offshore response, sediment trans-
port relationships, sand budgets around inlets and along open coasts, modeling of shoreline
response, analyses of beach problems and recommendations of remedial measures

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, infraro-
gravity and edge waves and nearshore modeling.
PREREQ: CIEG6572 and CIEG639

CIEG 683 PROBABILISTIC ENGINEERING ANALYSIS 3
Operational techniques, derived distributions and expectations are used to develop random
models to analysis and design in a random environment. Applications may span topics in
mechanics, stream and reservoir flows and technologic decision making and management

CIEG 691 GROUNDWATER HYDROLOGY 3
A quantitative analysis of groundwater in the hydrologic cycle. Topics include ground-
water movement, Darcy's law, mathematical formulation of groundwater problems,
groundwater pollution, salt water intrusion, well hydraulics and unsteady flow.

CIEG 693 WAVES IN THE MARINE ENVIRONMENT 3
See MAST693 for course description

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 appro-
priate 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, com-
posite members, statically indeterminate trusses and arches. Projects and special topics focus
attention to the basis and limitations of codes and specifications for steel structures
PREREQ: CIEG402

CIEG 803 ADVANCED CONCRETE DESIGN 3
Application of ultimate strength design procedures to continuous beams and frames, com-
posite members, slabs and arches. Projects and special topics focus attention to the basis
and limitations of codes and specifications for concrete structures.
PREREQ: CIEG403

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-conser-
vantive 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. Deformation buckling in composites.
PREREQ: CIEG212 and MATH302

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 numeri-
cal predictions. Finite element analyses of coupled stress-flow problems (e.g., consolida-
tion), reinforced earth structures and slopes. Discussion of anisotropy, time effects and fric-
tional interfaces.
PREREQ: CIEG420, CIEG601
RESTRICTIONS: CIEG620 is highly recommended as a Prereq.

CIEG 831 THEORY OF WATER TREATMENT 3
Application of physical, chemical and engineering techniques to water treatment pro-
cesses: aeration, coagulation, sedimentation, filtration and disinfection. Advanced purifi-
cation methods including adsorption and denaturalization processes.
PREREQ: CIEG632 and CIEG634.

CIEG 832 THEORY OF WASTEWATER TREATMENT 3
Composition of wastes; physical, chemical and biological methods of wastewater treat-
ment; treatment and disposal of sludges produced at wastewater treatment plants.
PREREQ: CIEG636

CIEG 833 FATE OF POLLUTANTS IN THE ENVIRONMENT 3
Study of processes affecting the distribution of inorganic and organic pollutants in the
environment. Equilibrium and kinetics of exchange among soil, water, sediment, air and
biota. Photolysis, hydrolysis, oxidation, reduction and complexation of chemicals. Models
used to describe fate of chemicals.
PREREQ: CIEG632 and CIEG634

CIEG 865 CIVIL ENGINEERING SEMINAR 1

CIEG 868 RESEARCH 1-6

CIEG 869 MASTER'S THESIS 1-6
An independent investigation under supervision of a member of the civil engineering grad-
uate 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 873 FATE OF POLLUTANTS IN THE ENVIRONMENT 3
Study of processes affecting the distribution of inorganic and organic pollutants in the
environment. Equilibrium and kinetics of exchange among soil, water, sediment, air and
biota. Photolysis, hydrolysis, oxidation, reduction and complexation of chemicals. Models
used to describe fate of chemicals.
PREREQ: CIEG632 and CIEG634

CIEG 875 ADVANCED WAVE WAVE MECHANICS 3
Development of finite amplitude wave theories such as solitary, concoidal 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 examina-
tions 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 & INFORMATION SCIENCE

CISC 101 COMPUTERS AND INFORMATION SYSTEMS 3
Introduces general concepts of computer organization, terminology, usage and discusses
the impact of computers on society. Introduces word processing, spreadsheets, databas-
es, electronic mail, bulletin boards, windowing systems, networks and the internet, and
very simple programming.
RESTRICTIONS: Does not count toward graduation if taken after CISC105 or any other
CISC course. Not open to students with credit for ACCT160 or 260, or FREC135

CISC 105 GENERAL COMPUTER SCIENCE 3
Principles of computer science illustrated and applied through programming in the high
level language C. Programming projects illustrate applications in all areas: business,
humanities, social sciences, physical sciences, mathematics C is the dominant language
of systems and applications development on UNIX platforms and PCs.
RESTRICTIONS: Does not count toward graduation if taken after CISC181.

CISC 106 GENERAL COMPUTER SCIENCE FOR ENGINEERS 3
Principles of computer science illustrated and applied through programming in the high
level language, FORTRAN. Programming projects illustrate computational problems, styles,
and issues that arise in numeric computational science and engineering.

CISC 120 OBJECT ORIENTED PROGRAMMING IN C++ 2
A bridging course for students who already know C programming (e.g. CISC105) to
move into CISC220 without taking CISC181
PREREQ: CISC105
RESTRICTIONS: Recommended only for strong students. Others should take CISC181.
Normally only offered in Winter and Summer Sessions.

CISC 135 TOPICS: PROGRAMMING LANGUAGE 2
Learning and using a second programming language, with an emphasis on style. Each
section will deal with one language: possibilities include ADA, C, COBOL, FORTRAN,
LISP or MODULA-2.
PREREQ: Computer programming course
RESTRICTIONS: Credit for CISC 135 in a given language is not allowed toward degree
when another course in which that language is taught is also taken.

CISC 181 INTRODUCTION TO COMPUTER SCIENCE 3
Principles of computer science illustrated and applied through programming in the object ori-
eted language C++. Programming projects illustrate computational problems, styles and issues
that arise in computer systems development and in all application areas of computer
PREREQ: Grade of C- or better in CISC105 or equivalent programming experience in a
high level language.
COREQ: MATH115, MATH171 or MATH241.
CISC 220 Data Structures 3
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: CISC181 or CISC120.
COREQ: MATH210 or MATH242.

CISC 260 Machine Organization and Assembly Language 3
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: CISC181.
RESTRICTIONS: CISC220 recommended as a Prerequisite.

CISC 280 Program Development Techniques 3
Structure and interpretation of computer programs. Different paradigms (mind sets) that programmers use: procedural, functional, logic and object-oriented programming. Top down design, stepwise refinement, procedural abstraction and information hiding concepts as applied to the program development process
PREREQ: CISC220.
COREQ: MATH241.

CISC 301 Elements of Logic and Automata Theory 3
Propositional and predicate logic for general reasoning and advanced applications in knowledge representation in artificial intelligence and data base, logic programming, program correctness and programming semantics. Automata and formal language theory. Background for advanced applications in compilers, computer networks, operating systems and natural language processing
PREREQ: MATH210, CISC220 and CISC280.

CISC 310 Logic and Programming 3
Propositional and predicate logic syntax, semantics; proof methods based on unification and resolution; applications involving reasoning and logic programming
PREREQ: CISC280 and MATH215.

CISC 320 Introduction to Algorithms 3
Design and analysis of algorithms: worst/average case analysis, proofs for correctness and performance of algorithms. Algorithmic strategies (divide and conquer, greedy methods, dynamic programming, etc.). Algorithms for searching, sorting and traversal of strings, trees and graphs. Categorization of computational problems: classes P and NP, NP completeness
PREREQ: CISC220, CISC280 and MATH210.

CISC 360 Computer Architecture 3
Principles and techniques used in the architecture of digital computers. Machine elements and their interrelation. Instruction sets, risc vs cisc, registers, busses and switches
PREREQ: CISC220, CISC260, CPEG210 and CPEG211.

CISC 361 Operating Systems 3
Principles and techniques employed in the development of operating systems and their control programs. Includes management of memory, processors, I/O devices
PREREQ: CISC220 and CISC260.
RESTRICTIONS: CISC360 recommended as a Prerequisite.

CISC 366 Independent Study 1-6
Study of object-oriented programming through use of the Java programming language. Applications for the World Wide Web (WWW) will be carried out
PREREQ: CISC181 and CISC220.

CISC 370 Object-Oriented Programming, Java and the World Wide Web 3
Study of object-oriented programming through use of the Java programming language. Applications for the World Wide Web (WWW) will be carried out
PREREQ: CISC181 and CISC220.

CISC 372 Parallel Programming 3
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 composition, data distribution, communication, load balancing, scalability, locality, granularity, debugging, performance evaluation
PREREQ: CISC220.

CISC 401 Elements of the Theory of Computation 3
General models of computation, formal languages and automata theory and algorithmic unsolvability
PREREQ: CISC301 or CISC310.
RESTRICTIONS: Credit cannot be received for both CISC401 and CISC601.

CISC 403 Program Verification 3
Specification and verification of programs. Through the use of formal and informal verification techniques, program design is made more effective and product quality (meeting specifications) is enhanced
PREREQ: CISC301 or CISC310.
RESTRICTIONS: Credit cannot be received for both CISC403 and CISC603.

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: CISC301 or CISC310.
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: CISC401/601.
RESTRICTIONS: Credit cannot be received for both CISC409 and CISC609.

CISC 410 Introduction to Numerical Analysis and Algorithmic Computation 3
See MATH426 for course description.

CISC 411 Algorithmic and Numerical Solution of Differential Equations 3
See MATH428 for course description.

CISC 423 Applied Symbolic Computation 3
Introduction to one or more computer algebra systems, algebraic computation applied to problems in applied mathematics, and individual student projects using symbolic computation to solve a problem from student's own discipline
RESTRICTIONS: Credit cannot be received for both CISC423 and CISC623. Offered in alternate years.

CISC 427 Computer Simulation Techniques 3
Modelling and computer simulation of discrete and continuous systems - those characterized by stochastic discrete events and those characterized by differential equations. Study and use of simulation languages.
PREREQ: CISC220.
RESTRICTIONS: Credit cannot be received for both CISC427 and CISC627.

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 437 Database Systems 3
Physical and logical organization of databases. Data retrieval languages, relational database languages, security and integrity, concurrency, distributed databases
PREREQ: CISC220 and either CISC301 or CISC310.
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, modelling and object hierarchy, and animation
PREREQ: CISC220 and MATH241.

CISC 449 Topics in Computer Applications 3
Contents vary to coincide with the interests of students and current faculty
RESTRICTIONS: Credit cannot be received for both CISC449 and CISC649.

CISC 450 Computer Networks 3
Computer Networks: LANs, MANs, and WANs. Analysis, design, and implementation of network communication protocols. ISO and TCP/IP protocol suites
PREREQ: CISC301, CISC360 and STAT205.
COREQ: CISC361.
RESTRICTIONS: Knowledge of probability recommended. Credit cannot be received for both CISC450 and CISC650.

CISC 451 Data Compression and Reliability in Multimedia 3
PREREQ: MATH242, STAT201 and CISC450.

CISC 452 Telecommunications Systems 3
Presents basic concepts in telecommunications, emphasizing topics such as SONET, Cell and Frame Relay and multimedia switching. Concepts of the operation and maintenance of large communications networks are discussed
PREREQ: CISC450 and CPEG419.
RESTRICTIONS: Restricted to CISC and ELEG/CPEG majors and minors.

CISC 458 Applied Computer Networks 3
Principles of communications as they apply to computer networks. Includes advanced concepts of network design, construction and management
PREREQ: CISC450.
CISC 459  Topics in Communications, Distributed Computing and Networks.  3
Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC450/650
RESTRICTIONS: Credit cannot be received for both CISC459 and CISC659.
CISC 462  Computer Systems: Architecture.  3
Recent advances in computer architecture and their impact on architectural design
Multiprocessor and parallel architectures. Parallel computing.
PREREQ: CISC360 and STAT205
RESTRICTIONS: Credit cannot be received for both CISC462 and CISC662.
CISC 466  Independent Study.  1-6
CISC 470  Programming Languages.  3
Selection, use and implementation of appropriate language(s) for given problems. Syntax,
semantics, pragmatics, parameter passing, abstract data types and comparisons between
languages.
PREREQ: CISC301 or CISC310
RESTRICTIONS: Credit cannot be received for both CISC462 and CISC662.
CISC 471  Compiler Design.  3
Introduction to the design and implementation of compilers, with a focus on lexical analysis,
parsing and syntax-directed translation.
PREREQ: CISC260 and either CISC301 or CISC310
CISC 473  Computer Science Projects.  3
Experimental, theoretical and literature studies of computer science problems.
RESTRICTIONS: Open to majors only. Requires permission of instructor. May be taken
twice for credit when topics vary.
CISC 475  Object-oriented Software Engineering.  3
Introduction to object-oriented software engineering concepts, methodologies and tools
Requirement analysis, specification, design and implementation of object-oriented software
development process using UML. Real-life examples and homework projects to cover all
aspects of object-oriented lifecycle, from the requirements to coding in C++ and/or Java.
PREREQ: CISC220 and CISC280
RESTRICTIONS: Credit cannot be received for both CISC475 and CISC675. CISC361 is recommended.
CISC 479  Topics in Architecture and Software.  3
Contents vary to coincide with the interests of students and faculty
PREREQ: CISC61 and CISC462
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 cross-listed with CGSC481
PREREQ: CISC280 and either CISC301 or CISC310
RESTRICTIONS: Credit cannot be received for both CISC481 and CISC681.
CISC 485  Mechatronics.  3
Mechatronics is the interaction of computers, electronics and mechanical engineering.
Covers practical and theoretical aspects of mechatronic design, including human/machine interfacing,
hydraulic systems, procedures in mechatronic design, reverse engineering, machine behaviors, and mechatronic control systems.
RESTRICTIONS: Credit cannot be received for both CISC485 and CISC685. Permission of
instructor required
CISC 489  Topics in Artificial Intelligence.  3
Contents vary to coincide with the interests of students and current faculty
PREREQ: CISC481/681
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 603  Program Verification.  3
Specification and verification of programs. Through the use of formal and informal verifi-
cation techniques, program design is made more effective and product quality [meeting spec]
is enhanced.
PREREQ: CISC301
RESTRICTIONS: Credit cannot be received for both CISC603 and CISC403
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, comp-
leteness, compactness and undecidability. Automated theorem proving also covered
PREREQ: CISC310
RESTRICTIONS: Credit cannot be received for both CISC604 and CISC404.
CISC 609  Topics in Theoretical Computer Science.  3
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 621  Algorithm Design and Analysis.  3
Emphasis on development expertise in the design and analysis of algorithms. Equal impor-
tance 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: CISC250 and MATH305
CISC 623  Applied Symbolic Computation.  3
Introduction to one or more computer algebra systems, algebraic computation applied to
problems in applied mathematics, and individual student projects using symbolic compu-
tation to solve a problem from student's own discipline. May be cross-listed with
MATH613
RESTRICTIONS: Offered in alternate years Credit cannot be received for both CISC623 and CISC423.
CISC 627  Computer Simulation Techniques.  3
Modeling and computer simulation of discrete and continuous systems - those character-
ized by stochastic discrete events and those characterized by differential equations. Study and use of simulation languages.
PREREQ: CISC220
RESTRICTIONS: Credit cannot be received for both CISC627 and CISC427.
CISC 629  Topics in Algorithms and Complexity Theory.  3
Contents vary to coincide with the interests of students and faculty.
RESTRICTIONS: Credit cannot be received for both CISC629 and CISC429.
CISC 633  Introduction to Computer Instruction.  3
See EDUC633 for course descriptions.
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 CISC310
RESTRICTIONS: Credit cannot be received for both CISC657 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
RESTRICTIONS: Credit cannot be received for both CISC640 and CISC440.
CISC 649  Topics in Computer Applications.  3
Contents 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
Computer Networks: LANS, MANs, WANS. Analysis, design, and implementation of
network communication protocols. ISO and TCP/IP protocol suites
PREREQ: CISC360; CISC631 or CISC663
RESTRICTIONS: Credit cannot be received for both CISC650 and CISC450. Knowledge of probability recommended.
CISC 651  Data Compression in Multimedia.  3
Important approaches to data and multimedia compression. Lossless techniques: Huffman,
dictionary, arithmetic, run length. Lossless applications: GIF, lossless JPEG, Unix comp-
press, gzip. Lossy techniques: scalar/vector quantization, differential/subband/transform
encoding. Lossy applications: JPEG, MPEG
PREREQ: MATH242, STAT201 and CISC450/650
CISC 652  Telecommunications Systems.  3
Presents basic concepts in telecommunication emphasizing topics such as SONET, Cell
and Frame Relay and multimedia switching. Concepts of the operation and maintenance
of large communications networks are discussed
PREREQ: CISC450 or CPEG419
RESTRICTIONS: Open to CISC, ELEG, and CPEG majors and minors only.
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.
Multiprocessor and multicomputer architectures. Parallel machines
PREREQ: CISC360
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
RESTRICTIONS: Not open to students with credit for CISC361.

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: CISC310.
RESTRICTIONS: Credit cannot be received for both CISC670 and CISC470.

CISC 672 ADVANCED 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 and CISC601 recommended
RESTRICTIONS: Undergraduates must obtain instructor's permission.

CISC 675 OBJECT-ORIENTED SOFTWARE ENGINEERING 3
Introduction to software engineering concepts, methodologies and tools. Requirement analysis, specification, design and implementation of object-oriented software development process. Students will be presented with several real life examples and homework projects to cover all aspects of object oriented lifecycle, from the requirements to coding in C++.
RESTRICTIONS: Requires C/C++ and permission of instructor. Credit cannot be received for both CISC675 and CISC475.

CISC 679 TOPICS IN ARCHITECTURE AND SOFTWARE SYSTEMS 3
Contents will vary to coincide with the interests of students and faculty.
PREREQ: CISC652 and CISC663.
RESTRICTIONS: Credit cannot be received for both CISC679 and CISC479.

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 cross-listed with CISC681.
PREREQ: CISC220 and CISC310.
RESTRICTIONS: Credit cannot be received for both CISC681 and CISC481.

CISC 685 MECHATRONICS 3
Mechtronics is the intersection set of computers, electronics and mechanical engineering. Covers practical and theoretical aspects of mechatronic design, including human/machine interfacing, haptic systems, procedures in mechatronic design, reverse engineering, machine behaviors, and mechatronic control systems.
RESTRICTIONS: Credit cannot be received for both CISC685 and CISC485. Requires permission of instructor.

CISC 689 TOPICS: ARTIFICIAL INTELLIGENCE 3
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC689.
RESTRICTIONS: Credit cannot be received for both CISC689 and CISC489.

CISC 699 GRADUATE INTERNSHIP 1
On-the-job experience performing technical computer science related work.
RESTRICTIONS: Requires permission of the instructor.

CISC 801 RECURSIVE FUNCTION 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, arithraical computations and quantifier hierarchies, classification of algorithms and non-enumerable sets, machine self-reference and priority arguments.
PREREQ: CISC601.

CISC 805 THEORY OF MACHINE 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
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC601.

CISC 821 PARALLEL ALGORITHMS 3
Study of design and analysis techniques for parallel algorithms is conducted. Topics include: basic techniques of parallel algorithm design; searching and sorting in parallel; parallel tree and graph algorithms; and complexity issues, including the relationships among PRAM models, the class NC, and P-completeness.
PREREQ: CISC621.

CISC 822 ALGEBRAIC ALGORITHMS 3
PREREQ: CISC621 or CISC623 (preferably both).
RESTRICTIONS: Offered in alternate years MATH450 or MATH550 recommended as prerequisites.

CISC 829 ADVANCED TOPICS IN ALGORITHMS AND COMPLEXITY THEORY 3
Contents vary to coincide with the interests of students and faculty.

CISC 849 ADVANCED TOPICS IN COMPUTER APPLICATIONS 3
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 local area, wide area and interconnected networks. Queueing delay models, ARQ: retransmission strategies, multi-access communication, routing, flow control, congestion control, and network reliability and availability.
PREREQ: CISC650.

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, CMS/FIP). Design of management agents and clients. Concepts of performance management, fault management, configuration management and other management applications.
PREREQ: CISC650.

CISC 855 DISTRIBUTED OBJECT COMPUTING WITH CORBA 3
Introduction to distributed object computing and the Common Object Request Broker Architecture (CORBA). Topics: Object Management Architecture, Object Service Common Facilities, Models of Distributed Computation, Distributed Algorithms and their Implementation in CORBA.
PREREQ: CISC663 and CISC450/650.

CISC 856 TCP/IP UPPER LAYER PROTOCOLS 3
Principles and techniques employed in the TCP/IP protocol suite with an emphasis on the network transport and application layers. Examples: ARP, RARP, IP, ICMP, TCP, UDP, FTP, telnet, SMTP, NNTP, HTTP, DNS, Multicast and T/TCP.
PREREQ: CISC650.

CISC 857 INTERCONNECTION OF NETWORKS 3
Overview of WAN, LAN and MAN technologies; internetworking technologies: design of bridges, routers and gateways; internetworking protocols (e.g., TCP/IP); routing in internets; internetwork performance issues; interoperability: issues, solutions and limitations; and review of applications supported across the internetworked environments.
PREREQ: CISC650.

CISC 859 ADVANCED TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING NETWORKS 3
Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC650.

CISC 868 RESEARCH 1-6
Upper-level graduate research oriented toward a student's potential master's thesis or Ph.D. dissertation.

CISC 869 MASTER'S THESIS 1-6

CISC 872 ADVANCED PROGRAM ANALYSIS AND TRANSFORMATIONS 3
Static program analysis and machine-independent code transformations. Topics include control flow analysis, intra-procedural data flow analysis, alias analysis, advanced program representations including SSA and PDG and local, global and interprocedural analysis for classical code-improving transformations.
PREREQ: CISC672.

CISC 873 COMPIILING FOR ADVANCED ARCHITECTURES 3
Techniques for generating code for advanced ultra-parallel and multiprocessor architectures. Topics include regular allocation, code generation for pipeline, 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 CISC655 or previous course in computer architecture.
RESTRICTIONS: CISC873 is recommended.

CISC 874 PARALLEL PROGRAMMING 3
Overview of high performance computing architectures, parallel program performance analysis, different paradigms for achieving parallelism including automatic parallelization, message passing, shared memory, data parallel programming, task and loop scheduling, debugging parallel programs and issues in getting good performance on parallel architectures.
RESTRICTIONS: CISC662 is recommended.
CNST 213  TWENTIETH-CENTURY DESIGN: ETHNIC INFLUENCE  3
Examines African American and other ethnic groups, their cultures and clothing practices and subsequent influences on fashion. Studies individual minority designers and their contributions

CNST 214  COSTUME HISTORY BEFORE 1700  3
Costume as a mirror of civilization in Western Europe and the Near East from antiquity through the 17th century. Influence of societal, economic and aesthetic factors upon the development of costume

CNST 215  FUNDAMENTALS OF TEXTILES I  3
Fundamental concepts related to textile materials. Emphasis on structure/property relationships in fibers and yarns. Includes standards and testing
PREREQ: CNST114 or CNST211/221 and CHEM102.

CNST 217  ACCOUNTING PRACTICE FOR MERCHANDISE  3
Introduction to basic accounting principles used in the retailing of apparel and other fashion products. Emphasis placed on the retail method of inventory, perpetual and periodic systems, LIFO, FIFO, development of gross margin statement and the effects of cost/price discounts and cumulative markup on profitability

CNST 218  FASHION MERCHANDISING  3
An overview of the fashion industry which examines the interrelationships between primary, auxiliary and retail fashion markets; trends in fashion retailing, promotion and manufacturing.

CNST 220  FUNDAMENTALS OF TEXTILES II  3
Fundamental concepts of textile materials emphasis on structure/property relationships in cloth forms, and finishing processes (including dye and print application); standards, laws and regulations. It is the second course of a textile sequence
PREREQ: CNST215.

CNST 221  APPAREL STRUCTURES  3
Comparative study of foundation principles and processes of apparel design utilizing draping, flat pattern, drafting and computer-aided design techniques. Includes development of master patterns. Execution of advanced garment assembly processes
PREREQ: CNST211.

CNST 224  CLOTHING DESIGN AND PRODUCTION SINCE 1700  3
Clothing design and production in America and Western Europe since 1700. Study of craft skills, growth of ready-to-wear industry, costume and 20th century manufacturing and fashion centers

CNST 225  ARCHITECTURAL DRAWING  3
Introduction to the handling of the tools, techniques and terms of architectural drawing and the designing of plans, elevations, sections and drawing of isometrics and perspectives

CNST 223  FASHION DRAWING AND RENDERING  3
Drawing from the fashion model; emphasis on rendering clothing character, fabrics and fashion details using various media; translation of drawings to finished fashion illustrations
PREREQ: ART129 or ART130.

CNST 225  FAMILY RESOURCE MANAGEMENT  3
The study of effective assessment and allocation of human and material resources by individuals and families at different stages in the life cycle

CNST 242  THE CONSUMER MOVEMENT  3
Examines the evolution of the consumer movement over time and the impact of leadership upon the movement's effectiveness

CNST 300  LEADERSHIP IN ORGANIZATIONS  3
Understanding the process of change and positively affecting change in organizations through the exercise of leadership skills and knowledge

CNST 305  CUSTOMER SERVICE AND CONSUMER VOICE  3
Explores incentives for seller to respond to consumer requests, comments, and complaints and to encourage customer feedback after purchase and investigates incentives for consumers to request, to comment, and to complain after purchase. Identifies alternative models of consumer satisfaction and dissatisfaction and complaining behaviors. Students design, develop, and evaluate a consumer response system

CNST 310  HOUSING  3
Selection of housing as related to varying income levels and stages in the life cycle; types of housing, government agencies, and design considerations for special groups

CNST 312  AMERICAN RESIDENTIAL STYLE  3
Historic survey of residential architectural styles from 1700 to present. Emphasis on exterior design elements as they relate to interior layouts, details, ornamentation and furnishings. Field trips

CNST 313  MULTICULTURAL FASHION ACCESSORIES  3
Examines design and production of accessory apparel and body adornment objects created by cultures throughout the world. Ornamental and functional accessories from African, Asian, Indian, American and Far Eastern cultures will be emphasized. Students will produce accessories inspired by self-conducted research
PREREQ: CNST211.

CNST 314  APPAREL DESIGN BY FLAT PATTERN  3
Advanced pattern making techniques using both traditional and computer-aided design methods. Design and execution of apparel based on variations of the torso block. Execution of apparel utilizing dressmaker tailoring techniques
PREREQ: CNST221.

CNST 318  FASHION MERCHANDISE PRODUCTS  3
Examines various types of fashion merchandise including the range of characteristics, sources and manufacturing processes. Emphasis on leather, furs, jewelry, kitchen and home furnishings, and allied merchandise areas

CNST 319  DRESS AND CULTURE  3
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
PREREQ: PSYC201 and SOC201.

CNST 320  FASHION MERCHANDISING INTERNSHIP  6
An off-campus supervised and coordinated field study program in selected retail stores
RESTRICTIONS: Requires permission of instructor

CNST 321  TRAVEL STUDY PROGRAM  1-6
Study of the domestic and/or international textiles, apparel, interior and allied fashion industries through visits and research projects
RESTRICTIONS: Requires CNST faculty approval through an application process. Offered at regular intervals

CNST 322  RETAIL DESIGN AND CONSUMER BEHAVIOR  3
Exploration of the effect of retail design on consumer behavior. Logos, packaging, point-of-purchase display, signage, personnel and store layout shall be examined. May be cross-listed with HREM522

CNST 324  APPAREL DESIGN BY DRAPEING  3
Exploration of three dimensional methods of apparel design. Design and execution of draped garment structures required
PREREQ: CNST314.

CNST 325  PRESENTATION TECHNIQUES  3
Development of oral, written, graphic, problem-solving and personal skills for professional presentations. Techniques include computer graphics, photography, as well as audio and video applications as they relate to professional presentations

CNST 328  FASHION SALES PROMOTION  3
Fashion advertising, fashion promotion and other special purpose media utilized uniquely in the world of fashion. Emphasis not only on various components of fashion promotion media and their interrelationship, but also on the interdependency of promotional strategy and fashion merchandising

CNST 330  APPAREL DESIGN INTERNSHIP  4
An off-campus, supervised field study program in selected business concerns dealing with apparel design and/or manufacturing
RESTRICTIONS: Requires permission of instructor

CNST 332  CONSUMERS, HEALTH AND MEDICAL CARE  3
Economic perspective on consumer interests in health, medical insurance and medical care. Emphasis on unusual aspects of health care and health insurance markets and relationships between the markets. Includes important effects of uncertainty on decision making, market institutions and public policy
PREREQ: ECON151 or ECON100.

CNST 333  CAD: FASHION DESIGN AND FORECASTING  3
Introduction to computer graphics for fashion design, emphasizing concept development, visualization, storyboard layout, and design presentation. Focuses on trend research and presentation, and collection design for targeted markets
PREREQ: CNST233.

CNST 335  CONSUMER FINANCIAL MANAGEMENT  3
Analysis of financial models utilized in planning, organizing and initiating a strategy for generating and allocating earned and unearned income. Emphasis on studying consumer financial decision making during various stages of an individual's life cycle (e.g., single, newly-married, single parent, etc.)

CNST 340  CONSUMER AFFAIRS INTERNSHIP  3-6
An off-campus supervised and coordinated field study in selected agencies and organizations
RESTRICTIONS: May be repeated once for credit. Requires permission of instructor

CNST 342  CONSUMER LAWS AND REGULATIONS  3
In-depth examination of consumer legislation and regulation policies at the federal and state level. Major pieces of consumer legislation, as well as the agencies responsible for implementing and enforcing these policies, examined in terms of efficiency and effectiveness
PREREQ: CNST200, ECON151 or ECON152.

CNST 365  FASHION MERCHANDISING AND APPAREL DESIGN SEMINAR  1 PF
Creates awareness of career opportunities and develops techniques for success in apparel and textile clothing career options
RESTRICTIONS: APF and FM majors only.
CONSUMER STUDIES

CNST 366 INDEPENDENT STUDY 1-6

CNST 400 LEADERSHIP AND POWER 3
Models of interactions between leadership and power are explored through a combina-
tion of speakers, readings, videos and simulations.
PREREQ: CNST100.

CNST 401 CONSUMER POLICY ANALYSIS 3
Analysis of a consumer welfare related market practice issue. Issue may change. Use of
management problem-solving tools to understand the issue and develop policies.
PREREQ: ECON151.

CNST 405 CONTROVERSIAL ISSUES: CONSUMER AND FAMILY BEHAVIOR 3
Uses an economic approach to consumer and family behavior to examine how various
economic, social, legal and corporate policies impact family investment in human capital.
Issues vary by term.

CNST 415 TOPICS IN TEXTILES 3
One topic is covered each semester; either fiber science, textile analysis, or textile dyeing
and finishing.

CNST 416 FASHION DIRECT MARKETING 3
Examines the scope and application of direct marketing including mail-order, customer
lists, catalogues, telemarketing, inserts, magazines and package goods applied to the
Clothing and textile industries.

CNST 418 ADVANCED FASHION MERCHANDISING 4
Focuses on computer application related to mathematical concepts and calculations used
in merchandising soft goods at the retail level. Mark-ons, mark-downs, retail method inven-
tory, open-to-buy and vendor negotiations are emphasized.
PREREQ: CNST218, BUAD6301, ACCT207 or CNST217, and ACCT160.

CNST 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-images, establishes social identities and affects interpersonal encounters.
PREREQ: CNST114, PSY201, and PSY201.

CNST 421 PROFESSIONAL PORTFOLIO DEVELOPMENT 1
Conceptualization and development of a professional portfolio of design work. Design
conceptualization, fashion illustration, and photo documentation techniques will be
emphasized.
PREREQ: CNST226.
RESTRICTIONS: Open to Apparel Design seniors only.

CNST 422 FAMILY FINANCIAL MANAGEMENT 3
Problem-solving approach for resolving family financial problems using a variety of finan-
cial management techniques. Primary focus oriented toward financial counselling, finan-
cial planning or a combination of the two
PREREQ: CNST335.

CNST 424 APPAREL COLLECTION DEVELOPMENT 3
Conceptualization, design and execution of a coordinated apparel collection. Advances
and expands knowledge and skills from previous courses.
PREREQ: CNST324.

CNST 426 FUNDAMENTALS OF TEXTILE CONSERVATION 3
Introduces scientific principles relevant to the cleaning, repair, storage and exhibition of
antique textiles. Evaluates treatment procedures that eliminate damaging agents, retard
their effects, or shield textiles from them.

CNST 433 CAD: MASS MARKET APPAREL 3
Focuses on all phases of apparel product development for a targeted market from con-
ceptualization through execution of sample garments for mass production. Further devel-
opment of skills in computer-aided pattern designing, grading, marker making and data man-
agement (e.g., sizing, specifications, operations and costing). Includes field trip.
PREREQ: CNST314.

CNST 435 CONSUMER AND THE ENVIRONMENT 3
Analysis of dwindling energy resources and their effect upon consumer alternatives in the
marketplace; sociocultural, family and income aspects of consumer behavior in a high energy
conserving society
PREREQ: CNST200, ECON151 or ECON152.

CNST 440 DECISION-MAKING AND LEADERSHIP 3
Using systems thinking for decision-making and planning relating to consumer issues.
Considerations of leadership in bringing decisions and plans to fruition. Includes prob-
lems arising from externalities, public goods and other economic aspects of systems
PREREQ: CNST200 or ECON100 or ECON151 or ECON152.

CNST 442 CONSUMER WELFARE AND EMPLOYEE BENEFITS 3
A critical analysis and evaluation of employee benefits, emphasizing the employee's
needs, rights and alternatives. Benefits to be analyzed include social insurance; group,
life, health, dental and disability insurance; qualified retirement plans; and other direct
and indirect benefits.

CNST 450 THE HISTORIC INTERIOR 3
Survey of the design and function of interior spaces and furnishings in the context of
the cultures and the times from which they evolved. Primary emphasis on Western
Europe and America. Primitive cultures, early civilizations and the Orient also explored.
Field trips.

CNST 451 CONTEMPORARY FURNISHINGS 3
A survey of modern design evolution in furniture, textiles and the minor arts from the late
19th century to the present. Emphasis on styling and technological forces shaping 20th-
century design of interior furnishings. Field trips

CNST 455 TRENDS IN THE GLOBAL ECONOMY 3
Global interdependencies that influence production, distribution, and consumption of
goods and services. The diverse roles of government, industry, and consumers in the glob-
al economy.
PREREQ: ECON151 or ECON152.

CNST 465 SEMINAR 1-3 PF
May be repeated to a maximum of three credits

CNST 466 INDEPENDENT STUDY 1-6

CNST 665 SEMINAR 1-3

CNST 668 RESEARCH 1-6

CNST 868 RESEARCH 1-6

CNST 869 MASTER'S THESIS 1-6

COMMUNICATION

COMM 200 TOPICS: HUMAN COMMUNICATION SYSTEMS 3
Analysis of various human communication systems which may include interpersonal, organi-
zational and/or mass

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 250 ELECTRONIC COMMUNICATION SKILLS 1 PF
Provides students with a basic understanding of the Internet and various Internet tools as
they are used at the University of Delaware. Course is self-paced and all instruction is on
the World Wide Web.

COMM 251 THE DEVELOPMENT OF VERBAL COMMUNICATION 3
Investigation of the physiological, linguistic, psychological and social bases of verbal
communication. Application of these insights to communicative disorders and to educa-
tional and family settings

COMM 255 FUNDAMENTALS OF COMMUNICATION 3
Introduction to theories in communication with applications Developing, analyzing and
critiquing communication in different settings
RESTRICTIONS: Not open to Seniors Not open to communication majors.

COMM 256 PRINCIPLES OF COMMUNICATION THEORY 3
Introduction to theories and research in communication with survey of the areas of the field.

COMM 263 INTERNATIONAL SOCIAL CONDUCT 3
Introduction to basic attitudes toward interpersonal relations and socioeconomic and polit-
ical responsibilities in various cultures An experiential course integrating foreign and U.S.
students.
RESTRICTIONS: Offered only in Winter. Not for major credit.

COMM 301 INTRODUCTION TO COMMUNICATION RESEARCH METHODS 3
The conceptual bases of research methodology: formulating questions, designing, con-
ducting and analyzing research.
PREREQ: COMM256

COMM 309 INTRODUCTION TO PUBLIC RELATIONS 3
Examination of the public relations process, practices and principles in various set-
tings, including corporations, non-profit organizations, educational institutions and
government. Insights are gained through case studies and interviews with public rela-
tions professionals.
PREREQ: ENGL207

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 and ENGL207
### COMM 312 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.

### COMM 313 Communication Principles in Advertising 3
Provides students with the basic concepts of advertising, including an exploration of the role of advertising in marketing, the use of various advertising media and the processes and features of advertising campaigns.

### 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 cross-listed with POSC 319.

**Restrictions:** For majors only.

### COMM 325 Studio Television Production 3
Television as a mass communication media. Background, programming, production and studio processes in educational television, broadcasting and closed circuit laboratory observation and practices.

**Restrictions:** For majors only.

### COMM 326 Field Television Production 3
Analysis and synthesis of the production, planning and videotaping of TV programs; news and public affairs, drama, variety and instructional programming.

