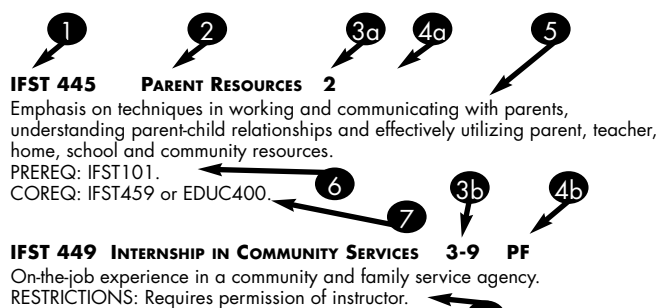


COURSE DESCRIPTIONS

UNIVERSITY OF DELAWARE
2008-2009

INTERPRETATION OF THE COURSE LISTINGS



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. The lower number is the minimum number of credits that a student may take in a section of this course in a semester. The higher is the maximum number of credits that a student may take in this course in a semester. A department may choose to offer a variable credit hour course as fixed in a particular semester, as long as the number of credit hours is within the range of the minimum and maximum for the course.
4. Grade types:
 - a. When blank the course is a letter graded course.
 - b. Course for which the grade is either pass or fail.
 - c. R, RP - Not for baccalaureate credit.
 - d. NR - No grade required.
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. Some courses only offered during specific semesters have those semesters identified here. Questions about when a course will be offered should be directed to the department.

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.
700-799	Graduate-level courses.
800-899	Graduate-level courses.
900-999	Ph.D.-level courses.
X66	Special problems and independent study.
X67	Experimental course (may be offered twice).

Courses numbered 500 to 599 may not be taken for graduate credit in a student's major. With the approval of the graduate student's major department, 500-level courses taken outside the student's major may be counted toward graduate degree requirements.

Courses numbered 600 to 699 are graduate-level courses also open to qualified advanced undergraduates with the consent of the instructor. There should be a single standard of expectation and grading for all students registered at this level.

In those few cases where the number of either undergraduate students or graduate students does not permit adequate offerings of both a 400-level and a 600-level course, a graduate 600-level course may be combined with a separately numbered 400-level undergraduate course in the same section. The graduate component must then be offered with a graduate standard of expectation and grading.

The appropriateness of 600-numbered courses for undergraduate credit is subject to review by the Committee on Undergraduate Studies.

CODES FOR SUBJECT AREAS

ACCT	Accounting	338	HEPP	Human Services, Education and Public Policy	431
AFSC	Air Force Science	339	HESC	Health and Exercise Sciences	431
AGED	Agricultural Education	340	HIST	History	437
AGRI	Agriculture	340	HLPR	Health Promotion	443
ANFS	Animal and Food Sciences	340	HLTH	Health Studies	444
ANTH	Anthropology	343	HRIM	Hotel, Restaurant and Institutional Management	444
ARAB	Arabic	345	HSAD	Health Services Administration	445
ARSC	Arts and Science	346	IFST	Individual and Family Studies	446
ART	Art	346	ITAL	Italian	450
ARTC	Art Conservation	350	JAPN	Japanese	451
ARTH	Art History	352	JOUR	Journalism	452
BAMS	Black American Studies	356	JWST	Jewish Studies	452
BISC	Biological Sciences	358	LATN	Latin	453
BMBA	Business: Multidisciplinary Business Administration	361	LEAD	Leadership	453
BMSC	Biomechanics and Movement Science	361	LEST	Legal Studies	454
BREG	Bioresources Engineering	361	LING	Linguistics	454
BUAD	Business Administration	362	MALS	Liberal Studies	457
CGSC	Cognitive Science	365	MAST	Marine Studies	458
CHEG	Chemical Engineering	366	MATH	Mathematics	461
CHEM	Chemistry and Biochemistry	368	MCST	Material Culture Studies	465
CHIN	Chinese	372	MEDT	Medical Technology	465
CIEG	Civil and Environmental Engineering	372	MEEG	Mechanical Engineering	467
CISC	Computer and Information Sciences	376	MISY	Management Information Systems	470
CMLT	Comparative Literature	381	MLSC	Military Science	471
COMM	Communication	381	MSEG	Materials Science	471
CPEG	Computer Engineering	384	MSST	Museum Studies	473
CRJU	Criminal Justice	385	MUED	Music Education	474
EAMC	American Material Culture	387	MUSC	Music	475
EAST	East Asian Studies	387	NTDT	Nutrition and Dietetics	481
ECON	Economics	387	NURS	Nursing	483
EDLM	Education Library Media	391	ORES	Operations Research	487
EDUC	Education	391	PHIL	Philosophy	487
EGGG	Engineering Graphics and General	400	PHYS	Physics and Astronomy	489
EGTE	Engineering Technology	400	PHYT	Physical Therapy	492
ELEG	Electrical Engineering	402	PLSC	Plant and Soil Science	494
ENEP	Energy and Environmental Policy	406	PORT	Portuguese	497
ENGL	English	407	POSC	Political Science	497
ENSC	Environmental Science	412	PRES	Preservation Studies	502
ENTR	Entrepreneurship	412	PSYC	Psychology	502
ENWC	Entomology and Wildlife Conservation	412	RUSS	Russian	506
FASH	Fashion and Apparel Studies	415	SCEN	Science	506
FINC	Finance	417	SGST	Sexualities and Gender Studies	507
FLIT	Foreign Languages and Literatures	418	SOCI	Sociology	507
FREC	Food and Resource Economics	420	SPAN	Spanish	510
FREN	French	422	STAT	Statistics	513
GEOG	Geography	424	THEA	Theatre	514
GEOL	Geology	427	UAPP	Urban Affairs and Public Policy	518
GREK	Greek	429	UNIV	University Courses	522
GRMN	German	429	WOMS	Women's Studies	523
HEBR	Hebrew	431			

ACCOUNTING

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 margins, cost-volume-profit analysis, and decision making. RESTRICTIONS: No credit granted for majors within the accounting or business degree programs.

ACCT 207 ACCOUNTING I 3

An introduction to financial accounting. Topics: the accounting cycle, merchandise accounting, accounting procedures for cash, receivables, payables, inventories, plant and equipment, stocks and bonds. RESTRICTIONS: Not open to freshmen.

ACCT 208 ACCOUNTING II 3

Introduction to managerial accounting. Topics: manufacturing accounting, cost-volume-profit analysis, job-order accounting, budgeting, standard costs and variance analysis, contribution approach to decision analysis, absorption and variable costing. PREREQ: ACCT207. RESTRICTIONS: Not open to freshmen.

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 analysis, design, development, and audit of computer-based accounting systems. Includes some computer work. PREREQ: ACCT208, MISY160 or CISC181. RESTRICTIONS: Requires junior status.

ACCT 315 INTERMEDIATE ACCOUNTING I 3

In-depth coverage of financial accounting. Topics include: environment and conceptual framework of financial accounting; review of the accounting process; preparation of financial statements; recognition and measurement of current assets, property, plant and equipment and current liabilities. PREREQ: ACCT207, ACCT208. RESTRICTIONS: Requires junior status.

ACCT 316 INTERMEDIATE ACCOUNTING II 3

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

ACCT 327 COST ACCOUNTING 3

Process, job order and standard costing; variable and absorption costing; budgeting, decentralization, and transfer pricing; and cost analysis for managerial applications. PREREQ: ACCT208. RESTRICTIONS: Requires junior status.

ACCT 350 BUSINESS LAW I 3

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

ACCT 351 BUSINESS LAW II 3

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

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, regulatory and judicial process, and effect of government and society on the formation and evolution of the law. RESTRICTIONS: Not open to accounting majors. Requires junior status.

ACCT 363 SERVICE LEARNING AND EARNED INCOME TAX CREDIT 3

Requires 8 hours of training in tax preparation for people with incomes low enough to qualify for the EITC (Earned Income Tax Credit). In addition, at least 34 hours of service preparing returns for this type of taxpayer is expected. PREREQ: ACCT315. RESTRICTIONS: Requires instructor permission.

ACCT 364 ACCOUNTING IN PRACTICE 3

Requires at least 120 hours of an accounting-related internship with verification by the hiring company. Term paper relating the real-world duties and experiences of the internship to principles learned in traditional accounting classes also required. PREREQ: ACCT315, ACCT327. RESTRICTIONS: Requires instructor permission.

ACCT 366 INDEPENDENT STUDY 1-6**ACCT 395 SEMINAR: INTERNATIONAL ACCOUNTING 3**

Seminar on selected topics in international accounting. Combines lectures and visits to local organizations. PREREQ: ACCT207. RESTRICTIONS: Taught abroad.

ACCT 410 THEORY OF EXTERNAL REPORTING 3

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

ACCT 413 INCOME TAX ACCOUNTING 3

Analysis of recent revenue acts; use of federal law and regulations to determine tax liability. PREREQ: ACCT315. RESTRICTIONS: Requires junior status and a grade of C or better in ACCT315.

ACCT 414 FEDERAL INCOME TAXATION: RESEARCH AND PLANNING 3

Introduction to tax research and corporate and partnership tax laws. Introduces research tools useful for analyzing tax issues. Student uses acquired skills to explore corporate and partnership taxation concepts. PREREQ: ACCT413.

ACCT 415 ADVANCED ACCOUNTING 3

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

ACCT 417 AUDITING 3

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

ACCT 425 STRATEGIC INFORMATION SYSTEMS AND ACCOUNTING 3

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

ACCT 466 INDEPENDENT STUDY 1-6**ACCT 483 INTRODUCTION TO INTERNATIONAL ACCOUNTING 3**

Describes the functions of international accounting; foreign currency transactions, financial statement translation, inflation, auditing and taxation. Current issues are covered as appropriate. PREREQ: ACCT207.

ACCT 614 FEDERAL TAX RESEARCH AND PLANNING 3

Introduces master's student to techniques and tools of technical tax research. Using these developing skills, student begins exploration of the corporate and partnership taxation area. PREREQ: ACCT413 or comparable undergraduate accounting course.

ACCT 800 FINANCIAL REPORTING AND ANALYSIS 3

Surveys concepts underlying financial accounting and external reporting. Provides an understanding of accounting methods, standards, and terminology so that students can interpret and evaluate financial statements. Students are encouraged to participate in class and group discussions involving contemporary investment issues and decisions. RESTRICTIONS: Not open to M.S. in Accounting students.

ACCT 801 MANAGEMENT CONTROL SYSTEMS AND INFORMATION TECHNOLOGY 3

Examines the use of management control systems to influence and direct managerial behavior in accomplishing strategic objectives. The impact of information technology

on their design and implementation is considered as well as the strategic use of technology to transform the organization and maintain competitive advantage.
 PREREQ: ACCT800 or equivalent.
 RESTRICTIONS: Not open to M.S. in Accounting students.

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

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

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

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

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

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

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

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

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

ACCT 868 RESEARCH 1-6

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

AIR FORCE SCIENCE

AFSC 110 FOUNDATIONS OF THE UNITED STATES AIR FORCE I 1
 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 FOUNDATIONS OF THE UNITED STATES AIR FORCE II 1
 Continuation of AFSC110. Emphasis on mission, organization and function of U.S. Air Force strategic, defensive, general purpose and aerospace support forces.

Includes understanding the use of army, naval and reserve forces in achieving national security objectives. Assesses oral and written communication skills.

AFSC 150 INITIAL MILITARY TRAINING I 0 PF
 Provides instruction on the ROTC program and an overview to Air Force skills and life.
 COREQ: AFSC110.
 RESTRICTIONS: Open to freshmen and sophomores.

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

AFSC 210 EVOLUTION OF UNITED STATES AIR AND SPACE POWER I 1
 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. Assesses oral and written communication skills.

AFSC 211 EVOLUTION OF UNITED STATES AIR AND SPACE POWER II 1
 Continuation of AFSC210. Focuses on growth and development of air and space power since 1945 in response to Korea, the Cold War, Southeast Asia, the Persian Gulf and the Space Age. Also includes peaceful employment of air and space forces for relief and civic action programs. Assesses oral and written communication skills.

AFSC 250 FIELD TRAINING PREPARATION I 0 PF
 Prepares cadets to attend the summer training program required for all those wishing to earn a commission through the ROTC program.
 RESTRICTIONS: Open to sophomores and juniors. Required for all cadets planning to attend field training in the next year.