**Prereq:** COMM 325.

### COMM 330 Communication and Interpersonal Behavior 3
Introduces key principles of interpersonal communication and discusses their application across diverse contexts.

### COMM 340 Politics and the Media 3
See POSC 340 for course description.

**Restrictions:** For 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 342 Topics in Organizational Communication 3
Focus on introductory areas of study in organizational communication.

**Restrictions:** May be repeated three times for credit when topics vary.

### 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 cross-listed with LEST 345.

### 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 356 Small Group Communication 3
Examines basic group processes, structures and functions. Emphasizes both theory and practical applications.

**Restrictions:** Requires permission of instructor.

### 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:** 2.75 or higher GPA. Offered in spring and fall semesters only.

### 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, communication theory, personal influence, social learning theory, diffusion theory and general media effects.

### COMM 388 Television Production Practicum 3
A special topics video/audio course that acts as the production arm of an interdisciplinary project. Intensive work on specific projects such as producing promotional or sales campaigns, video documentaries and radio drama.

**Prereq:** COMM 325.

**Restrictions:** Offered in winter session only.

### 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 409 Public Relations Campaign Planning 3
Application of the public relations process in designing a public relations plan for a nonprofit client. Includes conducting research, setting objectives, developing strategies, designing special events and making recommendations for implementation and evaluation.

**Prereq:** COMM 309 and ENG 307.

### COMM 413 Public Relations Management 3
Examination of the effects of management systems on the public relations function and the managerial role of the public relations practitioner. Includes in-depth analysis of complex cases, preparation of a crisis communications plan for a nonprofit client and several writing projects geared to specific audiences.

**Prereq:** ENG 307 and COMM 309.

### 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
Current directions in mass communication theory and practice including new technologies, politics, broadcast programming and research, advertising and audience responses to media content.

**Restrictions:** May be repeated three times for credit when topics vary.

### COMM 421 Intercultural Communication: Applications in International Contexts 3
Students critically assess current intercultural communication theory and apply that theory to practical situations in various international contexts.

**Restrictions:** Requires permission of instructor. Course offered in Madrid, Spain and Costa Rica only.

### 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. The method of how to conduct and assess research relating to the mass media.

**Restrictions:** Requires permission of instructor.

### COMM 425 Advanced Topics in Politics and Broadcast Journalism 3
Topics vary and may include the influence of crisis news on national and international politics, the effectiveness of political documentaries and the ethical and historical underpinnings of broadcast journalism. May be cross-listed with POSC 425.

**Restrictions:** Open to Junior and Senior communications majors only.

### COMM 438 Speech, Language and Communication 3
Analysis of theories of meaning, models of language use and acquisition, and the relationships between language and cognition.

### 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 cross-listed with WOMS 440.

**Restrictions:** May be repeated three times for credit when topics vary.

### COMM 442 Topics in Organizational Communication 3
Focuses on significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal communication in organizations, such as superior/subordinate relationships. May be cross-listed with PSYC 443 and/or WOMS 442.

**Restrictions:** May be repeated for up to nine credits when topics vary.

### COMM 450 Mass Communication Effects 3
Examines the history and nature of research on the effects of the mass media, particularly television, in such areas as attitude change, socialization, role modeling and sex and violence.

**Prereq:** COMM 370.

**Restrictions:** Requires permission of instructor.

### 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.
COMM 454 CHILDREN AND THE MASS MEDIA
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
Introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretive approaches are emphasized.

COMM 466 INDEPENDENT STUDY
1-3

COMM 485 ANALYSIS OF FACE-TO-FACE COMMUNICATION
An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.

COMM 486 MULTIMEDIA LITERACY
See EDUC485 for course description.

COMM 601 EPISTEMOLOGY AND THEORY IN COMMUNICATION
General issues in the philosophy of knowledge and science critical for the understanding of theoretical conceptions and a comprehensive survey of theories in communication.

COMM 603 COMMUNICATION RESEARCH METHODS - PROCEDURES
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.

COMM 604 COMMUNICATION RESEARCH METHODS - ANALYSIS
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.

COMM 609 PUBLIC RELATIONS CAMPAIGN PLANNING
Application of the public relations process in designing a public relations plan for a non-profit client. Includes conducting research, setting objectives, developing strategies, designing special events and making recommendations for implementation and evaluation.

COMM 610 ORGANIZATIONAL COMMUNICATION THEORY
An examination of major theories of organizations including functionalist paradigms; interpretive paradigms; neoclassical paradigms (classical, social exchange systems theory and structural systems theory); and modern paradigms (technological systems theory, adaptive systems theory and integrative organizational theory).

COMM 613 PUBLIC RELATIONS MANAGEMENT
Examination of the effects of management systems on the public relations function and the managerial role of the public relations practitioner. Includes in-depth analysis of complex cases, preparation of a crisis communications plan for a non-profit client and several writing projects geared to specific audiences.

COMM 617 COMMUNICATION AND THE MANAGEMENT OF CONFLICT
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 618 TOPICS IN MASS COMMUNICATION
Current directions in mass communication theory and research, cable television, radio and TV regulations, public policy.

COMM 624 MEDIA MESSAGE ANALYSIS
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.

COMM 630 INTERPERSONAL COMMUNICATION THEORY
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.

COMM 638 SPEECH, LANGUAGE AND COMMUNICATION
Analysis of theories of meaning, models of language use and acquisition, and the relationship between language and cognition.

COMM 640 TOPICS IN INTERPERSONAL COMMUNICATION
Significant research, theories and literature in communication, research design and theory building.

COMM 642 TOPICS IN ORGANIZATIONAL COMMUNICATION
Significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships.

COMM 652 COMMUNICATION AND PERSUASION
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.

COMM 656 COMMUNICATION IN ORGANIZATIONS
An introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretive approaches are emphasized.

COMM 657 CHILDREN, TELEVISION AND EDUCATION
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.

COMM 664 INTERNSHIP
1-6
Provides the student with practical, on-the-job training in the field of his or her interest, e.g., interpersonal, mass media, public relations or organizational communication.

COMM 665 COMMUNICATION AND PERSUASION
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.

COMM 685 ANALYSIS OF FACE-TO-FACE COMMUNICATION
An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.

COMM 686 MULTIMEDIA LITERACY
See EDUC685 for course description.

COMM 869 MASTER'S THESIS
1-6

COMPUTER ENGINEERING

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 the gate level and with MSI and LSI components. Analysis and design of asynchronous sequential state machines.

CPEG 210 INTRODUCTION TO COMBINATIONAL LOGIC
Boolean algebra and its application to logic circuits. Simplification of switching functions. Gate level design of circuits to implement logic functions and design with MSI and LSI components.

CPEG 211 INTRODUCTION TO SEQUENTIAL CIRCUITS
Analysis and design of asynchronous sequential logic circuits, synchronous sequential machines and algorithmic state machines. PREREQ: CPEG210

CPEG 220 MICROPROCESSOR BASED SYSTEMS I
Introduction to small computing machines including the architecture, organization and programming of microprocessors. Emphasizes basic machines language and assembly language coding.

CPEG 221 MICROPROCESSOR BASED SYSTEMS II
Extention of CPEG220 with emphasis on Input/Output, interrupt systems and the interfacing of microprocessor systems. A project is required that includes the design and implementation of a microprocessor based system with external interfacing.

CPEG 232 INTRODUCTION TO COMPUTER SYSTEMS ENGINEERING
General purpose and special purpose computer architectures are studied with emphasis on computers embedded in other systems in addition to conventional computer systems. Principles of digital system design are introduced including an introduction to tools for automated design and the use of programmable logic devices.

PREREQ: CPEG221 and ELEC309
PREREG: CPEG221 and ELEG312.

CRJU 621 COMPILER DESIGN 3
Introduction to compiler design, syntax and semantics, code generation and optimization. Design of high performance computer systems 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.

CRJU 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: CPEG221 and ELEG312.

CRJU 701 INTRODUCTION TO LEGAL STUDIES 3
See LISI301 for course description.

CRJU 703 JUVENILE DELINQUENCY 3
See SOCI303 for course description.

CRJU 704 CRIMINOLOGY 3
See SOCI304 for course description.

CRJU 711 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 those decisions
PREREQ: CRJU110 or CRJU203.

CRJU 712 CRIME AND PUNISHMENT IN AMERICAN HISTORY 3
Examines changes in the criminalization of deviant behavior and the social, institutional, and legal development of criminal justice administration in the United States from colonial times to the present. May be cross-listed with HIST312.

CRJU 713 THE STUDY OF MURDER 3
An historical and contemporary analysis of criminal homicide, examining the nature and extent of murder, including those related to assassination and war.

CRJU 720 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 724 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 cross-listed with HIST324.

CRJU 732 CRIMINAL VIOLENCE IN AMERICA 3
General overview of various aspects of criminal violence. In-depth analysis of child abuse, rape, domestic violence and black-on-black homicide.

CRJU 736 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 cross-listed with SOCI336.

CRJU 739 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 745 SOCIOLOGY OF LAW 3
See SOCI345 for course description.

CRJU 746 PSYCHOLOGY AND THE LAW 3
Seminar exploring the rapidly expanding field of psychology and the law. Reviews and discussion of psychological research on such topics as the adversary system, jury selection, eyewitness testimony, the insanity defense, perceptions of crime and the death penalty. May be cross-listed with PSYC346.

CRJU 748 THEORIES OF SOCIAL WORK PRACTICE 3
See SOCI348 for course description.

CRJU 750 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 cross-listed with WOMS350.

CRJU 755 RACE, CLASS AND CRIME 3
Examines contemporary patterns of race, class and crime through historical interconnections of social, political and economic processes. Addresses the impact of race and class on the arrest, conviction and sentencing of offenders. May be cross-listed with BAMS355.

CRJU 757 SEMINAR ON THE POLICE 3
Teaches students to criticize and analyze research and theory in the scholarly literature on policing.

CRJU 766 INDEPENDENT STUDY 1-6

CRJU 768 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.
PREREQ: CRJU110 or SOCI201

CRJU 370 Prison and Prison Subcultures 3
Provides an intensive examination of the culture and lifestyles of prisoners. Special emphasis on how gender, race and class contribute to differential patterns of adjustment to incarceration. Mainly examines how the prisoner subculture contributes to racial conflict, violence and mental health crises among prisoners.

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 Community 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 social 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
See SOCI428 for course description.

CRJU 437 Seminar on Corrections 3
An in-depth examination of current topics in corrections including philosophy of punishment, history of punishment; structure and change of correctional settings and programs; and prison reform.

CRJU 446 Judging the Jury 3
Examines and evaluates the institution of the jury. Explores contemporary controversies over the jury by review and analysis of research studies on jury decision making.

CRJU 448 Community-Based Treatment 3
See SOCI448 for course description.

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 454 Lawyer’s Ethics 3
See SOCI454 for course description.

CRJU 456 Lawyers and Society 3
See SOCI456 for course description.

CRJU 457 Criminal Evidence 3
The study of the laws of evidence and 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 two major theoretical positions that have dominated criminal justice policy making during that period.

CRJU 466 Independent Study 1-6

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 490 Drug Abuse Research Seminar 3
A concentrated examination of contemporary efforts in the areas of drug abuse legislation, enforcement and research, and how these combine to influence prevention, treatment and control strategies.
PREREQ: SOCI301.

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 cross-listed with SOCI495.
RESTRICTIONS: Requires permission of instructor.

CRJU 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.

CSCC 229 The Nature of Science 3
Introduction to the nature of the scientific enterprise. Uses both theoretical discussion and detailed examples to illustrate how science helps us to understand the world. Topics include scientific method, the role of theory, controversies in science and the relationship between science and culture. May be cross-listed with PHIL229.
PREREQ: Any two science courses or one science course and PHI241.

CSCC 233 Women, Biology and Medicine 3
See WOMS233 for course description.

CSCC 241 Ethical Issues in Health Care 3
Interdisciplinary study of basic ethical thought and its application to contemporary biomedical issues. May be cross-listed with PHIL241.

CSCC 246 Philosophical Perspectives of Medicine 3
Ethical and epistemological foundations of medicine; medicine as a way of knowing about the world compared with other ways. May be cross-listed with PHIL246.

CSCC 250 Engineering Ethics 3
See PHIL250 for course description.

CSCC 311 Sociology of Health Care 3
See SOCI311 for course description.

CSCC 330 Varying Authors, Themes and Movements 3
See FIIT330 for course description.

CSCC 341 Ethics of Engineering Profession 1
See PHIL341 for course description.

CSCC 343 Society, Politics and Health Care 3
See POSC343 for course description.

CSCC 355 Computers, Ethics and Society 3
Explores 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. May be cross-listed with SOCI355.

CSCC 365 Studies in Literary Genres, Types and Movements 3
See ENGL365 for course description.

CSCC 366 Independent Study 1-6

CSCC 368 Literature and Science 3
See ENGL368 for course description.

CSCC 369 Literature and Medicine 3
Critical examination of the relationship between medicine and literature; ways society has viewed the physician as reflected in literature. May be cross-listed with ENGL369.

CSCC 382 History of Western Medicine 3
Social and cultural forces that have influenced the development of modern medicine. May be cross-listed with HIST382.
PREREQ: HIST101 or HIST102.

CSCC 389 Topics in Women and Health Issues 3
See WOMS389 for course description.

CSCC 444 Medical Ethics 3
See PHIL444 for course description.

CSCC 480 Issues in Health Care for Children and Families 1-3
Students will come into contact with children, families, physicians, and other health professionals. Students will not only learn about particular cases, but also use these cases to explore issues of health, disease, physician-patient relationships, interactions among members of the health care teams, etc.
RESTRICTIONS: BALS and MSP majors only; at least Junior standing.

CSCC 481 Issues in Public Health 1-3
Students will come into contact with children, families, physicians, and other health professionals. Students will not only learn about particular cases, but also use these cases to explore issues of health, disease, physician-patient relationships, interactions among members of the health care team.
RESTRICTIONS: BALS and MSP majors only and Junior status or above.
CSCC 482 Issues in Public Health - Economics 1-3
Students will come into contact with children, families, physicians, and other health professionals. Students will not only learn about particular cases, but also use these cases to explore issues of health, disease, physician-patient relationships, interactions among members of the health care team.

RESTRICTIONS: BALS and MHP majors only and Junior status or above.

CSCC 498 Topics in Biology 3
See BISC498 for course description

CSCC 647 Philosophy of Technology 3
See PHIL647 for course description

EARLY AMERICAN CULTURE

EAMC 602 Material Life in Early America 3
American domestic environments and decorative arts within social and economic contexts of 17th and 18th centuries. Critically assesses how objects contribute to the study of everyday life in colonial America.

RESTRICTIONS: Requires permission of instructor.

EAMC 604 History of Nineteenth-Century American Interiors 3
Introduction to domestic interiors with emphasis on household technology, interior design, decorative arts and furnishings. Touches on some of the social, political, economic and technological forces that shaped the built environment.

RESTRICTIONS: Requires permission of instructor.

EAMC 605 History of Theories in 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 archaeology, cultural geography, sociology and history. May be cross-listed with ARTH630, HIST605, and/or MST605.

RESTRICTIONS: Requires permission of instructor.

EAMC 606 Issues in American Material Culture 3
Studies major themes in American material culture of the 17th, 18th or 19th centuries. Topics will vary from year to year. May be cross-listed with HIST606 and/or MST606.

RESTRICTIONS: Requires permission of instructor.

EAMC 671 Connoisseurship of the Decorative Arts in America I 1-3
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.

EAMC 672 Connoisseurship of the Decorative Arts in America II 1-3
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.

EAMC 673 Connoisseurship of the Decorative Arts in America III 1-3
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.

EAMC 801 Introduction to Decorative Arts in America to 1860 3
Development of decorative arts, painting and architecture in America. Principles of connoisseurship and studies of American and imported objects of art. Collections of the Winterthur Museum. May be cross-listed with ARTH801.

RESTRICTIONS: Requires permission of instructor.

EAMC 869 Master's Thesis 3

ECONOMICS

ECON 100 Economic Issues and Policies 3
Takes a nontechnical approach to basic economics. Applies economic concepts to contemporary issues, problems and policies. Covers both macro and micro topics.

RESTRICTIONS: Not for major credit. May not be substituted for ECON151 or ECON152.

ECON 141 Swedish Economics: A Survey 2
Introduction to the Swedish economy focusing on its unique features. The role of Sweden in Euroland is examined.

RESTRICTIONS: Offered only in Sweden.

ECON 151 Introduction to Microeconomics: Prices and Markets 3
Introduces supply and demand concepts with basic economic graphs. Examines models of perfect and imperfect competition and the determination of product price and quantities. Covers current microeconomic issues such as the effect of government regulation and environmental problems.

COREQ: MATH114 or MATH115.

ECON 152 Introduction to Macroeconomics: The National Economy 3
Analyzes the determinants of unemployment, inflation, national income, and policy issues relating to how the government alters unemployment and inflation through control of government spending, taxes and the money supply.

PREREQ: ECON151.

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: ECON151 and STAT201.

RESTRICTIONS: Credit can be earned for only one among ECON251, ECON300 or 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: ECON151.

RESTRICTIONS: Credit can be earned for only one among ECON251, 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: ECON151 and MATH221.

RESTRICTIONS: Credit can be earned for only one among ECON251, ECON300 or ECON301.

ECON 302 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: ECON152.

ECON 303 Intermediate Macroeconomic Theory 3
Determinants of national income and employment and inflation; theoretical problems of short-run fluctuations and secular growth; relative merits of monetary and fiscal policy.

PREREQ: ECON202 or permission of instructor.

ECON 305 Comparative Economic Systems 3
Theoretical and empirical comparison of economic systems' use of the market mechanism to allocate resources. Emphasis on the consequences of industrial democracy and governmental efforts to improve the decisions of corporations in Western and Eastern Europe, Russia and Japan.

PREREQ: ECON151.

ECON 306 Economic Theory of Politics 3
Uses rational choice principles of maximization and competition to analyze political behavior. Covers candidates' competition for votes, the "public good" problem, paradoxes of voting, the political business cycle, legislative decision making and vote trading and theories of bureaucracy. May be cross-listed with POSC306.

PREREQ: ECON151 and POSC105.

ECON 311 Economics of Developing Countries 3
Surveys policy issues related to economic growth and development. Special emphasis on problems facing contemporary third world countries.

PREREQ: ECON151 and ECON152.

RESTRICTIONS: ECON311 and ECON411 cannot both count for degree credit.

ECON 315 Economic History of Colonial America 3
Simple economic models and quantitative evidence used to explain colonial American history. Includes migration, servitude and slave markets, government financing and the creation of paper money, causes of the Revolution, colonial growth, foreign trade, education and witchcraft.

PREREQ: ECON151 and ECON152.

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: ECON151 and ECON152.

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: ECON151.

RESTRICTIONS: ECON 332 and ECON 433 cannot both count for degree credit.
ECON 333 CURRENT READINGS IN ECONOMICS
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: ECON 151

ECON 340 INTERNATIONAL ECONOMICS
Theory, problems and policy in international trade and finance with emphasis on developments since World War II
PREREQ: ECON 151 and ECON 152
RESTRICTIONS: ECON 340 cannot be taken for credit after ECON 441 and/or ECON 443

ECON 341 ENVIRONMENT OF MULTINATIONAL CORPORATIONS
See BUAD 341 for course description

ECON 344 THE MAKING OF THE EUROPEAN ECONOMY
Theory and policy of trade integration, resource mobility, exchange mechanisms, policy coordination, and progress toward monetary union. Visits may be made to business and government agencies where course material is supplemented by presentations of business executives, practicing economists, and financial experts
PREREQ: ECON 151 and ECON 152
RESTRICTIONS: Credit toward degree may not be earned in both ECON 344 and ECON 444

ECON 345 ECONOMIES IN TRANSITION
Analyzes the economic transition taking place in twenty-eight countries in Europe and Asia. Provides a general picture of the historical development of these economies under central planning and analyzes the successes and failures of the transition programs in these countries. PREREQ: ECON 151

ECON 360 GOVERNMENT REGULATION OF BUSINESS
Normative, economic and legal foundations of government intervention in business, particularly antitrust and regulation; and the process and the effects of government policies
PREREQ: ECON 151

ECON 366 INDEPENDENT STUDY
1-6

ECON 381 ECONOMICS OF HUMAN RESOURCES
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: ECON 151
RESTRICTIONS: ECON 381 and ECON 483 cannot both count for degree credit.

ECON 385 WOMEN AND THE ECONOMY
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 cross-listed with WOMS 385. May be cross-listed with WOMS 385.
PREREQ: ECON 151

ECON 403 HISTORY OF ECONOMIC THOUGHT
Development of economic analysis as a systematic discipline from mercantilist writers forward. Theories of resource allocation emphasized, with selected reference to topics in trade, money and welfare.
PREREQ: ECON 300 or ECON 301

ECON 405 THE PLANNED ECONOMIES
Theoretical and empirical comparison of market and centrally-planned economic systems. The United States and the Soviet Union are studied.
PREREQ: ECON 300 or ECON 301, and MATH 230.

ECON 406 MARKETS: INFORMATION AND UNCERTAINTY
Investigates impact of cost information on the 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: ECON 300 or ECON 301, and MATH 230 and STAT 202.

ECON 408 ECONOMICS OF LAW
Effect of legal rules on resource allocation both in and between the public and private sectors. Considers common law, regulation and constitutional rules.
PREREQ: ECON 300 or ECON 301.

ECON 411 ECONOMIC THEORY OF DEVELOPING COUNTRIES
Theoretical and empirical analysis of models of growth and development. Emphasizes the use of economic analysis to evaluate public policies in underdeveloped countries.
PREREQ: ECON 300 or ECON 301, and ECON 303
RESTRICTIONS: ECON 311 and ECON 411 cannot both count for degree credit.

ECON 415 ECONOMIC FORECASTING
A practically oriented introduction to the art of managerial forecasting includes an introduction to 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: ECON 151, ECON 152 and STAT 202.

ECON 418 ECONOMIC HISTORY OF AMERICAN LABOR MARKETS
Economic models will be 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: ECON 300 or 301

ECON 419 ECONOMICS OF THE GREAT DEPRESSION
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 intertemporal disturbances
PREREQ: ECON 303

ECON 422 ECONOMETRIC METHODS AND MODELS I
Uses statistical methods, especially multiple regression, to quantify economic models, including situations when the assumptions of classical statistics do not hold.
PREREQ: MATH 231, STAT 202 and ECON 152

ECON 423 ECONOMETRIC METHODS AND MODELS II
Class discussion and research in advanced economic statistics and applied econometrics.
PREREQ: ECON 422

ECON 426 MATHEMATICAL ECONOMIC ANALYSIS
Uses mathematical tools to formulate and analyze economic proposition topics include the use of calculus to analyze comparative statics, optimization and constrained optimization, interest and growth and dynamic models.
PREREQ: ECON 300 or ECON 301, and MATH 231

ECON 430 ADVANCED MACROECONOMIC THEORY
Continuation of intermediate macroeconomic theory. Recent developments in macroeconomic theory explored in the context of the ongoing debate between the classical equilibrium and Keynesian disequilibrium theorists.
PREREQ: ECON 303

ECON 433 ECONOMICS OF THE PUBLIC SECTOR
Role of government in the economy. Effects of taxation, spending and borrowing on resource allocation and income distribution. Special emphasis on cost-benefit analysis and current issues such as the energy environmental problems, the negative income tax, urban finances and the national debt.
PREREQ: ECON 300 or ECON 301
RESTRICTIONS: ECON 332 and ECON 433 cannot both count for degree credit.

ECON 441 ADVANCED INTERNATIONAL MICROECONOMICS
Focuses on international trade theory and policy, and exchange rates. Topics include trade based on comparative advantage and economies of scale and imperfect competition, international factor movements, tariffs, quotas, export subsidies, customs unions, current account deficits, purchasing power parity, and fixed versus flexible exchange rates.
PREREQ: ECON 300 or ECON 301

ECON 443 INTERNATIONAL MONETARY ECONOMICS
Applies macroeconomic theory in an international context. Uses historical cases to analyze policy making under fixed and flexible exchange rates. Develops alternative models of exchange rate dynamics. Discusses problems and proposed reforms of the international monetary system.
PREREQ: ECON 300 or ECON 301, and ECON 303.

ECON 444 ANALYSIS OF EUROPEAN ECONOMIC PERFORMANCE
Theory and policy of trade integration, resource mobility, exchange mechanisms, policy coordination, and progress toward monetary union. Visits may be made to business and government agencies where course material is supplemented by presentations of business executives, practicing economists, and financial experts. Project required.
PREREQ: ECON 303 and one of ECON 251, ECON 300, ECON 301
RESTRICTIONS: Credit toward degree may not be earned in both ECON 444 and ECON 444

ECON 461 INDUSTRIAL ORGANIZATION AND ANTITRUST POLICY
Describes and analyzes markets in terms of structure, methods of competition and social performance, particularly oligopolistic and differential competition. Stresses entrepreneurship, innovation and government competition policy, particularly antitrust.
PREREQ: ECON 300 or ECON 301, and MATH 231

ECON 463 THE ECONOMICS OF REGULATION
Analyzes government regulation of industry and its economic rationale, pricing issues, firm incentives and multiproduct natural monopolies. Discusses the positive theory of regulation and industry studies, and emphasizes efficiency and regulatory reform.
PREREQ: ECON 300 or ECON 301, and MATH 231
RESTRICTIONS: ECON 360 and ECON 463 cannot both count for degree credit.
**ECON 466** Independent Study 1-6

**ECON 471** Futures and Option Markets 4

See FREC471 for course description.

**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: ECON300 or ECON301

**ECON 530** Optimization and Game Theory 3

See MATH530 for course description.

PREREQ: MATH302, MATH349, ECON301 and ECON303

**ECON 551** Managerial Economics 3

Employs microeconomic theory and analysis to enhance managerial decision-making. Emphasizes the development and analysis of economic models to understand the different market environments in which firms operate. Special attention is paid to the effects of antitrust policy, government regulation, and international trade policy.

PREREQ: MATH221.

**ECON 552** Macroeconomic Environment of the Firm 3

Focuses on formal modeling of macroeconomic activity. Special attention is given to the short-run and long-run effects of monetary and fiscal policies on national output, economic growth, inflation, interest rates, business capital expenditures, exchange rates, and foreign trade.

**ECON 668** Research 1-3

**ECON 670** Applied Policy Analysis 3

See MAST672 for course description.

**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 and 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

See MAST675 for course description.

**ECON 676** Environmental Economics 3

See MAST676 for course description.

**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, cartel, 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** Microeconomic Theory 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.

**ECON 802** Macroeconomic Theory 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 808** U.S. Economic History 3

Topics where economic analysis has revolutionized the interpretation of U.S. History will be explored. Topics vary by semester, but may include: the market for immigrant servants; the economics of slavery; the impact of railroads; gender discrimination; the postbellum Southern economic failure.

PREREQ: STAT202 or equivalent.

**ECON 811** Advanced Microeconomic Analysis 3

Prepares doctoral students with microeconomic and mathematical tools needed to read the literature and perform original research. Focuses on producer and consumer theory, general equilibrium, welfare economics, and game theory. Additional topics include: uncertainty, time, stability, social choice, care theory, information, public goods, and externalities.

PREREQ: ECON801

**ECON 812** Advanced Macroeconomic Analysis 3

This course examines recent research and literature in macroeconomics. Among the topics treated are capital accumulation and economic growth, unemployment inflation, financial markets, 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: ECON802.

**ECON 815** Managerial Forecasting 3

Reviews quantitative methods commonly used in forecasting within a business and economic environment, including causal and time series techniques. Emphasizes use and evaluation of techniques rather than their mathematical derivation. Economic theory integrates with statistical techniques providing forecasts of series such as prices, sales, inventories and costs.


**ECON 819** Economics of Information 3

This course extends basic economic paradigms to incorporate and assess the impact of imperfect information. Topics include analysis of principal-agent relationships with applications to insurance markets and signalling product quality, auctions, consumer search behavior, and an introduction to game theoretic models of economic behavior.

PREREQ: ECON551 or ECON801 or equivalent.

**ECON 822** Econometric Theory 3

Applies and modifies statistical techniques to economic data; presents the essentials of econometric theory.

PREREQ: STAT202 or STAT371.

**ECON 823** Seminar in Econometrics 3

Class discussion and research in advanced economic statistics and applied econometrics.

PREREQ: ECON822.

**ECON 824** Topics in Advanced Econometrics 3

Limited dependent variables, panel data and time series techniques. Additional or substitute topics may also be covered. Intended for doctoral students.

PREREQ: ECON822 and ECON823 or equivalent.

**ECON 827** Advanced Production Economics 3

See FREC827 for course description.

**ECON 832** Public Finance 3

This course examines recent research and literature in public finance. Among the topics treated are 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.

**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: ECON551 or ECON801 or equivalent.

**ECON 842** International Finance and Development 3

Continues ECON841. Covers foreign exchange markets, balance of payments, exchange rate systems and international economic policy.

PREREQ: ECON552 or ECON802 or equivalent.

**ECON 846** Topics in Economic Development 3

The course will include topics of current interest to economists. Such topics will include labor markets, populations, human capital and income distribution in less developed countries. Additional or substitute topics may also be covered.

COREQ: ECON801 and ECON822 is recommended.

**ECON 852** Monetary Economics 3

Course 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: ECON552 or ECON802 or equivalent.
EDCE 642 SEMINAR IN HIGHER EDUCATION ADMINISTRATION 3
Overview of administrative and management issues faced by leaders in higher education

EDCE 643 THE LAW AND STUDENT AFFAIRS 3
Legal issues which affect the student affairs practitioner in higher education. Review of federal, state, and contract law as applied to administrative rules, legal rights of students, and institutional liabilities

EDCE 644 THE AMERICAN COLLEGE STUDENT 3
Survey of the attitudes, values, and demographic characteristics of American college students. Examines theories of person-environment interaction and methodologies for identifying student needs and assessing developmental change

EDCE 645 GROUP COUNSELING 3
Examination of group work and group counseling in higher education as well as primary and secondary school settings. Emphasis on theoretical foundations of group work and group skill training

RESTRICTIONS: Open only to majors in Counselor Education and School Counseling

EDCE 646 THEORIES OF COUNSELING 3
Theories and techniques used in counseling of individuals with personal, social, vocational, and educational problems

RESTRICTIONS: Open only to majors in Counselor Education and School Counseling

EDCE 647 MULTICULTURAL ISSUES IN COUNSELING 3
Examines the influence of cultural background, including ethnicity, gender, sexual orientation, socio-economic factors, religious orientation and age on the counseling relationship. Introduction to non-traditional theories and techniques useful with special populations. Emphasis on increased sensitivity towards cultural influences

RESTRICTIONS: Open only to majors in Counselor Education and School Counseling

EDCE 649 ASSESSMENT IN COUNSELING 3
Basic concepts in the use of assessment techniques in the counseling of college students. Selection and interpretation of commonly used instruments. Strategies related to other appraisal methods in counseling

RESTRICTIONS: Open only to majors in Counselor Education

EDCE 650 STUDENT DEVELOPMENT IN HIGHER EDUCATION 3
Studies in development of motivation and personality trends in late adolescence and young adulthood in the context of higher education institutions. Designed for college counselors and student personnel administrators who deal with student development and institutional impact interactions

RESTRICTIONS: Open only to majors in Counselor Education

EDCE 651 CAREER DEVELOPMENT: THEORIES AND PRACTICE 3
Review of the major career development theories as used in the counseling professions. Emphasis on analyzing the world of work and the use of occupational and educational resources

RESTRICTIONS: Open only to majors in Counselor Education and School Counseling

EDCE 652 SPECIAL ISSUES IN COUNSELING WOMEN 3
Examines traditional, non-sexist and feminist approaches used to counsel women. Through readings, discussions, presentations and films, students learn about issues particularly relevant to women. Topics may include women and depression, self-esteem, anger, eating disorders, abuse, careers and dependency

RESTRICTIONS: Open to graduate students only

EDCE 659 PRACTICUM IN COLLEGE COUNSELING 3
Closely supervised counseling experience with college students in the areas of educational, vocational and personal problems. Also includes a two-hour weekly seminar in problems of counseling

RESTRICTIONS: Open only to majors in Counselor Education

EDCE 664 INTERNSHIP 3
Supervised experiences in counseling or student affairs practice in higher education. Minimum of 240 clock hours of direct service time

RESTRICTIONS: Open only to majors in Counselor Education

EDCE 666 SPECIAL PROBLEM 1-6

EDUCATION LIBRARY MEDIA

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 623 ADVANCED CATALOGING AND CLASSIFICATION 3
Continues study of concepts introduced in EDU4622 but focuses on organizing non-book materials and cataloging in the online environment. Special emphasis is given to the organization of the school library media center. Topics include: Library Automation; USMARC Format; Electronic Bibliographic Databases.

EDLM 624 LIBRARY COLLECTION DEVELOPMENT 3
Explores and evaluates the theory and practice of building and managing library collections with a special emphasis on collections in school library media centers. Topics include: Intellectual Freedom; Selection Criteria; Collection Analysis; Budgets; and Producing Teacher Resources.

EDLM 625 SCHOOL LIBRARY MEDIA PROGRAM ADMINISTRATION 3
Explores and evaluates the administration and management of the school library media center. Topics include: Planning and Evaluation; Policy Making; Personnel; Budget; Facilities; Standards; Trends in research in this area.

EDLM 626 DEVELOPMENT OF LIBRARIES IN SOCIETY 3
Explores and evaluates the foundations, concepts, research and issues of librarianship pertaining to the goals and functions of American and world cultures with particular emphasis on the relationship between school library media centers and society.

EDUCATION

EDUC 011 COLLEGE INTENSIVE LITERACY 3 RP
A remedial course for college students with deficiencies in reading, spelling and handwriting. Also suitable for students who need to read and write in English as a second language.

EDUC 102 SKILLSMOD: ACADEMIC SELF MANAGEMENT 1 PF
Focuses on self-organization and growth in a college environment. Students investigate the 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.

EDUC 103 SKILLSMOD: STUDY SKILLS 1 PF
Teaches strategies for understanding and remembering college lectures and text materials. Strategies include identifying the underlying discourse structure of the field, summarizing, comprehension monitoring and transforming notes into test formats. Students practice on their own course materials.

EDUC 104 SKILLSMOD: CRITICAL THINKING 1 PF
Teaches strategies of good reasoning in humanities, social sciences and other liberal arts areas. Students learn how to become independent, well-informed thinkers and how to make persuasive arguments to support their own arguments.

EDUC 105 SKILLSMOD: PROBLEM SOLVING 1 PF
Teaches problem-solving strategies for college courses in chemistry, physics, economics, engineering, etc. Students learn methods for decomposing problems into manageable components and for using example problems strategically. Students apply these techniques to courses they are currently taking.

EDUC 166 SPECIAL PROBLEM 1-3

EDUC 186 EDUCATIONAL TECHNOLOGY I: PRODUCTIVITY TOOLS 1
Acquaints students with basic computing concepts and personal productivity tools, including electronic mail, word processing, spreadsheets and graphics programs. Identifies and analyzes social and ethical issues raised by computing and computer-mediated communication with respect to equal access, privacy and copyright.

EDUC 202 HUMAN DEVELOPMENT I: GRADES K-4 3
Introduces students to the major theories of human development as well as to issues in the area of language development. Students will also tutor in the schools to gain clinical experience.

EDUC 203 HUMAN DEVELOPMENT II: GRADES 5-8 3
The development of adolescents will be covered, including topics of language development and physical, cognitive and social-emotional changes in the middle school years. A field experience consisting of interviewing students in area middle schools is required.

EDUC 210 LITERATURE AND LITERACY FOR YOUNG CHILDREN 3
Introduces current theoretical perspectives of emergent literacy acquisition and development in home, community and school settings, and emphasizes the integration of reading, writing, oral language and literature. Takes a social constructivist orientation and highlights the influence of culture 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 PROFESSIONAL ISSUES: PHILOSOPHICAL PERSPECTIVES 3
Introduction to ethical thinking and decision making. Focuses on ethical dilemmas encountered in planning for classroom management, maintaining intellectual freedom, treating students equally, planning for moral or character education and other professional concerns.

EDUC 247 PROFESSIONAL ISSUES: HISTORICAL PERSPECTIVES 3
Interpretation of the history of American education as it has developed from the colonial era into current time, with particular attention to issues of equity, discipline, intellectual freedom and professionalism. Includes all levels of schooling in a social, multicultural context.

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 266 SPECIAL PROBLEM 1-6

EDUC 286 EDUCATIONAL TECHNOLOGY II: PROFESSIONAL TOOLS 1
Theory and practice of technology in the teaching profession. Topics include lesson planning, classroom management, statistics, electronic gradebooks, presentation technology, integrated learning systems (ILS), and educational resources and communication on the Internet. PREREQ: EDUC 186.

EDUC 303 CHILDREN’S LITERATURE IN WORDS AND IMAGES 3
Engages students in analyses of a range of children’s texts in different modes including books, films, oral performance, computer programs and television. The nature of children’s responses to these tests and the implications for educational practice are addressed. PREREQ: EDUC 210.

EDUC 306 EMERGING LITERACY: YOUNG CHILDREN 3
The nature, acquisition and development of literacy in children to age six. Explores appropriate instructional strategies and resources for use with young children. Field experience in kindergarten. PREREQ: EDUC 210, IFST 222 and IFST 224.

EDUC 308 CURRICULUM DEVELOPMENT IN THE PRIMARY AND MIDDLE GRADES 2 PF
Theories and practices of designing and implementing thematic, interdisciplinary, intradisciplinary and integrated curriculum in grades K-6 are explored. Stresses the need to address local and state curriculum guidelines and consider the attributes of the age group for whom the curriculum is provided. COREQ: EDUC 400 and EDUC 433.

EDUC 310 READING AND WRITING IN THE PRIMARY GRADES 3
Focuses on language arts development (reading, writing, listening, and speaking) of kindergarten through fourth grade children. Explores developmentally appropriate practices. Includes a field experience in kindergarten through fourth grade classrooms. PREREQ: EDUC 210.

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. PREREQ: EDUC 305.

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. Practice included. PREREQ: MATH 253.

EDUC 336 ELEMENTARY CURRICULUM: SOCIAL STUDIES 3
Introduces current instructional practices in the core disciplines and an integrated social studies curriculum in grades K-6. Involves social studies content in the historical and cultural context. PREREQ: EDUC 210, IFST 222 and IFST 224.

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. Practice included. PREREQ: EDUC 230, EDUC 335, EDUC 436 and EDUC 486 (for Elementary Education majors). EDUC 341, EDUC 335 and EDUC 436 (for Early Childhood Education majors).

EDUC 346 ELEMENTARY CURRICULUM: SOCIAL STUDIES 3
Introduction to social studies instruction 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. Practice included. PREREQ: EDUC 230, EDUC 335, EDUC 436 and EDUC 486 (for Elementary Education majors). EDUC 341, EDUC 335 and EDUC 436 (for Early Childhood Development majors).
EDUC 358 Linguistics and Language Arts 3
Explores linguistic and cultural assumptions that motivate and guide current language arts curricula and pedagogy. Encourages future teachers to reflect on their role in the classroom and on how they can empower their students to think critically about language and cultural meanings. May be cross-listed with ENGL358 and/or LING358.
PREREQ: ENGL390 or LING101

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 cross-listed with IFST360.

EDUC 366 Independent Study 1-6
Field-based internship in a school working as an assistant with a professional teacher, including tutoring, small group instruction, grading of instructional materials and limited whole group instruction

EDUC 386 Educational Technology III: Literacy and Language Arts Lab
Introduces prospective teachers to technology available for use in the literacy and language arts curriculum. Enables students to evaluate this technology by applying the approaches studied in their literacy and language arts methods courses. Concludes with a teaching project incorporating the use of technology
PREREQ: EDUC286
COREQ: EDUC310 and EDUC390

EDUC 390 Instructional Strategies and Reflective Practice 3
Strategies for elementary school teaching, including classroom management and models of teaching. Emphasis on provisions for students with special needs
COREQ: EDUC310 and EDUC386.

EDUC 391 Honors Colloquium 3
See ARSC390 for course description

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 a cooperating teacher in the classroom and a University of Delaware supervisor
PREREQ: Students must show evidence of passing Praxis 1

EDUC 403 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 410 Assistive Technology 1
Students identify, evaluate, and use technology to support the education of individuals with disabilities, including assistive technology to promote academic learning and to compensate for cognitive, physical and sensory disabilities.
COREQ: EDUC431, EDUC432 and EDUC435

EDUC 413 Educational Psychology - Social Aspects 3
Focuses on adolescent social and moral development. Specific topics include motivation and affect; teacher beliefs; biases and expectations; student attitudes toward school and teachers; adolescent values; interpersonal relations and self-concept; learning styles; psychological processes underlying classroom management; and student variability and exceptional students. May be cross-listed with PSYC413.
RESTRICTIONS: School practicum of 18 hours is required

EDUC 414 Educational Psychology - Cognitive Aspects 3
Focuses on adolescent cognitive development and learning and the relationship between these cognitive processes and sound instructional models, strategies and practices for diverse and exceptional learners. Assessment and measurement of instruction outcomes are stressed. May be cross-listed with PSYC404.
PREREQ: EDUC413

EDUC 419 Diversity in the Classroom 3
Examines type and implications of student diversity in classrooms (cultural, gender, class, language, and handicapping conditional, cross-cultural processes and foundations of special education). Explores best practices in multicultural education, classroom management and inclusion of secondary students with special learning needs
RESTRICTIONS: Field experience of 18 hours is required

EDUC 420 Reading in the Content Areas 1
Overview of reading comprehension issues at the middle and high school levels based primarily upon task analyses of content-area materials (math, social studies and science). Students will apply current theories of reading comprehension to texts in their areas of interest

EDUC 429 Methods of Teaching Languages in Elementary School 3
See FLTL29 for course description

EDUC 430 Classroom Management in Secondary Schools 1 PF
Examines various aspects of discipline in high school classrooms: the causes of misbehavior, procedures and rules to establish and maintain order, responding to misbehavior and legal issues
COREQ: EDUC400

EDUC 431 Applied Behavior Analysis 3
Covers the principles of behavior analysis and a variety of strategies based on these principles that teachers can employ to eliminate inappropriate behaviors and to teach academic skills. Includes exploration of classroom management techniques and systems for children and youth with and without disabilities. Students participate in a behavior analytic field experience in a public elementary school
PREREQ: EDUC230
COREQ: EDUC410, EDUC432 and EDUC435

EDUC 432 Curriculum for School-Age Exceptional Children 3
Examination of instructional techniques, curricular materials, and progress monitoring for school-aged children with mild disabilities including mental retardation, learning disabilities and social/emotional disturbance
PREREQ: EDUC230
COREQ: EDUC410, EDUC431 and EDUC435
RESTRICTIONS: Requires field placement

EDUC 433 Non-School Factors Affecting Learning in the Classroom 2
Emphasis on research findings describing extent to which academic success is affected by non-curricular factors including the role of families as partners and collaborators, peer relations, child abuse and classroom social climate. Counseling and mentoring skills will be taught and the role of other school and community based referrals will be examined
COREQ: EDUC308 and EDUC400

EDUC 435 Educational Evaluation for Exceptional Children 3
An examination of formal and informal assessment techniques for teacher use in identifying learning problems. Hands-on experience with test instruments used by school psychologists to improve student teacher's understanding of reports in school records. Proper techniques for construction and evaluation of teacher-made tests
PREREQ: EDUC230
COREQ: EDUC410, EDUC431 and EDUC432
RESTRICTIONS: Requires field placement

EDUC 436 Literacy Problems: Assessment and Instruction 3
Introduces general and special education teachers to the needs of students whose literacy attainments are below expectations. Prepares teachers to use diagnostic assessment as a basis for planning preventive and remedial instruction
COREQ: EDUC320, EDUC335, EDUC341, EDUC346 and EDUC486

EDUC 443 Teaching Science in Middle School 3
Introduction to curriculum and appropriate methods for teaching science concepts to middle school students (grades 4-8). Activities include review and evaluation of current middle school programs, research on student thinking, instructional materials, teaching strategies and appraisal of student learning

EDUC 451 Educational Assessment for Classroom Teachers 3
Examines 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' judgements. Discusses implications of assessment policy

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 ongoing language acquisition projects. May be cross-listed with LING462 and/or PSYC462

EDUC 465 Model OAS 3
See POS465 for course description

EDUC 466 Independent Study 1-6

EDUC 469 Research Internship Experience 3
Research apprenticeship with faculty mentor

EDUC 473 Transition From Secondary Special Education 3
Examines legislation, research and practices relating to school-to-adult life transition for youth with mild/moderate/severe disabilities. Emphasis on model secondary programs and instructional practices, family involvement, interagency collaboration and adult service systems
RESTRICTIONS: Requires permission of instructor
EDUC 621 DEVELOPMENTAL READING AND THE ROLE OF THE READING CONSULTANT 3
Laboratory course to prepare students as reading consultants. Teaching experience in the Reading Center is required along with visits to different schools. Provides opportunity to study and compare remedial and developmental reading programs.
PREREQ: EDUC620

EDUC 622 THE ROLE OF LITERACY IN CONTENT AREAS 3
Explores the contributions of literacy research for content learning (e.g., math, science, social studies). Underscores the benefits of linking reading, writing, listening, speaking, and viewing acquisition of domain knowledge and suggests various frameworks for supporting this linkage.
PREREQ: EDUC608
COREQ: EDUC320

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. May be cross-listed with IFST623.
PREREQ: EDUC202 or EDUC413

EDUC 624 INTRODUCTION TO AUTISM AND SEVERE DISABILITIES 3
An introduction to issues related to the identification and assessment of students with autism or sever disabilities. Presents identification instruments, assessment systems and their relation to theoretical models about these disabilities. Reviews the relationship between assessment and educational planning.
PREREQ: EDUC681
RESTRICTIONS: Requires at least two other special education courses in addition to Prerequisites

EDUC 625 METHODS AND CURRICULUM FOR INDIVIDUALS WITH AUTISM AND SEVERE DISABILITIES 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
PREREQ: EDUC681
RESTRICTIONS: Requires at least two other special education courses in addition to Prerequisites

EDUC 626 FUNCTIONAL COMMUNICATION FOR INDIVIDUALS WITH AUTISM AND SEVERE DISABILITIES 3
Reviews appropriately relevant communication activities and strategies that are consistent with current learning theories
PREREQ: EDUC624, EDUC681
RESTRICTIONS: Requires at least two other special education courses in addition to Prerequisites

EDUC 627 MODELS OF INSTRUCTION 3
Study of alternative models of instruction as applied to differing instructional objectives, content and settings

EDUC 628 INSTRUCTION IN READING AND WRITING WITH LEARNING DISABILITY STUDENT 3
Focuses on the cognitive processes involved in reading and writing and instructional methods for helping students, especially those with learning problems, develop strategies for meaningful reading and writing activities.
PREREQ: EDUC620

EDUC 629 PSYCHOLOGY OF TEACHING 3
A study of the research on teacher characteristics, teaching style and method, and teaching teaching

EDUC 630 ASSESSMENT AND INSTRUCTION FOR READING DIFFICULTIES IN THE MIDDLE GRADES 3
Explores the practices and organizational arrangements that optimize literacy learning for middle level students who have not yet achieved appropriate literacy attainments designed for classroom and special education teachers as well as reading specialists
PREREQ: EDUC608

EDUC 631 INSTRUCTIONAL DESIGN OF COMPUTER-BASED EDUCATION 3
Relates concepts and research in educational psychology to the development of instructional materials using the computer. Includes strengths and limitations of computers in meeting certain instructional needs and techniques for effective computer-based educational delivery
PREREQ: Introductory course in Instructional Design

EDUC 632 INTERNET CURRICULUM APPLICATIONS 3
Explores use of the Internet to support, enhance, and deliver curriculum in grades K-12. Participants will use a variety of tools, including the World Wide Web, File Transfer Protocol (FTP), e-mail, and newsgroups, and develop and utilize Internet resources in education and related disciplines. Individuals or small groups will create units of instruction appropriate to their teaching level which utilize Internet tools and resources
RESTRICTIONS: Familiarity with the World Wide Web and e-mail and an active e-mail account

EDUC 633 INTRODUCTION TO COMPUTER INSTRUCTION 3
Introduction to the field of computer-based instruction, including instructional theory and design, hardware and software systems, artificial intelligence techniques, author languages, and the politics and sociology of educational technology. May be cross-listed with CISC633

EDUC 634 TOPICS IN ELEMENTARY SCHOOL MATHEMATICS 3
Examines in-depth topics usually included in a K-8 mathematics program. Provides not only an overview of the topics, but increased understanding as well

EDUC 635 TEACHING MATHEMATICS IN LOWER ELEMENTARY SCHOOL 3
Acquaints students with historic and recent information from theory and research on teaching and learning mathematics in grades 1-4, and will engage students in methods and materials for instruction that such information suggests
PREREQ: EDUC634 and MATH252
RESTRICTIONS: Grade of C or better in EDUC634 or MATH252

EDUC 636 TEACHING MATHEMATICS IN UPPER ELEMENTARY SCHOOL 3
Acquaints students with historic and recent information from theory and research on teaching and learning mathematics in grades 4-6, and engages students in methods and materials for instruction that such information suggests
PREREQ: EDUC634 or MATH252
RESTRICTIONS: Grade of C or better in EDUC634 or MATH252

EDUC 637 EDUCATIONAL PSYCHOLOGY 3
Study of research and theory in educational psychology and their application to instruction and schooling.
RESTRICTIONS: Not open to students with credit in EDUC613 or EDUC614. Requires permission of instructor or enrollment in a Master's Degree Program

EDUC 638 PHILOSOPHY OF EDUCATION 3
Study of the philosophical assumptions basic to, and expressed in, American education; application of philosophy to the clarification of professional problems; and construction of a personal philosophy of education

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 fits 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) educational policy (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 curriculum. 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 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 644 SOCIAL STUDIES CURRICULUM AND INSTRUCTION 3
Compares the goals of the social studies curriculum with research on science teaching typically occur in social studies classrooms. Consideration of traditional and innovative approaches to instruction, curriculum materials development and evaluation for the social studies

EDUC 645 TOPICS: SOCIAL EDUCATION ISSUES 3
Analyzes selected topics and practices in social education. Reviews research findings, theoretical bases, resources and instructional strategies. Conceptual frameworks and/or curriculum modules designed with appropriate provisions for implementation and evaluation of student achievement.
RESTRICTIONS: May be repeated for credit when topics vary

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 HISTORY OF EDUCATION IN AMERICAN CULTURE 3
Historical foundations upon which to base judgments about American education
EDUC 648 Master's Portfolio 1 PF
Use of multiple assessment indicators in formative evaluation of improvement of candidate's teaching effectiveness.
PREREQ: Requires completion of at least 27 graduate credits toward master's degree.

EDUC 650 Advanced Group Counseling for Children and Adolescents 3
Focuses on the specialized skills and knowledge necessary in counseling groups of children and adolescents, integrating developmental considerations, leadership skills and fundamentals of group counseling practice. Students are supervised practicing skills in class and at practicum site.
PREREQ: EDUC654
COREQ: EDUC669
RESTRICTIONS: Requires permission of instructor.

EDUC 651 School-Based Family Issues and Intervention 3
Provides an ecological view of children in families and the relationships between families and the school system. Topics for study will be the family as a system, differing family shapes in contemporary society, special families in special circumstances and models of intervention.

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
PREREQ: EDUC230 or EDUC697

EDUC 653 Computer-Assisted Instruction in Remedial/Special Education 3
Focuses on the design and evaluation of instructional technology applications for elementary and secondary school students with disabilities. Topics include instructional design principles and their application to the development, modification and evaluation of computer-assisted and multimedia instruction.
PREREQ: EDUC652, EDUC679

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.
PREREQ: EDUC652

EDUC 655 Assistive Technology 3
Focuses on the use of computer-based aids and other assistive devices to reduce barriers to the education and rehabilitation of children and adults with mild, moderate, and severe physical and cognitive disabilities. Topics include strategies to facilitate the learning of cause-and-effect, alternate control interfaces to access computers and other aids, human factors principles in the design and configuration of assistive devices and strategies and devices to improve the interactivity of learning and living environments. Federal policies regarding assistive technology
PREREQ: EDUC652

EDUC 656 School Counseling Services 3
Detailed study of the function of school counselors with emphasis on developing a curriculum to promote social and emotional development of children. A practicum experience is included.

EDUC 657 Children, Television and Education 3
See COMM657 for course description.

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 Advanced Counseling Techniques 3
Provides students the opportunity to expand and skills learned in the Counseling Skills Laboratory course. Focuses on therapeutic procedures applied to treatment of problems faced by children and adolescents, including skills in assessment, treatment planning, evaluating outcomes, and termination.
PREREQ: EDUC653
RESTRICTIONS: Requires permission of instructor.

EDUC 660 Applied Educational Measurement 3
Theoretical and applied topics in basic educational measurement with emphasis on application. Topics include norm-referenced versus criterion-referenced assessment, methods of item analysis, classification of various measurement techniques, inter-rater reliability, validity, selection and reviewing tests based on accepted standards of test construction, item analysis, classification of over- and under-achievement, relationships among derived scores and an introduction to using the Statistical Packages for the Social Sciences (SPSS).

EDUC 661 School Business Management 3
A study of the financial and business aspects of school administration.

EDUC 662 Adult Learner 3
A study of values, interests and social roles through the life span. Emphasis on social and psychological development of adult learners; practical implications of aging on the learner studied from the perspective of teachers of adults.

EDUC 663 Counseling Skills Lab for Counselors and Psychologist 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 Legal Issues for School Managers 3
Legal problems affecting school management including tort and contractual liability, pupil personnel law, employee negotiations, Delaware school law and recent court decisions.

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 1-6

EDUC 669 Practicum in School Counseling 1-3
Supervised counseling and guidance experiences in a school setting.
PREREQ: EDUC618, EDUC651, EDUC654, EDUC660, EDUC663 and EDUC677
RESTRICTIONS: Requires contractual arrangement with University and on-site supervisor.

EDUC 670 Program Design for Adults 3
Program planning, development and evaluation for adult and continuing education programs including diagnosis of client needs, effective system of planning, development and evaluation for adult education programs; program scheduling and budget and resource planning.

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 Consultation and Intervention 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.
PREREQ: EDUC681

EDUC 673 Transitions From Secondary Special Education 3
Examines legislation, research and practices relating to school-to-adult life transition for youth with mild/moderate/severe disabilities. Emphasis on model secondary programs and instructional practices, family involvement, inter-agency collaboration and adult service systems.

EDUC 674 Instructional Methods in Secondary Special Education 3
Reviews current issues and practices in curriculum and instruction for secondary students with mild/moderate disabilities. Within a school-to-adult life transition framework, examines general principles of effective instruction and their application to teaching academic, vocational and life skills at middle and high school levels.

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 cross-listed with UNG675 and/or PSY675.

EDUC 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 cross-listed with UNG676.

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. May be cross-listed with ENGL677 and/or UNG677.

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 Methods of Instructing Learners with Mild Disabilities 3
Presents techniques and materials associated with effective instruction for students with mild disabilities. Emphasis is placed on generic principles of instruction and evaluation of their efficacy.
PREREQ: EDUC230 or EDUC697 and EDUC435 or EDUC680
EDUC 680  Educational Diagnosis  3
Informal and standardized measures are discussed and administered. Students are trained to be effective participants on a child study team and to administer a diagnostic-prescriptive protocol. Students are expected to interpret results from a placement protocol and to make recommendations for appropriate educational placement.

EDUC 681  Techniques for Behavior Change  3
Focuses on behavioral principles and procedures for promoting the acquisition of new skills, motivating the performance of previously acquired skills and reducing the occurrence of inappropriate behaviors. Includes strategies for analyzing the effectiveness of these interventions. Participates design and conduct a behavior-change project in an educational setting.
PREREQ: EDUC230 or EDUC697.

EDUC 682  Research in Special Education  3
Review of methods and procedures for analyzing and interpreting empirical research studies in special education and applying this information to questions of importance in classroom practice. Assists students to become informed consumers of findings in the special education literature to design and interpret action research projects in classroom settings.
PREREQ: EDUC607 and EDUC681.

EDUC 683  Curriculum and Methods for Teaching the Gifted Child  3
Focuses on the development of appropriate activities for gifted children. Acquaints students with theoretical models to guide the development and selection of curriculum for use with gifted and talented children. Practicum experiences included.
PREREQ: EDUC579.

EDUC 685  Multimedia Literacy  3
Defines multimedia and discusses it impact. It is having on society. Surveys applications across the curriculum and reflects on the effects of multimedia in 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 cross-listed with COMM686.

EDUC 686  Programming for Gifted Children  3
Focuses on the identification of gifted and talented children and the development of programs to meet their needs.

EDUC 687  Interpretation and Testing of the Exceptional Child  3
Testing procedures including the more esoteric tests that are administered in educational settings. Tests from areas such as the gifted and learning disabilities will be discussed and administered. Emphasis on interpretation and test protocol for placement and program purposes.
PREREQ: EDUC680.

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 and 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 692  Social Skills Training for Children  3
Presents a critical examination of methods to teach social skills to children and youth in both classroom and clinical settings. Presents a model for understanding social competence and a rationale for including social skill training in school curriculum. May be cross-listed with PSYC692.

EDUC 693  Supervision: Purposes and Effects  3
Investigates research in the purposes and effects of supervision and evaluation in school settings. Particular attention given to the Delaware appraisal process.

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 practicum 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 698  Instructional Strategies for Adults  3
Topics include characteristics of the adult learner; motivation; socioeconomic, cultural and psychological factors complicating the educational process; meeting students' needs through outside-class resources; counseling strategies; integrating adults' interests and needs into the curriculum.

EDUC 699  Foundations of Adult and Postsecondary Education  3
Overview of the historical and philosophical foundations of postsecondary education with particular reference to the United States. Key people, issues, institutions, movements, public policy and programs. Examines the influence of postsecondary education's historical evolution and philosophical roots on contemporary theory and practice.

EDUC 700  ARTC Seminar  1-2
Explores issues related to creating a positive classroom learning and teaching environment within a strong collegial support system. Content varies with participant needs and interests.
RESTRICTIONS: Limited to ARTC candidates.

EDUC 701  Effective Teaching Strategies  2-4
Develops skills in effectively designing, implementing, and assessing instruction. Topics include cognitive theories, goals and objectives, instructional models and strategies, materials, technology, tests, performance assessment, rubrics and other scoring instruments.
RESTRICTIONS: Limited to ARTC candidates.

EDUC 702  Adolescent Development and Classroom Management  2-4
Develops skills in effective classroom management and creating a classroom climate conducive to learning and growth with a focus on developmentally appropriate practice to adolescents.
RESTRICTIONS: Limited for ARTC candidates.

EDUC 710  Reading in Secondary Content Areas  1-2
Explores the teacher-learner-text interaction and strategies for using text to develop independent learners actively engaged in the learning process. Emphasis is on selecting, adapting, implementing and evaluating text-based strategies appropriate to different content areas and learning objectives.
RESTRICTIONS: Limited to ARTC candidates.

EDUC 711  Introduction to Secondary Special Education  1-2
Introduces current issues and best practices for serving secondary students with special education needs. Topics include legal bases, transition models, school-to-work and classroom adaptations. Emphasizes familiarity with both model and local programs.
RESTRICTIONS: Limited to ARTC candidates.

EDUC 712  Multicultural Education in Secondary Schools  1-2
Examines research and practices pertaining to the education of culturally and racially diverse students and implications for classroom instruction, school climate and curriculum development. Reviews effective strategies for identifying and addressing behaviors and practices affecting the academic achievement of under-represented populations.
RESTRICTIONS: Limited to ARTC candidates.

EDUC 801  Seminar: Child Discourse and Education  3
Examination of child discourse, such as children's narrative and conversational skills, from the earliest period of language development through the middle school years. Investigation of the literature on oral language development among children from different sociocultural backgrounds. Focus on the relationship between discourse development and children's abilities to engage in oral language and literacy activities in the classroom.
RESTRICTIONS: Open only to Ph.D. and advanced master's students.

EDUC 802  Seminar: Reading  3
Studies significant research in reading to train students in the methodology of reading research and to plan needed research in reading.
PREREQ: EDUC620.
RESTRICTIONS: May be repeated for credit when topics vary. Open only to Ph.D. and advanced master's students.

EDUC 803  Intern in School, Agency and Counseling Psychology  1-6
Students in school, agency and counseling psychology gain on-site experience in individual group and family counseling, as well as with consulting, assessing and conducting research in a variety of school and community agency settings.

EDUC 807  Writing Processes in Educational Settings  3
Focuses on the nature of the writing system, how it is acquired and developed and the functions and discourse forms in writing. Provides information on writing process, structures, evaluation and instruction in elementary and middle grades.
RESTRICTIONS: Open only to Ph.D. and advanced master's students.
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 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 EDUC 875, Introduction to Educational Policy.

EDUC 812 Regression Models in Education 3
The use of regression models in education. Topics include simple and multiple regression, regression models for limited dependent variables and path analysis models.
PREREQ: EDUC 856 or equivalent.

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 cross-listed with PSYC 845.
RESTRICTIONS: Requires permission of instructor.

EDUC 814 Psychological Assessment of Children 3
Intelectual and personality assessment of children. Offers extensive experience in administering, interpreting and integrating psychological tests, training in report writing and the development of treatment prescriptions.
RESTRICTIONS: Requires permission of instructor.

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, ESCR, WPPS, WAIS-R and KABC. May be cross-listed with PSYC 817.
RESTRICTIONS: Requires permission of instructor.

EDUC 820 Contexts for Learning 3
Current approaches to cognitive analysis of school subjects. Topics include theory and research in perception, memory and information processing and the analysis of models and tasks for school subject matters.
RESTRICTIONS: Open only to Ph.D. students in Education. Requires permission of instructor.

EDUC 821 Cognition and Instruction 3
Current approaches to the analysis of instruction and schooling. Topics include decision making and effectiveness, classroom processes, instructional methods and designs, models for schooling and theories of school-based learning.
RESTRICTIONS: Open only to Ph.D. students in Education. Requires permission of instructor.

EDUC 822 Social Foundations of Literacy 3
Explores social and cultural factors which influence children's acquisition and use of literacy. Issues relating to variations in expectations for literacy behavior in community and school contexts are considered. Relations between discourse patterns and literacy learning will be addressed.
RESTRICTIONS: Open only to Ph.D. and advanced master's students.

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 cross-listed with PSYC 823.

EDUC 825 Proseminar: Social and Urban Policy 3
See UAPP 823 for course description.

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 834 Development of Mathematical Thinking 3
Study of how mathematical thinking develops in children. Consideration of major research paradigms and research findings on mathematical thinking in children ages 4-15. Focuses on naturally emerging mathematics reasoning abilities and their relationships to school expectations and acquisitions.

EDUC 835 Past and Current Issues in Mathematics Education 3
Identifies and discusses continuing issues in mathematics education. Examines major historical themes that have shaped current theories and research. Analysis past and current instructional programs.

EDUC 836 Problem Solving in Mathematics 3
Problem solving heuristics as they might be applied to the learning of mathematical concepts. Includes a review of the literature and examination of kindergartners through grade 12. Examines curriculum materials employed to develop productive student problem-solving skills.

EDUC 837 Seminar: Human Development 3
See PSYC 804 for course description.

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 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 845 Seminar in Social Studies Education 3
The role of school programs in citizenship education. Selected topics may include analysis of the citizenship mission of American education, examination of how American culture is transmitted and evaluated in school programs and changing conceptions of civic education in an increasingly diverse nation.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 848 Seminar in Language Development 3
Covers aspects of semantic, syntactic and phonological development through an examination of current research and theory in the field. Treats the educational implications of language development. May be cross-listed with UNG 848.

EDUC 850 Qualitative Research and Evaluation Designs in Educational Settings 3
Theory and practice are combined as students read and critique exemplary qualitative studies, explore theoretical frameworks, and conduct short-term field research projects designed to develop students' capacity to collect and analyze qualitative data. This course is designed as the first part of a two-semester introduction to qualitative research.

EDUC 851 Practicum/Qualitative Research 3
Provides practical experience in qualitative data collection, analysis and writing. Topics include research design, formal and informal interviewing, community and classroom observations, life history, the case study, analytic induction, ethnics and style in qualitative research reporting.
PREREQ: EDUC 850.

EDUC 856 Introduction to Statistical Inference 3
Quantitative analysis topics include describing univariate and bivariate data distributions, calculating and interpreting useful summary statistics, the logic of least squares estimation, the fundamentals of probability theory, selected probability models and their interrelationships, the logic of null hypothesis testing, interval estimation and selected inferential techniques.
RESTRICTIONS: Requires admission to doctoral program.
PREREQ: EDUC 865 or equivalent.

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 861 Curriculum Development and Evaluation 3
Major curriculum theories and their relationships to planning, improvement and evaluation of school programs. Consideration of strategies for affecting curriculum change.

EDUC 862 Quantitative Issues in Education Research 3
Considers general topics relevant to the quantitative analysis of educational data. Topics include the extraction of data from major educational databases, sampling issues, experimental, quasi-experimental and non-experimental designs, basic ANOVA and basic regression. Students will design research studies and analyze data utilizing mainframe and PC-based statistical software.
PREREQ: EDUC 856.
RESTRICTIONS: Requires admission to doctoral program.

EDUC 863 Principles of Educational Evaluation 3
Focuses on models, theories and practice of program evaluation and applied research in education. Topics include experimental (randomized experiment) and quasi-experimental (e.g. non-equivalent groups, regression-discontinuity) designs, validity, political and ethical issues of evaluation, and the implementation and practice of process and outcome program evaluation.

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. Includes applications to norm-referenced and criterion-referenced assessment frameworks.
PREREQ: EDUC 865 or equivalent.

EDUC 869 Master's Thesis 1-6

EDUC 871 Topics in Research Methodology 3
Concerns the substantive applications of research and evaluation to education problems and is taught in a rotating manner. Possible topics include history and sociology of testing, visual and graphical display of data, models of educational stratification and problems of educational evaluation.
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 the remaining class sessions will emphasize item response theory.
PREREQ: EDUC856 and EDUC865.

EDUC 873 MULTILEVEL MODELS IN EDUCATION 3
Designed to introduce students to the method of multilevel modeling. Such modeling is useful for studies of organizations such as schools in which units of observations are nested in other units (e.g., students in schools). Also considers the analysis of growth and change as a special case of multilevel modeling.
PREREQ: EDUC812 and EDUC856.

EDUC 874 MULTIVARIATE DATA ANALYSIS IN EDUCATION 3
Topics covered include regression, factor analysis, discriminant analysis and multivariate analysis of variance. Emphasis on applications and the use of computer packages.
PREREQ: EDUC812 and EDUC856.

EDUC 875 INTRODUCTION TO EDUCATIONAL POLICY 3
Survey of the origins, nature and impact of the major state and federal educational policies of the past 20 years. What do officials seek when they frame policies; what happens when innovations take hold; how do we explain the frequent discrepancies between intentions and results?

EDUC 876 STRUCTURAL MODELS IN EDUCATION 3
Concerns the statistical modeling of latent variables arising in educational settings. Topics include model specification, identification, estimation and testing. Considers structural models in single and multiple groups, structural means analysis and structural analysis of categorical and other non-normal data.

EDUC 877 PRACTICUM IN SPECIAL EDUCATION 3-6
Demonstration, directed observation and practice teaching with consultation and an accompanying seminar to discuss experiences and problems under faculty supervision.
PREREQ: EDUC679, EDUC680 and EDUC681.

EDUC 879 INTERNSHIP IN EDUCATION 3-9
Supervised, on-the-job experience in one specific area of education (e.g., 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 883 ADMINISTRATION OF ADULT AND CONTINUING EDUCATION PROGRAMS 3
Considers the administration, design, 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 EDUCATION TECHNOLOGY TOPICS 3
In-depth study of a major problem in educational technology.
RESTRICTIONS: May be repeated for credit when topics vary.

EDUC 888 PUBLIC EDUCATION FINANCE 3
Review of approaches to collecting and distributing local, state, and federal funds for public education. Analysis of issues of funding public education and its economic aspects.
RESTRICTIONS: Open only to students in the Ed D program in Educational Leadership.

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.
RESTRICTIONS: Open only to students in the Ed D program in Educational Leadership.

EDUC 891 MANAGEMENT APPLICATIONS RESEARCH I 2
Focuses on conceptualizing, writing and designing quantitative decision-oriented studies for education administrators and policymakers.
RESTRICTIONS: Open only to students in the Ed D program in Educational Leadership.

EDUC 892 MANAGEMENT APPLICATIONS RESEARCH II 1
Focuses on developing, organizing and analyzing quantitative management-oriented data for education administrators and policymakers.
PREREQ: EDUC665, EDUC691.
RESTRICTIONS: Open only to students in the Ed D program in Educational Leadership.

EDUC 894 ADVANCED ORGANIZATIONAL THEORY 3
Survey of historical and contemporary macro-organizational theory with a focus on the school as an organization. Topics include power in organizations, Weberian and neo-Weberian theory, coordination and control, decision-making and organizational culture.
RESTRICTIONS: Open only to students in the Ed D program in Educational Leadership.

EDUC 895 IMPROVEMENT STRATEGIES 3
Focuses on philosophies of change, assessing the need for change in an educational setting, the educational leader as an agent of change, and an analysis of numerous approaches that have been successful in improving instructional programs.
RESTRICTIONS: Open only to students in the Ed D program in Educational Leadership.

EDUC 897 CURRICULUM INQUIRY 3
A study of the emerging concepts and radical policy options found in significant writings that have influenced curriculum theory and practice during the 20th century.
RESTRICTIONS: Open only to students in the Ed D program in Educational Leadership.

EDUC 899 ECONOMICS OF EDUCATION 3
Introduces economic analysis as it pertains to educational systems and their impact on economic growth. General economic principles related to specific education issues and problems such as productivity, human capital, effectiveness and funding. Approaches used by economists are presented in evaluating educational activities and their policy impact.

EDUC 904 PRE-CANDIDACY STUDY 3-12 PF
Research and readings in preparation for 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 TECHNOLOGY

EGGG 132 ENGINEERING GRAPHICS AND ANALYSIS 2
Fundamental concepts of multiview projection drawing and application of drawing conventions. Includes sectional views, dimensioning, pictorial representation, fastener specifications and drawings for various engineering disciplines. Computer applications include data structure for computer modeling, plotting routines for computer drawing and an introduction to CAD principles.
COREQ: MATH241 and a programming language.

EGGG 300 DEAN'S SCHOLAR SEMINAR 1 PF
Seminar examines ideas that are not regular course work and that are not closely related to students' disciplines. Topics reflect values that civic and community leaders should know.
RESTRICTIONS: Requires an invitation to participate.

EGGG 352 MICROCOMPUTER CAD FOR DESIGN AND MODELING 3
Microcomputer methods for development of design concepts. Modeling fundamentals including shading (rendering), hidden lines, unary and binary (Boolean) operations are included.
PREREQ: EGGG132
RESTRICTIONS: Requires a moderate proficiency in CAD software. Not open to Freshmen.

EGGG 392 GRAPHIC SIMULATION AND ANALYSIS 3
Advanced topics in applied descriptive geometry as related to mining, drainage and surveying. Development of nomographs, analysis for empirical functions, graphic Fourier analysis of typical transient disturbances and graphic solutions of ordinary differential equations.
PREREQ: MATH302

EGGG 432 PRINCIPLES OF COMPUTER-AIDED DRAWING 3
Concepts of computer graphics as related to CAD systems. Underlying procedure and algorithms for hidden line/surface treatment, animation, rendering and graphics standards. Modelling transformations for projection drawings and definition of curves, surfaces and solids. Emphasis on implementation of concepts through application programming.
PREREQ: MATH243 and CSIC106.
RESTRICTIONS: Requires knowledge of FORTRAN.

ENGINEERING TECHNOLOGY

EGTE 103 LAND AND WATER MANAGEMENT 3
Topics covered are land application of wastes, hazardous waste management, acid rain, nonpoint source pollution, water treatment, wetlands, runoff, ground water, erosion control, irrigation and drainage.
RESTRICTIONS: Open to non-majors only.

EGTE 104 INTRODUCTION TO LAND SURVEYING 1
Topographic surveying, mapping and measurement of distance, area and earth volume for applications in natural resource management, landscaping and construction.
RESTRICTIONS: Open to non-majors only.

EGTE 105 POWER AND MACHINERY 4
Principles of operation, selection and management of power and machinery units used in agricultural crop production.
RESTRICTIONS: Open to non-majors only.

EGTE 107 WELDING AND METALS 2
Arc welding, gas welding, soldering, sheet metal layout and fabrication, and properties of metals.
RESTRICTIONS: Taught during first half of Fall semester.
EGTE 108 UTILITIES 2
Domestic water supply and waste disposal, house wiring, heating systems
Restrictions: Taught during second half of Fall semester

EGTE 109 TECHNICAL DRAFTING 2
Basic principles of technical drafting, including sketching, use of drafting equipment, orthographic projection, pictorial drafting and architectural plans

EGTE 111 COMPUTER APPLICATIONS IN ENGINEERING TECHNOLOGY 3
A foundation course in the application of engineering principles and modern technology in agriculture and industry. Emphasis on problem solving and elementary FORTRAN programming.

EGTE 112 PERSONAL COMPUTERS AND TECHNOLOGY 3
Introductory course in personal computers, PC operation systems, programming, and software packages such as spreadsheets and word processing. Statistical and numerical analysis techniques will be applied to production problems in Engineering Technology.