AFSC 251 FIELD TRAINING PREPARATION II 0 PF
 Continuation of AFSC250. Prepares cadets to attend the summer training program required for all those wishing to earn a commission through the ROTC program.
 RESTRICTIONS: Open to sophomores and juniors. Required for all cadets planning to attend field training in the next year.

AFSC 310 LEADERSHIP STUDIES I 3
 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 311 LEADERSHIP STUDIES II 3
 Continuation of AFSC310. Emphasis on understanding and applying management concepts, principles and functions in relation to the organization and work environment. Continued emphasis on oral and written communication skills, leadership research and behavior.

AFSC 350 INTERMEDIATE CADET LEADER TRAINING I 0 PF
 Allows cadets to practice leadership skills and Air Force specific skills.
 COREQ: AFSC310.
 RESTRICTIONS: Restricted to those cadets who have completed Field Training.

AFSC 351 INTERMEDIATE CADET LEADER TRAINING II 0 PF
 Continuation of AFSC350. Allows cadets to practice leadership skills and Air Force specific skills.
 COREQ: AFSC311.
 RESTRICTIONS: Restricted to those cadets who have completed Field Training.

AFSC 410 NATIONAL SECURITY AFFAIRS I 3
 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 II 3
 Continuation of AFSC410. 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 requisites for maintaining national security forces; and the military justice system. Continued emphasis on oral and written communication skills.

AFSC 450 SENIOR CADET LEADER TRAINING I 0 PF
 Allows cadets within one year of commissioning to polish their leadership skills while learning about aspects of the military which will directly impact them upon entrance to active duty.
 COREQ: AFSC410. Restricted to those cadets who have completed Field Training.

AFSC 451 SENIOR CADET LEADER TRAINING II 0 PF
 Continuation of AFSC450. Allows cadets within one year of commissioning to polish their leadership skills while learning about aspects of the military which will

directly impact them upon entrance to active duty.

COREQ: AFSC411.

RESTRICTIONS: Restricted to those cadets who have completed Field Training.

AGRICULTURAL EDUCATION

- AGED 180 INTRODUCTION TO AGRICULTURAL EDUCATION 3**
Provides the foundation for planning activities necessary for an agricultural education program. Historical foundations, purposes and roles of schools, contemporary issues and careers in agricultural education are discussed. An early field-based experience and portfolio development is included.
RESTRICTIONS: Freshman or sophomore classification or approval of instructor.
- AGED 266 SPECIAL PROBLEM 1-3**
- AGED 280 FFA AND SUPERVISED AGRICULTURAL EXPERIENCE 3**
Acquaints the student with the activities necessary for an agricultural education program, specifically the history and structure of a FFA chapter and the development of individualized supervised agricultural experiences for high school students.
RESTRICTIONS: Freshman or sophomore classification or approval of instructor.
- AGED 366 INDEPENDENT STUDY 1-6**
- AGED 425 AGRICULTURAL LEADERSHIP: TOOLS AND TECHNIQUES 3**
Topics include leadership theories, team work, facilitation, internet research, problem solving and facilitating team activities focused on agricultural industries and professions. Global leadership issues will be added as appropriate.
- AGED 430 WORKING WITH ADVISORY COUNCILS 3**
Organize, manage, and follow-up advisory council meetings. Skill development includes working with small groups, strategic planning, conflict management, and communication.
- AGED 448 STUDENT TEACHING SEMINAR 3**
Provides support to undergraduates during their student teaching experience. Covers various aspects of professional development, portfolio development, and classroom management.
COREQ: EDUC400.
- AGED 466 INDEPENDENT STUDY 1-6**
- AGED 480 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES I 3**
Teaching methods, treatment of aims, materials, unit organization, evaluation and teaching techniques. Participation in career and technical student organization activities required.
PREREQ: Students must show evidence of passing Praxis I.
RESTRICTIONS: School practicum of 12 hours required.
- AGED 481 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES II 3**
Methods of teaching and organization in supervised career and technical programs, applied technical skills and adult education and community activities. Participation in career and technical student organization activities required.
- AGED 600 INTERNSHIP IN TEACHING 9**
Fourteen week teaching internship experience in 7th-12th grade schools under the guidance and supervision of a cooperating teacher in the classroom and a University of Delaware supervisor.
PREREQ: Must show evidence of passing Praxis I.
- AGED 625 AGRICULTURAL LEADERSHIP: TOOLS AND TECHNIQUES 3**
Topics include leadership theories, team work, facilitation, internet research, problem solving and facilitating team activities focused on the agricultural industries and professions.
- AGED 630 WORKING WITH ADVISORY COUNCILS 3**
Organize, manage, and follow-up advisory council meetings. Skill development includes working with small groups, strategic planning, conflict management, and communication.
- AGED 648 STUDENT TEACHING SEMINAR 3**
Provides support to graduates during their student teaching experience. Covers various aspects of professional development, portfolio development and classroom management.
PREREQ: Completion of at least 21 graduate credits toward master's degree and evidence of passing Praxis II content area as specified by the State of Delaware.
COREQ: AGED600.
- AGED 666 SPECIAL PROBLEM 1-12**

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

- AGED 681 CAREER AND TECHNICAL EDUCATION MATERIALS AND APPROACHES II 3**
Methods of teaching and organization in supervised career and technical programs; applied technical skills and adult education and community activities. Participation in student career and technical activities required.

AGRICULTURE

- AGRI 164 PRACTICAL TEAMWORK EXPERIENCE 1-3**
Examines roles of leaders, strategies for working in teams, and principles of event planning. The final project is the planning and execution of Ag Day, a college-wide community event.
RESTRICTIONS: Limited to majors in the College of Agriculture and Natural Resources.
- AGRI 165 MASTERING THE FRESHMAN YEAR 1 PF**
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 1**
Promotes familiarity with arrangement of the card catalog, guides to literature, indexes to periodical literature, abstracting services, bibliographic form, and scientific papers and reports. Aids students in scientific writing and reporting.
RESTRICTIONS: Not open to freshmen.
- AGRI 212 ORAL COMMUNICATION IN AGRICULTURE AND NATURAL RESOURCES 3**
Introduces basic communication principles and provides a series of experiences designed to develop skills needed for oral presentations and other forms of public and interpersonal communication.
RESTRICTIONS: Open to majors only.
- AGRI 399 TEACHING ASSISTANT 1-4 PF**
Practical teaching experience. Students participate and assist in instruction of an undergraduate course.
PREREQ: Must have taken the course for which assisting, or have equivalent experience.
RESTRICTIONS: An overall gpa of 2.5 or better is required. Maximum of 4 credits may count toward graduation.

ANIMAL AND FOOD SCIENCES

- ANFS 101 INTRODUCTION TO ANIMAL SCIENCE 3**
An introduction to the understanding of how animals function - genetics, nutrition, reproductive physiology, behavior and animal health. The course begins with a dialogue about the human-animal bond and the role of animals in society, and ends with the discussion of how agricultural animals are managed to produce safe and healthy food.
COREQ: ANFS111.
RESTRICTIONS: Corequisite mandatory for majors, optional for nonmajors. Offered in Fall only.
- ANFS 102 FOOD FOR THOUGHT 3**
Overview of the popular aspects of foods and beverages, including food composition, safety, processing and chemistry. The effect of cultural and social influences on food choice, factors directing marketing and development of new food products, and different food professions will be discussed. Some group work is expected.
- ANFS 111 ANIMAL SCIENCE LABORATORY 1**
Laboratory providing the opportunity to handle animals and to become familiar with common management practices.
COREQ: ANFS101.
RESTRICTIONS: Corequisite mandatory for majors, optional for nonmajors. Offered in Fall only.
- ANFS 140 FUNCTIONAL ANATOMY OF DOMESTIC ANIMALS 4**
Identification of relationship between form and function in domestic farm animals. Comparative examination of body systems in order to better understand the various management practices employed in animal agriculture. Serves as prerequisite for advanced departmental courses.
RESTRICTIONS: Offered in Spring only.

- ANFS 165 FRESHMAN FIRST YEAR EXPERIENCE 1**
Provides practical skills that foster academic and social competencies necessary for success in college. Focuses on academic services, campus resources, career exploration and preparation.
RESTRICTIONS: Limited to freshmen majors.
- ANFS 166 SPECIAL PROBLEM 1-3**
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.
- ANFS 220 INTRODUCTION TO EQUINE SCIENCE 4**
Study of equine science and husbandry. Instruction focuses on physiology, anatomy, genetics, behavior, reproduction and nutrition. Complement labs stress: systems care; safety, handling; feed identification and basic equipment and use. Accentuates unique equine biology and science foundational to understanding function and husbandry.
PREREQ: ANFS101 or permission of instructor.
- ANFS 230 FOODBORNE DISEASES: INVESTIGATING OUTBREAKS 3**
An introduction to basic epidemiology and a critical review of contemporary food- and water-borne outbreaks. Presents current issues in light of developments related to food safety and public health. Emphasis on emerging pathogens, virulence factors, epidemiological techniques, rapid detection methods, and quantitative risk assessment.
- ANFS 251 ANIMAL NUTRITION 3**
Comparative study of digestive anatomy, the nutrients, their metabolism and physiological function in animals of agricultural importance. Factors affecting the nutrient requirement of animals. Emphasis on effects of the plane of nutrition on productivity, health and well-being of animals.
PREREQ: ANFS101 and ANFS140.
- ANFS 252 ANIMAL NUTRITION LABORATORY 1**
Application of nutritional principals to animal feeding, nutritional value of feed ingredients and methods of assessment. Principles of ration formulation.
PREREQ: ANFS251.
COREQ: ANFS251.
- ANFS 261 PRINCIPLES OF COMPANION ANIMAL NUTRITION 3**
A broad overview of the principles of nutrition as they are applied to companion animals with emphasis on canine and feline nutrition
- ANFS 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.
- ANFS 265 SOPHOMORE SEMINAR 1 PF**
Emphasis on career development. Preparation for veterinary medicine and other careers in light of current and future trends in the field.
RESTRICTIONS: Open only to sophomore animal science majors.
- ANFS 266 SPECIAL PROBLEM 1-3**
RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.
- ANFS 270 BIOTECHNOLOGY: SCIENCE AND SOCIOECONOMIC ISSUES 3**
Introduction to agricultural biotechnology and socio-economic issues. Introduces genetic engineering and the basic scientific theory and the applications of biotechnology in agriculture production and research. Presents issues surrounding biotechnology-risk and technology assessment, animal rights, public and private research interface, media and environmental perspectives, consumer acceptance, regulation and economic development.
May be crosslisted with FREC270, PLSC270.
- ANFS 300 PRINCIPLES OF ANIMAL AND PLANT GENETICS 3**
Introduction to the theory and application of genetics as related to the improvement of plants and animals.
May be crosslisted with ENWC300, PLSC300.
PREREQ: ANFS101 and ANFS140, or PLSC101.
- ANFS 305 FOOD SCIENCE 3**
Composition, structure and functional properties of food and the fundamentals of commercial food processing. Discussion and video demonstrations of various food processing and preservation methods and the effects of ingredient manipulation.
- ANFS 310 ANIMAL AND PLANT GENETICS LABORATORY 1**
Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems.
May be crosslisted with ENWC310, PLSC310.
COREQ: ANFS300.
- ANFS 315 FOOD SAFETY FROM FARM TO FORK 3**
Examines safety issues in major food production systems in plants and animals (dairy, beef, swine, poultry, seafood). Study of government regulation, the use of antimicrobials

and pesticide residues. Explores the consumer's perception of biotechnology, organic farming, and post-harvest handling of agricultural commodities.
PREREQ: BISC207 or equivalent.
RESTRICTIONS: Offered in Spring semester.

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

- ANFS 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.
PREREQ: CHEM214 or CHEM527.

- ANFS 329 FOOD ANALYSIS 4**
Theory and practice of food analysis. Determine the chemical composition and characteristics of food. Introduction to instrumentation; spectroscopy, chromatography, electrophoresis, enzyme analysis and titration. Critically examine food analytical methods and data from journal articles including official AOAC and AACC methods and prepare scientific reports and presentations including a scientific poster.
PREREQ: CHEM214 or CHEM527, and CHEM220.

- ANFS 332 INTRODUCTION TO ANIMAL DISEASES 3**
Nature and mechanisms of disease processes with emphasis on their prevention and control.
PREREQ: ANFS140.