EGTE 125 INTRODUCTION TO ENGINEERING TECHNOLOGY 1
Career exploration in engineering technology, campus resources, engineering methods. Intended for first-year students in the Department of Bioresources Engineering.

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

EGTE 215 INTRODUCTION TO HYDRAULICS 4
Fluid properties, fluid statics, pipe flow, distribution systems, pumps, open channel flow, groundwater hydraulics, hydrologic structures. Laboratory includes flow measurements, energy measurements and analysis of data.
PREREQ: EGTE 111, MATH 221 and PHYS 201

EGTE 223 SURVEYING 3
See CIEG 223 for course description.
PREREQ: MATH 115, MATH 221, or MATH 241.

EGTE 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.

EGTE 306 COST ESTIMATING 2
Building components, bill of materials and cost estimating using cost of materials plus labor system.
PREREQ: EGTE 111.
Restrictions: Offered only in Winter Session.

EGTE 307 BUILDING CONSTRUCTION 1
Practical building experience with emphasis on light frame construction.
Restrictions: Offered only in Winter Session.

EGTE 309 ADVANCED COMPUTER-AIDED DRAFTING 2
Advanced topics in AutoCAD, including X-ref, perspectives, oblique projections, creation and modification of three dimensional models. 2D takeoffs from 3D models, renderings, programming in AutoCAD lisp language.
PREREQ: EGTE 209.

EGTE 311 FUNDAMENTALS OF THERMODYNAMICS 3
PREREQ: EGTE 215.
Coreq: MATH 222 or MATH 242.

EGTE 321 STORM WATER MANAGEMENT 4
Hydrology for small (urban/suburban/rural) watersheds. Fundamentals of open channel hydraulics. Design of culverts, spillways, vegetated waterways and detention basins.
PREREQ: EGTE 111, EGTE 112 and EGTE 215.

EGTE 328 WASTE MANAGEMENT SYSTEMS 3
Properties of agricultural, food-processing and industrial wastes. Wastewater treatment, sludge management and waste utilization.
PREREQ: CHEM 104, EGTE 111 or EGTE 112.

EGTE 331 MECHANICAL POWER UNITS 4
PREREQ: EGTE 111, EGTE 215 and EGTE 311.

EGTE 344 ELECTRONICS AND MICROPROCESSORS 3
Survey course with emphasis on fundamental electronic concepts and devices. A logical progression is made from semiconductors through microprocessors. Topics include diodes, transistors, SCR's, tricaps, digital logic, number systems, flip-flops, shift registers, counters, microprocessors, assembly language programming, A/D conversion and data communications.
PREREQ: EGTE 244.

EGTE 354 RURAL AND LIGHT INDUSTRIAL BUILDINGS 4
Analysis, design, materials and construction of rural and light industrial buildings.
PREREQ: EGTE 111, EGTE 112 and EGTE 209.

EGTE 365 JUNIOR SEMINAR 1
Invited speakers, faculty presentations, and oral and written reports required on selected topics in agricultural engineering.

EGTE 366 INDEPENDENT STUDY 1-3

EGTE 401 INTRODUCTION TO QUALITY CONTROL 2
Fundamental of quality and control. Topics include Pareto diagrams, matrix analysis, Gier diagrams, Ishikawa, process capability, control chart for variables and attributes, cumulative sum, weighted moving average and exponential weighted moving average.
PREREQ: STAT 201 or equivalent.

EGTE 402 QUALITY CONTROL APPLICATIONS 2
Application of quality and control techniques. Topics include lot by lot acceptance, sampling plan systems such as MII spec 105E, quality costs, quality software, total quality management, ISO 9000, international quality studies and quality exam preparation.
PREREQ: EGTE 401, STAT 201 or equivalent.

EGTE 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. Some problems are solved using differential calculus and spreadsheets.
PREREQ: MATH 221 or equivalent, EGTE 112.

EGTE 417 PROJECT MANAGEMENT 2
Basic procedures for finding the limiting sequence of events, constructing a flow network describing the project steps, and project planning and control for optimum scheduling. Project analysis using Critical Path Method (CPM), Project Evaluation and Review Technique (PERT) and linear programming.
PREREQ: EGTE 111 or EGTE 112.
Restrictions: Only offered in Winter Session.

EGTE 421 BIORESOURCES MANAGEMENT SYSTEMS 4
Water movement in soil-plant-atmosphere continuum, heat flow in soils, radiant energy in plant environment, groundwater, soil erosion and design of irrigation, drainage and soil erosion control systems.
PREREQ: EGTE 321, PESC 204, BESC 103.

EGTE 431 MECHANICAL ASPECTS OF BIOLOGICAL AND NATURAL RESOURCES 4
Mechanical properties of biological materials; mechanics of cutting and processing. Mechanics of soil cutting and traction. Design of off-highway equipment for biological and natural resources including machines for plant and soil systems. Watershed management, resource conservation and the land application of waste materials.
PREREQ: MATH 243, PHYS 207, and either EGTE 111 or CISC 106.

EGTE 435 MACHINERY DESIGN AND DEVELOPMENT 3
Fundamental requirements and relationships of agricultural machinery components, analysis of forces involved, design of machines and components, and field testing procedures.

EGTE 440 PLANT LAYOUT AND MATERIALS HANDLING 3
Fundamentals of spatial relationships, work flow patterns, equipment selection, conveyor sizing and motion economy applied to production and processing facilities.
PREREQ: EGTE 111 and EGTE 209.

EGTE 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: PHYS 202, EGTE 244 or EGTE 344.

EGTE 444 PROGRAMMABLE LOGIC CONTROL SYSTEMS 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: EGTE 111, EGTE 244 or equivalent.

EGTE 445 FOOD ENGINEERING TECHNOLOGY 4
See FOSC 445 for course description.

EGTE 451 SENIOR DESIGN 3
Work with engineering and technology advisors from industry, state agencies, and faculty on design projects requiring knowledge and skills acquired in previous courses.
Restrictions: Requires Senior status in bioresources engineering technology.
ELEG 456  FUNDAMENTALS OF HVAC  3
Heating, ventilating and air conditioning of rural and light industrial buildings. Heat trans-
mittance in structures, space heating and cooling loads, air distribution, piping and fluid
flow, heat and water production in livestock and poultry structures, environmental systems
for specific plant and animal structures.
PREREQ: EGET111, EGET112, EGET215 and EGET311

ELEG 466  INDEPENDENT STUDY  1-3

ELECTRICAL ENGINEERING

ELEG 101  INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING  1
Overview of key principles and subject areas which define the electrical and computer
engineering degrees.

ELEG 205  LINEAR CIRCUIT THEORY I  4
Laws of the electric circuit, analysis of DC and AC circuits, network equations and net-
work theorems.
PREREQ: MATH324 and PHYS207

ELEG 302  INTRODUCTION TO DEVICES AND MATERIALS  3
Emphasizes concepts and properties of materials important in modern solid state electron-
ics; topics include structure and processing of electrical materials, band structure, carrier
concentration and dynamics, junction phenomena and optical and magnetic phenomena.
PREREQ: MATH343 and PHYS208

ELEG 305  SIGNAL PROCESSING I  3
Covers continuous and discrete time signals and systems at the introductory level.
Introduces Z, Laplace and Fourier transforms and uses these to solve difference and dif-
ferential equations arising from circuit theory and signal processing. Presents theory of lin-
ear and causal systems.
PREREQ: ELEG205 and MATH342

ELEG 306  SIGNAL PROCESSING II  3
Continues topics introduced in ELEG305 at a more advanced level. Introduces filter
design, transmission line analysis, the discrete Fourier transform, the fast Fourier transform
and roundoff effects.
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 the statistical and spectral representations of random signals used in sta-
tistical communication theory. The mathematical techniques of probability theory and gen-
eralized harmonic analysis developed and applied to electrical noise and the design of
optimum systems.
PREREQ: ELEG305

ELEG 312  ELECTRONIC CIRCUIT ANALYSIS II  4
Low-frequency and high-frequency response of R-C coupled amplifiers, Class A tuned
amplifiers, tuned power amplifiers, frequency response and stability of feedback amplifi-
cers, oscillators, modulation and demodulation circuits.
PREREQ: ELEG309

ELEG 314  ELECTRONICS AND INSTRUMENTATION  4
Steady state circuit analysis, diode, power supplies and filters. Rotating machinery
integrated circuits, operational amplifiers, A to D converters and digital building blocks
with applications to information handling.
PREREQ: PHYS208 and MATH302

RESTRICTIONS: Not for major credit

ELEG 320  FIELD THEORY I  3
Study of field and problems in electrostatic and magnetostatic fields. Maxwell's equations
PREREQ: PHYS208, MATH342 and ELEG205

ELEG 340  SOLID STATE ELECTRONICS  3
Introduction to the concepts necessary to establish electronic phenomena in solids.
Application to electronic devices such as diodes, transistors, FETS and integrated circuits.
Emphasis on the reduction of the physical device to a circuit model.
PREREQ: ELEG302, MATH342 and ELEG309

ELEG 366  INDEPENDENT STUDY  1-6

ELEG 403  COMMUNICATION SYSTEMS ENGINEERING  3
Review of signal theory, Fourier transforms, linear and time-invariant systems; review of
probability and random signals, information theory, source entropy, channel capacity,
baseband data transmission, modulation, noise in analog systems and digital carrier
modulation.
PREREQ: ELEG306

ELEG 404  MULTIMEDIA COMMUNICATIONS  3
Covers the theory and principles of multimedia communications, including data compres-
sion, CD-ROMS, multimedia networking and standards (JPEG, MPEG, H261, H263, RTP, etc).

ELEG 412  INTRODUCTION TO POWER SYSTEM ANALYSIS  3
Analysis of steady state and transient response of medium to high voltage power distri-
bution systems. Circuit modeling of power system components, symmetrical components,
power factor correction, fault current prediction and three-phase circuit analysis.
PREREQ: ELEG320.

ELEG 413  FIELD THEORY II  4
Electrodynamics based on Maxwell's equations. Energy storage in and flow in electromag-
netic fields. Transmission lines, waves and radiating systems.
PREREQ: ELEG320.

ELEG 414  ELECTRICAL MACHINES, MOTORS AND GENERATORS  4
Study of rotating electrical machines (both AC and DC) motors and generators with spe-
cial emphasis on physical principles underlying machine dynamics. Equivalent circuits
and equations for predicting machine response derived and analyzed and application
considerations discussed.
PREREQ: ELEG320.

ELEG 418  DIGITAL CONTROL SYSTEMS  3
Study of closed-loop digital control systems. Emphasis on selection and pole
placement techniques for controller development. Both root locus and input/output pole
placement using the Diophantine equation are used to generate designs.
MATLAB is used for computer aided design.

ELEG 420  ELECTRONIC CIRCUIT DESIGN  4
Design with and application of operational amplifiers using integrated circuit units. Design
of discrete element clamping and clipping circuits, logic circuits, multivibrators, etc.
Analysis and simulation of digital integrated circuits. Laboratory studies involve extensive
use of analog and digital computers.
PREREQ: ELEG312.

ELEG 423  ELECTRICAL PROPERTIES OF MATTER  3
Provides basic understanding of electrical behavior in materials used for fabricating semi-
conductor 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: ELEG320 and ELEG340

ELEG 424  QUANTUM MECHANICS  3
See PHYS424 for course description.

ELEG 428  SYSTEMS ANALYSIS AND CONTROL  3
Involves the study of closed-loop analog control systems. Emphasis on stability analysis
and the translation of performance specifications into a control system design using the
root locus method. Implementation issues are covered. Computer aided design techniques
involving the use of MATLAB are stressed.

ELEG 430  MICROWAVE CIRCUIT DESIGN PRINCIPLES  4
Provides a comprehensive introduction to time and frequency domain integrated circuit
design in the submicrosecond/GHz regime. Major design project to complete course.
PREREQ: ELEG312 and ELEG320.

ELEG 433  ENERGY SYSTEMS  3
Study of basic principles underlying systems for distribution and utilization of electric power.
Consideration of local scheduling, polyphase systems, faults and stability, and power
system economics
PREREQ: ELEG309 and ELEG320

ELEG 438  THEORY AND DESIGN OF DIFFRACTIVE OPTICS  4
Applications of Fourier analysis to diffraction, imaging optical data processing and holog-
ography. Major design project required.
PREREQ: ELEG305, ELEG306 and ELEG320.

ELEG 440  OPTOELECTRONICS  3
Study of the generation, transformation and applications of coherent optical waves.
Introduction to engineering optics, Laser theory, optical wave propagation, modula-
tion and detection; holography; opto-electronic systems and related engineering
applications.

ELEG 450  SEMICONDUCTOR DEVICE DESIGN AND FABRICATION  4
Instruction in design and fabrication of simple bipolar and MOS integrated circuits.
Specific topics include semiconductor device and integrated circuit design, photolitho-
graphic mask design and fabrication, photolithography, N- Diffusion and P- Diffusion, P-
MOS, metallization and device and integrated circuit testing.

ELEG 466  INDEPENDENT STUDY  1-6

ELEG 616  KINETIC THEORY AND THERMODYNAMICS  3
See PHYS616 for course description.
ELEG 620 SOLAR ELECTRIC SYSTEMS 3
Examines the issues critical to the deployment of photovoltaic systems. Focuses on systems that have an electricity generating capacity of three kilowatts and larger.

ELEG 621 SOLID STATE ELECTRONICS II 3
Introduces fundamental principles of solid state physics upon which subsequent device-based courses build. Reviews the basic technologies and materials systems which are technologically important.
PREREQ: ELEG302 and ELEG340 or equivalents and ELEG423

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 ultrathin layers and superlattices, oxide growth, thin-film deposition, diffusion, ion implantation, etching and metallization.

ELEG 624 FUNDAMENTAL DEVICE PRINCIPLES 3
Introduces fundamental principles of semiconductor devices and derives the operating characteristics of several important device examples. Topics to be covered include semiconductor basics, equilibrium and nonequilibrium properties, Fermi levels, transport, injection, generation, recombination, pn junctions, bias, Fermi potentials, capacitance, JV characteristics, bipolar transistors, junction field effect transistors, MOS transistors, ideal MIS structure, microwave and optoelectronic devices.

ELEG 625 OPTICAL FIBER COMMUNICATIONS 3
Introduces the fundamental aspect of optical fiber communications as well as some advanced topics, such as all optical communications and networks. Topics include optical fiber structure, characteristics and fabrics, wave propagation in dispersive media, optical sources and coupling, optical detectors, communication systems and advanced system techniques.
RESTRICTIONS: Undergraduate students require permission of instructor

ELEG 630 MICROWAVE CIRCUIT DESIGN PRINCIPLES 4
Provides a comprehensive introduction to time and frequency domain integrated circuit design in the picosecond/GHz regime. Major design project required
PREREQ: ELEG312 and ELEG320

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

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, ZF fast Fourier transform algorithms and computed tomography. May be crosslisted with MAST633
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 theorems are studied.
PREREQ: ELEG305 and MATH342 or MATH349 or equivalents.

ELEG 635 DIGITAL COMMUNICATION 3
Covers the theory and applications of digital communication including source coding dealing with lossless and lossy compression of data such as images and speech, channel coding dealing with error control techniques to fight noise, and modulation dealing with the efficient transmission of signals over waveform channels.
RESTRICTIONS: Familiarity with probability and linear systems required

ELEG 636 STATISTICAL SIGNAL PROCESSING 3
PREREQ: Undergraduate courses in probability and signals and linear systems

ELEG 638 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, ELEG306 and ELEG320.

ELEG 640 OPTOELECTRONICS 3
Study of the generation, transformation and applications of coherent optical waves. Introduction to engineering optics. Laser theory; optical wave propagation, modulation and detection; holography; optoelectronic systems and related engineering applications. May be crosslisted with MAST640.

ELEG 650 SEMICONDUCTOR DEVICE DESIGN AND FABRICATION 3
Instruction in design and fabrication of simple bipolar 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, metalization, and device and integrated circuit testing.
PREREQ: ELEG340

ELEG 651 COMPUTER NETWORKING COMMUNICATIONS 3
Presents basic concepts in computer network analysis and design. Emphasizes generic principles developed over the last two decades in the specification, implementation and evaluation of modern computer networks and networking systems.
RESTRICTIONS: Requires undergraduate mathematical maturity, including calculus, analytical geometry and infinite series and courses in operating systems and computer architecture.

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.

ELEG 661 MATERIALS AND DEVICES SEMINAR 1-6
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 theorems are studied.
PREREQ: ELEG312 and ELEG320

ELEG 662 DIGITAL SYSTEMS SEMINAR 1-6
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 theorems are studied.
PREREQ: ELEG312 and ELEG320

ELEG 663 SIGNAL PROCESSING SEMINAR 1-6
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 theorems are studied.
PREREQ: ELEG305 and ELEG340

ELEG 686 RESEARCH 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 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

ENGL 011 ENGLISH ESSENTIALS 3 RP
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.

ENGL 015 PREPARATORY ENGLISH 3 RP
English fundamentals for students inadequately prepared for college composition.

ENGL 110 CRITICAL READING AND WRITING 3
Expository and argumentative composition through analysis of selected readings.
RESTRICTIONS: Required of all Freshmen.
ENGL 166  SPECIAL PROBLEM  1-3

ENGL 183  GRAMMAR FOR ENGLISH TEACHERS  2  PF
Prepares English education majors for student teaching by providing them with a comprehensive, systematic coverage of traditional and non-traditional approaches to grammar, punctuation, usage, and spelling.
PREREQ: ENGL 110.
RESTRICTIONS: Open only to English education majors.

ENGL 200  APPROACHES TO LITERATURE  3
Dual emphasis on reading and writing. Offers an introduction to poetry, fiction, and drama, and provides for extensive practice in writing about literary subjects.
PREREQ: ENGL 110.

ENGL 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. May be cross-listed with CMLT 202 and/or PLIT 202.
PREREQ: ENGL 110.

ENGL 204  AMERICAN LITERATURE  3
Study of representative nineteenth-and twentieth-century works, set in their historical and cultural contexts, introducing appropriate critical concepts.
PREREQ: ENGL 110.
RESTRICTIONS: Not for major credit.

ENGL 205  BRITISH LITERATURE I  3
Study of representative Medieval and Renaissance British works, set in their historical and cultural contexts, introducing appropriate critical concepts.
PREREQ: ENGL 110.

ENGL 206  BRITISH LITERATURE II  3
Study of representative eighteenth-through twentieth-century British works, set in their historical and cultural contexts and introducing appropriate critical concepts.
PREREQ: ENGL 110.

ENGL 207  INTRODUCTION TO POETRY  3
Representative masterworks of English, American and world verse.
PREREQ: ENGL 110.

ENGL 208  INTRODUCTION TO DRAMA  3
Representative masterworks from the classical era to the present. May be cross-listed with CMLT 218.
PREREQ: ENGL 110.

ENGL 209  INTRODUCTION TO THE NOVEL  3
Representative masterworks of fiction, emphasizing those of Europe and America. May be cross-listed with CMLT 219.
PREREQ: ENGL 110.

ENGL 210  SHORT STORY  3
Study of the short story as a narrative form, with readings from American and foreign short story traditions.
PREREQ: ENGL 110.
RESTRICTIONS: Not for major credit.

ENGL 211  GREAT WRITERS OF THE WESTERN WORLD I: 1100-1700  3
See CMLT 208 for course description.

ENGL 212  GREAT WRITERS OF THE WESTERN WORLD II: 1650-1950  3
See CMLT 208 for course description.

ENGL 214  LITERATURE AND GENDER  3
Specific concepts of gender in society, as manifested in the literature of writers of both sexes.
PREREQ: ENGL 110.

ENGL 217  INTRODUCTION TO FILM  3
Focuses on different techniques of acting, mise-en-scene, cinematography, editing, sound, color movies used to encourage audiences to respond in the ways they do. May be cross-listed with CMLT 217.
PREREQ: ENGL 110.

ENGL 260  HUMANITIES COLLOQUIUM  3
See ARSC 260 for description.
PREREQ: ENGL 110.

ENGL 300  TEXTS AND CONTEXTS  3
Examines cultural, historical, and theoretical contexts of a broad range of literary, critical and non-traditional texts.
PREREQ: ENGL 202, ENGL 205 and ENGL 206.
RESTRICTIONS: Any two of the three prerequisites acceptable.

ENGL 301  EXPOSITORY WRITING  3
Expository writing, with related studies in grammar, diction and rhetoric.
PREREQ: ENGL 110.
RESTRICTIONS: Does not count toward English major.

ENGL 302  ADVANCED COMPOSITION  3
Expository writing in a variety of forms, with emphasis on literary analysis.
PREREQ: ENGL 110.

ENGL 304  POETRY WRITING  3
Practice in writing a variety of verse forms.
PREREQ: ENGL 110.
RESTRICTIONS: Final enrollment set after first class and submission of five poems.

ENGL 305  FICTION WRITING  3
Practice in writing the short story.
PREREQ: ENGL 110.
RESTRICTIONS: Final enrollment set after first class and submission of a short story.

ENGL 306  TOPICS IN WRITING  3
Special topics in writing (for example, autobiography, scriptwriting) Variable content.
PREREQ: ENGL 110.
RESTRICTIONS: Final enrollment set after first class and submission of appropriate written sample.

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: ENGL 110.
RESTRICTIONS: Minimum grade of B required in ENGL 110. Counts toward English major only as part of journalism concentration.

ENGL 308  REPORTER’S PRACTICUM  3
Builds on ENGL 307 with extensive reporting and writing for the campus newspaper. Attention to libel and privacy issues.
PREREQ: ENGL 307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 309  FEATURE AND MAGAZINE WRITING  3
All aspects of the newspaper and feature article. Developing ideas, researching, interviewing, writing, and marketing.
PREREQ: ENGL 307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

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: ENGL 307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 311  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: ENGL 110.
RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.

ENGL 314  INTRODUCTION TO FOLKLORE AND FOLK LIFE  3
Traditional forms of folklore with emphasis on modern folklore as it functions in contemporary societies. May be cross-listed with CMLT 314.
PREREQ: ENGL 110.

ENGL 315  BALLAD AND FOLK SONG  3
English-language ballad and folksong tradition in America. Consideration of oral, literary, historical and sociocultural aspects of the Anglo-Scottish-Irish and Afro-American heritages.
PREREQ: ENGL 110.

ENGL 316  PEER TUTORING/ADVANCED COMPOSITION  3
See ARSC 316 for course description.

ENGL 317  FILM HISTORY  3
History of American and/or foreign national cinemas. May be cross-listed with CMLT 317.
PREREQ: ENGL 110.
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 cross-listed with CMLT 318 and/or JWST 318.
PREREQ: ENGL 110.
RESTRICTIONS: May be repeated for credit when topics vary.
ENGL 320  THE BIBLE AS LITERATURE  3
Studies the cultural contexts, narrative strategies, poetic forms, and literary archetypes of the Hebrew and Christian scriptures
PREREQ: ENGL110.

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 cross-listed with CMIT321
PREREQ: ENGL110.

ENGL 322  CHAUCER  3
The Canterbury Tales (in part), Troilus and Criseyde, and some of the shorter poems
PREREQ: ENGL110.

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 328  MILTON  3
Milton's major poetry and selected prose
PREREQ: ENGL110.

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 repeated for credit when topics vary.

ENGL 334  THE EARLY ROMANTICS  3
Poetry and prose of Blake, Coleridge, Wordsworth, and their associates
PREREQ: ENGL110.

ENGL 335  THE LATER ROMANTICS  3
Poetry and prose of Byron, Shelley, Keats and their associates
PREREQ: ENGL110.

ENGL 336  VICTORIAN POETRY  3
Tennyson, the Brownings, Arnold, Bronte, and their contemporaries
PREREQ: ENGL110.

ENGL 337  VICTORIAN PROSE  3
Carlyle, Ruskin, Arnold and their contemporaries
PREREQ: ENGL110.

ENGL 338  VICTORIAN FICTION  3
Authors may include Dickens, the Brontes, Eliot, Hardy and their contemporaries. May be cross-listed with WOMS337
PREREQ: ENGL110.

ENGL 340  AMERICAN LITERATURE TO THE CIVIL WAR  3
PREREQ: ENGL110.

ENGL 341  AMERICAN LITERATURE: CIVIL WAR TO WORLD WAR II  3
PREREQ: ENGL110.

ENGL 342  AMERICAN LITERATURE SINCE WORLD WAR II  3
PREREQ: ENGL110.

ENGL 344  AFRICAN AMERICAN LITERATURE I  3
Literature by African American writers from the eighteenth century to the Harlem Renaissance. May be cross-listed with BAMS313
PREREQ: ENGL110.

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

ENGL 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
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 348  CONTEMPORARY JEWISH-AMERICAN LITERATURE  3
Lectures and discussions of outstanding contemporary Jewish American novelists, short story writers, and others. May be cross-listed with JWST348
PREREQ: ENGL110.

ENGL 349  INTRODUCTION TO JEWISH SOURCES: TEXT AND INTERPRETATION  3
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 cross-listed with JWST349.

ENGL 351  INTRODUCTION TO IRISH LITERATURE  3
Survey emphasizing modern and contemporary writers of various genres such as Yeats, Synge, Joyce, Beckett, Heaney and Boland. Critical reading set in mythic, historic and cultural contexts
PREREQ: ENGL110.

ENGL 352  STUDIES IN NINETEENTH-CENTURY LITERATURE  3
Special topics in an author or authors, a genre, literary movement, or an idea
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 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. May be cross-listed with WOMS333
PREREQ: ENGL110.

ENGL 355  KING ARTHUR IN LITERATURE  3
Study of the historical background and literary treatments of Arthurian characters and themes in English literature
PREREQ: ENGL110.

ENGL 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, postcolonial writing and politics
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 357  LITERATURE OF LONDON  3
The interaction between London and a variety of literary works
RESTRICTIONS: Offered only through the Semester in London Program.

ENGL 358  LINGUISTICS AND LANGUAGE ARTS  3
See EDUC358 for course description.

ENGL 361  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. May be cross-listed with CMIT361
PREREQ: ENGL110.

ENGL 365  STUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS  3
Particular areas or writers to be announced. May be cross-listed with CMIT365 and/or CSCC365
PREREQ: ENGL110.
RESTRICTIONS: Not for major credit.

ENGL 366  INDEPENDENT STUDY  1-6

ENGL 368  LITERATURE AND SCIENCE  3
Comparative examination of literature and science in several important philosophical, methodological, cultural and social aspects, including the study of elementary philosophy and history of science and theory and history of literature and the analysis of individual scientific and literary texts. May be cross-listed with CSCC368
PREREQ: ENGL110.

ENGL 369  LITERATURE AND MEDICINE  3
See CSCC369 for course description.

ENGL 371  STUDIES IN FICTION  3
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 repeated for credit when topics vary.
ENGL 372 STUDIES IN DRAMA 3
Special topics in an author or authors, a type or types of drama, a period or theme.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 373 STUDIES IN POETRY 3
Special topics in a poet or poets, a type or movement, a period or theme.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 379 INTRODUCTION TO ETHNIC AND CULTURAL STUDIES 3
Focuses on representations of ethnicity, social class, race, gender, and other constructions of identity in literature, arts, and folk culture.
PREREQ: Any two of the following: ENGL 202, ENGL 205, ENGL 206, ENGL 324.
RESTRICTIONS: Requires permission of instructor. Required for concentrations in ethnic and cultural studies.

ENGL 380 WOMEN WRITERS 3
Study of a variable set of women writers. Addresses such topics as the idea of women’s tradition, formation of the canon, use of genre, language, and form. May be cross-listed with JWST380 and/or WOMS380.
PREREQ: ENGL110.

ENGL 381 WOMEN IN LITERATURE 3
Cultural representations of women by male as well as female writers. Variable in historical range, geography, and genre. May be cross-listed with WOMS381.
PREREQ: ENGL110.

ENGL 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. May be cross-listed with JWST382 and/or WOMS382.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 385 STUDIES IN LITERARY CRITICISM AND THEORY 3
Studies in selected topics in literary criticism and critical theory. May be cross-listed with CHLT385.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 390 ENGLISH LINGUISTICS 3
General introduction to the study of the English language, with emphasis on modern linguistic approaches. May be cross-listed with LING390.

ENGL 391 HONORS COLLOQUIUM 3
See ARSC390 for description. May be cross-listed with JWST390.
PREREQ: ENGL110.

ENGL 404 ADVANCED POETRY WRITING 3
Intensive practice in composition. Group discussion and individual conferences. Write reference to professional poems as well as models. Emphasis on student competence in traditional prosody as well as exploring freer forms.
PREREQ: ENGL304.
RESTRICTIONS: Final enrollment set after first class and submission of five poems. May be repeated once for credit.

ENGL 405 ADVANCED FICTION WRITING 3
PREREQ: ENGL305.
RESTRICTIONS: Final enrollment set after first class and submission of a short story. May be repeated once for credit.

ENGL 407 ADVANCED REPORTING 3
In-depth reporting, reporting methods, ethics, and other topics.
PREREQ: ENGL307.
RESTRICTIONS: Maximum of three credits for any registration with no more than six credits toward graduation. Counts toward English major only as part of journalism concentration.

ENGL 408 SPORTS WRITING 3
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.
RESTRICTIONS: Counts toward the English major only as part of journalism concentration.

ENGL 409 TOPICS IN JOURNALISM 3
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 repeated once for credit when topics vary. Counts toward English major only as part of the journalism concentration.

ENGL 410 TECHNICAL WRITING 3
Selected problems in technical communications, the preparation of reports and technical editing.
PREREQ: ENGL110.
RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.

ENGL 411 RHETORIC FOR BUSINESS AND TECHNICAL WRITERS 3
Study of rhetorical theories and strategies within the context of business and technical skills.
PREREQ: ENGL312, ENGL410, or ENGL415.
RESTRICTIONS: Open only to English majors. Counts toward English major only as part of the concentration in business and technical writing.

ENGL 412 BUSINESS AND TECHNICAL PUBLICATION 3
Advanced instruction in the production of business publications and technical documents; team projects provide practical experience in preparing instruction manuals, research proposals, formal reports, brochures and newsletters.
PREREQ: ENGL411.
RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.

ENGL 413 TOPICS IN TECHNICAL WRITING 3
Special studies and writing in selected kinds of business and technical communication (e.g., computer software documentation) or in an aspect of business and technical communication profession (e.g., ethics of business and technical communication).
PREREQ: ENGL312, ENGL410, or ENGL415.
RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing. May be repeated for credit when topics vary.

ENGL 414 TECHNICAL EDITING 3
Practical work and study of the editorial procedures essential in editing technical publications and documentation.
PREREQ: ENGL312, ENGL410, or ENGL415.

ENGL 415 WRITING IN THE PROFESSIONS 3
Designed to improve the communications skills of students aiming toward careers in any of the professions.
PREREQ: ENGL110.
RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.

ENGL 417 FILM THEORY AND CRITICISM 3
Survey of major theories of film.
PREREQ: ENGL217.
RESTRICTIONS: For film concentrators and advanced film students.

ENGL 446 INTERNSHIP IN BUSINESS/TECHNICAL WRITING 3
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.
RESTRICTIONS: Open to qualified students on the basis of a portfolio review by all concentration faculty.

ENGL 465 STUDIES IN LITERATURE Genres, Types and Movements 3
Particular areas or writers to be announced. May be cross-listed with CHLT465 and/or WOMS465.
PREREQ: ENGL110.

ENGL 466 INDEPENDENT STUDY 1-6

ENGL 472 STUDIES IN THE DRAMA 3
Special topics in an author or authors, a type or types of drama, a period or theme.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 477 THE STRUCTURE OF ENGLISH 3
See EDUC477 for course description.

ENGL 480 SEMINAR 3
Intensive capstone program in creative writing or study of some aspect of literature, be it a critical problem (e.g., reader response criticism), a movement (e.g., experimental American literature), a single author (e.g., John Keats), a group of authors (e.g., Fitzgerald, Hemingway, Steinbeck), or a genre (e.g., autodidactery). Stresses critical writing and literary research. May be cross-listed with WOMS480.

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: EDUC460.
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 and graduate students

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 and graduate students

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 Methods of Research 3
Research methods and problem-solving strategies in literary and cultural studies.

ENGL 604 Poetry Writing Workshop 3
Intensive practice in verse composition. Group discussions and individual conferences. Wide reference to professional poems as models. Emphasis on student competence in traditional prosody as well as exploring freer forms.
RESTRICTIONS: May be repeated once for credit when topics vary.

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)
RESTRICTIONS: For graduate students with little or no medieval literature and culture background

ENGL 625 Studies in the Renaissance 3
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. For graduate students with little or no Renaissance background

ENGL 627 Seventeenth-Century Literature 3
Survey of representative examples of prose, poetry, and drama from Jacobean comedies, tragedies, and masques to the satires, burlesque, and mannered literature of the Restoration. Points of focus are the concepts and propositions of Francis Bacon and his followers; developments in lyrical, narrative, descriptive, and meditative poetry of Donne, Herbert, Vaughan, Marvell and Milton; classicism from Jonson to Cowley and Dryden; romance and prose fiction

ENGL 631 Eighteenth-Century Literature 3
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 the 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 American Literature: Period Studies 3
Historical survey of American literature of the Colonial Romantic period or the Realist period, emphasizing "canonical" works of major writers along with selected "non-canonical" writings
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 651 Irish Literature: Period Studies 3
Study of a set of Irish writers related by genre or period, set in historical and political contexts
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 671 Studies in Fiction 3
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.
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 672 Studies in the Drama 3
Special topics in 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
Special topics in a poet or poets, a type or movement, a period or theme
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 677 The Structure of English 3
See EDUC677 for course description

ENGL 680 Seminar 3

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
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
A topical introduction to cultural theory, emphasizing in different terms such varied topics as semiotics, deconstructionism, feminism, post-colonial and third-world studies, and problems of representation and signification in literary and non-literary texts.
RESTRICTIONS: May be repeated once for credit when topics vary

ENGL 688 Teaching Composition 3
Study of current composition theory, with emphasis on the relationship between theory and classroom practices

ENGL 694 History of the English Language 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 Studies in Old and 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
RESTRICTIONS: May be repeated once for credit when topics vary

ENGL 804 Studies 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-Boadicea, The Age of Langland, The Romance

ENGL 806 Studies in Renaissance 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 815 Studies in Seventeenth-Century Literature 3
Research seminars on authors (Donne and Jonson; Bacon, Browne, Hobbes, and Locke; the Fletchers, Cowley, and Milton); genres (classical, metaphysical, and neoclassical poetry; Jacobean, Caroline, and Restoration drama); or topics and themes (empiricism; skepticism; gender and society; literature of the civil wars; puritan culture)
RESTRICTIONS: May be repeated once for credit when topics vary

ENGL 820 Studies in Eighteenth-Century Literature 3
Variable content. Possible course topics include: The Restoration Theatre; English Neoclassicism; The Rise of the Novel; individual writers or groups of writers; applications of theory

ENGL 830 Studies in Nineteenth-Century Literature 3
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 Studies 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)

ENGL 844 Seminar: Special Topics in American Literature 3
RESTRICTIONS: May be repeated for credit when topics vary

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ENGL 846  Seminar: Special Topics in English Literature  3
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 848  Special Topics in Comparative Literature  3
Variable content. Possible course topics include: Existential literature, The Avant-Garde, and Literature and Aesthetics.
RESTRICTIONS: May be repeated once for credit when topics vary

ENGL 850  Studies in Colonial American Literature  3
Topics may include New England Puritanism, Southern Colonial Literature, and Major Early American Authors
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 852  Seminar: American Realism and Naturalism  3
Classic works by Clemens, James, Crane, Chapin, Dreiser, Stein, and Wharton, with focus (1) on the practice of theory and aesthetic assumptions of current criticism and (2) on labels for the period (Realism, Naturalism) as formulations from specific literary texts (including some expurgated texts).
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 853  Modern/Postmodern American Literature  3
Modern American Novelists (Fitzgerald, Hemingway, Faulkner, Bellow, Barth, Heller, Morrison, Pynchon); modernist poetry (Faulk, Eliot, Stevens). Drama of the Absurd.
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 868  Research  3

ENGL 869  Master's Thesis  1-6

ENGL 884  Studies in Literary and Cultural Theory  3
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.
PREREQ: ENGL684 or 685
RESTRICTIONS: May be repeated for credit when topics vary

ENGL 890  Studies in Linguistics  3
See LING890 for course description

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

ENGL 969  Doctoral Dissertation  1-12 PF

ENTOMOLOGY AND APPLIED ECOLOGY

ENTO 105  Insects in Our World  3
Insects and their relatives. Principles of insect control as interrelated with ecology and behavior. Recognition of the various insect orders stressed. Small insect collection may be required.

ENTO 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

ENTO 201  Wildlife Conservation and Ecology  3
Natural history of North American wildlife; general principles of ecology; ecological and sociological problems and solutions in wildlife conservation.
RESTRICTIONS: Should precede BISC302.

ENTO 205  Elements of Entomology  3
Lives of insects, emphasizing interactions with humans. Basic insect identification, structure and function, behavior, ecology, evolution, pest control and impact on human society, history and culture.

ENTO 214  Apiculture and Apiiculture  2
Scientific study of the life of honey bees, including their biology, behavior and communication; and introduction to techniques of culturing and managing honey bees for honey production and crop pollination

ENTO 224  Apiculture and Apiiculture Laboratory  1
Laboratory and field course to complement topics in ENTO214. Bee identification and culture; hive management. Work with bees in an apiary to develop confidence in keeping bee colonies.
PREREQ: ENTO214
COREQ: ENTO214

ENTO 300  Principles of Animal and Plant Genetics  3
See ANSC300 for course description.

ENTO 305  Entomology Laboratory  2
Insect structure, physiology, behavior, taxonomy, evolution and ecology studied through field trips, dissection and experiments. Insect collection (with identification to orders) required.
PREREQ: ENTO205
COREQ: ENTO205

ENTO 310  Animal and Plant Genetics Laboratory  1
See ANSC310 for course description.

ENTO 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 cross-listed with MAST314.
PREREQ: BISC208

ENTO 315  Insect Conservation Ecology  3
Conservation biology with emphasis on the insect component of biodiversity. Topics include rationale for insect and biodiversity conservation, island biogeography, endangered species and mechanisms of species loss.
PREREQ: ENTO201 and ENTO305

ENTO 318  Taxonomy of Birds  2
Classification of birds; identification by sight and sound. Emphasis on orders of the world, North American families and species of the region. Indoor labs with one hour of lecture and field trips

ENTO 325  Wildlife Management  3
Introduction to solving wildlife management problems. Development of management plans with consideration of habitat, human and animal population components
PREREQ: At least one of the following: BISC302 or ENTO201.
RESTRICTIONS: Requires Junior status.

ENTO 344  Forest Ecology  2
The ecology of major forest types in the mid-Atlantic region. A series of field trips provides demonstration of techniques and field experience in forest ecology. Guest experts are used for their experience in particular forest types. May be cross-listed with LISC344.
PREREQ: BISC207, BISC208

ENTO 366  Independent Study  1-6

ENTO 405  Insect Structure and Function  4
Comparative functional anatomy and evolution of arthropods, especially the Insects. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems.
PREREQ: ENTO305

ENTO 406  Insect Identification - Taxonomy  3
Lecture and laboratory course in the collection, preservation and classification of common insect families.
PREREQ: ENTO305

ENTO 408  Insect Field Taxonomy  3
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENTO406
COREQ: ENTO406

ENTO 410  Ecology of Arthropod Vectors and Parasites  3
Introduction to the ecological relationships among arthropod disease vectors, the diseases they transmit and arthropods as human parasites. The interactions of vectors and arthropod parasites, host responses to these organisms and environmental mechanisms that foster vector/disease relationships are explored.
PREREQ: BISC207 and BISC208

ENTO 411  Insect Pest Management  3
Principles of managing insect populations to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human populations in an environmentally compatible manner. Diagnostic recognition, control and habits of major pest species.
PREREQ: ENTO205

ENTO 415  Wildlife Research Techniques  3
Lecture and laboratory course in research design, field sampling techniques, data analysis and interpretation and preparation of publication-quality manuscripts.
PREREQ: BISC302, one course from ENTO318, ENTO418, ENTO424 or ENTO425
RESTRICTIONS: Open only to Juniors and Seniors.
ENTOMOLOGY AND APPLIED ECOLOGY

ENTO 418 AVIAN BIOLOGY 3
Birds as adaptive complexes. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction.
PREREQ: BISC208
RESTRICTIONS: Requires Junior status

ENTO 424 HERPETOLOGY 3
Introduction to the 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
RESTRICTIONS: Requires Junior or Senior standing

ENTO 425 MAMMALOGY 3
PREREQ: ANSC134 or BISC207, and BISC208.
RESTRICTIONS: Requires Junior status

ENTO 426 AQUATIC INSECTS 3
Biology and systematics of aquatic insects with emphasis on the fauna of North America. Collection of immature aquatic insects required.
PREREQ: ENT0305
RESTRICTIONS: Requires Junior status

ENTO 430 CLOSE-UP NATURE PHOTOGRAPHY 3
Introduction to the principles of close-up and ultra close-up photography of natural history subjects. Lens and electronic flash systems for biological photography, plus field and indoor techniques. In-class analysis of assigned student slides.
RESTRICTIONS: Requires permission of instructor.

ENTO 440 INTEGRATED PEST AND DISEASE MANAGEMENT 3
Introduction to the theory and practice of integrated pest management (IPM), especially of insects and plant pathogens. Integration of cultural, biological, host resistance and other management strategies to achieve control in an economically and environmentally sound manner. May be cross-listed with PLSG440.
PREREQ: ENT0205 and PLSG303

ENTO 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, lowland rainforests and tropical dry forests.
RESTRICTIONS: Offered in Winter Session only. Taught in Costa Rica.

ENTO 450 DEBATES IN CONSERVATION BIOLOGY 2
Global debate about anthropocentric use and misuse of earth's biological and physical resources.

ENTO 455 CONSERVATION GENETICS 3
Principles of genetics applied to the conservation of animal and plant populations. Fundamentals of basic and population genetics. Examination of case studies of species from a variety of taxonomic groups.
PREREQ: BISC208.

ENTO 464 ENTOMOLOGY FIELD EXPERIENCE 1-3 PF
Career-related work experience and exploration of potential occupations related to entomology or ecology. Student works with a faculty member to arrange for supervised (usually part-time) employment at a discipline-related site such as a research laboratory, pest control firm, museum, pesticide company or nature center.
RESTRICTIONS: Maximum of six credits may count toward B.S. degree, three credits toward major.

ENTO 465 SEMINAR 1
Development and presentation on an aspect of a student-selected topic. Presentation in the format of a scientific symposium and written conference report. Proposals submitted, design, production and use of computer generated visual aids.
RESTRICTIONS: Requires Senior status.

ENTO 466 INDEPENDENT STUDY 1-6

ENTO 468 RESEARCH 1-6

ENTO 501 NATURAL HISTORY FOR TEACHERS 3
Background knowledge, methods and materials for teaching basic concepts of ecology, environmental problems and field natural history, particularly as applicable to Delaware. Includes outdoor studies in field, forest, stream and estuarine environments.

ENTO 507 INSECT PHYSIOLOGY 4
Physiology and biochemistry of major organs and tissues of insects. Laboratory demonstrates basic tools of insect physiology through original and classical experiments.
PREREQ: ENT0305

ENTO 602 LARVAL TAXONOMY 3
Lecture-laboratory course treating the collection, preservation and classification of the immature stages of insects. Emphasis on holometabolous orders, with special attention to aquatic immature stages.
PREREQ: ENT0305 and ENT0406

ENTO 605 INSECT STRUCTURE AND FUNCTION 4
Comparative functional anatomy and evolution of arthropods, especially insects. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems.
PREREQ: ENT0305.

ENTO 606 INSECT IDENTIFICATION - TAXONOMY 3
The identification, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENT0605.

ENTO 610 ECOLOGY OF ARTHROPOD VECTORS AND PARASITES 3
Introduction to the ecological relationships among arthropod disease vectors, the diseases they transmit and arthropods as human parasites. Interactions of vectors and arthropod parasites, host responses to these organisms and environmental mechanisms that foster vector/disease relationships are explored.
PREREQ: BISC208.

ENTO 611 INSECT PEST MANAGEMENT 3
Principles of managing insect populations to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human population in an environmentally compatible manner. Diagnostic recognition, control and habits of major pest species.
PREREQ: ENT0205.

ENTO 614 INSECT ECOLOGY 3
The interaction of insects with their environment as it influences their distribution, abundance, life history and evolution. Emphasis on primary research literature.
PREREQ: BISC302 and ENT0305, or BISC337.

ENTO 615 WILDLIFE RESEARCH TECHNIQUES 3
Lecture and laboratory course in research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. Class and individually designed field projects will focus on regional wildlife and their habitats.
PREREQ: BISC302 and one course from ENT0318, ENT0424, ENT0425.

ENTO 617 FIELD NATURAL HISTORY 1-3
An extended field trip or several shorter trips to natural and managed areas. Emphasis on identification and observation of biota, field notes, knowledge of natural habitats, ecological processes and wildlife conservation issues and practices. Individual projects.
RESTRICTIONS: Requires Junior status and consent of instructor. Credit depends on extent of travel; maximum of three credits allowed toward major.

ENTO 618 AVIAN BIOLOGY 3
Birds as adaptive complexes. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction.
PREREQ: BISC208.

ENTO 619 PRINCIPLES OF BIOLOGICAL CONTROL OF INSECTS 3
Historical, ecological and biological bases of biological control of pest insects and weeds. Consideration given to procedures and techniques (e.g., foreign population) and related aspects (e.g., insect pathology and insect resistance in crop plants).
PREREQ: ENT0305.

ENTO 620 BEHAVIORAL ECOLOGY OF INSECTS 3
Advanced treatment of selected topics in the ecology of insect behavior. Original research project required.
PREREQ: BISC302 and ENT0406 or ENT0606.

ENTO 622 TOXICOLOGY OF INSECTICIDES 3
Principles of insecticide toxicity, biochemistry and physiological bases of toxic action, animal and plant metabolism, and environmental dynamics of insecticides.
PREREQ: CHEM213, or CHEM321 and CHEM322.

ENTO 624 HERPETOLOGY 3
Introduction to the 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.

ENTO 625 MAMMALOGY 3
PREREQ: ANSC134 or BISC207, and BISC208.
RESTRICTIONS: Requires Junior status.
FINC 313 Financial Markets 3
An analysis of the domestic and international financial markets. Characteristics of the market makers are examined, e.g., investment bankers, brokers, dealers. This analysis includes the description of the financial instruments that are used in money and capital markets and their relevant risk, liquidity and risk-return trade-offs.
PREREQ: FINC311
RESTRICTIONS: Requires a grade of C or better in FINC311.

FINC 392 Seminar on International Financial Management 3
Seminar on 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.

FINC 407 Securities Analysis 3
An analysis of components of security evaluation and the establishment of investment standards and policies.
PREREQ: FINC313.

FINC 412 Financial Institutions 3
Examines business purpose, asset and liability structure and current issues pertaining to major categories of financial institutions.
PREREQ: FINC313 and ECON302.

FINC 413 Advanced Corporate Finance 3
Topics vary by semester. Typically examines such areas as financial theory and practice, financial systems, markets and individual inquiry.
PREREQ: FINC312.

FINC 414 Bank Management 3
Considers formation of banking policy and financial management of a commercial bank and similar institutions. Topics include funds management, liquidity and credit standards, lending operations, capital adequacy and the changing regulatory environment.
PREREQ: FINC412.

FINC 415 International Finance 3
Interrelationships between the international monetary environment and 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 and FINC313.

FINC 416 Advanced Investments 3
Topics covered may include portfolio theory, stock and bond valuation and management of portfolios, market efficiency, futures, options and other related issues.
PREREQ: FINC407.

FINC 417 Real Estate Finance 3
Introduction to real estate theory and management. Financing, evaluation and property management, as well as housing policy and government participation.
PREREQ: FINC313.

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, security valuation techniques, and the theory and practice of portfolio management.
PREREQ: FINC850.

FINC 853 International Financial Management 3
Examines the financial management of multinational firms and the interactions 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.
FOREIGN LANGUAGES AND LITERATURES

FLLT 100 ESSENTIAL FOREIGN LANGUAGE: LANGUAGE 1 PF
Basic, practical vocabulary and idiomatic expressions for beginners in the Foreign Language (e.g. French, Spanish, Chinese, Hungarian) during Winter or Summer Session abroad.
RESTRICTIONS: Open only to students who have never studied the language or have had less than two years in high school. Not for major credit. Taught abroad only.

FLLT 101 ESSENTIAL FOREIGN LANGUAGE: LANGUAGE 2 PF
Basic, practical vocabulary and idiomatic expressions for beginners in the Foreign Language (e.g. French, Spanish, Chinese, Hungarian, Swedish, etc.), and introduction to the foreign culture.
RESTRICTIONS: Open only to students who have never studied the language or have had less than two years in high school. Not for major credit. Taught abroad only.

FLLT 105 MODERN LANGUAGE I - ELEMENTARY 4
Various modern languages outside national departmental offerings, e.g., Korean, Modern Greek. An introduction to the language and a development of speaking, listening, reading, and writing skills through the use of basic texts.

FLLT 106 MODERN LANGUAGE II - ELEMENTARY/INTERMEDIATE 4
Completion of the basic modern language. Increasing mastery of the basic skills (speaking, listening, reading, writing).
PREREQ: FLLT 105.

FLLT 202 BIBLICAL AND CLASSICAL LITERATURE 3
See ENGL202 for course description.

FLLT 316 CLASSICAL MYTHOLOGY 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 cross-listed with CMLT16.
RESTRICTIONS: Open to first-year students.

FLLT 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; Countly Love; and the European Postwar Novel. May be cross-listed with CMLT320 and/or WOMS320.
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 cross-listed with CMLT322 and/or WOMS322.
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 324 TOPICS: FRENCH LITERATURE IN TRANSLATION 3
Examines the nature, purpose, and management of financial institutions and markets.
PREREQ: FINC850.

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. Topics vary and are announced in registration booklet. May be cross-listed with CMLT330, CSCC330, and/or WOMS330.
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 331 LIGHT AND SHADOW—JAPANESE FILMS 3
Special topics in Japanese culture. Course taught in English. Topics vary and are announced in registration booklet. May be cross-listed with CMLT330, CSCC330, and/or WOMS330.
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 360 HUMANITIES COLLOQUIUM 3
May be repeated for credit when topics vary.

FLLT 375 TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION 3
Special topics in Russian and Soviet culture. Course taught in English. Topics vary and are announced in registration booklet. May be cross-listed with WOMS375.
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 380 TOPICS: JAPANESE CULTURE IN TRANSLATION 3
Special topics in Japanese culture. Course taught in English. Topics vary and are announced in registration booklet.
RESTRICTIONS: May be repeated for credit when topics vary.

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 a one and a half hour weekly practicum and 25 hours of observation in high school classrooms for future student teachers.
May be cross-listed with LING421.

FLLT 422 LANGUAGE SYLLABUS DESIGN 3
Study of approaches to language syllabus design and materials development including grammatically sequenced, situational, national-functional and verbal strategy approaches. Simplification, standardization, textbook evaluation and adaptation, and design and implementation of learning units for second language, special purpose and bilingual learners. May be cross-listed with LING422.

FLLT 424 SECOND LANGUAGE TESTING 3
May be cross-listed with LING424.

FLLT 429 METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS 3
Course familiarizes students with appropriate teaching methods and techniques for the elementary foreign language classroom. It 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. May be cross-listed with EDUC429.

FLLT 466 INDEPENDENT STUDY 1-6
May be repeated for credit when topics vary.

FLLT 621 METHODS OF TEACHING FOREIGN LANGUAGES 3
Special topics in Russian and Soviet culture. Course taught in English. Topics vary and are announced in registration booklet.
RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 622 LANGUAGE SYLLABUS DESIGN 3
Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, national-functional and verbal strategy approaches. Simplification, standardization, textbook evaluation and adaptation, and design and implementation of learning units for second-language, special purpose and bilingual learners. May be cross-listed with LING622.

FLLT 623 THEORETICAL AND PRACTICAL ISSUES IN FOREIGN LANGUAGE PEDAGOGY 3
Graduate assistants enrolled in this course will study current perspectives and materials on foreign language instruction and have hands-on experience with the implementation of effective teaching strategies. Emphasis will be given to the enhancement of students’ proficiency in class planning, syllabus design and materials preparation.
RESTRICTIONS: Graduate students only.

FLLT 624 SECOND LANGUAGE TESTING 3
May be cross-listed with LING624.

FLLT 629 METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS 3
This course familiarizes students with appropriate teaching methods and techniques for the elementary foreign language classroom. It 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. May be cross-listed with EDUC629.

FLLT 801 PROFESSIONAL ORIENTATION 3
Provides students in foreign languages and literature with a general introduction to three topics relevant to their graduate career and subsequent employment: 1) research methods and tools; 2) approaches to the literary text; and 3) professional practices.
The role and significance of microorganisms in foods with particular reference to food growth and the marketing of new foods; environmental and social issues involved in food production and current controversies surrounding the food we eat.

FOC 165 Seminar on Food Science 1
Overview of world food supplies, sources of raw materials, broad compositional components of foods, food safety and food processing methods. Introduction to career opportunities and orientation to the profession.

FOC 166 Special Problem 1-3

FOC 265 Seminar on Food Science 1
Overview of world food supplies, sources of raw materials, broad compositional components of foods, overview of food safety and food processing methods. Introduction to career opportunities and orientation to the profession.

FOC 266 Special Problem 1-3
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

FOC 305 Food Science 3
Composition, structure and functional properties of food and the fundamentals of commercial food processing. Discussion and video demonstration of various food processing and preservation methods and the effects of ingredient manipulation. May be cross-listed with ANSC305.
PREREQ: NTD1201, NTD1211 and CHEM213.

FOC 328 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. May be cross-listed with ANSC328.
PREREQ: CHEM213 or CHEM321 or CHEM214.

FOC 329 Food Analysis 4
Critically analyze food analysis methods and data from journal articles and reports including official AOAC and AACCC methods. Develop food label for your favorite food using above techniques; prepare scientific reports and presentations. Introduction to instrumentation, spectroscopy, chromatography, enzyme assays. May be cross-listed with ANSC329.
PREREQ: CHEM214 or CHEM216 or CHEM527.

FOC 359 Topics in Food Science 1-3
Bridges prerequisite science courses and applications in food science. Utilization of fundamental sciences linked with food applications of the scientific method will be stressed. Demonstrates basic concepts used to quantitatively solve everyday problems in the food industry. Uses mathematical principles as tools for problem solving. Develops awareness of the intimate relationship between mathematical principles and physical properties of food. May be cross-listed with ANSC359.
PREREQ: Math221 and Math222 or Math241 and Math242.

FOC 365 Seminar on Food Science 1
Focuses on food supplies in meeting specialized needs, new processing methods, introduction to analytical methods and computer application in food processing.

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

FOC 399 Teaching Assistant 1-2 PF
Practical teaching experience. Students participate and assist in instruction of undergraduates.

FOC 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. May be cross-listed with ANSC409.

FOC 411 Food Science Capstone 4
A team-taught 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: FOSC328, FOSC329, FOSC409 and FOSC439.

FOC 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: BISC371.

FOC 445 Food Engineering Technology 4
Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations. May be cross-listed with EGE445.
PREREQ: EGE311, MATH 222, and PHYS201.
RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOC 449 Food Biotechnology 4
Processes used in industrial fermentations and biotechnology: essential biochemical background of commercial microorganisms, use and genetics of starter cultures, design and control of fermentor systems, kinetics of growth and product recovery. Biotechnological production of alcoholic and alcoholic beverages, organic acids, cultured dairy, vegetable and meat products, enzymes, vitamins and therapeutic compounds.
PREREQ: BISC371 or FOSC439.

FOC 459 Topics in Food Science 3
In-depth studies on specific aspects of current food science research and application.

FOC 464 Practicum in the Food Industry 1-3
Provides hands-on supervised field experience in research, processing equipment and methodology, product development and testing, and/or other activities in the food industry. RESTRICTIONS: May be repeated once for credit. Separate application form for industry (off campus) or campus courses.

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

FOC 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.

FOC 611 Food Science Capstone 4
A team-taught capstone course for graduate students to advance food science training by participating in a food product development team that simulates the real-world operation and requires integrated knowledge in the areas of general food science, food chemistry, food analysis, food microbiology and food processing.

FOC 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.
PREREQ: CHEM212 and CHEM214.

FOC 629 Food Analysis 4
The application of instrumentation: UV/VIS, FTIR and Fluorescence Spectrophotometry, Chromatography (TLC, GC, HPLC). Electrophoresis, and Enzyme Assays for the determination of food constituents and additives. Official AOAC and AACCC methods utilized. May be cross-listed with ANSC629.
PREREQ: CHEM216.

FOC 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. May be cross-listed with ANSC639.
PREREQ: BISC371.

FOC 643 Food Microbiology 4
Processes used in industrial fermentations and biotechnology: essential biochemical background of commercial microorganisms, use and genetics of starter cultures, design and control of fermentor systems, kinetics of growth and product recovery. Biotechnological production of alcoholic and alcoholic beverages, organic acids, cultured dairy, vegetable and meat products, enzymes, vitamins and therapeutic compounds.
PREREQ: BISC371 or FOSC439.

FOC 659 Topics in Food Science 2-6
In-depth studies on specific aspects of current food science research and application.

FOC 665 Seminar 1-3

FOC 668 Research 1-6

FOC 868 Research 1-6

FOC 869 Master's Thesis 1-6

FRE 110  INTRODUCTION TO FOOD AND AGRIBUSINESS INDUSTRY
Designed to introduce students to the food and agribusiness industry. The economic structure and importance of the industry will be discussed.

FRE 135  INTRODUCTION TO DATA ANALYSIS
Introduction to computer systems, with an emphasis on microcomputer systems, and their use to process and analyze data. Emphasis on application programs used in agricultural sciences including spreadsheets, graphics, database management, electronic communications, and word processing.

FRE 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.

FRE 201  RECORDS AND ACCOUNTS
Introductory course. Emphasis on concepts and principles and the uses of accounting for control and decision-making purposes.

FRE 212  FOOD RETAILING AND PRODUCT MANAGEMENT
Major topics include consumer market environments, demographic characteristics of the population, food retail marketing and financial strategies, product merchandising planning, new product development strategies, and site location analysis.

FRE 240  QUANTITATIVE METHODS IN AGRICULTURAL ECONOMICS
Basic quantitative applications of agricultural economics principles and theory.

FRE 270  BIOTECH: SCIENCE AND SOCIOECONOMIC ISSUES
See ANSC 270 for course description.

FRE 302  MANAGEMENT OF AGROBUSINESS FIRMS
Principles and practical problems of firm management (decision-making and planning.

FRE 335  ADVANCED DATA MANAGEMENT
Advanced use of microcomputer systems and application software used in agricultural sciences.

FRE 345  STRATEGIC SELLING AND BUYER COMMUNICATION
Application of strategic selling techniques to actual selling situations. Focus on personal and sales presentations and traveling with sales professionals.

FRE 350  FARM MANAGEMENT
Basis and conditions for agricultural production, farm planning and analysis, management of crop and production investments, and financial problems and management of labor.

FRE 404  FOOD AND FIBER MARKETING
System approach to food and fiber marketing analysis: consumer, retail, processor, wholesale and farm level.

FRE 405  MANAGEMENT AND LEADERSHIP DEVELOPMENT
Exposes students to agribusiness human resource management and employee development. Emphasis on the consumer of management, management science, effective supervision, training programs, employee and management appraisal systems, role of minorities in management, and ethics in management.

FRE 406  AGRICULTURAL AND NATURAL RESOURCE POLICY
Agricultural and environmental policy analysis of effects of policy on resource allocation and economics of alternatives. Analysis of effects of various programs on producers, consumers, and taxpayers, especially current issues and market failures.

FRE 408  RESEARCH METHODS I
Descriptive and inferential statistics in agribusiness and biological applications focusing on hypothesis testing, multiple regression, and analysis of variance techniques.

FRE 409  RESEARCH METHODS II
Quantitative methodologies focusing on market survey research techniques; forecasting methods including exponential smoothing, trend analysis and regression analysis; aggregate production planning; just-in-time inventory management and materials requirement planning.

FRE 410  INTERNATIONAL AGRICULTURAL TRADE AND MARKETING
Trade theories and market analysis techniques necessary for implementing international agribusiness marketing operations. Various trade intervention schemes, export readiness, market entry sources of market intelligence and market analysis techniques will be emphasized. Case studies are used to reinforce concepts and integrate major topics presented.

FRE 412  STRATEGIC MARKETING COMPETITION
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.

FRE 420  AGRIBUSINESS ECONOMIC DEVELOPMENT
Process of increasing agricultural productivity and food supply in developing nations and foreign resource adjustment problems and various stages of industrialization. Role of foreign trade in development process.

FRE 424  RESOURCE ECONOMICS
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.

FRE 427  AGRIBUSINESS FINANCIAL MANAGEMENT
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.

FRE 429  COMMUNITY ECONOMIC DEVELOPMENT
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.

FRE 430  ESTABLISHING AND MANAGING A FOOD AND AGRIBUSINESS ENTERPRISE
Analysis of the necessary factors to consider in initiating a Food and Agriculture 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.

FRE 444  ECONOMICS OF ENVIRONMENTAL MANAGEMENT
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.

FRE 450  TOPICS IN ENVIRONMENTAL LAW
Overview of the legal process and environmental laws in order to understand policy issues and learn action processes in the environmental field.

FRE 464  AGROBIOLOGY INTERNSHIP
Practical experience acquired by working with corporate and government institutions. Internship sponsor, performance evaluation, and written reports are required.

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

FRE 466  INDEPENDENT STUDY

FRE 471  FUTURES AND OPTION MARKETS
Analysis of futures and option markets of agricultural and nonagricultural commodities. Hedging and speculative theory and techniques, cash and future price relationships. Students trade commodities via a satellite information system. May be crosslisted with ECON 471.

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

FRE 609  RESEARCH METHODS
Experimental design and plot plans, collection, analysis and presentation of data in agricultural and biological research.

FRE 615  ADVANCED PRICES AND STATISTICS
Statistical tools used in agricultural economics research and operations research. Introduction to econometric specifications, estimation and interpretation. May be crosslisted with ORES 615.
FREN 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.
PREREQ: Requires permission of instructor.

FREN 682  SPATIAL ANALYSIS OF NATURAL RESOURCES  3
Advanced hand-on training in geographic information systems and spatial statistics for environmental and natural resource management.
PREREQ: FREC680.

FREN 801  APPLIED DEMAND AND MARKETING ANALYSIS  3
Deals with research techniques and procedures in applied economics with a focus on empirical applications of economic theory and econometric tools in consumer demand and marketing analysis.
PREREQ: FREC610.

FREN 806  RESEARCH TECHNIQUES AND PROCEDURES  3
Planning research projects with a focus on methods of collecting and analyzing data, and the presentation of results. A problem course. May be cross-listed with CRSS622.
PREREQ: FREC608.

FREN 810  INTERNATIONAL AGRICULTURAL TRADE SPECIAL TOPICS  3
Advanced theory, issues and policies in international agricultural trade emphasizing international finance and agriculture. Agricultural trade and development, empirical and methodological issues and international market modeling. May be cross-listed with CRSS610.

FREN 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 base, shift share, input-output, growth and development models; empirical analysis and case studies.
PREREQ: FREN627.

FREN 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 cross-listed with ECON627 and/or CRSS627.
PREREQ: ECON601 and an econometrics/statistics course.
RESTRICTIONS: Requires permission of instructor.

FREN 834  SEMINAR IN RESOURCE ECONOMICS  3
Quantitative analysis of natural resource markets, resource depletion and the design of optimal management strategies. May be cross-listed with CRSS632.

FREN 869  MASTER'S THESIS  1-6

FREN

FREN 101  ELEMENTARY FRENCH I  3
Introduction to the French language and development of speaking, listening, reading and writing skills through the use of basic texts.
PREREQ: FREN101 or FREN105.

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.
PREREQ: FREN105.

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.

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. Course satisfies Arts and Science 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.

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  THE CONTEMPORARY CARIBBEAN WORLD  3
Introduction to the contemporary Caribbean world, the culture, its people, their way of life, and the issues confronting them. The specific focus of the course will be Martinique.
RESTRICTIONS: Taught in English during Winter Session abroad. Not for major 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 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 255  FRANCE IN THE NEWS  3
Explores topics in contemporary French society, culture and politics as expressed in the news media. Emphasis on current events and issues of France. Focus of study is the French press: newspapers and magazines printed in the French language.
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, nouvelle, roman) and nonfiction (essai) 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 (lyric, epic, narrative) and theatre (comedy, tragedy, drama) from the middle ages to the present.
PREREQ: 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: FREN205 and any other 200-level course 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 exposure, discussion of articles and videos, textual analysis and compositions.
PREREQ: FREN200. Emphasis is on grammar improvement through reading and writing.
RESTRICTIONS: Not intended for native speakers of French.

FREN 308  CONTEMPORARY FRANCE II  3
Discussion and study of issues related to contemporary cultural, political and social developments in France, including its place in today's European community.
PREREQ: Any two 200-level French courses taught in the French language.
RESTRICTIONS: Course taught abroad only. Taught in French.

FREN 313  INTENSIVE FRENCH COMPOSITION  3
Exercises and practice in composing correct and idiomatic French.
PREREQ: Any two 200-level French courses.
Chateaubriand, Balzac, Stendhal, Flaubert, and Chenier

PREREQ: Any two 300-level French literature courses

FREN 445 Nineteenth-Century French Novel 3
The novel from Romanticism to Naturalism: Chartierublair, Balzac, Stendhal, Flaubert, Zola and others
PREREQ: Any two 300-level French literature courses
An interdisciplinary introduction to individual and group behavior in relation to developed and natural environments. The implications of such human-environment interactions for maintaining environmental quality.

Introduces the global nature of resource management and discusses the relationships between industrial and developing nations.

Intraduction to processes responsible for the development, modification, distribution and persistence and change of settlements, economic activities and social/cultural behavior in different geographical regions of the United States.

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.

Spatial relationships of urban areas, focusing on the structure of towns, the organization of urban space and the external relationships of cities.

Geographical factors in the development of transportation and influences of transportation innovations on spatial patterns of settlement and regional growth.

The environment is defined, arranged and experienced differently by different social groups. Examines the geographical settings of minorities - ethnic groups, women, children, elders and the homeless - and the ways in which ideas, media and political processes affect the spatial location and place experiences of these groups.

Intraduction 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.

Intraduction 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.

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.

Introduction to the geographic regions of the world and the changing relations between regions. Emphasis on environmental, economic, and political geographic relationships between industrial and developing nations.

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 GEOG101 and 106 form a comprehensive introduction to physical geography and its tools.

Introduction to physical, historical and cultural geography of Latin America.

A survey of earth's climatic history, with emphasis on the methods used to reconstruct that history and the relevance of past climate changes as indicators of the sensitivity of the current climate.

An interdisciplinary introduction to individual and group behavior in relation to developed and natural environments. The implications of such human-environment interactions for planning.

Introduces the 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.

Intraduction to the geographic regions of the world and the changing relations between regions. Emphasis on environmental, economic, and political geographic relationships between industrial and developing nations.

Intraduction to physical geography and its tools. Maps and air photo interpretation. Together GEOG101 and 106 form a comprehensive introduction to physical geography and its tools.

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GEOG 412 PHYSICAL CLIMATOLOGY 4
Energy and moisture exchange between the atmosphere and land surface for character-
istic natural and human-modified environments. 
PREREQ: MATH241 and GEOG250

GEOG 417 SEMINAR IN CLIMATE CHANGE 3
Examines facts and fallacies regarding global warming and climate science and assess-
es 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 3
Introduction to energy and moisture flows in the atmosphere at small scales. Includes atmo-
spheric thermodynamics, cloud physics and radiation.
PREREQ: GEOG220 and 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 dis-
cussion and analysis of 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 cor-
trightness and circulation. Discusses atmospheric wave motion and general circulation.
PREREQ: MATH242 and GEOG220.

GEOG 427 APPLIED ENVIRONMENTAL SCIENCE 3
Introduction to the diverse field of environmental consulting; an application of science to the solution of environmental problems. Topics include project planning, data collection and analysis, health and safety, work products, business management, accounting and contracts, marketing, professional responsibility and ethics.
RESTRICTIONS: Open to junior and seniors or by permission of instructor.

GEOG 428 ISSUES IN LAND USE AND ENVIRONMENTAL PLANNING 3
Examine the contemporary practice in land-use and environmental planning with emphasis on creating an integrative framework that balances development demands for urban, suburban, and agricultural land against the needs to conserve and enhance envi-
ronmental and cultural resources.

GEOG 438 WORLD CITIES IN COMPARATIVE PERSPECTIVE 3
World cities 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 soci-
etal problems. A pre-professional course.

GEOG 449 ENVIRONMENT AND SOCIETY 3
Considers the relationships between environmental and social processes from the theo-
retical, 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 PROSEMINAR IN ENVIRONMENTAL SCIENCE 3
Discussion of the history and state of environmental science as well as its relation to cur-
rent environmental problems. Survey of research topics and methodologies in the current scientific literature. May be cross-listed with BISC450 and/or GEOL450.
RESTRICTIONS: Open to senior Environmental Science majors only, or requires permis-
sion of instructor.

GEOG 451 MICROCLIMATOLOGY 3
Introduction to instrumentation and techniques involved in microclimatic monitoring and sampling. Field observation programs carried out in varying environmental situations.
PREREQ: GEOG412

GEOG 452 SEMINAR IN CLIMATOLOGY 3
General theoretical and practical considerations of research in climatology.
RESTRICTIONS: Requires permission of instructor.

GEOG 453 SYNOPTIC CLIMATOLOGY 3
Physical processes involved with development and transportation of weather systems, including relationships between upper atmospheric flow and surface weather phenomena, synoptic evaluation of air masses, synoptic techniques for environmental analysis.
PREREQ: GEOG220

GEOG 454 NEW EUROPE: CULTURE, GEOPOLITICS, MILIEU 3
Post-Soviet Europe is examined in terms of emerging economic, cultural, and ethnic con-
figurations; tensions between national and supra-national territories; the role of mass media in ethnic, political, and ecologic space; processes of transformation in former Soviet states; dynamics of regional cooperation on environmental issues.

GEOG 455 WATER BUDGET IN ENVIRONMENTAL ANALYSIS 3
The development of the climatic water budget and its use in understanding problems in hydrology, agriculture, forestry, urban planning and the distribution of environmental sys-
tems. Evaluation of the influence of different human activities on the factors of the water budget.

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, evapotranspi-
ration, runoff and streamflow will be examined.
PREREQ: MATH241 and GEOG250 or equivalent.

GEOG 460 WOMEN IN INTERNATIONAL DEVELOPMENT 3
See SOCI460 for course description

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 469 SENIOR RESEARCH AND THESIS 1-6

GEOG 470 COMPUTER CARTOGRAPHY 4
Introduction to cartographic theory and computational methods necessary for drawing maps with the aid of a digital computer.
PREREQ: GEOG250

GEOG 471 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS 4
Commercial geographical information systems (GIS) are introduced and used to analyze a wide variety of spatial data bases. Georeferenced data are acquired, restructured and manipulated in a GIS environment. GIS methods are applied to local-scale geographical, environmental and land planning problems.
PREREQ: GEOG250 and GEOG270 or GEOG372 or GEOG470.

GEOG 474 INTRODUCTION TO ENVIRONMENTAL REMOTE SENSING 3
Introduction to the basic physics, techniques and theory of remote sensing in geography and environmental science. Digital image processing of satellite imagery and its incor-
poration into geographic information systems is emphasized. A set of computer-based lab-
oratory exercises will be required.
PREREQ: GEOG250 and GEOG272.

GEOG 475 STATISTICS FOR ENVIRONMENTAL SCIENCE 3
See STAT475 for course description

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, nonglaciar) landforms and environmental problems in cold regions. May be cross-listed with GEO482.
PREREQ: GEOG106 or GEOG106 or GEO107.

GEOG 600 PRELIM TO GEOGRAPHY 1
Introduction to contemporary American geography, especially its research and educa-
tional 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 611 FLUVIAL GEOMORPHOLOGY 3
See GEO611 for course description.

GEOG 612 PHYSICAL CLIMATOLOGY 4
Energy and moisture exchange between the atmosphere and land surface for character-
istic natural and human-modified environments.
PREREQ: MATH241 and GEOG250

GEOG 614 THE AMERICAN SUBURB 3
See UAPP614 for course description.

GEOG 615 URBAN, REGIONAL AND ENVIRONMENTAL PLANNING 3
See UAPP615 for course description.

GEOG 617 SEMINAR IN CLIMATE CHANGE 3
Examines facts and fallacies regarding global warming and climate change and assess-
es 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 3
Introduction to energy and moisture flows in the atmosphere at small scales. Includes atmo-
spheric thermodynamics, cloud physics and radiation
PREREQ: MATH242 and GEOG220.
COREQ: GEOG250.
GEOG 622 Resources, Development and the Environment 3
Focuses on resources, energy, population and 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. 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 628 Issues in Land Use and Environmental Planning 3
Examines theory and contemporary practice in land use and environmental planning with emphasis on creating an integrative framework that balances development demands for urban, suburban, and agricultural land against the needs to conserve and enhance environmental and cultural resources. May be crosslisted with UAPP628.

GEOG 635 The Evolution of the American Urban Landscape 3
See UAPP635 for course description.