- ANFS 359 TOPICS IN FOOD SCIENCE 1**
Students select a topic in food science, search the literature or other sources for information on the topic, critically examine the information and prepare a presentation to the class. Work is done in groups or individually. Opportunities to discuss careers are provided.

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

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

- ANFS 404 DAIRY PRODUCTION 4**
Principles of modern dairy production units emphasizing nutrition, reproduction, housing, health, management and lactation.
PREREQ: ANFS101 and ANFS251.
RESTRICTIONS: Offered in Spring of even-numbered years. Laboratory requires some out of class time for hands-on experience in animal production facilities.

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

- ANFS 411 FOOD SCIENCE CAPSTONE 4**
A team-taught capstone 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: ANFS328, ANFS329, ANFS409 and ANFS439.

- ANFS 415 VERTEBRATE DEVELOPMENTAL MORPHOLOGY 3**
Introduces the basic principles of vertebrate development including the formation of the basic body plan and the molecular control of tissue morphogenesis. The importance of each developmental milestone will be illustrated by discussing the underlying causes of birth defects.
Crosslisted with BISC415.
PREREQ: BISC207 and BISC208.

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

- ANFS 418 SWINE PRODUCTION 4**
Principles of modern swine production: nutrition, reproduction, housing, health and management.

PREREQ: ANFS101 and ANFS251.

RESTRICTIONS: Laboratory requires some out-of-class time for hands-on experience in animal production. Offered in Spring of even-numbered years.

ANFS 419 TOPICS IN INTERNATIONAL ANIMAL AGRICULTURE 3-4

Instruction in animal production taught as part of a study abroad course. Topics vary with program location and focus.
PREREQ: ANFS101.

ANFS 420 EQUINE REPRODUCTIVE MANAGEMENT 4

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

ANFS 421 POULTRY PRODUCTION 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. Requires additional hands-on experience outside of class.
PREREQ: ANFS101 and ANFS140.

ANFS 424 NONRUMINANT NUTRITION 3

Advanced comparative study of digestion, absorption and metabolism of nutrients in terms of the needs of nonruminant animals. Application of principles to swine, poultry and equine nutrition.
PREREQ: ANFS251, CHEM214.
RESTRICTIONS: Offered in Spring of odd-numbered years.

ANFS 435 ANIMAL VIROLOGY 3

Lecture-based introduction to virus functional characterization; including, classification methods, replication strategies and pathogen-host interactions. Content stresses current methods in diagnosis and analysis of viruses associated with important animal diseases.
PREREQ: BISC300.

ANFS 436 IMMUNOLOGY OF DOMESTIC ANIMALS 3

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

ANFS 439 FOOD MICROBIOLOGY 4

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

ANFS 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 involve both classic and current state of knowledge in mammalian and avian reproduction.
PREREQ: ANFS140. BISC306 strongly recommended.

ANFS 442 LACTATIONAL PHYSIOLOGY 3

Fundamentals of physiology and metabolism involved in initiation, maintenance and cessation of lactation. Neuroendocrine control of lactation, nutrient absorption and processing by the mammary gland and control of milk composition. Covers mammals of commercial dairy importance as well as rodents, horses and humans.
PREREQ: ANFS140.

ANFS 443 FOOD ENGINEERING TECHNOLOGY 4

Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations.
May be crosslisted with EGTE445.
PREREQ: MATH222, and PHYS104 or PHYS201.
RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

ANFS 445 COMPARATIVE PHYSIOLOGY OF DOMESTIC ANIMALS 3

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: ANFS140.
RESTRICTIONS: Offered in Fall only. Required for prevet concentration.

ANFS 449 FOOD BIOTECHNOLOGY 4

Traditional food biotechnology and biotechnology based on genetic engineering are explored through in-depth study of current examples. Technical, economic and social aspects of biotechnology are researched and analyzed through individual and group assignments and lectures. Field trips provide a view of local biotechnology enterprises.
PREREQ: BISC300, CHEM214 or CHEM527, or ANFS439.

ANFS 454 RUMINANT NUTRITION 3

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

ANFS 464 ANIMAL AND FOOD SCIENCE EXPERIENCE 1-3 PF

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

ANFS 466 INDEPENDENT STUDY 1-6

RESTRICTIONS: Contract must have department chair signature. Independent study to involve library or lab research.

ANFS 468 RESEARCH 1-3

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

ANFS 470 PRINCIPLES OF MOLECULAR GENETICS 3

Fundamentals of nucleic acid biochemistry (replication, repair and recombination) and bacterial genetics are studied to provide the background needed for detailed study of selected topics in animal and plant molecular biology.
PREREQ: BISC401/411 and ANFS300.

ANFS 609 FOOD PROCESSING 4

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

ANFS 611 FOOD SCIENCE CAPSTONE 4

A team-taught capstone 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.

ANFS 615 VERTEBRATE DEVELOPMENTAL BIOLOGY 3

Introduces the basic principles of vertebrate development including formation of the basic body plan and the molecular control of tissue morphogenesis. The importance of each developmental milestone will be illustrated by discussing the underlying causes of birth defects.
Crosslisted with BISC615.
PREREQ: BISC401 and BISC403.
RESTRICTIONS: Requires instructor approval.

ANFS 628 FOOD CHEMISTRY 4

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

ANFS 629 FOOD ANALYSIS 4

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

ANFS 633 POULTRY PATHOLOGY 3

Study of poultry diseases with emphasis on their causes, prevention, treatment and control.
PREREQ: ANFS332, ANFS431 and ANFS635.

ANFS 635 ANIMAL VIROLOGY 3

Introduction to virus functional characterization; including classification methods, replication strategies and pathogen-host interactions. Stresses current methods in the diagnosis and analysis of viruses associated with important animal diseases.
PREREQ: ANFS431 or BISC300.

ANFS 636 IMMUNOLOGY OF DOMESTIC ANIMALS 3

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

ANFS 637 AVIAN IMMUNOLOGY 3

Advanced study of the avian immune system covering cellular and humoral

immune responses; autoimmunity; neuroendocrine-immune interactions; nutritional effects on the immune system; and immunogenetics.
 RESTRICTIONS: Offered in Spring of even-numbered years.

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

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

ANFS 645 FOOD ENGINEERING TECHNOLOGY 4
 Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations.
 PREREQ: MATH222 and PHYS201.
 RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

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

ANFS 654 ADVANCED RUMINANT NUTRITION 3
 Emphasis of metabolic aspects of ruminant microbiology and intermediary metabolism. Discussions on methods to partition nutrients at the tissue level and methods to alter rumen fermentation.
 May be crosslisted with NTDT654.
 PREREQ: Undergraduate or graduate courses in nutrition, microbiology, biochemistry, ANFS454 or equivalents. ANFS404 or ANFS417 recommended.

ANFS 665 SEMINAR 1-3

ANFS 668 RESEARCH 1-6

ANFS 670 PRINCIPLES OF MOLECULAR GENETICS 3
 Fundamentals of nucleic acid biochemistry (replication, repair, and recombination) and bacterial genetics provide the background needed for detailed study of selected topics in animal and plant molecular biology.
 PREREQ: BISC401, BISC411 and ANFS300.

ANFS 865 SEMINAR 1

ANFS 868 RESEARCH 1-9

ANFS 869 MASTER'S THESIS 1-6

ANFS 874 TOPICS IN MOLECULAR BIOLOGY 1
 Provides a forum for the discussion of current topics in molecular biology, with critical reading of relevant primary literature.
 May be crosslisted with PLSC874.
 RESTRICTIONS: Requires permission of instructor.

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

ANFS 969 DOCTORAL DISSERTATION 1-12 PF

ANTHROPOLOGY

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

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

ANTH 103 INTRODUCTION TO PREHISTORIC ARCHAEOLOGY 3
 Fundamental concepts and research procedures of archaeology. History of archaeology, methods of fieldwork and artifact analysis, and theories of human behavior in archaeological research.

RESTRICTIONS: Neither anthropology major or degree credit will be granted for ANTH103 if ANTH104 is taken.

ANTH 104 INTRODUCTION TO ARCHAEOLOGY AND BIOLOGICAL ANTHROPOLOGY 3

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

ANTH 105 INTRODUCTION TO HISTORICAL ARCHAEOLOGY 3

Introduces principal ideas, approaches, and research methods in historical archaeology. Presented through a comparative case study of the emergence of the modern world.

ANTH 200 INTRODUCTION TO THE HISTORY OF ANTHROPOLOGICAL THEORY 3

Provides a foundation in anthropological theory and insights into the relationship between theory, method and social context. Examines the history of anthropology as an academic discipline and intellectual enterprise.

ANTH 201 VISUALIZING HUMANITY: ETHNOGRAPHIC FILM 3

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

ANTH 202 HUMAN EVOLUTION AND THE FOSSIL RECORD 3

A survey of the human fossil record from the origin of the human species to the establishment of agriculture. Includes evolutionary theory, anatomical interpretation and reconstruction of early social behavior.
 May be crosslisted with CGSC202.

ANTH 205 ANTHROPOLOGY AND HUMAN NATURE 3

Archaeological, biological and cultural anthropology organized around the theme of human nature.
 May be crosslisted with CGSC205.

ANTH 210 PEOPLES AND CULTURES OF SOUTHEAST ASIA 3

Introduction to diverse cultural, societal and ecological systems of Indonesia, Malaysia, Thailand, Vietnam, Singapore and the Philippines. Focuses on theoretical and ethnographic issues in culture, history and contemporary life of modern Southeast Asia.

ANTH 211 PEOPLES AND CULTURES OF EAST ASIA 3

Introduction to diverse cultural, societal and ecological systems of China, Japan, Korea and Taiwan as well as Overseas Chinese. Focuses on theoretical and ethnographic issues in culture, history and contemporary life of modern East Asia.

ANTH 212 PEOPLES AND CULTURES OF THE MUSLIM WORLD 3

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

ANTH 216 INTRODUCTION TO MATERIAL CULTURE STUDIES 3

Introduces students to material culture studies, broadly defined as study of all things people make and all the ways people have altered the physical world. Explores the approaches, concepts, and methods of numerous disciplines that investigate material culture.
 May be crosslisted with HIST216, MCST216.

ANTH 222 TECHNOLOGY AND CULTURE 3

Primitive and preindustrial technologies. Theoretical issues of innovation, diffusion and adaptation. The relationship between technology and other aspects of culture.

ANTH 223 FOOD, GENDER AND CULTURE 3

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

ANTH 225 PEASANT SOCIETIES 3

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

ANTH 227 AMERICAN CULTURE 3

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

- ANTH 228 PEOPLES AND CULTURES OF THE SOUTHWEST** 3
Cultures, institutions and ethnic groups of southwestern United States. Analysis of both prehistoric and historic cultures, continuity and change.
- ANTH 229 INDIANS OF NORTH AMERICA** 3
An introductory comparative study of Native American cultures as they existed prior to their disruption by European contact. Uses the culture area approach.
- ANTH 230 PEOPLES OF THE WORLD** 3
Anthropological studies of societies and culture areas throughout the world to illustrate their characteristics and anthropological issues.
- ANTH 235 ANTHROPOLOGY OF FOOD** 3
Explores relationship between food and culture in the past and in the contemporary world. Topics include the economic, political and symbolic dimensions of food, effects of dietary changes on health, role of globalization, and causes of hunger and famine.
- ANTH 239 ARTS AND CRAFTS OF NATIVE NORTH AMERICA** 3
Anthropological analysis of indigenous technologies, arts, and crafts of native peoples of North America, including textiles, stoneworking, and ceramics.
- ANTH 245 CONTEMPORARY NATIVE AMERICAN CULTURE ISSUES** 3
An overview of cultural identity issues for Native Americans in the contemporary United States, including how Native Americans view their own cultures and society, perspectives they bring to the Euro-American and native encounters and to persistent denials of their distinctiveness in modern American society.
- ANTH 251 INTRODUCTION TO ETHNIC ARTS** 3
General survey of the ethnoarts from Africa, the Americas and the Pacific, including sculpture, painting, decoration and their interrelationships with oral literature, music, dance, games and ritual.
- ANTH 255 APPLIED ANTHROPOLOGY** 3
Anthropology applied to practical problems, including community development, directed change, agrarian reform and urban dislocation, particularly in Third World countries.
- ANTH 259 HUNTING SOCIETIES** 3
The role of hunting in human evolution, especially as biobehavioral adaptation; the technology 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.
May be crosslisted with JWST261.
- 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 300 PRIMATOLOGY** 3
Survey of the nonhuman primates, including their taxonomy and biological characteristics, and the study of their behavior and how it relates to human behavior.
- ANTH 305 THE EVOLUTION OF HUMAN SEX ROLES AND REPRODUCTION** 3
Survey of the evolution of human reproduction and sex differences. Evidence derived from the human fossil record, living non-human primates, modern biological differences between human males and females and cross-cultural comparisons of reproductive behavior and sex roles.
May be crosslisted with WOMS305.
- ANTH 310 ASIAN WOMEN'S LIVES** 3
Using examples from China, Japan, Southeast Asia, South Asia, and the Middle East, examines how lives of Asian women have been constructed by cultural, historical, and international forces and seeks to understand and challenge culturally pervasive stereotypes that define their lives.
May be crosslisted with WOMS310.
- ANTH 311 ANTHROPOLOGY OF TOURISM** 3
Views tourism as an international industry, a cultural practice and a phenomenon of globalization. Examines such topics as tourism and modernity, sexual and romantic tourism, ecotourism and environmental tourism, tourism and "authenticity".
- ANTH 312 ASIAN WOMEN IN THE GLOBALIZED WORKPLACE** 3
Focuses on relationship between work, gender, and social, cultural, and economic

transformations associated with globalization in East and Southeast Asia.
May be crosslisted with WOMS312.

- ANTH 313 ANTHROPOLOGY OF ELITES: THE NEW RICH IN ASIA** 3
Focuses on cultural contexts from which a newly affluent middle class has emerged, seeks an understanding of practices and ideologies which constitute a non-Western middle class, and examine how Asia's "new rich" have transformed their societies.
- ANTH 314 IMMIGRANT ISLAM: THE MUSLIM DIASPORA IN THE WEST** 3
Examines social and cultural aspects of transnational Muslim cultures in the West, focusing on nature of and responses to Islamic immigration to Western Europe. Using anthropological case studies, examines Islamic integration in Europe before and after September 11th.
- ANTH 316 ISLAM AND GENDER** 3
Uses anthropological case studies and historical material to comprehend ideals, practices, and themes of gender and gender relations in Islam. Introduces representations of Islamic belief in doctrinal, historical, and contemporary contexts.
May be crosslisted with WOMS316.
- ANTH 320 PREHISTORY OF NORTH AMERICA** 3
Major cultural and social developments of prehistoric humans in North America, from the entrance of the PaleoIndians 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 Americans, from the earliest evidence of human activity until the rise of civilizations with particular emphasis on technological, economic and social change.
- ANTH 325 PEOPLES OF EUROPE** 3
Cultures and subcultures of Europe, with special attention to the rural sectors and their historical development.
- ANTH 328 MAYAN ART AND ARCHITECTURE** 3
Introduction to the civilization of the Maya as evident in the Yucatan Peninsula. Incorporates visits to relevant archeological zones. Examines the geographical framework that shaped the development of Mayan culture, political and economic organizations, art, architecture, ideology and history.
Crosslisted with ARTH338.
RESTRICTIONS: Offered abroad only.
- ANTH 330 DEVELOPMENT AND UNDERDEVELOPMENT** 3
Anthropological perspectives of sociocultural change in Africa, Asia and Latin America. Emphasis on the economic and political relationships established between these areas and industrial societies.
- ANTH 333 PEOPLES OF AFRICA** 3
Social institutions and cultural traditions of Africa; political, economic, legal and kinship systems, and modes of thought.
May be crosslisted with BAMS333.
- 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 351 RACE AND ETHNICITY IN LATIN AMERICA** 3
Explores the multiple, complex and historically changing meanings of race and ethnicity in Latin America, and the consequences of discrimination towards specific groups. Regions covered are the Caribbean, Mexico and Central America, and the Andean, Atlantic and Southern Cone regions of South America.
May be crosslisted with BAMS351.
- ANTH 360 AMERICAN ANABAPTISTS: AMISH, MENNONITE AND BRETHREN CULTURES** 3
Examines the origins, development, and current status of Amish, Mennonite and Brethren communities in the United States. Special emphasis placed on the varied methods these groups have used to establish and maintain a visible and distinctive identity separate from mainstream American culture. The merchandizing and consumption of their separate identity through tourism is also discussed.

ANTH 363	WOMEN IN CROSS-CULTURAL PERSPECTIVE	3
Social realities of women within the cultures of Asia, Africa and Latin American societies. How institutions such as motherhood, the family, sexuality and work structure women's lives within the dominant social ideologies. Crosslisted with WOMS363.		
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 perspective. 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. 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 381	VISIONS OF NATIVE AMERICANS	3
Critically examines the visual images of Native Americans that have been created in films, photography, commercial art and media and analyzes how those images function in Euroamerican culture.		
ANTH 382	ANTHROPOLOGY AND BUSINESS	3
How culture affects business and capitalism in societies worldwide and how modern capitalistic life affects culture. Looks at diverse work cultures from direct-sales organizations to dot-coms, street-vendor businesses to megacorporations, as well as working women and the working poor in different cultures.		
ANTH 385	HISTORICAL ARCHAEOLOGY OF AMERICAN BATTLEFIELDS	3
Represents the material culture interpretation of selected historical conflicts with an emphasis on the American war sites. Topics vary and include a broad spectrum of social and ethnic groups in battle and the material evidence of armed struggle. Besides the Civil War, interpretation is given from a material culture perspective of the wars of the 20th century. The commonality of behavior by individuals subjected to war is emphasized.		
ANTH 390	COLLOQUIUM	3
RESTRICTIONS: Requires a GPA of 3.0 or higher.		
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. RESTRICTIONS: Requires permission of instructor.		
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
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions. Crosslisted with MSST444.		
ANTH 445	TECHNOLOGY OF CULTURAL MATERIALS: METALS	3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics and functions. Case studies from a wide variety of cultural traditions. Crosslisted with MSST445.		
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, MSST463.		
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 489	TUTORIAL IN APPLIED ANTHROPOLOGY	3
Provides an advanced, in depth synthesis of subfield of applied anthropology. Examines history of the subfield, current debates regarding applied and public anthropology, and applicability of anthropological methods to the world beyond the academy. Divided into three sections: history of applied anthropology, ethnographic methods (theoretical and applied implications, qualitative and quantitative methodology) and supervised original research. RESTRICTIONS: Open to anthropology majors only.		
ANTH 604	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 644	TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS	3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions. Crosslisted with MSST644.		
ANTH 645	TECHNOLOGY OF CULTURAL MATERIALS: METALS	3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics, and functions. Case studies from a wide variety of cultural traditions. Crosslisted with MSST645.		
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, MSST663.		

ARABIC

ARAB 105	ARABIC I - ELEMENTARY	4
Introduction to the Arabic language and development of speaking, listening, reading and writing skills through the use of basic texts.		
ARAB 106	ARABIC II - ELEMENTARY/INTERMEDIATE	4
Completion of basic Arabic. Increasing mastery of the basic skills of speaking, listening, reading and writing.		

PREREQ: ARAB105.

RESTRICTIONS: Two to three years of high school Arabic acceptable in lieu of ARAB105.

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

ARTS AND SCIENCES

ARSC 166 SPECIAL PROBLEM 1-3

ARSC 266 SPECIAL PROBLEM 1-3

ARSC 293 HONORS FORUM 1-12

Topics vary.

RESTRICTIONS: May be repeated for credit when topics vary.

ARSC 295 ARTS FORUM 1-12

Attendance at, and critical appreciation of, performing arts events and visual arts events. RESTRICTIONS: May be repeated for credit when topics vary.

ARSC 296 FORUM: MULTICULTURAL 1-12

Recent topics include Passing the Torch: An Interdisciplinary Look at a World Poised for Change; Living in History; Representations of Race, Class and Gender in the Media; Sexual Identity in Contemporary Culture.

RESTRICTIONS: May be repeated for credit when topics vary.

ARSC 316 PEER TUTORING/ADVANCED COMPOSITION 3

Trains a selected group of upper-division students in writing techniques by applying recent composition theories to students' own writing. Explores and evaluates fundamental theories of teaching writing. May be crosslisted with ENGL316.

ARSC 320 RESEARCH IN AREA STUDIES 1 PF

Lecture series in which faculty from all area studies programs and disciplines present their research on a given topic.

ARSC 366 INDEPENDENT STUDY 1-6

ARSC 390 HONORS COLLOQUIUM 3

First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

ARSC 392 HONORS COLLOQUIUM: MULTICULTURAL 3

First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

ARSC 466 INDEPENDENT STUDY 1-6

ARSC 480 ISSUES IN HEALTHCARE FOR CHILDREN AND FAMILIES 1-3

One of two required practicums for students accepted into the Medical Scholars Program. Involves one-on-one interaction with a physician mentor, usually at Christiana Hospital.

RESTRICTIONS: BALS MSP majors only and junior status or above.

ARSC 482 ISSUES IN PUBLIC HEALTHCARE - ECONOMICS 1-3

One of two required practicums for students accepted into the Medical Scholars Program. Involves one-on-one interaction with a physician mentor, usually at Christiana Hospital.

RESTRICTIONS: BALS MSP majors only and junior status or above.

ARSC 866 SPECIAL PROBLEM 1-12

ARSC 869 MASTER'S THESIS 1-6

ART

ART 110 DRAWING I 3

What do we see versus what we think we see? Perceptual drawing as a language and means of communication for artists and designers. Projects in and development of technical skills through basic drawing media explore drawing in its various forms: process/investigation, proposal, document, and artifact. COREQ: ART111 and ART116.

RESTRICTIONS: Open to majors only.

ART 111 DESIGN I 3

Introduction to the dynamic shaping of surface and space for expressive communication. Concentration on visual and temporal vocabulary of the artist and

designer with an emphasis on organizational principles relative to art elements. Students represent, rank and rethink originality of designs and ideas.

COREQ: ART110 and ART116.

RESTRICTIONS: Open to majors only.

ART 112 DRAWING II 3

Emphasizes drawing as the expressive communication of experience and ideas with increasing attention on the conceptual rather than perceptual. Progressive understanding of materials and mixed media with a broader development of critical vocabulary.

PREREQ: ART110.

COREQ: ART113 and ART117.

RESTRICTIONS: Open to majors only.

ART 113 DESIGN II 3

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

COREQ: ART112 and ART117.

ART 116 INTRODUCTION TO DIGITAL MEDIA 3

Introduction to the Macintosh computer through pixel-based and object oriented image manipulation plus exposure to time-based media. Looks at digital media as an investigative and creative tool in art and design; emphasis on relevance of technology to contemporary creative practices.

COREQ: ART110 and ART111.

RESTRICTIONS: Open to majors only.

ART 117 RESEARCH STUDIO: PRACTICE AND PRODUCT 3

Problem solving for the artist and designer through projects that are media independent.

Discussion of creative strategies for idea generation, research, critical analysis, and communication. Exploration and discovery toward the establishment of productive studio practice. Projects include both individual and collaborative investigations.

COREQ: ART112 and ART113.

RESTRICTIONS: Open to majors only.

ART 129 DESIGN IN VISUAL ARTS 3

Introduction to design through the physical application of various art media as applied to the study of 2-dimensional and 3-dimensional design. Study of design criteria and artistic objectives as they relate to the environment.

RESTRICTIONS: Open to nonmajors and nonminors only.

ART 130 DRAWING I: 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

Representational 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.

ART 202 TYPOGRAPHY I 3

Introduction to fundamentals of typography and the study of letterforms: history of the modern alphabet, type classification, effects of printing technology (i.e. letterpress) on typography, drawing letterforms, constructing letterforms, designing a page with type.

RESTRICTIONS: Open to BFA VC majors only.

ART 203 TYPOGRAPHY II 3

Further development in use of typography for communication: grid systems, effects of context on legibility and readability, type in sequence (i.e. books, animation, interactivity), typographic systems and modernist grid compositions in publications, use of computer as tool for typographic projects, introduction to design theory (i.e. semiotics) as it applies to typography.

PREREQ: ART202.

RESTRICTIONS: Open to BFA VC majors only.

ART 204 MEDIA/DESIGN/CULTURE 3

Current and historical media processes and their impact on art, design and culture. Image making and manipulation, video, audio, interactivity, and connectivity.