GEOG 636 Research Topics in Historic Preservation 3
See UAPP636 for course description.

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 645 Method and Theory in Geography 3
The nature of geography, its history, methodology and applications in research and societal problems. A preparrofessional course.

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. Restrictions: Open to graduate students in Environmental Science.

GEOG 651 Micrometeorology 3
Introduction to instrumentation and techniques involved in micrometeorological monitoring and sampling. Field observation carried out in varying environmental situations. Prereq: GEOG412 or GEOG612.

GEOG 652 Seminar in Climatology 3
General theoretical and practical considerations of research in climatology. Restrictions: Requires permission of instructor.

GEOG 653 Synoptic Climatology 3
The physical processes involved with the development and transportation of weather systems. Selected topics include relationships between upper atmospheric flow and surface weather phenomena, synoptic evaluation of air masses and synoptic techniques for environmental analysis. Prereq: GEOG220.

GEOG 654 New Europe: Culture, Geopolitics, Milieu 3
Post-Soviet Europe is examined in terms of emerging economic, cultural and ethnic configurations; tensions between national and supra-national territories; the role of mass media in ethnic, political and ecologic space; processes of transformation in former Soviet states; dynamics of regional cooperation on environmental issues.

GEOG 655 Water Budget in Environmental Analysis 3
The development of the climatic water budget and its use in understanding problems in hydrology, agriculture, forestry, urban planning and the distribution of environmental systems. Evaluation of the influence of different human activities on the factors of the water budget.

GEOG 656 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 and GEOG250 or equivalent.

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: GEOG250 and MATH302.

GEOG 670 Computer Cartography 4
Introduction to cartographic theory and computational methods necessary for drawing maps with the aid of a digital computer. Prereq: GEOG250.

GEOG 671 Advanced Geographic Information Systems 4
Commercial geographical information systems (GIS) are introduced and used to analyze a wide variety of spatial data bases. Georeferenced data are acquired, restructured and manipulated in GIS environment. GIS methods are applied to local-scale geographical, environmental and land planning problems. Prereq: GEOG250 and GEOG270 or GEOG372 or GEOG470.

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 GEOG472.

GEOG 674 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: GEOG250 and GEOG412.

GEOG 681 Remote Sensing of Environment 3
See MAST681 for course description.

GEOG 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, nonglacial) landforms and environmental problems in cold regions. May be crosslisted with GEOG682.

GEOG 803 Topics in Geomorphology 1-3
See GEOG803 for course description.

GEOG 820 Environmental Research 3
Planning and carrying out a research project with an emphasis on collecting and analyzing environmental data, or modeling and simulating an environmental system or process. Findings will be presented in form of a grant proposal (following NSF guidelines), or as a refereed journal article. Oral presentation(s) will be expected as well. May be crosslisted with BISC620. Restrictions: Open to PhD students in Environmental Science or by consent of instructor.

GEOG 855 Climatological Research 3
Techniques of research in basic and applied climatology: to include field study, and the analysis of climatological data. Restrictions: Requires permission of instructor.

GEOG 868 Research 1-9 PF

GEOG 869 Master's Thesis 1-6

GEOG 964 Pre-Candidacy Study 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examination 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.

GEOG 969 Doctoral Dissertation 1-12 PF

GEOLOGY

GEOL 105 Geological Hazards and Their Human Impact 3
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, GEO115.

GEOL 107 General Geology 4
Principles of physical and historical geology and their application in interpreting earth processes and the history of the earth. Laboratory covers identification of earth materials including fossils and the interpretation of topographic and geologic maps.

GEOL 108 Volcanoes and Earthquakes 3
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.

GEOL 109 Planets, Asteroids and Impacts 3
Composition, structure, surface features, origin, and evolution of the planets, satellites, asteroids, and comets. The course will also explore the possible connection between meteorite impacts and mass extinctions. Did an asteroid kill off the dinosaurs?

GEOL 110 Earth History: Evolution, Extinction and the Geological Record 3
History of the earth and its biota. Origins, evolution and mass extinctions of major groups of organisms as demonstrated by the earth's fossil record. History of the Pleistocene Ice Ages and the evolution of humans.
GEOL 111 GEOLOGY OF DELAWARE AND ITS NEIGHBORS 3
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.

GEOL 112 EARTH RESOURCES AND PUBLIC POLICY 3
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.

GEOL 113 EARTH SCIENCE 4
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.
RESTRICTIONS: Open to education majors and other selected programs. Does not satisfy Group D requirement in Arts and Science.

GEOL 115 GEOLOGICAL HAZARDS LABORATORY 1
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

GEOL 300 THE EARTH'S MATERIALS I: MINERALS 4
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.

GEOL 301 SYSTEMATIC AND EVOLUTIONARY PALEONTOLOGY 3
Classification of fossils, organic evolution, paleoecology; and application to geologic principles.
PREREQ: GEOL107

GEOL 302 THE EARTH'S MATERIALS II: ROCKS 4
Identification, description, occurrences, origins and uses of rocks and ores.
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL300.

GEOL 303 THE EARTH'S SURFACE I: SURFICIAL PROCESSES 4
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113

GEOL 304 THE EARTH'S SURFACE II: STRATIGRAPHY 4
Description and correlation of stratigraphic units, concepts of time and methods of absolute dating, environments of deposition and modern/analogues and facies analysis; basin analysis.
PREREQ: GEOL105 and GEOL115, GEOL107, or GEOL113; GEOL303

GEOL 305 THE EARTH'S LITHOSPHERE I: STRUCTURAL GEOLOGY AND PLATE TECTONICS 4
The study of geologic structure, geologic stress and the responses of rocks to stress. Examines plate tectonics and the major structural and tectonic relations generated at plate boundaries.
PREREQ: GEOL105 and GEOL115, or GEOL107 or GEOL113

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: PALEONTOLOGY 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, paleoceanography and tectonics. Integrative study of the history of the earth and its inhabitants.
PREREQ: GEOL105 AND GEOL115, OR GEOL107, OR GEOL113; GEOL207.

GEOL 366 INDEPENDENT STUDY 1-3

GEOL 385 GEOMORPHOLOGY 4
Survey of landforms and processes that shape them. Description and classification of landforms, relation to geological and climatic processes, rates of landform development and change. Laboratory involves map/air photo interpretation and analysis of digital elevation models. May be cross-listed with GEOG385.
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113, or GEOG106.

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 407 PETROLOGY 3
Petrography, chemistry, origin and tectonic significance of the major classes of igneous, sedimentary, or metamorphic rocks.
PREREQ: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 411 FLUVIAL GEOMORPHOLOGY 3
PREREQ: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 412 GEOLOGICAL APPROACHES TO ARCHAEOLOGY AND HISTORY 3
Geological techniques in interpretation of archaeological sites and their surrounding geographic terrain; paleoecographies of archaeological settings; and use of geology for interpretations of history.
PREREQ: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

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: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 416 PALEOECOLOGY 3
Paleoenvironmental and stratigraphic interpretation of sediments and fossils. Basic statistics, bioturbation models, well-logging and sequence stratigraphy. Application to geologic problems.
PREREQ: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 421 ENVIRONMENTAL AND APPLIED GEOLGY 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: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

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 control, health and safety plans, decontamination and spill response recovery.
RESTRICTIONS: GEOL 422 cannot be applied toward the 9 credits of 400-level Geology electives required of B.S. Geology majors.

GEOL 428 HYDROGEOLOGY 3
PREREQ: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 431 MARINE GEOLOGY 3
Geology of the ocean basins and their continental margins; sedimentation within the marine environment and its uses in interpreting geologic history and paleoecology.
PREREQ: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

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: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).

GEOL 446 GENERAL GEOCHEMISTRY 3
Chemical principles applied to geologic processes and environments. Thermochemistry of mineral equilibria; mineral stabilities at high temperature and pressure. Radioisotopes and methods of geochronology. The geochemical history of the earth.
PREREQ: GEOL107 and CHEM103

GEOL 450 PROSEMINAR IN ENVIRONMENTAL SCIENCE 3
See GEOG450 for course description.
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 453 Elementary Geophysics I 3
PREREQ: GEOL107 or GEOL105/115 or GEOL113; MATH 242; PHYS201 and PHYS202.

GEOL 454 Elementary Geophysics II 3
Gravity and the shape of the earth and theories of isostasy. Geomagnetism, magnetization of rocks and paleomagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging.
PREREQ: GEOL107 or GEOL105/115 or GEOL113; MATH242; PHYS201 and PHYS202.

GEOL 466 Independent Study 1-3
Enables students to begin planning work and research before admission to dissertation candidacy and GEOL969.

GEOL 482 Physical Geography of Cold Environments 3
See GEOG482 for course description.

GEOL 601 Geological 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 602 Case Studies of Near Surface Geologic Systems 3
Broad overview of the history and processes of selected near surface geologic systems. Environmental and applied aspects of near surface geologic systems.
RESTRICTIONS: Graduate students only.

GEOL 603 Numerical Modeling of Near Surface Geological Systems 3
PREREQ: GEOSG250 or equivalent or permission of instructor.
RESTRICTIONS: Graduate students only.

GEOL 604 Field Methods - Near Surface Geologic Systems 3
Training and experience in obtaining and interpreting surface and shallow subsurface data. Emphasis on the correlation and interpretation of morphostratigraphic relationships and history. Field methods to be employed include: augering and coring, shallow geophysical methods and modern surveying techniques.
RESTRICTIONS: Graduate students only.

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 Petrology 3
Petrography, chemistry, origin and tectonic significance of the major classes of igneous, sedimentary, or metamorphic rocks.

GEOL 611 Fluvial Geomorphology 3

GEOL 612 Geological Approaches to Archaeology and History 3
Geological techniques in interpretation of archaeological sites and their surrounding geographic terrain; paleogeographies of archaeological settings; and use of geology for interpretations of history.

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 Paleoecology 3
Paleoenvironmental and stratigraphic interpretation of sediments and fossils. Basic statistics, bioturbation 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, and site zone control, health & safety plans, decontamination, and spill response recovery.

GEOL 628 Hydrogeology 3
Principles of groundwater flow and water chemistry in varied geologic media. Evaluation of ground water resources and assessment of environmental problems associated with groundwater use.

GEOL 631 Marine Geology 3
The geology of the ocean basins and their continental margins; sedimentation within the marine environment and its use in interpreting geologic history and paleoecology. May be cross-listed with MAST631.

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 646 General Geochmistry 3
Chemical principles applied to geologic processes and environments. Thermochmistry of mineral equilibria; and mineral stabilitues at high temperature and pressure. Radios isotopes and methods of geochronology. The geochmical history of the earth.

GEOL 650 Clay Mineralogy 3
See MAST650 for course description.

GEOL 653 Elementary Geophysics I 3

GEOL 654 Elementary Geophysics II 3
Gravity and the shape of the earth, theories of isostasy. Geomagnetism, magnetization of rocks and paleomagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging.

GEOL 657 Statistics for Earth Sciences 3
See STAT657 for course description.

GEOL 682 Physical Geography of Cold Environments 3
See GEOG682 for course description.

GEOL 801 Topics in Planetary Geology 1-3
Topics in planetary geology. Topics vary according to instructor's preference.
RESTRICTIONS: May be taken more than once for graduate credit.

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's preference.
RESTRICTIONS: May be cross-listed with GEOG803.

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 808 Topics in Structural Geology 1-3
Selected topics in structural geology. Topics vary according to instructor's 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 818 Topics in Paleobiology 1-3
Selected topics in paleobiology. Topics vary according to instructor's preference.

GEOL 888 Research 1-9
Enables students to begin planning work and research before admission to dissertation candidacy and GEOG969.

GEOL 869 Master's Thesis 1-6
GERMAN 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

GERMAN 969 DOCTORAL DISSERTATION 1-12 PF

GREEK

GREK 101 ELEMENTARY ANCIENT GREEK I 3
Course for beginners

GREK 102 ELEMENTARY ANCIENT GREEK II 3
Completion of basic Greek
PREREQ: GREK101

GREK 213 PLATO 3
GREK 214 HOMER 3
GREK 366 INDEPENDENT STUDY 1-3
GREK 466 INDEPENDENT STUDY 1-3

GERMAN

GRMN 101 ELEMENTARY GERMAN I 3
Introduction to the German language and a development of speaking, listening, reading and writing skills through the use of basic texts

GRMN 102 ELEMENTARY GERMAN II 3
Completion of basic German
PREREQ: GRMN101 or GRMN105

GRMN 105 GERMAN I - ELEMENTARY 4
Introduction to the German language and development of speaking, listening, reading and writing skills through the use of basic texts

GRMN 106 GERMAN II - ELEMENTARY/INTERMEDIATE 4
Completion of basic German. Increasing mastery of the basic skills of speaking, listening, reading and writing.
PREREQ: GRMN105.
RESTRICTIONS: Two to three years of high school German acceptable in lieu of prerequisite.

GRMN 107 GERMAN III - INTERMEDIATE 4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty
PREREQ: GRMN106.
RESTRICTIONS: Four years of high school German acceptable in lieu of prerequisite. Satisfies Arts and Sciences foreign language requirement.

GRMN 111 INTERMEDIATE GERMAN I 3
Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing.
PREREQ: GRMN102 or GRMN106.
RESTRICTIONS: Three years of high school German acceptable in lieu of prerequisite.

GRMN 112 INTERMEDIATE GERMAN II 3
Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed
PREREQ: GRMN 111.
RESTRICTIONS: Four years of high school German acceptable in lieu of prerequisite. Satisfies Arts and Sciences foreign language requirement.

GRMN 200 GERMAN GRAMMAR REVIEW 3
Systematic review of elementary and intermediate German grammar. Emphasis on grammar. Conversational practice
PREREQ: GRMN107.
RESTRICTIONS: Not intended for students who have already taken a 300 or 400 level course in German.

GRMN 205 GERMAN CONVERSATION 3
Practical use of German by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work.
PREREQ: GRMN107 or one 200 level German course.
RESTRICTIONS: Prerequisites require minimum grade of B. Not intended for students who have already taken a 300 or 400 level course in German.

GRMN 206 CULTURE THROUGH CONVERSATION 3
Discussion of topics drawn from contemporary German life. Designed for students who wish to broaden their knowledge of German culture while improving their oral and aural language skills.
PREREQ: GRMN107

GRMN 208 CONTEMPORARY GERMANY I 3
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.

GRMN 211 GERMAN READING AND WRITING 3
Reading and discussion of 20th-century German short stories and novellas. Several short compositions. Grammar review where appropriate
PREREQ: GRMN107
RESTRICTIONS: Not intended for students who have already taken a 300 or 400 level course in German.

GRMN 250 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: GRMN107.

GRMN 255 GERMANY IN THE NEWS 3
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.
PREREQ: Any 200-level course taught in the German language.

GRMN 305 GERMAN CONVERSATION AND COMPOSITION 3
Discussion of current cultural, social and political topics in German-speaking countries. Vocabulary building, grammar exercises and frequent compositions.
PREREQ: One of GRMN200, GRMN205, GRMN255, GRMN211, GRMN212 or GRMN250.

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 conducted in German.
RESTRICTIONS: Taught abroad only.

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 taught in the German language.
RESTRICTIONS: Taught abroad only. Taught in German.

GRMN 311 INTRODUCTION TO GERMAN LITERATURE I 3
Masterpieces of poetry, narrative prose and drama from the 18th to the mid-19th century.
PREREQ: GRMN211, GRMN212 or GRMN255.

GRMN 312 INTRODUCTION TO GERMAN LITERATURE II 3
Masterpieces of poetry, narrative prose and drama from the mid-19th century to the present.
PREREQ: GRMN211, GRMN212 or GRMN255.

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.
RESTRICTIONS: GRMN211 or GRMN212.

GRMN 340 FOCUS ON GENRE: GERMAN DRAMA, PROSE OR POETRY 3
Introduces one of three major genres by examining a specific theme. The subject matter varies and will be announced in the registration booklet.
PREREQ: GRMN211, GRMN212 or GRMN255.
RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 355 SPECIAL TOPICS 3
Explores an area of special interest in German literature or culture studies. The subject matter varies and will be announced in the registration booklet.
PREREQ: GRMN211, GRMN212 or GRMN255.
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: Any 300-level German course.
RESTRICTIONS: Taught abroad only.
**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: Any two 300-level German courses.

**GRMN 433 Nineteenth-Century German Literature 3**  
Studies major literary trends and figures (Heine, Buechner, Dostoevskii, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of Romanticism to Naturalism.  
PREREQ: Any two 300-level German courses.

**GRMN 442 From Naturalism to Expressionism 3**  
Main literary currents from the 1880's to the 1920's. The drama from Hauptmann to Kaiser; the poetry of Hofmannsthal, Rilke, Lasker-Schuler, and others; narrative prose including Thomas Mann and Kafka.  
PREREQ: Any two 300-level German courses.

**GRMN 453 Contemporary German Literature 3**  
Major authors and literary movements from 1945 to the present. Works by Boell, Grass, Frisch, Duerrenmatt, Bachmann, Mandel and Christa Wolf.  
PREREQ: Any two 300-level German courses.

**GRMN 455 Selected Authors, Works and Themes 3**  
Works of one or more outstanding authors or a special theme.  
PREREQ: Two 300-level German literature courses.  
RESTRICTIONS: May be repeated for credit when topics vary.

**GRMN 462 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' Fastnachtsspiele, Eulenspiegel); and the Baroque themes of "carpe diem" and "memento mori" (Grimmelshausen's Simplicissimus, Gryphius' plays, Baroque poetry).  
PREREQ: Any 400-level German literature course.

**GRMN 466 Independent Study 1-3**  
**GRMN 533 German Readings for Ph.D. Candidates 3**  
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 (Heine, Buechner, Dostoevskii, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of Romanticism to Naturalism.  
**GRMN 642 Naturalism to Expressionism 3**  
Main literary currents from the 1880's to the 1920's. The drama from Hauptmann to Kaiser; the poetry of Hofmannsthal, Rilke, Lasker-Schuler and others, and narrative prose including Thomas Mann and Kafka.  
**GRMN 653 Contemporary German Literature 3**  
Major authors and literary movements from 1945 to the present. Works by Boell, Grass, Frisch, Duerrenmatt, Bachmann, Mandel and Christa Wolf.  
**GRMN 655 Selected Authors, Works and Themes 3**  
Works of one or more outstanding authors or a special theme.  
RESTRICTIONS: May be repeated for credit when topics vary.

**GRMN 662 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' Fastnachtsspiele, Eulenspiegel); and the Baroque themes of "carpe diem" and "memento mori" (Grimmelshausen's Simplicissimus, Gryphius' plays, Baroque poetry).

**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.

**HEBREW**

**HEBR 105 Hebrew I - Elementary 4**  
Introduction to the Hebrew language and development of speaking, listening, reading and writing skills through the use of basic texts. May be crosslisted with JWST 105.

**HEBR 106 Hebrew II - Elementary/Intermediate 4**  
Completion of basic Hebrew. Increasing mastery of the basic skills of speaking, listening, reading and writing. May be crosslisted with JWST 106.

**HEBR 107 Hebrew III - Intermediate 4**  
Review of grammar, continued practice in speaking and writing and reading texts of average difficulty. May be crosslisted with JWST 107.

**HEBR 266 Special Problem 1-4**

**HUMAN SERVICES, EDUCATION & PUBLIC POLICY**

**HEPP 100 Introductory Seminar 1 PF**  
Introduces students to the academic disciplines represented in the College of Human Services, Education and Public Policy. Possible opportunities for service learning and career opportunities are also explored.

**HEPP 160 Special Topics 3**  
Freshman level interdisciplinary course on topics drawn from disciplines within the College of Human Services, Education and Public Policy. Course content varies each semester. May be repeated for credit as topics change.

**HEPP 260 Special Topics 3**  
Sophomore level interdisciplinary course on topics drawn from the disciplines within the College of Human Services, Education and Public Policy. Course content varies each semester. May be repeated as topics change.

**HEPP 360 Special Topics 3**  
Junior level interdisciplinary course on topics drawn from the disciplines within the College of Human Services, Education and Public Policy. Course content varies each semester. May be repeated as topics change.

**HEPP 400 Service Learning Practicum 3-6 PF**  
Structured experience in a public or private, business, educational or non-profit setting as part of the Human Services, Education and Public Policy major. Course credit requires written documentation of the experience by the student through various means such as a paper, portfolio, report, journal, etc.

**HEPP 433 Internet Literacy 3**  
Provides the conceptual background and the online skills needed for students 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.

**HEPP 460 Special Topics 3**  
Senior level interdisciplinary course on topics drawn from the disciplines within the College of Human Services, Education and Public Policy. Course content varies each semester. May be repeated as topics change.

**HEPP 465 Senior Seminar in Disabilities Studies 3**  
Culminates the Disabilities Studies minor with an integrative seminar requiring a significant project in the student's area of specialization.

**HESC 105 Foundations of Recreation and Leisure Study 3**  
Study of the history, theory and philosophy of recreation and leisure services. Nature of the play experience, influence of leisure on society and a survey of the range of leisure services in the public, private, voluntary, military and commercial sectors.

**HESC 120 Physical Education 1**  
Introduces knowledge and skills in physical activity. The program is geared toward life skills and allows for selection.

**HESC 121 Water Safety Instruction 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.  
RESTRICTIONS: Requires current Red Cross Advanced Lifesaving Certificate.
HEALTH AND EXERCISE SCIENCES

HESC 124 AEROBIC INSTRUCTOR TRAINING CERTIFICATION
Provides the potential teacher with pertinent, current knowledge on aerobic dance, to allow them to design safe and effective programs. Emphasis on effective leadership skills.
RESTRICTIONS: Requires aerobic dance experience and permission of instructor.

HESC 132 SCUBA
Prepares students with the skills and knowledge necessary to continue their training for open water scuba certification.

HESC 135 FRESHMAN SEMINAR
Teaches 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 HESC majors.

HESC 138 LIFEGUARD TRAINING INSTRUCTOR
RESTRICTIONS: Current certification in First Aid, CPR and Lifeguard Training.

HESC 139 CURRICULUM IN 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.
RESTRICTIONS: Open to HPE majors.

HESC 140 FUNDAMENTAL SKILLS ANALYSIS
Designed to develop cognitive understanding and practical experience for the teaching and refinement of fundamental skills in grades K-12. Emphasis will be on processes of perceiving, extending, refining and applying fundamental skills through teaching progressions, lead-up games, and activities.
RESTRICTIONS: Must be completed for upper division clearance. Open to HPE majors only.

HESC 141 ADVENTURE CHALLENGE AND OUTDOOR RECREATION
Provides the 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.
RESTRICTIONS: Open to HPE majors only.

HESC 142 SKILLS, TECHNIQUES AND KNOWLEDGE OF BEGINNING SWIMMING/DIVING
Preparation of physical education teachers. Provides the 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 majors only in Fall.

HESC 143 SKILLS, TECHNIQUES AND KNOWLEDGE OF STUNTS, TUMBLING AND GYMNASTICS
Provides future physical education teachers with the ability to teach a unit in gymnastics, covering skills, techniques and knowledge in gymnastics activities including the balance beam, uneven bars, vaulting horse, tumbling, parallel bars and rings.

HESC 144 SKILLS, TECHNIQUES AND KNOWLEDGE OF VOLLEYBALL AND SELF DEFENSE
Provides the opportunity to develop skills and learn methods and techniques. Emphasis on developing readiness for presenting such activities in public school settings.
RESTRICTIONS: Open to majors only.

HESC 155 PERSONAL HEALTH MANAGEMENT: AN APPROACH FOR A LIFETIME
Utilizing group problem solving techniques and on-line resources, students will develop a comprehensive approach to managing their own health.
RESTRICTIONS: Not open to students who have taken HESC 214.

HESC 164 PRACTICUM IN RECREATION AND PARKS
Provides the potential teacher with pertinent, current knowledge on utilizing critical thinking, principles of transfer and basic movement education. Students learn to adapt games/activities for a varied population.

HESC 210 SAFETY, FIRST AID AND EMERGENCY CARE
Practical approach to first aid, safety, family health and prevention. Topics include basic concepts, needs, purposes, individual skills and legal implications.
RESTRICTIONS: Requires permission of instructor. Open to HESC majors only.

HESC 214 WELLNESS: A WAY OF LIFE
Principles of personal and public health including present and future problems of environmental control. Includes health services, health education and healthy school environment.
RESTRICTIONS: Open to majors only in Fall.

HESC 215 OBSERVATION AND ASSISTING IN SCHOOLS
Observation of classes in both the elementary and secondary schools. Primary emphasis on opportunity to assist the regular teacher in classroom and gymnasium activities.
RESTRICTIONS: Requires permission of department.

HESC 216 PRACTICUM IN TEACHING
Practical teaching experience. Student is assigned to lifetime sports activity courses and assists in conducting the course.
RESTRICTIONS: Requires permission of department.

HESC 220 ANATOMY AND PHYSIOLOGY
Structure and function of the human body; skeletal, muscular, circulatory, respiratory, nervous, endocrine, digestive and urinary systems. A foundation course for all areas of physical education and athletics.
RESTRICTIONS: Open to majors only.

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

HESC 233 ADVANCED SCUBA DIVING
In-depth study and review of material from entry and mid-level scuba diving courses. Opportunity to use advanced diving skills and knowledge under controlled conditions.
RESTRICTIONS: Requires basic scuba certification.

HESC 235 PROFESSIONAL TRANSITIONS
Focuses on requirements for successful transition from college student to workplace professional. Examines career planning, managing transition from college to career or graduate school, personal life changes and workplace issues. Through self-assessment, exploration, and classroom activities, students select, clarify and prepare for professional career choices.
RESTRICTIONS: Open to PES concentration majors.

HESC 242 SKILLS, TECHNIQUES AND KNOWLEDGE OF LACROSSE AND FIELD HOCKEY
Preparation of physical education teachers. Provides the 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 PEH majors only.

HESC 243 SKILLS, TECHNIQUES AND KNOWLEDGE OF SOFTBALL AND Track and Field
Preparation of physical education teachers. Provides the 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 HPE majors only.

HESC 244 SKILLS, TECHNIQUES AND KNOWLEDGE OF SOCCER and BASKETBALL
Preparation of physical education teachers. Provides the 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 HPE majors only.

HESC 245 INTRODUCTION TO COMMERCIAL RECREATION SERVICES
Focuses on the establishment, organization, management and marketing of various commercial recreation services. Areas addressed include travel and tourism, entertainment services, leisure services in the outdoor environment, hospitality/food services and retail outlets.

HESC 246 TECHNIQUES FOR MEN'S LACROSSE
Practical experience in advanced techniques and strategies of men's lacrosse.
RESTRICTIONS: Offered in Winter only.

HESC 247 TECHNIQUES FOR WOMEN'S LACROSSE
Practical experience in advanced techniques and strategies of women's lacrosse.
RESTRICTIONS: Offered in Winter only.

HESC 250 MOTOR DEVELOPMENT
RESTRICTIONS: Open to HPE majors only.

HESC 251 SKILLS, TECHNIQUES AND KNOWLEDGE OF RHYTHMS AND DANCE
Preparation of physical education teachers. Provides the 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.

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HESC 252 LIFETIME LEISURE ACTIVITIES 1
Provides the opportunity to develop skills, learn teaching methods and instructional techniques in selected lifetime sports including archery, golf, and bowling. Emphasis on developing readiness for presenting such activities in public school settings.
RESTRICTIONS: Open to HPE majors only.

HESC 253 SKILLS, TECHNIQUES AND KNOWLEDGE OF PHYSICAL CONDITIONING 1
Preparation of physical education teachers. Provides the 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 majors only.

HESC 254 SKILLS, TECHNIQUES AND KNOWLEDGE OF GYMNASTICS II 1
An advanced level course in skills, techniques and knowledge of apparatus and tumbling. Emphasis on developing readiness for presenting such activities in public school settings.

HESC 255 SKILLS, TECHNIQUE AND KNOWLEDGE OF RACQUET SPORTS 1
Preparation of physical education teachers. Provides opportunity to develop skills, learn methods and techniques and acquire knowledge of racquetball, tennis, badminton and pickleball. Emphasis on developing readiness for presenting such activities in public school settings.

HESC 256 TAPING TECHNIQUES 1
Learn accepted and approved taping/wrapping and splinting techniques which are NATA certified and accepted as standard measured by First Aid and CPR requirements.

HESC 257 ATHLETIC TRAINING PRACTICUM I 3
Supervised clinical experience in athletic training. Focuses on development of competencies related to pathology of injuries and illnesses, acute care of injury and illness, and nutritional aspects of injury and illness.
PREREQ: HESC305
RESTRICTIONS: Restricted to students admitted to the athletic training major.

HESC 258 ADVANCED TAPING AND BRACING TECHNIQUES 1
Laboratory experience in advanced taping, wrapping, bracing, and splinting; variations for upper and lower extremity orthopaedic injuries; emergency and non-emergency on-field transportation techniques; and equipment fitting and modification techniques.
RESTRICTIONS: Open to athletic training majors only.

HESC 260 LEISURE SERVICE PROGRAMMING 3
An understanding of the program fields in relation to programming principles, objectives, structural organization and program evaluation. Purposes and values of a comprehensive range of recreation offerings and considerations necessary to provide a broad range of activities to all segments of the population.
PREREQ: HESC105 and HESC270.
RESTRICTIONS: Open to RPAD majors only.

HESC 263 LEADERSHIP PRACTICUM 1
Students work under the auspices of an appointed professional to develop leadership skills in fitness activities.

HESC 270 RECREATION LEADERSHIP 3
An understanding of the dynamics of group interaction and the theories, principles and practices of leadership. Review of research in leadership and group dynamics. Study of and practical experience with techniques and methods working with individuals and groups in the recreation setting. Includes 15 hours of supervised practical experience.
PREREQ: HESC105
RESTRICTIONS: Open to RPAD majors only.

HESC 275 TACTICAL APPROACH TO TEACHING SPORTS 3
Uses tactical problems to teach invasion, wall/net and fielding/run-scoring activities. Students will analyze strategies for successful transition across similar games. Appropriate practices and outcomes of quality physical education programs will be emphasized.
RESTRICTIONS: Open to HPE majors only.

HESC 276 PERSONAL COMPUTERS IN HEALTH, PHYSICAL EDUCATION AND RECREATION 2
Focuses on the fundamental characteristics of microcomputer systems and their increasing importance in the physical education and recreation areas. Basic concepts of programming as well as an overview of existing software packages.
RESTRICTIONS: Open to majors only.

HESC 300 ISSUES IN PHYSICAL ACTIVITY STUDIES AND SPORTS 3
Compares professional issues and social forces to various philosophic systems. Examines personal beliefs, values and assumptions for the purpose of developing and/or refining a professional philosophy and a professional plan of action.
RESTRICTIONS: Open to Junior and Senior HESC majors only.

HESC 305 FUNDAMENTALS OF ATHLETIC TRAINING 3
The organization and administration of an athletic training program and the prevention, diagnosis and treatment of athletic injuries, including physical therapy, taping and training room. First aid, safety measures and prevention of injuries.
PREREQ: HESC220.

HESC 306 ADVANCED SEMINAR IN SPORTS ORTHOPAEDICS I 1 PF
Provides student with an understanding of diagnostic and decision making processes for common orthopaedic soft tissue injuries. Emphasis on the principles of consultation and referral will be emphasized.
PREREQ: HESC220 and HESC305
RESTRICTIONS: Open to athletic training majors only or permission of instructor.

HESC 307 ADVANCED SEMINAR IN SPORTS ORTHOPAEDICS II 1 PF
Provides student with an understanding of special tests used in the diagnosis of common orthopaedic soft tissue injuries and their anatomic and pathomechanical basis.
PREREQ: HESC220, HESC305.
RESTRICTIONS: Open to athletic training majors only or permission of instructor.

HESC 315 INSTRUCTIONAL STRATEGIES FOR DRUG EDUCATION 3
Focuses on the delivery and value of special recreation participation opportunities for members of special population groups and particularly by persons with disabilities.

HESC 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 is health-related fitness, lifetime physical activity and nutrition using a nationally approved program.
RESTRICTIONS: Open to HPE majors only.

HESC 320 PRINCIPLES OF STRENGTH/CONDITIONING 3
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: HESC220
RESTRICTIONS: Open to HESC majors only.

HESC 321 ADVANCED PRINCIPLES OF STRENGTH AND CONDITIONING 4
Provides greater scope and depth of strength and conditioning principles than the prerequisite. Concentrates more on the physiological, neural and biomechanical principles as applied to strength and conditioning. The lab affords hands-on experience and extensive break-down of basic and advanced weight training techniques.
PREREQ: HESC320.
RESTRICTIONS: Must be in the strength and conditioning concentration. Requires Junior status.

HESC 322 WEIGHT ROOM SAFETY AND DESIGN 1
Provides students with a background in both weight room safety (conduct, rules, regulations) and weight room design (custom-built, multi-station, size, spacing, budget).
PREREQ: HESC320.
RESTRICTIONS: Must be in strength and conditioning concentration. Requires Junior status.

HESC 323 THEORIES AND APPLICATION OF PROGRAM DESIGN 3
Provides theoretical principles in developing strength and conditioning programs based on physical, physiological and neural concerns. These programs are individual in design and entail detailed calculations of volume, intensity and frequency.
PREREQ: HESC319
RESTRICTIONS: Must be in strength and conditioning concentration. Requires junior status.

HESC 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 HESC majors only.

HESC 325 INSTRUCTIONAL STRATEGIES FOR HUMAN SEXUALITY 3
Develops content knowledge and present teaching methodologies relative to all facets of human sexuality. Emphasis will be on the process of integrating information into effective age specific educational strategies.
PREREQ: HESC319 and FST401
RESTRICTIONS: HPE majors or permission of instructor.

HESC 329 DYNAMICS OF TEAM PROBLEM SOLVING 3
Development of team-approach problem solving techniques. Topics include group leadership, balance, group and team maintenance and development, conflict resolution.

HESC 330 TEACHING COMMUNITY AND MENTAL HEALTH 3
Teaching of mental health skills and their application in solving real life health-related issues. Topics include facilitation and leadership, group process, team maintenance and development, conflict resolution.
PREREQ: HESC214.
RESTRICTIONS: Open to HPE majors only.
HESC 332 Health Behavior Theory and Assessment
Provides an understanding and application of health behavior theory to program development and evaluation. Emphasis is also placed on skills and competencies necessary for programming and evaluation including needs assessments, research, communication and team process.
RESTRICTIONS: Open to students in HPE or fitness management concentration

HESC 341 Principles of Outdoor Recreation
Presents an orientation to the field of outdoor recreation. Attention given to historical, social, economic, 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.

HESC 342 Survey in Adaptive Physical Education and Recreation
Study of prevalent abnormalities found in a general population including causes, prevention, care and treatment. Methods of screening students for determination of these disabilities are presented as a laboratory experience.
RESTRICTIONS: Open to majors only

HESC 350 Basic Concepts in Kinesiology
A review of musculoskeletal anatomy and lever systems will provide the foundation for analyzing human movement. Practical kinesiological evaluation will focus on common fitness and health related exercises. Movement analysis and proper techniques will be discussed for cardiovascular machines, abdominal work, stretching, etc.

PREREQ: HESC220
RESTRICTIONS: Open to majors only

HESC 355 Seminar in Exercise Physiology
Prepares students in the exercise physiology concentration with the planning of employment and/or advanced degree opportunities. Includes in-depth resume and cover letter writing, interviewing techniques, and personalized career inventory and career exploration projects.
RESTRICTIONS: Must be in exercise physiology concentration. Requires Junior status

HESC 354 Seminar in Exercise Physiology
Explores internship opportunities in (1) recreation and leisure services field for the recreation major or (2) for the fitness management field for the fitness management major. Completion of necessary paperwork for placement in an agency that will assist students in meeting career objectives is required.
RESTRICTIONS: Requires Junior status. Recreation/leisure service is limited to recreation majors; fitness management is limited to fitness management majors

HESC 355 Figure Skating Practicum
A survey in figure skating science covering the basics of coaching and teaching including an in-depth review of the instructional and competitive programs of the Ice Skating International Association and U.S.F.S.A. Extensive study and work in the basic badge programs of the I.S.I.A. and U.S.F.S.A.
RESTRICTIONS: Open to figure skating science majors only

HESC 356 Figure Skating Practicum
Concentration in the areas of pairs and ice dance with emphasis on teaching and coaching techniques related to the basic through intermediate levels with an analysis of progression and sequencing.
RESTRICTIONS: Open to figure skating science majors only

HESC 357 Athletic Training Practicum
Supervised clinical experience in athletic training. Focuses on development of competencies related to assessment and evaluation, therapeutic modalities and health care administration.
PREREQ: HESC257
RESTRICTIONS: Restricted to students in the athletic training major

HESC 358 Athletic Training Practicum
Supervised clinical experience in athletic training. Focuses on development of competencies related to assessment and evaluation, pharmacology, risk management and injury prevention and general medical conditions and disabilities.
PREREQ: HESC157
RESTRICTIONS: Restricted to students in the athletic training major

HESC 360 Psychology of Coaching
Lectures involving the psychology of coaching team sports. Emphasis on information concerned with observing the principles of individual differences.