Viewing fine art and design projects, the historical aspects of design and digital media, basic media theory, and universal principles of software and digital media. Projects include writing, creating visual media, and making presentations.

Unfamiliar media experienced firsthand through exhibitions, screenings, lectures, online exploration and consumer media devices.

ART 206 FORM AND COMMUNICATION I 3

Hand created illustrative image-making processes as communication elements in the context of graphic design. Development of techniques and processes, with the

intention to communicate visual elements in conceptual contexts. Processes are introduced and implemented in assignments that push basic representation into complex designed systems.

RESTRICTIONS: Open to BFA VC majors only.

ART 207 FORM AND COMMUNICATION II 3

Development of image-making techniques and processes with the intention to communicate: graphic translation and representation, digital and analog processes, semiotics, design systems. Utilization of design fundamentals for composition and communication of visual form.

PREREQ: ART206.

RESTRICTIONS: Open to BFA VC majors only.

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 exploration of 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 244 DIGITAL PRINTMAKING 3

Use of computer as tool investigated for imagemaking by scanning, originating and manipulating digital imagery, both photographic and hand drawn. Exploration of contemporary and traditional printmaking techniques used to produce printed editions of created digital 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, symbolical 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 300 TYPOGRAPHY III 3

Development of Type as expression and experimental contexts of typography: type as experience, type as art object, symbol and cultural element, type as personal voice, type as an interactive experience, experimental and post-modern typography.

PREREQ: ART203.

RESTRICTIONS: Open to BFA VC majors only.

ART 301 GRAPHIC DESIGN STUDIO 3

Integrative course designed to bring together typographic and image-making skills in the context of graphic design projects: identifying individual strengths, team building, collaboration, development of personal creative practice and methods, introduction to clients (commercial and non-commercial). Designed to implement a self-motivated creative methodology in the context of complex communication design projects.

PREREQ: ART300 and ART308.

RESTRICTIONS: Open to BFA VC majors only.

ART 307 NEW MEDIA DESIGN 3

Focus on effectively communicating content and ideas using multiple digital media formats. Media can include visual images, text, sound, animation, and video. Students research, plan and produce complete media projects, including web sites. Facility with Adobe's Creative Suite programs Photoshop and Illustrator is required.

ART 308 FORM AND COMMUNICATION III 3

Concentrated focus of image-making techniques and processes within the practice of communication design. Introduction to a refined use of materials and challenged to utilize personal methods to express a point of view and communicate ideas through visual form. Study is determined by student's selection of one of two sections of this course.

PREREQ: ART301.

RESTRICTIONS: Open to BFA VC majors only.

ART 309 BOOK ARTS 3

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

ART 310 PHOTOGRAPHIC DESIGN METHODS 3

This course encourages students to use photographic imagery in a communication design context and to understand the creative relationship between image and text. Students develop conceptual and technical skills emphasizing both studio and location assignments for graphic and advertising design projects including editorial, print advertising, posters, collateral materials, books and packaging. May be repeated for up to six credits.

PREREQ: ART301 or 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: ART310, or ART380 and ART381.

RESTRICTIONS: Requires permission of instructor.

ART 312 ILLUSTRATION METHODS 3

This course introduces illustration methods through color mediums such as watercolor, gouache, acrylic, oils, and dry color media. Emphasis is on various approaches to illustrated visual imagery in editorial, book, institutional and advertising contexts. May be repeated up to six credit hours.

ART 315 ISSUES IN CONTEMPORARY ART 3

Examination of current issues of content and form; developments in technology; and social, political and cultural issues affecting contemporary visual art and artists.

RESTRICTIONS: Completion of 60 credit hours.

ART 318 APPLIED DESIGN VISITS 3

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

COREQ: ART319.

ART 319 APPLIED DESIGN TOPICS 3

Students undertake assigned independent research projects relating to applied design topics and projects (i.e. advertising, graphic and design, typography, applied photography, etc.) resulting in visual and written presentations.

COREQ: ART318.

RESTRICTIONS: Requires permission of instructor.

ART 322 ADVERTISING DESIGN METHODS 3

Introduces basic tools and techniques of modern advertising along with an overview of industry history and practices. Ability to create advertising strategies and use of various media to communicate ideas effectively. Assignments include semester-long and weekly assignments to build strategy, copywriting, and art direction skills.

PREREQ: ART301 or permission of instructor.

RESTRICTIONS: May be repeated for up to six credits.

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 up to nine credit hours.

ART 331 INTERMEDIATE PAINTING I 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.

ART 332 INTERMEDIATE PAINTING II 3

Continuation of the investigations established in ART331 with emphasis on the individual student's development of ideas and techniques through studio practice, fieldtrips and the research of contemporary art.

PREREQ: ART331.

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 3
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 up to six credit hours.

ART 340 WOODCUT 3
Introduction to basic woodcut and/or linoleum with relief printing processes. Black and white as well as multi colored printing processes will be investigated.
RESTRICTIONS: Open to majors and minors.

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

ART 342 INTRODUCTION TO MONOPRINTING AND PAPERMAKING PROCESSES 3
Introduction to western and eastern papermaking and cast paper processes.
Introduction to monoprinting and collage processes to produce one of a kind prints.

ART 344 DIGITAL PRINTMAKING 3
Investigates the computer as a tool for imagemaking by scanning, creating and manipulating digital images, both photographic and hand drawn. Exploration of contemporary and traditional printmaking techniques are used to produce printed editions of original digital images.

ART 346 LETTERPRESS PRINTING 3
Explores the process and product of printing through various media, technology and conceptual approaches. Focuses on text and image relationships by integrating letterpress, woodcut, linoleum blocks, and digital systems. Exploration of processes and results in creation of an edition conceptually centered around individual interests.

ART 350 INTERMEDIATE SCULPTURE I 3
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 3
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 AND WHITE 3
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 3
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: ART280.

ART 382 ALTERNATIVE PHOTOGRAPHIC PROCESSES 3
Non-silver photographic processes such as cyanotype, gum-bichromate, photo transfer, and van-dyke brown. Using existing negatives, students will create, alter and manipulate images.
PREREQ: ART280.
RESTRICTIONS: Ability to work independently.

ART 383 PHOTOGRAPHIC FACILITIES MANAGEMENT 3
First-hand 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 3
Continuation of Beginning Ceramics.
PREREQ: ART290.

ART 391 INTERMEDIATE CERAMICS II 3
Continuation of Intermediate Ceramics I with emphasis on the technical properties of clay and glazes.
PREREQ: ART290.

ART 400 VISUAL COMMUNICATIONS PRACTICUM 3
Designed to introduce 3rd year students (seniors) to various aspects of a career in the applied arts. Various faculty, community members and visiting designers are invited to present topics to the class in an informal discussion format. Includes field trips to printing presses, artist/designer representatives and many other professional services.
PREREQ: ART301.
RESTRICTIONS: Open to BFA VC majors only.

ART 401 VISUAL COMMUNICATIONS PORTFOLIO PREPARATION 3
Directed toward production of body of work (portfolio), which accurately and effectively portrays the student's proficiencies in media and ability to communicate ideas and point of view in their work.
PREREQ: ART301.
RESTRICTIONS: Open to BFA VC majors only.

ART 403 PORTFOLIO PREPARATION I 3
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.
RESTRICTIONS: May be repeated up to six credit hours.

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

ART 407 ADVANCED NEW MEDIA DESIGN 3
Continuing from New Media Design this course focuses on time-based or 'dynamic' media, incorporating text, moving image, and sound. Non-motion based projects (such as web sites) may be produced but must use advanced scripting, databases, or other specialized applications. Aesthetics and innovation are emphasized in creating media projects. In addition to other assignments, students work in groups to complete one client-based project. Course format includes short lectures and demonstrations, discussions, critiques, independent research and supervised work time in class.
PREREQ: ART307 or permission of instructor.

ART 408 VISUAL COMMUNICATIONS INTERNSHIP 3
Hands-on experience in a design-related company or organization associated with the student's post-graduate career goals. A minimum of 140 hours and positive supervisor feedback is required to receive course credit.
RESTRICTIONS: Senior Level (3rd year) Visual Communications Degree Candidates. May be repeated for up to six credits.

ART 412 ILLUSTRATION TOPICS 3
Application of creative illustration concepts to more advanced editorial, book, institutional and advertising projects. Specific focus of course dependent on instructor's topic of choice. May be repeated for up to six credits.
PREREQ: ART301 or permission of instructor.

ART 414 PHOTOGRAPHIC DESIGN TOPICS 3
Development of a student's understanding of how images can be created using a variety of photographic processes. Students are encouraged to use photographic imagery at an advanced creative level in a communication design context and to understand the relationship between image and text. May be repeated for up to six credits.
PREREQ: ART301 or permission of instructor.

ART 416 SENIOR SEMINAR 3
Explores issues relevant to advancing studio practice and developing a cohesive body of work for BFA exhibitions. Examines implications of pursuing a future in a fine arts studio discipline.
RESTRICTIONS: Open to 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 3
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 concentration.
RESTRICTIONS: Requires permission of instructor. May be repeated up to six credit hours.

- ART 422 ADVERTISING DESIGN TOPICS 3**
Through assignments and critiques students learn the broader application of advertising strategies to include new media, motion design, and integrated campaigns. Develop skills in oral, written and visual communication. Study of contemporary issues in the advertising industry including profiles of current companies, individuals and student competitions.
PREREQ: ART301 or permission of instructor.
- ART 424 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3**
Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research.
Crosslisted with MSST480.
RESTRICTIONS: Requires permission of instructor.
- ART 426 COLOR MIXING AND MATCHING 3**
Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and the manufacture of paint studied. Major topics include color interaction and the Munsell system of color description.
Crosslisted with MSST485.
RESTRICTIONS: Requires permission of instructor.
- ART 427 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3**
Major masters and the materials, tools, supports and techniques of architectural painting and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.
Crosslisted with MSST488.
RESTRICTIONS: Requires permission of instructor.
- ART 428 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3**
Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to present. Major topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.
Crosslisted with MSST489.
RESTRICTIONS: Requires permission of instructor.
- ART 429 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3**
Major masters and materials, tools and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.
Crosslisted with MSST490.
RESTRICTIONS: Requires permission of instructor.
- 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 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: ART331 and ART332, or ART331 and 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 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 or ART 246, 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 or ART246, and ART341 or ART342.
RESTRICTIONS: May be repeated 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 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 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 up to nine credit hours.
- 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 up to nine credit hours.
- ART 487 LOCATION PHOTOGRAPHY 3**
A series of interrelated projects and assigned topics on location to develop the visual and technical skills of on site photography. The location and environment may vary. Winter and/or summer session offering.
PREREQ: ART280 or equivalent.
RESTRICTIONS: Requires permission of instructor.
- 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 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 up to nine credit hours.
- ART 600 GRADUATE CRITIQUE 3**
Multidisciplinary graduate critique class in which students share and discuss creative work.
RESTRICTIONS: To be repeated up to twelve credit hours.
- ART 632 PAINTING 3-6**
Advanced problems in the media and aesthetics of painting.
RESTRICTIONS: May be repeated 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 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 up to eighteen credit hours.
- ART 677 CRITICAL ISSUES SEMINAR 3**
Introduces foundational language and ideas used to talk about qualities of works of art and the creative practice. Emphasis on development of language that helps individuals to respond to each other's work during group critiques, and to elevate the level of discourse within personal practice. Prepares students to develop their supporting paper during the second year.
- ART 678 RESEARCH SEMINAR 3**
Introduction to graduate study focusing on developing research strategies as an integral component of studio practice. Includes critical reading and writing. Emphasis on students' identifying directions within their own work.
RESTRICTIONS: Requires permission of instructor.

ART 679	GRADUATE STUDIO	3-9
Independent studio practice under the guidance and supervision of graduate advisors.		
ART 681	MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN	3
Twentieth-century artists' materials. Topics: acrylic emulsion and acrylic solution alkyd resin, PVA paints: collage-assemblage; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, felt-tip markers, colored inks and pencils: airbrush spray gun; and non-art materials. Potential health hazards. Conservation topics: pH, lightfastness, adhesion and storage environments. Crosslisted with MSST681.		
ART 682	STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST	3
Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include: the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research. Crosslisted with MSST680. RESTRICTIONS: Requires permission of instructor.		
ART 683	PHOTOGRAPHY	3-6
Individual problems in still photography applied to art education, fine arts, or applied design. RESTRICTIONS: May be repeated up to eighteen credit hours.		
ART 685	COLOR MIXING AND MATCHING	3
Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and manufacture of paint studied. Major topics include color interaction, and Munsell system of color description. Crosslisted with MSST685. RESTRICTIONS: Requires permission of instructor.		
ART 686	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. RESTRICTIONS: May be repeated up to six credit hours.		
ART 688	STUDIO MATERIALS AND TECHNIQUES OF PAINTING I	3
Major masters and materials, tools, supports and techniques of architectural and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research. Crosslisted with MSST688. RESTRICTIONS: Requires permission of instructor.		
ART 689	STUDIO MATERIALS AND TECHNIQUES OF PAINTING II	3
Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research. Crosslisted with MSST689. RESTRICTIONS: Requires permission of instructor.		
ART 690	STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I	3
Major masters and materials, tools, and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research. Crosslisted with MSST690. RESTRICTIONS: Requires permission of instructor.		
ART 691	CERAMICS	3-6
Problems in throwing, glazing and firing techniques. RESTRICTIONS: May be repeated 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 868	RESEARCH	1-12

ART CONSERVATION

ARTC 101	ART CONSERVATION FRESHMAN SEMINAR	1 PF
Introduction to the field through exposure to Winterthur Museum, Library and Garden and current art conservation projects. Professional interaction fosters academic and social competencies while explaining education, research, and career opportunities.		
ARTC 210	SCIENCE OF COLOR PHENOMENA	4
Introduction to basic physical and chemical principles which describe nature of light and the phenomena of color. Targeted for non-science majors who seek a descriptive understanding of scientific principles underlying formation of color phenomena found in nature and works of art. May be crosslisted with CHEM210, SCEN210. PREREQ: High school chemistry and algebra.		
ARTC 301	CARE AND PRESERVATION OF CULTURAL PROPERTY I	3
Examines philosophy, ethics, and practice of material culture preservation and the issues pertaining to collections management of cultural property. Typical deterioration characteristics and preventive conservation alternatives will be presented and discussed.		
ARTC 302	CARE AND PRESERVATION OF CULTURAL PROPERTY II	3
This undergraduate course will serve as an introduction to the practice of conservation, specifically conservation documentation. The class will provide students with a basic knowledge of conservation terminology, conservation literature and research resources, methods of conservation documentation, and prepare students for conservation internships. PREREQ: ARC301.		
ARTC 444	TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS	3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions. Crosslisted with MSST444.		
ARTC 445	TECHNOLOGY OF CULTURAL MATERIALS: METALS	3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics and functions. Case studies from a wide variety of cultural traditions. Crosslisted with MSST445.		
ARTC 464	PRESERVATION INTERNSHIP	3-6
ARTC 466	INDEPENDENT STUDY	1-6
ARTC 480	STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST	3
Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research. Crosslisted with MSST480. RESTRICTIONS: Requires permission of instructor.		
ARTC 485	COLOR MIXING AND MATCHING	3
Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and the manufacture of paint studied. Major topics include color interaction and the Munsell system of color description. Crosslisted with MSST485. RESTRICTIONS: Requires permission of instructor.		
ARTC 488	STUDIO MATERIALS AND TECHNIQUES OF PAINTING I	3
Major masters and the materials, tools, supports and techniques of architectural painting and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research. Crosslisted with MSST488. RESTRICTIONS: Requires permission of instructor.		
ARTC 489	STUDIO MATERIALS AND TECHNIQUES OF PAINTING II	3
Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to present. Major topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationship		

between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.

Crosslisted with MSST489.

RESTRICTIONS: Requires permission of instructor.

ARTC 490 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3

Major masters and materials, tools and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.

Crosslisted with MSST490.

RESTRICTIONS: Requires permission of instructor.

ARTC 495 PRESERVATION CAPSTONE 3

Summarize and synthesize the previous three years of a student's undergraduate career in Material Culture Preservation major. Faculty complete the undergraduate experience and prepare students for their next step (job market or graduate school). Career advisement and assessment of learning using exams, the creation of portfolios, oral presentations of internship or research experiences.

ARTC 615 PROPERTIES AND STRUCTURE OF ART MATERIALS I 3

Relationship between structure of materials and their physical, mechanical and chemical behavior. Emphasis on art materials such as metals, ceramics, glasses, geological materials, polymeric materials, textiles, coatings, cellulose products, pigments, dyestuffs, etc. Also, mechanics of change due to heat, time, radiation and environment.

RESTRICTIONS: Full-time fellowship students only.

ARTC 616 CONSERVATION RESEARCH METHODS 3

Introduction to the principles and methodology of scientific research in conservation. Emphasis on topics such as experimental design, data analysis, preparation of research proposals, authenticity and technical studies, accelerated aging, and simple analytical methods.

PREREQ: ARTC615.

RESTRICTIONS: Full-time fellowship students only.

ARTC 617 ANALYSIS OF PAINTED SURFACES 3

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

ARTC 618 CONSERVATION CLEANING METHODS 3

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

ARTC 644 TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS 3

Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions.

Crosslisted with MSST644.

ARTC 645 TECHNOLOGY OF CULTURAL MATERIALS: METALS 3

Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics, and functions. Case studies from a wide variety of cultural traditions.

Crosslisted with MSST645.

ARTC 650 SEMINAR IN ART CONSERVATION 1

Oral reports on current work in the fields of art conservation, art history, ethics, philosophy and museum science.

PREREQ: ARTC655.

RESTRICTIONS: Full-time fellowship students only.

ARTC 654 EXAMINATION AND TREATMENT OF ART OBJECTS I 1-3

Application of scientific and art historical techniques to the examination, treatment and preservation of works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and 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, 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 CONSERVATION I 6

Discussion, demonstration, practice and research relating to the examination, analysis, treatment, and collections care of cultural property including works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archeological materials. Course requirements may be fulfilled by work in cooperating institutions outside the Winterthur Museum.

PREREQ: ARTC654 and ARTC655.

RESTRICTIONS: Full-time fellowship students only.

ARTC 659 TOPICS: ADVANCED APPRENTICESHIP AND RESEARCH IN ART CONSERVATION II 6

Discussion, demonstration, practice, and research relating to the examination, analysis, treatment, and collections care of cultural property including works of art on paper, library materials, photographs, textiles, paintings, joined wooden objects, decorative, ethnographic, and archeological materials. Course requirements may be fulfilled by work in institutions outside the Winterthur Museum.

PREREQ: ARTC655 and ARTC658.

RESTRICTIONS: Full-time fellowship students only.

ARTC 666 INDEPENDENT STUDY 1-12

ARTC 670 CHEMICAL AND PHYSICAL TECHNIQUES USED IN THE EXAMINATION OF ART MATERIALS I 3

Classroom discussion and laboratory application of chemical and physical techniques that art conservators perform to identify and characterize organic art materials.

RESTRICTIONS: Full-time fellowship students only.

ARTC 671 CHEMICAL AND PHYSICAL TECHNIQUES USED IN THE EXAMINATION OF ART MATERIALS II 3

Classroom discussion and laboratory application of chemical and physical techniques that art conservators perform to identify and characterize metals, glass, ceramics, and natural and synthetic polymers. Basic structure, composition and deterioration mechanics of such materials.

PREREQ: 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

Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present.

Topics include: the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research.

Crosslisted with MSST680.

RESTRICTIONS: Requires permission of instructor.

ARTC 681 MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3

Twentieth-century artists' materials. Topics: acrylic emulsion and acrylic solution alkyd resin, PVA paints: collage-assemblage; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, felt-tip markers, colored inks and pencils: airbrush spray gun; and non-art materials. Potential health hazards.

Conservation topics: pH, lightfastness, adhesion and storage environments.

Crosslisted with MSST681.

ARTC 685 COLOR MIXING AND MATCHING 3

Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and manufacture of paint studied. Major topics include color interaction, and Munsell system of color description.

Crosslisted with MSST685.

RESTRICTIONS: Requires permission of instructor.

ARTC 688 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3

Major masters and materials, tools, supports and techniques of architectural and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research. Crosslisted with MSST688.

RESTRICTIONS: Requires permission of instructor.

ARTC 689 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3

Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.

Crosslisted with MSST689.

RESTRICTIONS: Requires permission of instructor.

ARTC 690 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3

Major masters and materials, tools, and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research. Crosslisted with MSST690.

RESTRICTIONS: Requires permission of instructor.

ARTC 870 INTERNSHIP IN CONSERVATION 1-9

A third year of study at an accredited institution working with a master conservator in the student's field of interest.

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

ARTC 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.

ARTC 969 DOCTORAL DISSERTATION 1-12 PF**ART HISTORY****ARTH 101 VISUAL CULTURE 3**

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

ARTH 150 MONUMENTS AND METHODS IN THE HISTORY OF ART 3

Painting, sculpture and architecture studied as artistic and cultural expressions of their times. Emphasis on selected major artists, monuments and methods of analysis.

ARTH 151 MYTH, RELIGION AND ART 3

An introduction to the study of mythical and religious images, types, attributes and symbols 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 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 present studied in historical and cultural context.

RESTRICTIONS: Usually offered in Spring semester.

ARTH 156 ROME: FROM CAESAR TO FELLINI 3

Investigates Rome from antiquity to the twentieth century focusing on art and architecture, archaeology, film, literature, urban planning, law, social history, religion, and politics.

ARTH 162 HISTORY OF ARCHITECTURE 3

Major buildings and architects from the ancient world to the present. Elements of architectural design and the influence of social, economic, political, religious and technological factors on the art of building. Architecture as cultural expression.

ARTH 163 ARCHITECTURE IN GLOBAL CONTEXTS 3

Concepts of architecture, with case studies drawn from various world regions ranging from prehistoric times to present. Understanding the role of architecture in

human society and how it has shaped human history. Study of physical and cultural dimensions of architecture in different parts of the world and learn how to place their varieties in global contexts.

ARTH 165 INTERNATIONAL DECORATIVE ARTS 3

Introduction to history of decorative arts in world cultures, ancient times to present. Ornamental and functional arts in metalwork, glass, and ceramics in art historical, cultural, symbolic, and technological contexts. Case studies from Asia, Africa, the Islamic World, Europe, and the Americas.

Crosslisted with MSST165.

ARTH 166 SPECIAL PROBLEM 1-3**ARTH 203 ART OF THE BLACK AND AFRICAN DIASPORA 3**

Through the art and architecture of the Atlantic and Indian oceans, introduces the art of African Heritage peoples after the early 15th century and indicates what connects them (and what separates them) in terms of subject matter, style, representational mode and critique.

ARTH 204 ART, POWER AND ARCHITECTURE IN AFRICA 3

Explores several African communities including Bamileke, Yoruba, Shona, Edo, Fon, Kuba and Hasua-Fulani (located among others in Nigeria, Zimbabwe, Benin, Congo). Reveals the relationships, sometimes spatial, between art and architecture in their varied stances to, and as representations of, political, social and spiritual power. May be crosslisted with BAMS203.

ARTH 205 SCIENCE AND THE DETECTION OF ART FORGERIES 3

Concepts from many scientific disciplines are useful for interpreting works of art. Analytical techniques based on those concepts often reveal art forgeries. Case studies will use basic scientific principles to investigate a wide variety of known or alleged art forgeries.

Crosslisted with MSST205.

ARTH 206 INTRODUCTION TO ART AND ARCHITECTURE IN AFRICA 3

Explores all-African selections from diverse art histories including modern Congo, contemporary Nigeria and South Africa, 19th Century Mande, 17th century Ethiopia, 15th century Edo, 19th Century Yoruba, Nubian Egypt and the pre-pharaonic Northeast. Lectures thematize art against a backdrop of politics, religions, sensuality and architecture.

ARTH 207 ART OF ANCIENT EGYPT AND THE NEAR EAST 3

Survey of the art and architecture of ancient Egypt and Near East. Emphasis on the relationship of art to religion, politics and ritual. Topics include Egyptian pyramids and the after-life, images of kings and the art of propaganda and art in the service of religion.

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

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

ARTH 217 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, Bramante, Titian, Tintoretto and El Greco. Also treats the spread of Italian style to France and Spain.

ARTH 219 ART OF THE ITALIAN RENAISSANCE 3

Surveys major artistic centers, personalities and stylistic trends in Italy from fourteenth to sixteenth century. Special emphasis on Giotto, Donatello, Mantegna, Leonardo, Michelangelo, Raphael and Titian. Paintings and sculptures discussed in relation to techniques, systems of production, patronage and crucial historical events.