HESC 361 Coaching Volleyball
Study of the methods and skill techniques involved with coaching participants in the sport of volleyball. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 362 Coaching Baseball
Study of the methods and skill techniques involved with coaching the sport of baseball. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 363 Coaching Tennis
Study of the methods and skill techniques involved with coaching participants in the sport of tennis. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 365 Coaching Basketball
Study of the methods and skill techniques involved with coaching participants in the sport of basketball. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 368 Coaching Track and Field
Study of the methods and skill techniques involved with coaching participants in the sport of track and field. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 370 Practicum in Methods of Elementary Physical Education
Emphasis on clinical experience activity in the public school setting. Considers organization and supervision of elementary physical education programs and includes curriculum planning, selection of materials and related teaching techniques.
PREREQ: HESC140, HESC150, HESC210, HESC250 and HESC276. Satisfactory completion of Praxis I.
COREQ: HESC380
RESTRICTIONS: Junior status, upper division clearance, minimum GPA of 2.50, major index of 2.75 and completion of all skills requirements

HESC 371 Outdoor Adventure Leadership
Introduces recreation leadership in outdoor adventure activities. Attention directed toward conceptual and technical aspects of adventure programs.

HESC 372 Coaching Swimming and Diving
Study of the methods and skill techniques involved with coaching participants in the sport of swimming and diving. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 373 Coaching Football
Study of the methods and skill techniques involved with coaching participants in the sport of football. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 374 Coaching Women's Lacrosse
Study of the methods and skill techniques involved with coaching participants in the sport of women's lacrosse. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 375 Coaching Wrestling
Study of the methods and skill techniques involved with coaching participants in the sport of wrestling. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 376 Coaching Soccer
Study of the methods and skill techniques involved with coaching participants in the sport of soccer. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 377 Coaching Field Hockey
Study of the methods and skill techniques involved with coaching participants in the sport of field hockey. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 378 Coaching Softball
Study of the methods and skill techniques involved with coaching participants in the sport of softball. Emphasis on organizing and administering this activity in a school program.
RESTRICTIONS: Requires interscholastic or intercollegiate experience, and/or the skills/technique course

HESC 379 Coaching Men's Lacrosse
Study of the methods and skill techniques involved with coaching participants in the sport of men's lacrosse. Emphasis on organizing and administering this activity in a school program.

391
HEC 380 PRACTICUM IN METHODS OF SECONDARY PHYSICAL EDUCATION 3
Emphasis on clinical experience activity in the public school setting. Consideration of supervision and selection of secondary physical education programs and includes curriculum planning, selection of materials and related teaching techniques.
PREREQ: HESC140, HESC150, HESC210, HESC220, HESC250 and HESC276
Satisfactory completion of Praxis I
COREQ: HESC370.
RESTRICTIONS: Junior status, upper division clearance, minimum GPA of 2.50, major index of 2.75 and completion of all skills courses.

HESC 381 ADVENTURE CHALLENGE EDUCATION 3
An introduction to adventure challenge education and its concepts. Counseling concepts in adventure challenge education will be introduced. Activities low-level group initiates through participation on high level “ropes course” is emphasized. Activities create the atmosphere for individual and group development.

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

HESC 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 overdoses, phosphorosis, iontophoresis, drugs affecting skeletal muscle, pain and inflammation.
RESTRICTIONS: Open to athletic training majors only.

HESC 403 PRACTICUM IN ADAPTIVE PHYSICAL EDUCATION 3-9 PF
Experience working with special children in a physical education setting. Clinical experiences may include work with a particular group of disabled children (e.g. mentally retarded) or several different groups of disabled children (e.g. mentally retarded, visually or hearing impaired or orthopedically handicapped). Variable time involvement up to a maximum of 14 weeks.
PREREQ: HESC342
RESTRICTIONS: Open to HESC majors only.

HESC 404 ORGANIZATION, ADMINISTRATION, RECREATION AND LEISURE SERVICE 3
Study of administrative practices in recreation and parks including legal aspects, principles of planning and operation of parks and facilities, financial and business procedures, public relations, personnel practices and evaluations.
PREREQ: HESC105, HESC260, and HESC270.

HESC 405 REHABILITATION OF ATHLETIC INJURIES 3
Students plan and implement comprehensive individualized rehabilitation programs including determination of therapeutic goals and objectives, selection of therapeutic exercises, methods of evaluating and recording rehabilitation progress and development of criteria for progression and return to competition.
RESTRICTIONS: For students in the athletic training curriculum.

HESC 407 PREVENTION AND RECOGNITION OF ATHLETIC INJURIES 3
Procedures for preventing, diagnosing, treating and rehabilitating athletic injuries. Emphasis on early detection of both the nature and extent of injury.
PREREQ: HESC480 and HESC481 or HESC420.

HESC 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: For students in athletic training education curriculum.

HESC 414 METHODS AND MATERIALS IN HEALTH EDUCATION 3
Emphasis on health education in the school curriculum: curriculum content and organization of materials for instructional purposes.
PREREQ: HESC210, HESC214, HESC276, HESC315, HESC325, HESC330 and HESC401
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.

HESC 416 PRACTICUM IN STRENGTH AND CONDITIONING 1 PF
Assigns students laboratory experience in the DFH or BBC weight rooms or campus fitness centers. Direct working experience with varsity athletic teams in teaching techniques, program writing, flexibility routines and conditioning routines.
RESTRICTIONS: Must be in strength and conditioning conditioning. Requires Senior status.
PREREQ: HESC220.

HESC 420 FUNCTIONAL HUMAN ANATOMY 4
Anatomical individuality: functional significance and human performance interpretations involved through the consideration of muscular, skeletal and nervous systems. Laboratory experience emphasizes the meaning and significance of musculoskeletal movements and utilizes procted human specimens, models, x-rays, dry biological materials and other aids.
PREREQ: HESC220.

HESC 425 ATHLETICS AND SPORT PSYCHOLOGY 3
Introduces topics relevant to sport psychology and coaching. Material covered is applicable to specific situations that occur between athletes, coaches and sport-related incidents. Presents a survey of recent sport psychological techniques and experiments.

HESC 426 BIOMECHANICS 1 4
Studies the scientific principles of biomechanics. Develops fundamental understanding of the mechanics of the human body at rest or in motion. Includes basic principles of statics and dynamics as applied to the quantitative analysis of selected activities in sport.
RESTRICTIONS: Open to majors only.

HESC 427 BIOMECHANICS II 3
Provides information on the measurement of human motion in three dimensions and on the calculation of inverse dynamics in two dimensions as applied to the analysis of human motion.
PREREQ: HESC276, HESC426 and MATH242.

HESC 430 PHYSIOLOGY OF ACTIVITY 3
Study of integration of the body systems in performance of exercise, work and sports activities. Performance of exercise activities by the human body under environmental, stress situations.
PREREQ: HESC220
COREQ: HESC431.

HESC 431 PHYSIOLOGY OF ACTIVITY LABORATORY 1
Laboratory experiences include the measurement of physiological parameters under exercise conditions.
COREQ: HESC430.

HESC 432 BASIC EXERCISE PRESCRIPTION 3
Studies the principles and guidelines (as established by the American College of Sports Medicine) for the development of exercise programs for apparently healthy populations. Emphasis on individualization of fitness programs for optimal client participation.
PREREQ: HESC430
RESTRICTIONS: Open to EXSS majors only.

HESC 434 EXERCISE TEST TECHNOLOGY 3
Emphasizes American College of Sports Medicine objectives for cardiac rehabilitation exercise technologist certificate. Basic electrocardiography, exercise physiology, stress test administration, medications, report preparations, program considerations and facilities development.
RESTRICTIONS: Open to EXSS majors only.

HESC 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, visual motor behavior rehearsal, hypnosis stress reduction and concentration techniques.

HESC 445 CONCEPTS OF PHYSICAL FITNESS TESTING 3
Combines both practical and theoretical aspects of physical fitness training. Special reference made to aging, youth fitness, diabetics, asthmatics and obese individuals.
PREREQ: HESC265, HESC430, HESC431 and HESC432.

HESC 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.

HESC 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.

HESC 450 FACILITY AND PARK MANAGEMENT 3
Study of the principles and procedures involved in planning for parks and recreation areas, land acquisition and utilization, maintenance of park and recreation areas, facilities and equipment.
PREREQ: HESC105 and HESC270.

HESC 451 EXERCISE TESTING PRESCRIPTION 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, a variety of testing protocols, basic exercise physiology and exercise prescription.

HESC 452 PRINCIPLES OF FITNESS MANAGEMENT 3
Concepts in general management principles including organizational structure, personal management and budgeting. Specific reference made to the health fitness industry addressing promotion and marketing, facility development and risk management.
PREREQ: HESC265.
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
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<tbody>
<tr>
<td>HESC 453</td>
<td>Aquatic Management</td>
<td>Equips individuals with the knowledge, techniques and skills required to operate an aquatic facility as manager or director</td>
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<tr>
<td>HESC 455</td>
<td>Figure Skating Practicum III</td>
<td>Concentration on advanced teaching/coaching techniques related to the skill required in IS.A and U.S.F.S.A. Levels with an analysis of progression and sequencing. Seminar sessions to include professional responsibilities, business practices, skating pedagogy, special programs and precision skating.</td>
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<tr>
<td>HESC 456</td>
<td>Figure Skating Practicum IV</td>
<td>Direct involvement in the teaching/coaching of beginner elite national and world competitors under the supervision of Ice Skating Development Center professional staff.</td>
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<tr>
<td>HESC 457</td>
<td>Athletic Training Practicum IV</td>
<td>Supervised clinical experience in athletic training. Focuses on development of competencies related to therapeutic exercise, psychosocial intervention and referral and professional development and responsibilities.</td>
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<tr>
<td>HESC 460</td>
<td>Coaching/Performance Practicum 2 PF</td>
<td>Practical coaching/performance experience in a scholastic/clinical setting with the season chosen corresponding to each students interest. The student must keep a daily log of methods and experiences and choose and appropriate project. Observations will be made by the minor and the cooperating supervisor.</td>
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<tr>
<td>HESC 464</td>
<td>Internship</td>
<td>Open to HPE majors only.</td>
</tr>
<tr>
<td>HESC 465</td>
<td>Teaching Seminar in Health and Physical Education</td>
<td>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.</td>
</tr>
<tr>
<td>HESC 470</td>
<td>Baseball and Society</td>
<td>Study of baseball as a reflection of society and how it pervades American culture. Examines baseball as a game, sport, business and social institution as portrayed in literature, memorabilia, film, ballparks and scandals.</td>
</tr>
<tr>
<td>HESC 475</td>
<td>Teaching Health in the Elementary School</td>
<td>Examines the importance of teaching health in the elementary school. Presents content and teaching strategies proven effective for teaching health at the elementary level. Also discusses how to incorporate health into other subjects.</td>
</tr>
<tr>
<td>HESC 480</td>
<td>Upper Extremity and Spine Evaluation</td>
<td>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.</td>
</tr>
<tr>
<td>HESC 481</td>
<td>Lower Extremity and Spine Evaluation</td>
<td>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.</td>
</tr>
<tr>
<td>HESC 484</td>
<td>Women in Sports</td>
<td>Contemporary view of women in the world of sports. Emphasis on biological, physiological, sociological, psychological, historical and legal aspects. May be cross-listed with WOMS 484.</td>
</tr>
<tr>
<td>HESC 486</td>
<td>Tension Control and Relaxation</td>
<td>Focuses on the phenomenon of stress and includes application of various techniques in a laboratory setting with emphasis on individual measurement, awareness and improvement of relaxation. Students learn tension reduction, relaxation techniques or the refinement of relaxation techniques.</td>
</tr>
<tr>
<td>HESC 490</td>
<td>Development of Health Promotion Programs</td>
<td>Reviews the pathophysiology of cardiovascular disease, including the theory and principles of major risk factor development. Prepares students to plan, create and implement health promotion programs in the workplace, focusing on program selection, promotion, evaluation and expansion.</td>
</tr>
<tr>
<td>HESC 601</td>
<td>Research Methods</td>
<td>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.</td>
</tr>
<tr>
<td>HESC 602</td>
<td>Elementary Computer Statistics</td>
<td>Overview of elementary statistics and their use in research. Emphasis on the use and interpretation of packaged computer routines (SPSS). Discusses experimental designs utilizing analysis of variance and other research procedures.</td>
</tr>
</tbody>
</table>
HESC 650 Perceptual Motor Development 3
Analysis of perceptual motor concepts and theory. Emphasis on screening techniques utilized to identify perceptual motor difficulties in children and development of remediation programs.

HESC 659 Cardiopulmonary Rehabilitation Practice 1
Students will assist in the phase III cardiac and pulmonary rehabilitation.

HESC 660 Administration of Physical Education and Sports 3
Provides students with knowledge of the basic principles of administration with specific application to the areas of physical education and athletics.

HESC 664 Field Study in Physical Education and Sport 3
Aids in the development of the graduate course student's knowledge in physical education and sport studies. Includes selecting, organizing, conducting, evaluating and presenting a seminar on a project, plus developing a professional portfolio.

HESC 665 Cardiovascular Assessment I 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.

HESC 670 Critical Issues in Physical Education and Athletics 3
Focuses on three themes: historical perspective, current issues facing physical education and athletics; and trends toward the future in physical education.

HESC 675 Cardiovascular Assessment II 3
Prepares the student to direct exercise programs in the rehabilitative setting. Addresses theoretical and practical aspects of exercise testing and prescription in addition to administrative issues of programs. Students design an exercise program for phase I, II or III cardiac rehabilitation.

HESC 685 Advanced Exercise Prescription 3
Instructs students in exercise recommendations for populations with special needs. Exercise prescription for cardiac patients, diabetics, pulmonary diseases and others with special needs will be discussed.

HESC 690 Biomechanical Methods 3
Introduces students to fundamental methods of two and three-dimensional analysis in sports biomechanics. Topics will include the creation of coordinate systems, coordinate system transformations, joint center predictions, vector manipulation, linear and angular kinematics, joint forces and moments.

PREREQ: Calculus
RESTRICTIONS: Requires permission of instructor

HESC 691 Gait Laboratory Internship 3
Provides hands-on experience in all patient-related phases of a full-service gait analysis laboratory. Designed to enable students to apply skills learned in HESC690 and HESC803.

PREREQ: HESC690 and HESC803
RESTRICTIONS: Requires permission of instructor

HESC 800 Advanced Physiology of Exercise 3
Combines of three basic parts: a survey of completed research on the effects of exercise upon the human body as it specifically relates to physical education and athletics; instruction in the use of stress testing equipment; and completion of an independent research project.

HESC 803 Introduction to Laboratory Instruments 3
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 area of application of instruments. Laboratory involves hands-on use of equipment to collect data for faculty and student research projects.

HESC 807 Motor Learning 3
Evaluation and application of research literature concerned with motor learning as it relates to teaching elementary and secondary physical education. Laboratory work includes major research techniques used in motor learning. Research proposal required at completion of the course.

HESC 810 Biomechanics of Sports 3
Mechanics of human motion. Investigation into the action of forces on bodies during the performance of sport activities. PREREQ: College algebra, trigonometry and calculus

HESC 840 Advanced Human Anatomy 3
Laboratory course 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.

HESC 869 Master's Thesis 1-6

HISTORY

HIST 101 Western Civilization to 1648 3
The principal political, social, economic and cultural developments in Western civilization from late antiquity (3rd century A.D.) to the middle of the 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 to 1648 3
Principal political, economic, cultural and social developments in world history from origins to 1648, relating the past to the present. Course gives equal weight to the history of Asia, Africa, the Americas and Europe.

HIST 104 World History: 1648 to the Present 3
Principal political, economic, cultural and social developments in world history from 1648 to the present, relating the past to the present. Course gives equal weight to the history of Asia, Africa, the Americas and Europe.

HIST 130 Islamic Near East: 600-1500 3
Introduces the student to 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 "mash-up" of the Middle East and charts the emergence of the region in its present form through the nineteenth and twentieth centuries.

HIST 134 History of Africa 3
Introductory course on 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 cross-listed with BAMS134.

HIST 135 Introduction to Latin American History 3
Introduction to Latin American history from the preconquest period to the present.

HIST 137 East Asian Civilization: China 3
A survey of major aspects of Chinese civilization, relating the past to the present.

HIST 138 East Asian Civilization: Japan 3
A survey of major aspects of Japanese civilization, relating the past to the present.

HIST 200 History and Government of Delaware 3
A survey of the history of Delaware and its present government, with special attention to the needs of social studies teachers.

HIST 205 United States History 3
An introductory survey of 17th, 18th, and 19th century American history. Themes and approach vary with the instructor.

HIST 206 United States History 3
An introductory survey of American history since 1865. Themes and approach vary with the instructor.

HIST 210 War and Society 3
Relationship between warfare, its constantly mutating technology, and social change. Survey from replacement of the professional soldier to the contemporary subalternation of machinery for soldiers.

HIST 216 Introduction to Material Culture Studies 3
See ANTH316 for course description.

HIST 220 American Civil Rights Movement 3-4
Team-taught, interdisciplinary, large-enrollment course on the history of the American Civil Rights Movement. Deals with the crucial years from 1954 to 1970 and examines the larger theme of the American race relations. May be cross-listed with BAMS220.

HIST 221 Film and American Society 3
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.

HIST 241 History of Christianity to 1300 3
A survey of the evolution of Christianity from its origins to 1300.

HIST 245 Medieval Kings and Queens 3
An intensive examination, based on primary sources, of the deeds and lives of selected kings and queens of the Middle Ages, Byzantine rulers and the popes.

HIST 250 Roots of Contemporary Culture 3
Main developments in literature and the arts from the early 18th century to World War II from a social and historical perspective. Stresses the impact of social and political change on conceptions of the function of the arts.
HIST 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. May be cross-listed with JWST254.

HIST 268 SEMINAR  
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.

HIST 270 HISTORY OF MODERN ASIA  
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, nationalistic and communist movements, Pacific War, Cultural Revolution in China, Vietnam Conflict and emergence of the Japanese economic powerhouse.

HIST 278 HISTORIC CULTURES OF THE MIDDLE ATLANTIC REGION  
See ANTH278 for course description.

HIST 280 SCIENCE AND CIVILIZATION  
Concepting conception of the universe and of humanity’s place within it, as seen in ideas and institutions of science from ancient to modern times.

HIST 291 WOMEN’S HISTORY THROUGH FILM  
See WOMS291 for course description.

HIST 300 WOMEN IN AMERICAN HISTORY  
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 cross-listed with WOMS300.

HIST 301 THE WORKER IN AMERICAN LIFE  
Survey of the major historical transformations affecting the lives of American working people and their social, political, economic and cultural responses to these changes. Special attention given to how workers’ world views and the nature of work have evolved over the course of American history.

HIST 302 THE WORLD IN OUR TIME  
An examination of current events within the context of historical forces.

HIST 303 AMERICAN INTELLECTUAL HISTORY  
The development of principal patterns of American religious, social and scientific thought before 1865.

HIST 304 AMERICAN INTELLECTUAL HISTORY  
The development of principal patterns of American religious, social and scientific thought after 1865.

HIST 305 IMAGES OF RACE AND ETHNICITY IN AMERICAN CULTURE  
Study of how images have shaped attitudes toward race and ethnicity in American culture from the colonial era to the present. Will study Native Americans, African-Americans and immigrants. Visual materials include works of fine art, folk art, photographs, cartoons, motion pictures and popular illustrations. May be cross-listed with WOMS305.

HIST 306 HISTORY OF AMERICAN FOREIGN POLICY  
Foreign policy of the United States and the nation’s changing relations with the outside world. Covers the period 1900 to the present. Special attention given to presidential personality-how a President’s background and personality affect the making of foreign policy.

HIST 307 THE UNITED STATES IN THE EARLY NATIONAL PERIOD  
Political and cultural change in America from 1789-1825, 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.

HIST 308 THE UNITED STATES IN THE ANTEBELLUM PERIOD  
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.

HIST 309 U.S. BUSINESS AND POLITICAL ECONOMY  
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.

HIST 312 CRIME AND PUNISHMENT IN AMERICAN HISTORY  
See CRJU312 for course description.

HIST 313 EARLY TWENTIETH CENTURY AMERICA  
The rise of big business and the ways that farmers, labor leaders, socialists and middle-class reformers responded to the new industrialism.

HIST 314 TWENTIETH CENTURY AMERICA  
Causes and consequences of American intervention in the two world wars, and the social, political and economic history of the U.S. during the years between the wars.

HIST 315 POSTWAR AMERICA: THE UNITED STATES SINCE 1945  
A social, intellectual and political history of the United States from the death of Franklin D. Roosevelt to the resignation of Richard M. Nixon. Topics covered are the origins of the cold war, Truman-mania, McCarthyism, the 1950’s, JFK and LBJ, and Nixon and Watergate.

HIST 318 COLONIAL AMERICA  
The transit of culture from England to America and its modification there during the seventeenth century. The development of nature colonial societies to 1760.

HIST 319 REVOLUTIONARY AMERICA  
The American colonies and the new nation from 1760-1789 with particular emphasis on political and cultural developments in the age of the American Revolution.

HIST 321 CIVIL WAR AND RECONSTRUCTION  
Sectional conflict and the struggle between rival nationalisms in mid-19th century United States.

HIST 323 THE OLD SOUTH  
The history of the Southern States from the beginnings of European colonization to the outbreak of the Civil War. Special attention to slavery and how it shaped Southern life.

HIST 324 AMERICAN CONSTITUTIONAL HISTORY  
See CRJU324 for course description.

HIST 325 HISTORY OF BLACK AMERICA TO THE CIVIL WAR  
See BAM3504 for course description.

HIST 326 HISTORY OF BLACK AMERICA SINCE THE CIVIL WAR  
See BAM3506 for course description.

HIST 328 AMERICAN INDUSTRIAL SOCIETY FROM 1815 TO THE PRESENT  
Exploration of social forces and social impact of American industrialization: rise of the factory system, emergence of an industrial work force, role of cities and immigrants, westward migration, transition from slavery to freedom, the southern reform movements, family life and population change, and social and political conflict.

HIST 329 INTERNATIONAL MIGRATION  
See POSC329 for course description.

HIST 330 PEASANTS AND REVOLUTION IN AFRICA  
The most remarkable nationalist struggles in modern Africa have been supported by peasants. Special attention paid to these struggles, especially in Ghana, Nigeria, Angola, Zimbabwe, Mozambique, and to the Mau-Mau of Kenya. Why did the peasants support the revolution? Did they benefit from the victory?

HIST 331 HISTORY OF CARIBBEAN I  
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. May be cross-listed with BAM331.

HIST 332 HISTORY OF CARIBBEAN II  
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. May be cross-listed with BAM332.

HIST 336 TOPICS IN LATIN AMERICAN HISTORY  
Historical experience and culture of Central America and/or Costa Rican peoples.

HIST 337 ANCIENT RELIGION AND CIVILIZATION  
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 and use of religious edifices.

HIST 338 GREEK-ROMAN SPORT-RECREATION  
Covers period 2000 B.C. to 6th century A.D. from point of view of spectator and participant; use of ancient authors in translation, artistic representations and secondary literature. Extensive use of slides.

HIST 339 TOPICS IN MODERN EUROPEAN HISTORY  
A reflection of developments in modern European history from the First World War to the present. Emphasis on political, social, cultural and economic patterns of the period, complemented by visits to museums and appropriate historic sites.

HIST 340 ANCIENT NEAR EAST AND GREECE  
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.
HIST 341 ANCIENT ROME  3
Students 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.

HIST 342 BARBARIAN EUROPE  3
A survey of political, social, cultural and economic developments in Europe between 300
and 1050.

HIST 343 MEDIEVAL EUROPE: 1050-1350  3
A survey of political, social, cultural and economic developments in Europe between 1050 and 1350.

HIST 344 RENAISSANCE EUROPE  3
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.

HIST 345 EUROPE IN THE REFORMATION ERA: 1517-1648  3
Religion in the realms of thought and action during the rise of "modern" Western civili-
zation: the scientific revolution, the Reformation, the Counter-Reformation and their
impact on the behavior and perceptions of men by 1650.

HIST 346 AGE OF LOUIS XIV  3
The culture, society and politics of 17th century France, centered upon the biography of
Louis XIV. Emphasis on growth of absolute monarchy in France and the implications for
all of Europe.

HIST 347 THE FRENCH REVOLUTION AND NAPOLEON  3
Emphasis on personalities in the Revolution - Louis XIV, Robespierre and Napoleon - and
the clash of social forces.

HIST 348 HISTORY OF SPAIN: 1479-PRESENT  3
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.

HIST 349 MODERN SPANISH SOCIETIES: 1800-PRESENT  3
Comparative social history of the Hispanic world. Topics include the social and cultural
background of early modern Spain, the formation of Latin American colonial society and
the struggle for modernization in contemporary Spain and Latin America.

HIST 351 EUROPE IN CRISIS: 1919-1945  3
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.

HIST 352 CONTEMPORARY EUROPEAN SOCIETY  3
A comprehensive survey and analysis of the evolution and structure of postwar society,
with particular emphasis on current social and cultural developments.

HIST 353 MODERN GERMANY: 1770-1919  3
German political, socioeconomic, and cultural history from 1770 to the end of the First
World War.

HIST 354 GERMANY IN THE TWENTIETH CENTURY: 1914 TO PRESENT  3
German political, socioeconomic and cultural history from the First World War to the present.

HIST 355 EARLY MODERN INTELLECTUAL HISTORY  3
Examines the major development in thought from around 1600 to 1800. Questions con-
sidered 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 histori-
cal reason and theories of the fine arts. Readings will be from Milton, Locke, Voltaire,
Rousseau and others.

HIST 356 MODERN EUROPEAN INTELLECTUAL HISTORY  3
Philosophical and political thought from English Romanticism and German Classicism through
Existentialism. Readings from Hegel, Marx, Kierkegaard, Nietzsche, and Thomas Mann.

HIST 357 RUSSIAN HISTORY TO 1801  3
Political, socioeconomic and cultural developments in Russia to 1801. Russian trends and
developments.

HIST 358 RUSSIAN HISTORY: 1801-1917  3
Political, socioeconomic and cultural developments in Russia in the 19th century.

HIST 359 SOVIET RUSSIA: 1917-1990  3
Analyses the development of the state under the Soviet regime.

HIST 366 INDEPENDENT STUDY  1-6

HIST 368 MODERN CHINA: 1600-1920’S  3
The history of China from the rise of the Manchus to the collapse of their dynasty and the
emergence of the Republic. Topics include the reform tradition, Opium War and imperi-
alism, modernization, the rise of modern Chinese nationalism and revolution.

HIST 369 CHINA SINCE 1900  3
History of China from the fall of the last dynasty to present. Topics include the collapse of
the ancient regime, the Republican revolution, warlordism and imperialism, rise of mod-
er nationalism, Chiang Kai-shek and Mao Zedong, post-1949 China and the Deng
Xiaoping era.

HIST 370 HISTORY OF MODERN JAPAN  3
History of Japan from 1600 to 1932 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.

HIST 371 POSTWAR JAPAN  3
Traces the emergence of contemporary Japan in its cultural and social spheres. Emphasis is
on an analysis of the historical significance of postwar Japanese culture. Investigations
explore everyday life as depicted in literature, film, journalism, memoirs and histori-
writings.

HIST 372 POPULAR CULTURE IN URBAN JAPAN  3
Explores the theory and practice of popular culture as manifested in the history of urban
Japan from the seventeenth to the twenty-first century. Topics include entertainments,
sports, mass media, tourism, fashion, consumerism, sex and gender. Discussion format
with intensive reading and writing. May be cross-listed with WOMS372.

HIST 373 MODERN IRELAND: 1534-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 1715  3
Political, constitutional, social and economic development to 1715.

HIST 375 HISTORY OF ENGLAND: 1715 TO THE PRESENT  3
Rise and decline of a global power; the transformation of an oligarchy into a democra-
cy, and the consequences of industrialization and urbanization.

HIST 376 RADICALISM AND REVOLUTION: ISLAMIC MOVEMENT/MODERN MIDDLE EAST  3
Addresses the background, historical development and present state of Islamic funda-
mentalist movements.

HIST 378 NATIONALISM IN THE MODERN MIDDLE EAST  3
Focuses in the ideology of nationalism in an attempt to explain the emergence of the mod-
ern states in the Middle East.

HIST 379 HISTORICAL ARCHAEOLOGY OF THE EASTERN UNITED STATES  3
See ANTH379 for course description.

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 centu-
ry, 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 pro-
tected search for coexistence between Jews and Arabs.

HIST 382 HISTORY OF WESTERN MEDICINE  3
See CS332 for course description.

HIST 391 HISTORY OF WORLD WAR II IN ASIA AND THE PACIFIC  3
Social, political and military developments in Asia and the Pacific from c. 1870-1954,
focusing on the causes, courses and consequences of World War II. Topics include
Western imperialism in Asia, Japanese militarism, occupation and resistance, the Allied
counterattack, origins of the Cold War and the rise of nationalism and communism in
occupied and affected areas.

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 civi-
liization, colonization, nationalism and communism, the Indochina Wars (among them the
"Vietnam Conflict"), the Kampuchean Crisis, and life under the Socialist Republic of
Vietnam since 1976.

HIST 394 AFRICA SINCE 1960  3
Deals with current political, economic and social problems and progress found in Africa.
Historical analysis of the emergence and development of these problems, issues and
achievements. Links the present to the past for factual historical analysis.

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 cross-list-
ed with AMS395.
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, Africans in power since 1948, and African struggles for freedom.

HIST 403 History, Philosophy, Functions and Future of Museums 3
See MSST403 for course description

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 cross-listed with WOMS410.

HIST 411 Seminar in American History 3

HIST 430 Seminar in Twentieth Century Latin American Revolutions 3
Focuses on four 20th century Latin American revolutions. Concentrates on the historical background and events of the Mexican, Guatemalan, Cuban and Nicaraguan revolutions.

HIST 439 Women and Revolution in Africa 3
Discusses the critical roles played by women in African revolution movements. Why did women join these revolutionary movements? What is the relationship between feminism and revolution? May be cross-listed with WOMS439.

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 effect of Colonialism on Africa's economic, social and political development.

HIST 446 Seminar in Industrial Revolution in Europe 3
The origins and spread of rapid, sustained economic growth since 1750.

HIST 449 Seminar: Science, Technology and Medicine 3
Topics vary. May include topics such as The American System, History of Chemistry, or History of Engineering.

HIST 453 Seminar: History through Media 1-6
Trains students to produce historical documentaries from archival photographs and sound recordings in the United States National Archives and other depositories.

HIST 454 Vernacular Architecture 3
The 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 cross-listed with ARTH454.

HIST 459 Seminar in United States Urban History 3
The process of urbanization in America with special emphasis on the Philadelphia-Wilmington area.

HIST 463 Historical Archaeology and the Public 3
See ANTH463 for course description

HIST 466 Independent Study 1-6

HIST 470 Seminar in Ancient History 3
Topics vary. May include topics such as Slavery in Antiquity, The Archaeology of the Ancient World or The Great City State.

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 cross-listed with WOMS472.

HIST 473 Seminar in Early Modern European History 3
Topics vary. May include topics such as Renaissance Humanism, or Women in Europe, 1100-1600.

HIST 474 Seminar in English History 3

HIST 475 Seminar in Modern European History 3
Topics vary. May include The Holocaust, The Cold War, Hitler's Germany, or The Age of Revolution. May be cross-listed with WOMS475.

HIST 477 Seminar in Latin American History 3
Topics vary. May include such History of Mexico, History of the Caribbean or Slavery in the New World.

HIST 479 Seminar in Asian History 3
Topics vary. May include topics such as History of Southeast Asia, 20th Century China or Japan in the 20th Century.

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.

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.

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 604 History and Philosophy 3
Survey of major historians from the Bible and Herodotus through the 19th century, together with some of the most influential philosophers of history.

HIST 605 History of Theories in Material Culture 3
See EAMC605 for course description.

HIST 606 Issues in American Material Culture 3
See EAMC606 for course description.

HIST 607 Readings in American Material Life 3
Readings of recent monograph and serial publications pertaining to American Material Life. Topics include landscape, architecture, work, department, family and religion. Discussion and interpretation of authors' arguments. Review of material life historiography. Emphasis on broad synthesis of material culture literature.

HIST 608 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 cross-listed with MSST608.

HIST 611 Seminar in American History 3

HIST 614 The American Suburb 3
See UAPP614 for course description.

HIST 617 Seminar in Gender and Women's History 3
Reading seminar. Topics may include topics such as U.S. Women's History, U.S. Women's History in Comparative Perspective, Gender in History, or European Women's History.

HIST 621 Seminar on American Society and Culture Before the Revolution 3
Reading seminar in American society and culture from the first settlements to the Revolution.

HIST 623 Age of the American Revolution 3
Reading seminar on political and constitutional changes from 1760 to 1790 but also the social and cultural history of that period.

HIST 625 U.S. Social and Cultural History: 1790-1860 3
Reading seminar on social and cultural change between 1790 and 1860, with emphasis on expansion of population into the West, sectionalism, the rise of urban and industrial revolutions, and reform.

HIST 627 Antebellum America 3
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.

HIST 629 U.S. Social and Cultural History: 1850-1929 3
Reading seminar covering interpretive issues in social and cultural history. Topics covered include social class, social structure and social mobility, work and leisure, reform, and historical memory.

HIST 630 Twentieth Century Latin American Revolutions 3
Examines revolutionary change and obstacles to revolutionary change in Latin America. External and internal processes discussed in full context of each country's historical development. Each student is responsible for leading a discussion of several of the required readings.
HIST 631 U.S. POLITICAL, CULTURAL AND ECONOMIC HISTORY: 1929-PRESENT 3
Reading seminar on major interpretive works illustrating the changing modes by which historians have viewed American political, economic and cultural past from 1929 to the present

HIST 632 MAKING THE AMERICAN CITY 3
See UAPP632 for course description.

HIST 633 THE U.S. IN THE TWENTIETH CENTURY 3
Reading seminar on 20th century U.S. history.

HIST 634 METHODS IN HISTORIC PRESERVATION 3
See UAPP630 for course description.

HIST 635 THE EVOLUTION OF THE AMERICAN URBAN LANDSCAPE 3
See UAPP635 for course description.

HIST 636 RESEARCH TOPICS IN HISTORIC PRESERVATION 3
See UAPP636 for course description.

HIST 637 LAW AND SOCIETY IN HISTORICAL PERSPECTIVE 3
See SOC1637 for course description.

HIST 640 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 effect of Colonialism on Africa's economic, social and political development

HIST 646 INDUSTRIAL REVOLUTION OF EUROPE 3
The origins and spread of rapid, sustained economic growth since 1750.

HIST 650 POLITICAL ECONOMY OF THE MODERN UNITED STATES 3
A reading seminar introducing the fields and historiographies of U.S. business history, business-government relations planning and modern political economy, from the late 19th century to the present

HIST 652 SEMINAR IN HISTORIC PRESERVATION 3
See UAPP629 for course description.

HIST 654 VERANULAR 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 cross-listed with ARTH654 and/or UAPP654

HIST 655 ARCHIVAL MANAGEMENT I 3
Survey of the various types of archival institutions and practices, the principles of manuscript curatorship, the problems associated with huge archives generated by modern bureaucracies

HIST 656 ARCHIVAL MANAGEMENT II 3
Internship and paper.

HIST 657 HISTORICAL ARCHAEOLOGY AND MUSEUM INTERPRETATION 3
Introduction to the methods and practices of historical archaeological research from a museum perspective. Readings, demonstration techniques and field work.

HIST 660 HUMANITIES COLLOQUIUM 3
See ANTH662 for course description

HIST 663 HISTORICAL ARCHAEOLOGY AND THE PUBLIC 3
See ANTH663 for course description.

HIST 671 STUDIES IN MEDIEVAL HISTORY 3
Topics vary. Topics may include: Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.

HIST 673 STUDIES IN EARLY MODERN EUROPEAN HISTORY 3
Topics vary. May include such topics as Renaissance Humanism, Women in Europe, 1100-1600 or Rome and Religion.

HIST 675 SEMINAR IN MODERN EUROPEAN HISTORY 3
Topics vary. May include topics such as The Holocaust, The Cold War or Hitler's Germany.

HIST 677 STUDIES IN LATIN AMERICAN HISTORY 3
Topics may include history of Mexico, history of the Caribbean or slavery in the New World. Topics will vary.

HIST 679 STUDIES IN ASIAN HISTORY 3
Topics vary. May include topics such as History of Southeast Asia, 20th Century China or Japan in the 20th Century.

HIST 683 STUDIES IN COMPARATIVE HISTORY 3
Topics may include but not compare some aspect of American history with European history or Western history with non-Western history.

HIST 692 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.

HIST 693 SEMINAR: PROBLEMS IN TEACHING HISTORY AND SOCIAL SCIENCE 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 802 RESEARCH AND WRITING SEMINAR: EUROPEAN HISTORY 3
Original research and writing on subjects in European history. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism

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
See MSST804 for course description

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 806 RESEARCH AND WRITING SEMINAR: HAGLEY LIBRARY AND ARCHIVES 3
Original research and writing on a variety of subjects based on research materials available at the Hagley Museum and Library. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 807 Topical Topics and Issues in Health Promotion 3
Using a seminar format and a multidisciplinary approach to study current issues in health promotion, different faculty review issues from the viewpoint of their discipline. Students participate in the selection of topics and are required to prepare and present an in-depth report on multiple issues.

HIST 808 RESEARCH AND WRITING SEMINAR: EUROPEAN HISTORY 3
Original research and writing on subjects in European history. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 809 RESEARCH AND WRITING SEMINAR: AMERICA 1860-PRESENT 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 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: Open to graduate students only

HIST 966 TOPICS AND ISSUES IN HEALTH PROMOTION 3

HEALTH PROMOTION

HLPR 803 ADVANCED HEALTH PROMOTION PROGRAMMING AND EVALUATION 3
Provides the student with the skills for planning, developing, implementing and evaluating health promotion programs in a variety of settings and populations. Emphasis is placed on the behavioral, epidemiological and socio-ecological issues that impact programming and the skills required to evaluate a program.

PREREQ: HESC490

RESTRICTIONS: Open to graduate students only

HLPR 807 TOPICS AND ISSUES IN HEALTH PROMOTION 3

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 is placed on the psychological and social determinants of health-related behaviors of individuals. Examine the roles of health professionals in facilitating behavior change.

RESTRICTIONS: Open to 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 retooling of select- ed 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.
Special emphasis is placed on the development and use of service delivery evaluation instruments.

Introduction to the research process as it applies to the evaluation of service delivery systems.

Examines the decision-making process, tasks and styles as well as factors that can complicate decision-making. Considers decision-making techniques and offers suggestions for building decision-making confidence.

Introduction to the research process as it applies to the evaluation of service delivery systems.

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.

Examines network architectures that support hospitality and retail systems, such as LANs, WANs, UNIX and Internet based networks. Students plan and define the supporting telecommunications and cable infrastructure needed to create data highways in today's hotels and retail environments, using workflow analysis to shape the flow of information.

Objectives within the industry, the means of achieving these objectives and opportunities for career development. History of hospitality, current trends and related issues.

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.

Aims to discover processes of service delivery and the way new technologies are affecting them.

Reviews contract management field as applied to hotel operations, non-commercial and recreational food service, and facilities management. Emphasizes processes of site audits, proposal construction, the bidding procedure and the development of management systems.

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.

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.

Principles of purchasing food and beverage supplies for hotels, restaurants and general food service; and marketing selection principles, buying procedures, choice of supplier and receiving. Field trips to suppliers.

Laboratory experience in quantity food production, service and management. 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.

Principles of purchasing food and beverage supplies for hotels, restaurants and general food service; and marketing selection principles, buying procedures, choice of supplier and receiving. Field trips to suppliers.

HOTEL RESTAURANT 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 144 Hospitality Information Management, Networks and Systems 3
Examines networks architectures that support hospitality and retail systems, such as LANs, WANs, UNIX and Internet based networks. Students plan and define the supporting telecommunications and cable infrastructure needed to create data highways in today's hotels and retail environments, using workflow analysis to shape the flow of information.

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 201 FOOD PRINCIPLES 2
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.

COREQ: HRIM 11

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: HRIM 201

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 and off-premise catering management; and food production. Students plan and implement actual catered events.

HRIM 218 BEVERAGE MANAGEMENT 3
Beverages are a complex product category with legal and social issues that require special attention from management. Emphasizes legal and ethical issues associated with serving alcoholic beverages. Includes an in-depth study of wine, mixology, inventory control, and profitable beverage management.

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 DECISION-MAKING SKILLS AND TECHNIQUES 3
Examines the decision-making process, tasks and styles as well as factors that can complicate decision-making. Considers decision-making techniques and offers suggestions for building decision-making confidence.

HRIM 238 ASSESSMENT AND EVALUATION IN SERVICE DELIVERY SYSTEMS 3
Introduction to the research process as it applies to the evaluation of service delivery systems, including design, data collection, analysis, interpretation and reporting of findings. Special emphasis is placed on the development and use of service delivery evaluation instruments.

HRIM 250 HOSPITALITY SERVICES MANAGEMENT 3
Examination of the strategic and general management issues facing profit and not-for-profit service organizations. Emphasizes the unique characteristics and operations of service organizations, concentrating on functions critical to the effective delivery of service: marketing, operations and human resources.

HRIM 280 PROPERTY MANAGEMENT 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. Emphasis on equipment, personnel and technology.

HRIM 311 HOSPITALITY CONTRACT MANAGEMENT 3
Reviews contract management field as applied to hotel operations, non-commercial and recreational food service, and facilities management. Emphasizes processes of site audits, proposal construction, the bidding procedure and the development of management systems.

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 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 320 HOTEL, RESTAURANT AND GENERAL FOOD SERVICE PURCHASING 3
Principles of purchasing food and beverage supplies for hotels, restaurants and general food service; and marketing selection principles, buying procedures, choice of supplier and receiving. Field trips to suppliers.

HRIM 321 QUANTITY FOOD SERVICE MANAGEMENT 2
Principles of quantity food service management with an emphasis on quality and cost control. Topics include menu planning, safety, sanitation and technical operations, as well as labor, food and energy cost containment.

PREREQ: HRIM 201

COREQ: HRIM 221

HRIM 322 RETAIL DESIGN AND CONSUMER BEHAVIOR 3
See CNST 322 for course description.

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: HRIM 201

COREQ: HRIM 221

HRIM 346 HOSPITALITY AND INDUSTRY WEB-BASED MARKETING 3
Provides the information necessary to understand the world of online service industry 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 354 HOSPITALITY FRANCHISE MANAGEMENT 3
Provides students with the necessary background to understand and operate under management contracts, franchise agreements and national and international joint ventures as they relate to the hospitality industry.

HRIM 366 INDEPENDENT STUDY 1-6

HRIM 380 MANAGEMENT OF LODGING OPERATIONS 3
Management of front desk, housekeeping, maintenance, security and conference operations.

PREREQ: HRIM 280

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: HRIM 321

HRIM 382 MANAGERIAL ACCOUNTING AND FINANCE IN THE HOSPITALITY 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: ACCCT 200 or both ACCCT 207 and ACCCT 208

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 and retail outlets will be discussed as they relate to travel and tourism.
HRIM 442 HOUSITTY COMPUTER-BASED EDUCATION  3
Introduction to the use of computer-based education and training in the hospitality industry. Focuses on implementing interactive technology-based training in hospitality learning environments and includes instructional systems design, how to evaluate and select hardware and software, and the concept of just-in-time training.

HRIM 448 DATA MINING ANALYSIS IN THE HOTEL INDUSTRY  3
Focuses on the collection of data in hospitality systems environments into an accessible warehouse, and mining (or organizing) the data into a management information system. Multi-vari consolidations using traditional polling techniques and innovative web-based consolidations are the key to organization of data into an up-to-date and accurate source of management information for analysis.

HRIM 458 ENTREPRENEURSHIP IN HOTELITY  3
Provides students with knowledge of entrepreneurship in the hospitality industry. Students will become familiar with owning and managing hospitality operations.

HRIM 466 INDEPENDENT STUDY  1-6

HRIM 480 HUMAN RESOURCES MANAGEMENT IN THE HOTELITY INDUSTRY  3
Techniques and philosophies of personnel management as applied to various types of hospitality operations. Motivation, attitude formation and job satisfaction. Case studies related to theories of organizational behavior and industrial psychology.

HRIM 481 MARKETING IN THE HOTELITY 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 487 MANAGEMENT SYSTEMS IN THE HOTELITY INDUSTRY  3
Principles of systems analysis applied to the hospitality industry. Organization of the operation and subsystems of a property. Case studies and simulations apply economic and management principles.

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 hotel property.

RESTRICTIONS: Requires proof of 800 hours paid work experience in the food service and lodging industry.

HRIM 489 HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT PRACTICUM II  1-6
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: HRIM 488

INDIVIDUAL AND FAMILY STUDIES

IFST 101 INTRODUCTION TO COMMUNITY AND FAMILY SERVICES  1
Broad overview of the many services available within the community and state to assist individuals and families in resolving major life concerns and problems. Insights into the human services profession by leaders in the field.

IFST 165 SEMINAR I PF

IFST 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.

IFST 202 FOUNDATIONS OF FAMILY STUDIES  3
Fundamental descriptions of family forms and issues as they affect individual families and cohorts in historical and contemporary perspective. Emphasis on multicultural diversity and social change in families.

IFST 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; development. curriculum; family issues; health, safety, and nutrition; and professional issues.

IFST 221 CHILD DEVELOPMENT  3
The study of social-emotional, cognitive and psycho-biological development in infancy, early and middle childhood. Emphasis on the child's development as it occurs in the family context. Directed observation in the University's Laboratory Preschool.

IFST 222 EARLY CHILDHOOD CURRICULUM I  2
Principles underlying values in and guidance of young children's play, creative activities and curricular content. Selection and use of appropriate materials, with emphasis on preschool and kindergarten settings.

PREREQ: IFST221
COREQ: IFST224

IFST 223 EARLY CHILDHOOD CURRICULUM II  2
Three-hour weekly practicum experience with a one-hour weekly discussion section. Gives students a realistic exposure to working with young children, with emphasis on preschool and kindergarten settings.

PREREQ: IFST221
COREQ: IFST222

IFST 225 PROFESSIONAL ISSUES IN EARLY CHILDHOOD DEVELOPMENT AND EDUCATION  3
Overview and analysis of issues for professionals serving children birth to age eight and their families. History, scope, and mission of early care and educational programs; controversial issues; theories and program models; ethical and legal issues; emerging careers; public policy and advocacy. Program observations and interviews.

PREREQ: IFST221 or IFST201.

IFST 230 EMERGING LIFE STYLES  3
Interdisciplinary approach to the processes stereotyping masculine and feminine behavior issues in women's and men's liberation; and an analysis of the present opportunity structure for individual choices.

IFST 235 SURVEY IN CHILD AND FAMILY SERVICES  3
Introduces the scope of human service agencies focusing on the needs of children and families.

PREREQ: IFST101.

IFST 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: IFST221

IFST 270 FAMILIES AND DEVELOPMENTAL DISABILITIES  3
Focuses on people with developmental disability in the context of their family and culture from a multidisciplinary perspective. Covers disabilities and their causes; changing needs across the life span; gender, cross-cultural and legal issues; and information about prevention/intervention, employment, inclusion, and empowerment. May be cross-listed with PSYC270 and/or SOC270.

IFST 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.

IFST 293 HONORS SHORT COURSE  1
See ARSC293 for course description.

IFST 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: IFST201 and IFST202.

IFST 329 ADOLESCENT DEVELOPMENT  3
Physical, intellectual and sociocultural 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: EDUC202 or IFST201.

IFST 338 SEXUALITY IN CONTEMPORARY SOCIETY  3
A multidisciplinary approach to controversial human sexuality issues which examines and addresses societal solutions to these controversies.

IFST 339 ADULT DEVELOPMENT AND AGING  3
Examines developmental processes, life-span changes, transitions and stage-related issues of early, middle and late adulthood. Explores concepts, theories, historical trends and empirical studies during these life periods. Integrates theories with practical applications.

PREREQ: EDUC202 or IFST201.

IFST 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: IFST222 and IFST224.

IFST 346 DELIVERY OF HUMAN SERVICES  3
Presents approaches to interviewing and working with individuals and families in a variety of community-based human service settings. Discusses prevention, advocacy and empowerment strategies of community intervention. Explores professional and ethical issues in providing family and community services.

PREREQ: IFST101 and IFST235.
INDIVIDUAL AND FAMILY STUDIES

IFST 347 HUMAN SERVICE DELIVERY SYSTEMS 3
Focuses on organizational and work related issues, including program development, net-
working, fund raising, administrative procedures and program evaluation. Basic skills
required for the development, delivery and administration of a wide range of human ser-
pices programs including preventive interventions for families and individuals.
PREREQ: IFST101 and IFST235.

IFST 360 LEARNING IN COMMUNITY CONTEXTS 3
See EDUC360 for course description.

IFST 364 FIELD EXPERIENCES IN INDIVIDUAL AND FAMILY STUDIES 2-4
Provides opportunities to work/participate in human service agencies, business and indus-
try, as well as formal and non-formal educational settings.
RESTRICTIONS: May be repeated for up to nine credit hours.

IFST 365 SEMINAR 1-3

IFST 366 INDEPENDENT STUDY 1-12

IFST 380 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.

IFST 381 CURRICULUM AND EVALUATION 3
Foundations of curriculum development and evaluation as applied to programming in for-
mal and non-formal Home Economics/Family Life educational settings.
PREREQ: IFST380.

IFST 390 HONORS COLLOQUIUM 3
Topics vary within the Individual and Family Studies content; often multidisciplinary. May be
cross-listed with WOMS390.

IFST 401 FOUNDATIONS OF HUMAN SEXUALITY 3
A multidisciplinary study of human sexuality focusing on the implications for individuals
and for society of the biological, psychological and sociocultural determinants of human
sexuality. This course deals with sexually explicit material. May be cross-listed with
WOMS401 and NURS401.

IFST 403 CONCEPTS IN GERONTOLOGY 3
Theories and practices of gerontology with emphasis on their relationships to the elderly
and their needs for the development of resources.
PREREQ: EDUC202 or IFST201.

IFST 404 INTERDISCIPLINARY GERONTOLOGY 3
Considers theoretical and practical approaches to the dimensions of aging. Emphasis on
the provisions of material and human resources to meet the basic needs of food, shelter,
clothing and income adequacy. Relevant community programs and government services
will be studied.

IFST 405 IMPACT OF AGING ON THE FAMILY 3
Psychological, physical and financial impact of aging persons on younger family mem-
bers; increased interdependence and dependency; and family adjustment, both positive
and conflicting.

IFST 410 THE HOSPITALIZED CHILD 3
Organization and administration of programs for hospitalized children with emphasis on
emotional needs of the children and their parents. Includes terminology and hospital pro-
cedures, directed observation and participation in a hospital setting.
PREREQ: IFST222 and IFST224.

IFST 422 FAMILY RELATIONSHIPS 3
Interpersonal relationships and problems in courtship, marriage and the family in con-
temporary society.
PREREQ: IFST202.

IFST 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.

IFST 430 TEACHING FAMILY LIFE 3
Selection, presentation and evaluation of subject matter and materials essential to under-
standing relationships within the family. Emphasis on needs, interests and abilities of sec-
condary school students. May be cross-listed with WOMS430.
PREREQ: IFST221 and IFST422.

IFST 435 EARLY CHILDHOOD PROGRAMS FOR CHILDREN WITH
EXCEPTIONALITIES 4
Philosophy, organization and operation of programs for young children with exception-
aliies; development and adaptation of curriculum, materials, facilities and equipment.
Clinical experience with children and programs.
PREREQ: EDUC230 and IFST340.

IFST 438 LEADERSHIP DEVELOPMENT IN HUMAN SEXUALITY 3
Seminar/practicum for organizing and leading discussion groups in human sexuality.
Trains group leaders to facilitate effective communication skills and responsible sexual
decisions, integrating research and theories with individual and family life experiences.
PREREQ: IFST328 or IFST401.

IFST 440 EARLY CHILDHOOD ADMINISTRATION, LEADERSHIP AND
ADVOCACY 3
Organization and administration of programs for young children. Development of effec-
tive strategies for leadership and advocacy. Consideration of personnel, facilities, regu-
lations, quality programming and business management.
PREREQ: IFST340.

IFST 445 FAMILY, COMMUNITY AND SCHOOL PARTNERSHIPS 2
Emphasis on techniques in working and communicating with families, understanding par-
ent-child relationships and effectively utilizing parent, teacher, home, school and commu-
nity resources.
PREREQ: IFST101.
COREQ: IFST439 or EDUC400.

IFST 449 INTERNSHIP IN COMMUNITY SERVICES 3-9 PF
On-the-job experience in a community and family service agency.
RESTRICTIONS: Requires permission of instructor.

IFST 450 TECHNOLOGY IN EARLY CHILDHOOD 3
Developmentally appropriate uses of technology in early childhood and early childhood spe-
cial education. Operation of computers and adaptive devices, evaluation of software and
curriculum development. Includes a practicum using technology in appropriate environments.
PREREQ: IFST222 and IFST224.

IFST 452 ASSESSMENT OF YOUNG CHILDREN 3
Focuses upon the issues in, and techniques of the assessment of physical, socio-emotion-
al, behavioral and cognitive-intellectual development in children. Secondary emphasis on
evaluation of test results, written reports, research in assessment and an analysis of reme-
diation/teaching strategies. May be crosslisted with PSYC460.
PREREQ: IFST221 or PSYC325.

IFST 459 CHILD DEVELOPMENT PRACTICUM 1-9 PF
Supervised student teaching experience.
PREREQ: IFST435, IFST452 and IFST470.
RESTRICTIONS: Requires permission of instructor.

IFST 460 WOMEN IN INTERNATIONAL DEVELOPMENT 3
See SOCI460 for course description.

IFST 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: IFST221 and IFST236.

IFST 465 SEMINAR 1-3 PF

IFST 466 INDEPENDENT STUDY 1-12

IFST 470 FAMILIES AND CHILDREN AT RISK 3
Deals with social-emotional considerations of disabilities and risk factors upon the devel-
oped of children and families over the life course. Includes information on family assess-
ment and systems, changing demographics and at-risk families. Includes some clinical
counseling skills.
PREREQ: IFST221 or PSYC325.

IFST 475 TOPICS IN INDIVIDUAL AND FAMILY STUDIES 1-3
Selected topics focusing on current issues affecting families from an interdisciplinary and
global perspective. May be cross-listed with WOMS475.
RESTRICTIONS: Prerequisites vary by topic and instructor.

IFST 480 IFST SENIOR SEMINAR 1-3
Discussion-oriented and problem-centered with emphasis on the role and contributions of
the individual to the profession and society.

IFST 601 DEVELOPMENT THROUGH THE LIFESPAN 3
Exploration of all segments of the lifespan from a bio-psycho-social perspective. Special
emphasis on research and theory concerning families and the lifespan as contexts of
development.

IFST 603 BASIC CONCEPTS IN GERONTOLOGY 3
Theories and practices of gerontology with emphasis on their relationships to the elderly
and their needs for the development of resources.
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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 Prereq. Satisfies Arts and Science foreign 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  CONTEMPORARY ITALY I  3
An introduction to contemporary Italy. 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 the characteristics of business Italian (vocabulary, terminology, syntax). Focuses on the 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 conducted 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.

ITAL 310  SURVEY OF ITALIAN LITERATURE  3
Development of Italian literature from its origins to the 16th century. Study and discussion of representative works.
PREREQ: ITAL211 or ITAL212

ITAL 311  SURVEY OF ITALIAN LITERATURE  3
Development of Italian literature from the mid-19th century to the present. Study and discussion of representative works.
PREREQ: ITAL211 or ITAL212

ITAL 325  ITALIAN CIVILIZATION AND CULTURE  3
A survey of the major cultural, political and social developments in Italy from the 15th century to the present.
PREREQ: ITAL211 or ITAL212

ITAL 355  SPECIAL TOPICS  3
Explores an area of special interest in Italian literature or cultural studies. Topics vary and will be announced in the registration booklet.
PREREQ: ITAL310 or ITAL311
RESTRICTIONS: May be repeated for credit when topics vary.

ITAL 366  INDEPENDENT STUDY 1-3

ITAL 401  ADVANCED ITALIAN GRAMMAR AND SYNTACTICS  3
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.

ITAL 403  HISTORY OF THE ITALIAN LANGUAGE  3
Development of the Italian language from its Latin origins. Discussion of the question of the relationship between the Italian and the dialects of the Italian peninsula. Focuses on the social, economic, political, cultural, and linguistic factors that have influenced the Italian language. Topics vary and will be announced in the registration booklet.
PREREQ: Any two 200-level Italian courses.

ITAL 406  ADVANCED ITALIAN LANGUAGE  3
Grammar and syntax with special attention to technical vocabulary and discourse, e.g., business, law, science and agriculture.
PREREQ: Any 300-level Italian course.
RESTRICTIONS: Taught abroad only.

ITAL 455  SELECTED AUTHORS, WORKS AND THEMES  3
Works of one or more outstanding authors or on a special theme.
PREREQ: ITAL310 and ITAL311
RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL655.

ITAL 466  INDEPENDENT STUDY 1-3
ITALIAN

ITAL 601 ADVANCED ITALIAN GRAMMAR AND SYNTACTICS 3
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.

ITAL 603 HISTORY OF THE ITALIAN LANGUAGE 3
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

ITAL 655 SELECTED AUTHORS, WORKS AND THEMES 3
Seminar on works of one or more outstanding authors or of a special theme.

RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL455.

JAPANESE

JAPN 105 JAPANESE I - ELEMENTARY 4
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 Kana characters. Media Center resources utilized.

JAPN 106 JAPANESE II - ELEMENTARY/INTERMEDIATE 4
Continued practice in the aural, oral, reading, and writing skills of contemporary Japanese, including the identification and reproduction of basic Kana characters. Introduction to formality levels and to male/female speech patterns. Media Center resources utilized.

PREREQ: JAPN105

RESTRICTIONS: Two to three years of high school Japanese acceptable in lieu of Prerequisite.

JAPN 107 JAPANESE III - INTERMEDIATE 4
Development of aural, oral, reading, and writing skills at the intermediate Japanese level, including continued practice in identifying and reproducing Kana characters, handling a greater variety of formality levels, and further comprehending gender-based language differences. Media Center resources utilized.

PREREQ: JAPN106

RESTRICTIONS: Four years of high school Japanese acceptable in lieu of Prerequisite. Satisfies the Arts and Science foreign language requirement.

JAPN 200 JAPANESE GRAMMAR AND COMPOSITION 3
Further study of Japanese grammar, Kana characters and reading and writing skills for communication.

PREREQ: JAPN107

JAPN 204 THE ART OF JAPANESE CALLIGRAPHY 3
Practical training in Japanese calligraphy, using brush, inkstone, and sumi ink. Students will work with both phonetic syllabaries and Kana characters.

PREREQ: JAPN105

JAPN 205 JAPANESE CONVERSATION 3
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 competence.

PREREQ: JAPN107

RESTRICTIONS: Prerequisite requires a minimum grade of B.

JAPN 206 CULTURE THROUGH CONVERSATION 3
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: JAPN107

RESTRICTIONS: Taught abroad only.

JAPN 208 CONTEMPORARY JAPAN I 3
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.

JAPN 209 INTERMEDIATE SITUATIONAL JAPANESE 3
Practical training in Japanese for formal situations. Students will develop all four language skills in such contexts as job interviews, telephone etiquette, correspondence and relations with supervisors. Skills and role-playing featured.

PREREQ: JAPN107

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: Two of the following: JAPN200, JAPN205, JAPN206.

JAPN 340 TECHNICAL JAPANESE I 3
Introduction to technical Japanese vocabulary and kanji reading.

PREREQ: Two of the following: JAPN200, JAPN205, JAPN206.

JAPN 350 BUSINESS JAPANESE I 3
Familiarize students with characteristics of business Japanese. Vocabulary, terminology, syntactical patterns and aspects of the Japanese business community.

PREREQ: Two of the following: JAPN200, JAPN205, JAPN206

JAPN 355 SPECIAL TOPICS 3
Explore an area of special interest in Japanese literature or culture studies. The subject matter may vary and will be announced in the registration booklet.

PREREQ: Two of the following: JAPN200, JAPN205, JAPN206

RESTRICTIONS: May be repeated for credit when topics vary.

JAPN 366 INDEPENDENT STUDY 1-3
PREREQ: Two of the following: JAPN200, JAPN205, JAPN206.

JAPN 440 TECHNICAL JAPANESE II 3
Further study in the reading and writing of technical Japanese, including the translation of technical writings.

PREREQ: JAPN340.

JAPN 466 INDEPENDENT STUDY 1-3
PREREQ: One 300-level Japanese course.

JEWSH STUDIES

JWST 105 HEBREW I - ELEMENTARY 4
See HEBR105 for course description.

JWST 106 HEBREW II - ELEMENTARY/INTERMEDIUM 4
See HEBR106 for course description.

JWST 107 HEBREW III - INTERMEDIATE 4
See HEBR107 for course description.

JWST 208 INTRODUCTION TO JEWISH PHILOSOPHY 3
See PHIL208 for course description.

JWST 254 JEWISH HолОCAUST: 1933-1945 3
See HIST254 for course description.

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

JWST 348 CONTEMPORARY JEWISH-AMERICAN LIT 3
See ENGL348 for course description.

JWST 349 INTRODUCTION TO JEWISH SOURCES: TEXT AND INTERPRETATION 3
See ENGL349 for course description.

JWST 380 WOMEN WRITERS 3
See ENGL380 for course description.

JWST 382 STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH 3
See ENGL382 for course description.

JWST 435 SOCIOLOGY OF AMERICAN JEWRY 3
See SOC435 for course description.

LATIN

LATN 100 INDIVIDUALIZED ELEMENTARY LATIN 1-6
Self-paced, computer-assisted individual study of fundamentals of Latin. No formal class-room component. Content identical to LATN101/102.

RESTRICTIONS: May be repeated for up to six credits. Maximum of six credits of LATN100, LATN101 or LATN102 may be counted toward graduation.

LATN 101 ELEMENTARY LATIN I 3
Course for beginners.

LATN 102 ELEMENTARY LATIN II 3
Completion of basic Latin.

PREREQ: LATN101.

RESTRICTIONS: One year of high school Latin acceptable in lieu of Prerequisite.

LATN 213 CICERO 3
Readings in Cicero's orations or various authors, and review of grammar and syntax.

PREREQ: LATN 102.
LINGUISTICS

LATN 214 Vergil 3
Vergil's Aeneid or Ovid select works. Review of grammar and readings in the poetry of Vergil.
PREREQ: LATN 213

LATN 221 Roman Letters 3
Explores the letter as a literary form in the Roman world. Readings from the letters of Cicero and Pliny.
PREREQ: LATN 214.

LATN 222 Historians of the Republic 3
Selected readings from the works of Livy, Sallust and Cornelius Nepos.
PREREQ: LATN 214.

LATN 366 Independent Study 1-3

LATN 403 Roman Lyric Poetry 3
Readings in the lyric poetry of Catullus and Horace.
PREREQ: LATN 214.

LATN 466 Independent Study 1-3

LEGAL STUDIES

LEST 301 Introduction to Legal Studies 3
Introduces legal studies as a multidisciplinary field. May be cross-listed with CRJU 301.

LEST 345 Legal Issues of the Mass Media 3
See COMC 345 for course description.

LEST 380 Introduction to Law 3
See POSC 380 for course description.

LEST 401 Senior Seminar 3
Culminates the legal studies minor by requiring an independent research project resulting in a term paper. Seminar provides guidance from professor and chance to share ideas and problems with fellow students.

LEST 466 Independent Study 1-6

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 among English and non-English varieties.

LING 102 Language, Mind and Society 3
Explores the structural aspects of language variation and the mental representation of language. Topics include regional and social variation in language, sociolinguistics of multilingual/multicultural communities, language change, role of universal grammar in language acquisition, lexical access, and parsing.
PREREQ: LING 101.

LING 130 American Sign Language I 3
Introduction to American Sign Language and to the deaf culture. Topics include WH-questions, yes/no questions, negations, the alphabet, and a basic working vocabulary.
RESTRICTIONS: Requires interview with instructor if Sign Language has been studied elsewhere.

LING 131 American Sign Language II 3
Continuation of LING 130.
PREREQ: LING 130.
RESTRICTIONS: Requires interview with instructor if Sign Language has been studied elsewhere.

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 sociolinguistic. How do multicultural societies choose a common language? What is the relation between language and thought?

LING 222 Language and Gender 3
Explores various ways in which gender is reflected in language. Topics include sexism in language, lexical and gender 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 cross-listed with WOMS 222.

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.

LING 265 Studies in Language 3
Topics vary and will be announced in the registration booklet.
RESTRICTIONS: May not be taken as credit when topics vary.

LING 301 Dictionaries 3
Lexicographical information on the use of dictionaries in research, teaching, translation, reading and other fields. Sociolinguistic and political importance of dictionaries. Introduction to planning and compiling dictionaries: technological developments such as computerization and the dictionary of the future.

LING 358 Linguistics and Language Arts 3
See EDUC 358 for course description.

LING 366 Independent Study 1-6

LING 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: LING 101.

LING 377 Clinical Principles and Procedures in Speech Pathology 3
Focuses on clinical principles and procedures in assessment, planning and treatment 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, collecting data, baselines and documenting treatment effectiveness.
PREREQ: LING 376.

LING 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 on learning normal and non-normal behaviors of speech, language and hearing and their changes throughout the lifespan.

LING 390 English Linguistics 3
See ENGL 390 for course description.

LING 401 Historical Linguistics 3
Languages of the world, Indo-European languages, the comparative method and linguistic evolution.
PREREQ: Completion of two years of a college language course.

LING 407 Phonology I 3
Basic introduction to phonology, concentrating on principles of articulatory phonetics, IPA transcription system, distinctive feature theory, segmental phonological analysis and the writing of phonological rules.
PREREQ: LING 101.
RESTRICTIONS: Requires permission of instructor.

LING 409 Syntax I 3
Introduction to syntactic theory and analysis for advanced undergraduates. Emphasis on argumentation and analysis rather than on the fine points of syntactic theory.
PREREQ: LING 101.
RESTRICTIONS: Requires permission of instructor.

LING 417 Language Planning 3
Sociolinguistic study of the interaction between official and indigenous languages as well as the role of minority groups in national policy making. Highlights language as a cultural, political and social marker.

LING 421 Methods of Teaching Foreign Languages 3
See FLI 421 for course description.

LING 422 Language Syllabus Design 3
See FLI 422 for course description.

LING 424 Second-Language Testing 3
Study of the principles and techniques of second-language testing, including measurement of the four skills and of communicative competence. Instrumental measures. Practice in item construction and analysis. May be cross-listed with FLI 424.

LING 433 Introduction to Acoustic Phonetics 3
Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily a lecture course with assigned text, a few laboratory sessions will provide an introduction to computer-based methods used in instrumental studies of speech.
PREREQ: LING 253.

LING 462 Language Acquisition 4
See EDUC 462 for course description.
LING 856  TOPICS IN THE STRUCTURE OF ITALIAN  3
Formal analysis of selected aspects of the grammar of Italian and related dialects. Topics may include phonology, morphology, syntax and semantics
RESTRICTIONS: May be repeated for credit when topics vary.

LING 857  TOPICS IN THE STRUCTURE OF JAPANESE  3
Formal analysis of selected aspects of the grammar of Japanese and related dialects. Topics may include phonology, morphology, syntax and semantics
RESTRICTIONS: May be repeated for credit when topics vary.

LING 861  TOPICS IN PHONOLOGY  3
Detailed examination of one or more current (controversial) issues in phonological theory
PREREQ: LING4608
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: LING4608

LING 863  PROJECTS IN ACOUSTIC PHONETICS  3
Brief review of the articulatory, acoustic, and perceptual characteristics of speech and computer-based laboratory instrumentation. Students conduct research projects in acoustic phonetics, speech analysis, or speech synthesis. Projects will be suggested by the instructor, however, students may (with instructor's approval) choose a project of their own design

LING 880  SECOND LANGUAGE ACQUISITION  3
A detailed analysis of current issues in second language acquisition based on extensive readings of research findings. Topics include monitor model, pidginization process, natural versus formal second language acquisition, and adult versus child acquisition

LING 890  STUDIES IN LINGUISTICS  3
Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing. May be cross-listed with CGSC890 and/or ENGL890

LING 964  PRE-CANDIDACY STUDY 1-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examination for doctoral students before admission to candidacy, but after completion of all required coursework.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

LING 969  DOCTORAL DISSERTATION 1-12 PF

LIBERAL STUDIES

MALS 600  NATURE AND HUMAN NATURE  3
Concentrates on salient views of nature and human nature, and the ways in which they have been shaped by the historical circumstances and disciplinary perspectives from which they were developed
RESTRICTIONS: Open to majors only

MALS 610  FORCE, CONFLICT AND CHANGE  3
From antiquity to the present, the use of force and the resolution of conflict have been among humanity's enduring preoccupations. Examines ideas about these issues, and associated questions such as the meaning of "heroism" and "just war."
RESTRICTIONS: Open to majors only

MALS 611  DOCUMENTARY: JOURNALISM AND FILM  3
Explores non-fiction narratives, both in print and on film. It looks at social reporting from the Victorian Era to the present, drawing analogies between the techniques of literature and cinema.
RESTRICTIONS: Open to majors only

MALS 613  LATIN AMERICAN EXPERIENCE  3
Examines recurring issues and problems in Latin America. The conflict between church and state, nationalism and a place in world affairs, tensions between the individual and society and the influence of the United States.
RESTRICTIONS: Open to majors only

MALS 615  REASON, REVOLUTION AND THE RIGHTS OF MAN  3
Examines eighteenth-century French and English movement away from Cartesian rationalism and towards a rejection of reason leading to romanticism and revolution and an application of reason leading to a discussion of civil and human rights.
RESTRICTIONS: Open to majors only

MALS 617  AMERICAN ART IN CONTEXT  3
This course is designed to give the non-specialist in art history an understanding of how social, economic, religious, and cultural attitudes in America are reflected in its art, architecture, and decorative arts from the colonial period to the present. Discussion encompasses such subjects as patronage, regionalism, ethnicity, and gender
RESTRICTIONS: Open to majors only

MALS 619  THE SCIENTIST IN SOCIETY  3
Scientific research is directly influenced by the society in which it is conducted. In addition to financial limitations, constraints are imposed by societal norms of what are acceptable topics and procedures for research. Focus on the philosophical basis of science as well as consequences to society of the scientific revolution.
RESTRICTIONS: Open to majors only

MALS 620  THE USE OF SCIENCE IN PUBLIC DISCOURSE  3
Examines important questions of general interest to both individuals and to governmental bodies that depend heavily on scientific information.
RESTRICTIONS: Open to majors only

MALS 621  THE IMPACTS OF EUROPEAN CONTACTS ON NATIVE AMERICANS  3
Considers how the arrival of the first Europeans in North America affected the indigenous Native Americans.
RESTRICTIONS: Open to majors only

MALS 622  INTERPRETING THE PAST  3
Considers the different perspectives that can be applied to learning about the past.
RESTRICTIONS: Open to majors only

MALS 623  MOZART AND NOVERRE  3
Mozart's contributions to opera and how they compare favorably to Noverre's contribution to dance. Noverre's letters reveal his innovative ideas about dance while several of the final operatic masterpieces of Mozart are useful examples to study and understand his musical, sociological and philosophical environment.
RESTRICTIONS: Open to majors only

MALS 624  INTRODUCTION TO GRADUATE RESEARCH/Writing in Liberal Studies  3
Focuses on developing research and writing skills by concentrating on one issue, such as the family, the environment, or education. Students will be taught to narrow the focus of a topic, create an arguable thesis, gather source information from both library and online resources, evaluate the source of information, organize a logical argument, incorporate source information into the argument and revise into a finished paper.
RESTRICTIONS: Open to majors only

MALS 647  PHILOSOPHY OF TECHNOLOGY  3
See PHIL647 for course description

MALS 648  ENVIRONMENTAL ETHICS  3
See PHIL648 for course description

MALS 660  ON BECOMING HUMAN  3
Examines the biological and cultural evolution of humans, focusing on similarities and differences between humans and our closest primate relatives.
RESTRICTIONS: Open to majors only

MALS 869  MASTER'S THESIS  1-6

MALS 879  SYNTHESIS PROJECT  1-6

MATERIALS SCIENCE

MASC 302  MATERIALS SCIENCE FOR ENGINEERS  4
Crystalline and structural properties of materials and the consequences of these properties for processing, performance, and durability. Emphasis on microstructure.

MASC 304  EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS  3
Study of the micromechanical and thermomechanical response of composite materials. Emphasis on materials selection and corrosion control methods. May be cross-listed with CIEG410

MASC 406  CORROSION AND PROTECTION  3

MASC 410  EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS  3
Study of the micromechanical and thermomechanical response of composite materials. Emphasis on materials selection and corrosion control methods. May be cross-listed with CIEG410

MASC 446  SENIOR RESEARCH  1-6
Student will research general areas of materials science and/or engineering under the direction of a member of the materials science faculty or other faculty in science or engineering subject to the approval of the materials science chair.
RESTRICTIONS: Open to Seniors only Science background required