ARTH 220 ITALIAN RENAISSANCE ARCHITECTURE 3

Italian architecture and cities from the 14th to the 16th centuries. Emphasis on the socio-economic, intellectual and cultural context of Renaissance architecture.

Focuses on architects such as Brunelleschi, Alberti, Michelangelo and Palladio and cities such as Florence, Rome and Venice.

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 225 EIGHTEENTH CENTURY ART 3
Examines 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
History and theory of art 1789-1900, including neoclassic, romantic, realist, impressionist, and post-impressionist movements.

ARTH 228 MODERN ART II 3
History and theory of art from 1900 to present in its cultural, social, and political context, including painting, sculpture, photography, installation, performance, film, and video.

ARTH 230 AMERICAN ART: 1607 - 1865 3
Architecture, painting, sculpture and the 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.

ARTH 231 AMERICAN ART: 1865 - PRESENT 3
Architecture, painting, sculpture, photography and decorative arts in the United States from the Civil War on. 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 232 ART OF LATIN AMERICA 3
Survey of art and architecture in Latin America from pre-Hispanic times to the 21st century. Emphasis on the interaction between native traditions and imported ideas, particularly in relationship to religion, politics, and daily life.

ARTH 233 ART AND ARCHITECTURE IN CHINA 3
Through examination of art, architecture, and archaeology, approaches China as an historical and cultural unit. Emphasis on relationship of art to religious and art objects, and architecture in China, with additional materials from nearby regions. Thematic coverage of Chinese history, from neolithic sites to buildings in the twentieth century. Interdisciplinary approach.

ARTH 236 ARTS OF THE ISLAMIC WORLD 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 243 AMERICAN DECORATIVE ARTS, 1700 - 1900 3
An introduction to interior decoration and household arts during the 18th and 19th centuries, with an emphasis on furniture, metalwork, glass, ceramics, textiles, prints, and wallpaper. Field trips to Winterthur and the Delaware Art Museum are required. May be crosslisted with MCST243.

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 WASHINGTON 3
Thirteen rulers from the ancient, medieval and early modern worlds as they were depicted in contemporary artistic and literary works. Rulers studied include Augustus, Justinian, Saint Louis, Napoleon and Washington. Focuses on rulers' images in the modern world.

ARTH 299 MODERN ARCHITECTURE 3
Introduction to architecture of modern periods. Focuses from the eighteenth century to the present. Examines classical texts, rising ideas, and major debates in the field of modern architecture, and explores various connotations of modernity and modernism that have emerged during the past three hundred years around the world. Interdisciplinary approach.

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
A social history of prints and printmaking techniques, focusing on such major printmakers as Durer, Rembrandt, Piranesi, Goya, Daumier and Picasso. Topics include the role of woodcuts in popular culture, political and satirical prints, posters and advertising, and the connoisseurship of original prints.

ARTH 303 ART OF THE SPANISH RENAISSANCE 3
The art of Spain and its New World territories during the 15th and 16th centuries. Emphasis on the negotiation between different artistic and religious traditions in both the Iberian Peninsula (Christian, Muslim, and Jewish) and Spanish America (European and Native American).

ARTH 304 NORTHERN BAROQUE ART: THE AGE OF RUBENS, REMBRANDT AND VERMEER 3
Painting, printmaking and art theory in 17th-century Holland and Flanders in social and historical context. Examines the rise of landscape, genre and portraiture, the nature of Dutch realism, the social role of the artist, art and theater, and the impact of religion on art.

ARTH 305 ITALIAN BAROQUE ART: METAPHOR AND MARVEL 3
Painting, sculpture and architecture from the time of Caravaggio and the Carracci to Bernini and Cortona. Examines topics such as the Counter-Reformation and its impact on the arts, the rise of naturalism and illusionism, the design process and the function of drawings, theatricality and rhetoric.

ARTH 307 SEURAT TO MATISSE: ART IN FRANCE 3
Examines developments in French art, culture and society between 1880 and 1907. Topics include the avant-garde, women artists, public art, bohemianism, mass culture and early cinema. Artists include Manet, Monet, Pissarro, Degas, Cezanne, Morisot, Cassatt, Seurat, Van Gogh, Gauguin, Vuillard, Redon, Moreau, Puvion de Chavannes, Rodin, Claudel, Matisse and Picasso. PREREQ: ART227 or ART228 or permission of instructor.

ARTH 310 THE ROLE OF THE ARTIST IN SOCIETY 3
Explores changing ideas of the artist from medieval craftsman and Renaissance courtier to Romantic genius and modern revolutionary. Topics include self-portraiture, notions of artistic temperament and genius, women artists and artists' changing relations with their clients.

ARTH 311 RENAISSANCE WOMEN, SOCIETY AND THE ARTS 3
Focuses on the role of women in Italian art and society from 1300-1650. Interdisciplinary and feminist readings emphasize a variety of approaches. Topics include gender and power; women as patrons; female eroticism and mysticism; the masculine vision of ideal beauty; women writers and their complaints; nuns, prostitutes and saints. May be crosslisted with WOMS311.

ARTH 318 HISTORY OF PHOTOGRAPHY 3
History and aesthetics of photography from its beginnings to the present. Emphasis on photography as artistic expression, the importance of technology and photography in relation to the other arts and social history. Photographers such as Negre, Emerson, Stieglitz, Cunningham, Weston and Arbus.

ARTH 322 INTRODUCTION TO HISTORIC PRESERVATION 3
Examines a specific research issue within historic preservation including hypothesis construction, design of research methodology and evaluation of results.

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

ARTH 339 ART AND ARCHITECTURE OF EUROPE 3-12
Primary focus on painting, sculpture and architecture in Europe from the Romanesque to the Modern eras. 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 349 ART AND ARCHITECTURE IN CONTEXT 3
Painting, sculpture and architecture studied as artistic and cultural expressions of their times. RESTRICTIONS: Taught only in Study Abroad Program.

ARTH 366 INDEPENDENT STUDY 1-6

ARTH 399 TOPICS IN ART HISTORY 3
Detailed investigation in a lecture rather than a seminar format of varying topics, e.g., St. Denis and Problems of 12th Century Art.

ARTH 402 UNDERGRADUATE SEMINAR IN THE HISTORY OF ART 1-4

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

ARTH 403 HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS 3

Introduction to philosophy, purposes, structure, historical development and future of museums, and botanical and zoological gardens. Examines functions of collection, conservation, research, exhibition/interpretation, and social/cultural services; museum field growth.
 Crosslisted with MSST403.

ARTH 405 SEMINAR IN GREEK AND ROMAN ART 3

The art and architecture of antiquity from the origins of Greek civilization to the fall of Rome. Recent topics include Art in the Everyday Life of Ancient Romans, Hellenistic Greek Sculpture, Late Roman Portraiture and Roman Architecture.
 PREREQ: ARTH208.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 406 SEMINAR IN MEDIEVAL ART 3-12

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

ARTH 413 SEMINAR IN ITALIAN RENAISSANCE ART 3

Italian art from 1300 to 1600. Recent topics include Leonardo da Vinci, Michelangelo, Art of the Italian Renaissance Courts.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 414 SEMINAR IN ITALIAN RENAISSANCE ARCHITECTURE 3

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

ARTH 415 SEMINAR IN ITALIAN BAROQUE ART 3-12

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

ARTH 417 SEMINAR IN NORTHERN BAROQUE ART 3-12

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 419 SPANISH ART OF THE GOLDEN AGE 3

Art in Spain and its colonies from 1500-1700. Topics vary. Seminars may focus on particular artists, or on broader historical and/or methodological issues dealing with artistic production, reception, and circulation within the Spanish empire.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 420 SEMINAR IN AFRICAN ART 3

Studies recent scholarship on art and/or architecture in Africa, focusing on specific subjects such as Modern and Contemporary art, sculpture before 1500, global views and uses of African art and art institutions in Africa.
 RESTRICTIONS: Not open to freshmen.

ARTH 421 SEMINAR IN NINETEENTH CENTURY ART 3

History and theory of art 1789-1900. Recent topics include Paris in the age of Gericault, Delacroix, and Baudelaire; Art and Ideology; Modern Art and Literature; Modern Portraiture.
 PREREQ: ARTH227 or permission of instructor.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 422 FOLK AND OUTSIDER ART 3

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 3

History and theory of art from 1900 to the present.
 PREREQ: ARTH227 or ARTH228 or permission of instructor.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 424 SEMINAR IN NINETEENTH CENTURY PHOTOGRAPHY 3

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 ARTH318.

ARTH 425 SILENT CINEMA 3

Examination of the invention, emergence, and development of silent cinema in Europe, the former USSR, and the United States. Includes study of significant films and filmmakers; social, cultural and artistic contexts; and the critical literature.
 PREREQ: Either ARTH227 or ARTH228.

ARTH 427 SEMINAR IN TWENTIETH CENTURY PHOTOGRAPHY 3

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.

ARTH 429 SEMINAR IN MODERN ARCHITECTURE 3-12

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 3-12

American architecture from the Colonies to the present. Recent topics include Architecture of the Colonial and Federal Periods, Nineteenth Century American Architecture, and Philadelphia Architecture.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 435 SEMINAR IN AMERICAN ART 3-12

American art from the Colonies to the present. Recent topics include Art and Revolution in Early America; Early American Modernism, and American Painting and Sculpture after World War II.
 May be crosslisted with MCST435.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 440 SEMINAR IN LATIN AMERICAN ART 3

The arts of Latin America from pre-Hispanic times to the 21st century. Topics change with each time of offering. Recent topics include Art and Religion in Latin America, and Art and Conquest in the New World.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 445 SEMINAR IN EAST ASIAN ART AND ARCHITECTURE 3

Art, architecture and archaeology of China, Japan, and/or Korea. Materials from nearby regions may also be included. Possible topics include Chinese Art and Collecting, Modern Architecture in East Asia, Meiji Art and architecture, East Asian Archaeology and Nationalism.

ARTH 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.
 Crosslisted with HIST454.

ARTH 457 SURVEY OF AFRICAN ART 3

Major African art styles, their interrelationships, the context of usage and the meanings of African artworks.
 Crosslisted with ANTH457.

ARTH 464 INTERNSHIP IN ART HISTORY 1-3

On-the-job experience and explore potential occupational areas at a museum or other art related venue, under joint supervision of Department of Art History and sponsoring organization. Completion of journal of activities and/or final academic project or paper.
 RESTRICTIONS: Requires pre-approval of instructor and/or department's Director of Undergraduate Studies. Does not count as a 400-level seminar and does not fulfill an area requirement.

ARTH 466 INDEPENDENT STUDY 1-6**ARTH 480 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3**

Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research.
 Crosslisted with MSST480.
 RESTRICTIONS: Requires permission of instructor.

ARTH 488 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3

Major masters and the materials, tools, supports and techniques of architectural painting and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.
 Crosslisted with MSST488.
 RESTRICTIONS: Requires permission of instructor.

ARTH 489 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3

Major masters and materials, tools and techniques of indirect and direct oil

painting. Time frame: 1500 to present. Major topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.
Crosslisted with MSST489.

RESTRICTIONS: Requires permission of instructor.

ARTH 490 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3

Major masters and materials, tools and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.
Crosslisted with MSST490.

RESTRICTIONS: Requires permission of instructor.

ARTH 599 TOPICS IN ART HISTORY 3

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

ARTH 601 THEORIES AND PRACTICES OF ART HISTORICAL INTERPRETATION 3

Critical analysis of selected writings influential in art history and the humanities. Designed to help students hone their interpretive skills through close examination of assumptions, standards of argument and evidence, core concepts, procedures, boundaries, and objectives that have shaped art historical writings past and present.

ARTH 602 THEORIES AND METHODOLOGIES IN ARCHITECTURAL HISTORY 3

Introduction to issues and methodologies in architecture and urbanism history. Readings in philosophy and sociology and in recent works of architectural and urbanism history they have inspired. Organized thematically (capitalism; colonialism; print culture; etc.).

ARTH 605 STUDIES IN GREEK AND ROMAN ART 3

The art of antiquity from the origins of Greek civilization to the fall of Rome. Recent topics include Roman Architecture; Religion, Religiosity and Ritual in the Lives of Romans; Visual Culture in Pompeii.

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.

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.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 617 STUDIES IN NORTHERN BAROQUE ART 3

Seventeenth century art in northern Europe. Recent topics include Vermeer and Dutch Genre Painting; Art and Money; 17th Century Netherlands; and Prints in the Age of Rembrandt.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 619 SPANISH ART OF THE GOLDEN AGE 3

Art in Spain and its colonies from 1500-1700. Topics vary. Seminars may focus on particular artists, or on broader historical and/or methodological issues dealing with artistic production, reception and circulation within the Spanish culture.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 620 SEMINAR IN AFRICAN ART 3

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

ARTH 621 STUDIES IN NINETEENTH CENTURY ART 3

History and theory of art 1789-1900.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 622 RESEARCH TOPICS IN HISTORIC PRESERVATION 3

Seminar addresses a specific research issue within historic preservation including hypothesis construction, design of research methodology and evaluation of results. Emphasis on use of primary sources and application of data-base techniques.

Crosslisted with UAPP636.

ARTH 623 STUDIES IN TWENTIETH CENTURY ART 3

History and theory of art from 1900 to the present.

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 include colonial Pennsylvania-German decorative arts, Victorian-Welsh 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 625 SILENT CINEMA 3

Examination of the invention, emergence, and development of silent cinema in Europe, the former USSR, and the United States. Includes study of significant films and filmmakers; the social, cultural and artistic contexts; and the critical literature.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 626 STUDIES IN MODERN ART AND THEORY 3

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

ARTH 627 STUDIES IN THE HISTORY OF PHOTOGRAPHY 3

Aspects of the history and aesthetics of photography. Recent topics include Nineteenth Century Documentary Photography, Nineteenth Century "Art" Photography, Twentieth Century Photography and Criticism, and Twentieth Century Photography and Art.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 628 THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING 3

Examines the historic preservation planning process, the theory supporting this process and contemporary practices. Case studies used to demonstrate the integration of theory and practice.

Crosslisted with UAPP629.

ARTH 629 STUDIES IN MODERN ARCHITECTURE 3

Architecture in Europe and/or America from 1750 to the present. Recent topics include the Architecture of Neoclassicism and Sullivan, Wright and the Prairie School.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 630 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 archeology, cultural geography, sociology and history.

Crosslisted with EAMC605.

RESTRICTIONS: Requires permission of instructor.

ARTH 631 STUDIES IN AMERICAN ARCHITECTURE OF THE COLONIAL AND FEDERAL PERIODS 3

Architecture in the American Colonies from the anonymous buildings of the 17th century to the designs of Thomas Jefferson and B.H.Latrobe in the early 19th century.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 633 STUDIES IN NINETEENTH CENTURY AMERICAN ARCHITECTURE 3

The Greek, Gothic, Egyptian and Oriental Revivals; High Victorian Style and its culmination in the Age of Elegance; and Late Nineteenth Century American Architecture.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 635 AMERICAN ART TO 1865 3

Topics change with each offering. Recent topics include Visual Culture in Antebellum America, Common Ground: Dialectics of High and Low in 19th Century American Visual Arts.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 636 STUDIES IN AMERICAN ART: 1875-PRESENT 3

Painting, sculpture and related media from Eakins to the present. Recent topics include Eakins and American Modernism, and American Painting and Sculpture after World War II.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 640 SEMINAR IN LATIN AMERICAN ART 3

The arts of Latin America from pre-Hispanic times to the 21st century. Recent topics include Art and Conquest in the New World, and Life and Afterlife of pre-Hispanic Artifacts.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 654 VERNACULAR ARCHITECTURE 3

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

Crosslisted with HIST654.

ARTH 657 SURVEY OF AFRICAN ART 3
Major African art styles, their interrelationships, the context of usage and the meanings of African artworks.
Crosslisted with ANTH657.

ARTH 680 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include: the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research.
Crosslisted with MSST680.
RESTRICTIONS: Requires permission of instructor.

ARTH 681 MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3
Twentieth-century artists' materials. Topics: acrylic emulsion and acrylic solution alkyd resin, PVA paints: collage-assemblage; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, felt-tip markers, colored inks and pencils: airbrush spray gun; and non-art materials. Potential health hazards. Conservation topics: pH, lightfastness, adhesion and storage environments.
Crosslisted with MSST681.

ARTH 685 CULTURAL THEORY AND CRITICISM 3
Topical introduction to cultural theory, emphasizing 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.
Crosslisted with ENGL685.
RESTRICTIONS: May be repeated once for credit when topics vary.

ARTH 688 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3
Major masters and materials, tools, supports and techniques of architectural and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.
Crosslisted with MSST688.
RESTRICTIONS: Requires permission of instructor.

ARTH 689 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3
Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.
Crosslisted with MSST689.
RESTRICTIONS: Requires permission of instructor.

ARTH 690 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3
Major masters and materials, tools, and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.
Crosslisted with MSST690.
RESTRICTIONS: Requires permission of instructor.

ARTH 851 SEMINAR IN ART HISTORICAL PEDAGOGY 3 PF
Discussion of all aspects of teaching in the field of art history (lectures, discussions, materials, examinations, grading), especially in the context of the teaching of a large introductory survey course.
RESTRICTIONS: Open only to teaching assistants in ARTH153 or ARTH154.
May be taken for credit only once.

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 107 HISTORY OF ROCK 3
The study of various styles of rock music. Introduction to folk, country, blues, and jazz as predecessors to rock. Intended for the non-music major. No music reading

skills required.
Crosslisted with MUSC107.
RESTRICTIONS: Offered in fall and spring semesters.

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
Introduction to African history south of the Sahara, from the earliest times to 1914. Introduces major themes in African history: pre-colonial African political, social and economic institutions; diversity in African political organizations; slave trade and colonialism.
Crosslisted with HIST134.

BAMS 166 SPECIAL PROBLEM 1-3

BAMS 203 ART, POWER AND ARCHITECTURE IN AFRICA 3
Explores several African communities including Bamileke, Yoruba, Shona, Edo, Fon, Kuba and Hasua-Fulani (located among others in Nigeria, Zimbabwe, Benin, Congo). Reveals the relationships, sometimes spatial, between art and architecture in their varied stances to, and as representations of, political, social and spiritual power.
Crosslisted with ARTH204.

BAMS 204 URBAN COMMUNITIES 3
Urbanization, rural-urban social differences and the organization of urban communities by race, class, ethnicity and stage in the life cycle.
Crosslisted with SOCI204.

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 207 HISTORY OF JAZZ 3
Chronological study of the style changes in jazz from the late 19th century to the present. Emphasis on the sociological, economic and technological influences of the period and on the principal personalities who have been primarily responsible for change.
Crosslisted with MUSC207.
RESTRICTIONS: Offered in spring semester only.

BAMS 215 RACE IN SOCIETY 3
Social definitions of race, how race is incorporated into social institutions and how race structures relationships among diverse groups in society. Includes analysis of rights and privileges denied or extended to groups and how disadvantaged groups work towards racial equality.
Crosslisted with SOCI215.

BAMS 220 AMERICAN CIVIL RIGHTS MOVEMENT 3-4
Team-taught, interdisciplinary, history of the American Civil Rights Movement. Deals with the crucial years from 1954 to 1970 and examines the larger history of American race relations.
Crosslisted with HIST220.

BAMS 293 HONORS SHORT COURSE 1
See ARSC293 for course description.

BAMS 296 HONORS FORUM 1
See ARSC296 for course description.

BAMS 298 RESEARCH ON RACE, ETHNICITY AND CULTURE 1 PF
Lecture series in which faculty and guest speakers discuss their research on contemporary and historical perspectives on race, ethnicity and culture. Research presented from several disciplines, including sociology, history, literature, anthropology and psychology, among others.
Crosslisted with WOMS298.
RESTRICTIONS: May be repeated for credit when topics vary.

BAMS 304 HISTORY OF BLACK AMERICA TO THE CIVIL WAR 3
Black historical impact on American life and culture to the Civil War.
May be crosslisted with HIST325.
PREREQ: BAMS110.

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 ghetto and the struggle for civil rights.
May be crosslisted 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 crosslisted with PHIL307.
- BAMS 308 DELAWARE BLACK HISTORY 3**
Survey course in Delaware Black history. The Black American in Delaware from colonial times to recent developments.
PREREQ: HIST205.
- BAMS 309 POLITICAL CULTURE BY COUNTRY 3**
Introduction to the political and civic cultures underpinning and supporting different political systems. Topics may vary depending on host country.
Crosslisted with POSC309.
RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.
- BAMS 313 AFRICAN AMERICAN LITERATURE I 3**
Literature by African American writers from the eighteenth century to the Harlem Renaissance.
Crosslisted with ENGL344.
PREREQ: ENGL110.
- BAMS 322 RACE AND POLITICS 3**
Provides an insight and understanding of race as an intricate part of the political process in the United States. Role of race in United States politics is explored primarily through the political experiences of black Americans and how the political system has responded.
Crosslisted with POSC322.
- BAMS 327 RACE, GENDER, SCIENCE 3**
Critically examines a number of metaphysical, epistemological, and ethical issues related to science of race, gender, and sexual orientation. Topics may include (a) evolution of sex and gender, (b) gender and cognition, (c) biological basis, or lack thereof, of sexual orientation/preference (d) evolutionary, cognitive, historical, and political origins of race thinking, (d) relationship between everyday conceptions of race and gender as compared with scientific conceptions of race and gender, (e) ethical issues raised by human kind classification schemes.
Crosslisted with PHIL327.
- BAMS 330 RHETORIC OF BLACK AMERICA 3**
Rhetoric of Black Americans from early orators to contemporary figures. Oral interpretation and analysis of methods and techniques.
PREREQ: Introductory class in communication.
- BAMS 331 HISTORY OF CARIBBEAN I 3**
Examines major themes in Caribbean history from the pre-Columbian period to the end of slavery in 1838. Discussion of the demographic and ecological consequences of European contact, sugar and slavery, the evolution of creole cultures and slave resistance.
Crosslisted with HIST331.
- BAMS 332 HISTORY OF CARIBBEAN II 3**
Examines the period from 1838 to the present. Includes a discussion of the social and economic adjustments to emancipation, the making of plural societies with the importation of Asian laborers, American imperialism and political and social movements of the twentieth century.
Crosslisted with HIST332.
- BAMS 333 PEOPLES OF AFRICA 3**
Social institutions and cultural traditions of Africa; political, economic, legal and kinship systems, and modes of thought.
Crosslisted with ANTH333.
- BAMS 334 AFRICAN AMERICAN WOMEN'S HISTORY 3**
Explores the diversity of African American women's lives and development of women, work, and culture from the colonial era through the late 20th century. Examines the social, political, religious and economic factors affecting change and transformation in the lives of African American women. Provides a broad introduction to the interdisciplinary field of African American and Women's Studies.
Crosslisted with HIST334.
- BAMS 345 AFRICAN AMERICAN LITERATURE II 3**
Literature by African American writers from the Harlem Renaissance to the present.
Crosslisted with ENGL345.
PREREQ: ENGL110.
- BAMS 347 STUDIES IN AMERICAN LITERATURE 3-6**
Special topics, ranging from the beginnings to contemporary American literature; may include studies in a single author or authors (e.g., the detective stories of Poe) or period and genre studies (e.g., the Harlem Renaissance or the humor of the old southwest). Variable content.
Crosslisted with ENGL347.
RESTRICTIONS: May be repeated once for credit when topics vary.
- BAMS 350 RACE AND WORK IN THE UNITED STATES 3**
Examines how race affects work-related experiences and opportunities of black workers in the United States. Explores ways in which race, class, gender and other systems of social organization operate to determine access to resources, how resource access is managed and restricted, and to what extent workers are able to achieve economic and occupational mobility. Also looks at cultural and social capital formation and their impact on Black workers' employment outcomes.
- BAMS 351 RACE AND ETHNICITY IN LATIN AMERICA 3**
Explores the multiple, complex and historically changing meanings of race and ethnicity in Latin America, and the consequences of discrimination towards specific groups. Regions covered are the Caribbean, Mexico and Central America, and the Andean, Atlantic and Southern Cone regions of South America.
Crosslisted with ANTH351.
- BAMS 355 INEQUALITY, CRIME AND JUSTICE 3**
Introduction to challenges in addressing crime in multiracial, multiethnic, class-stratified society. This context serves as backdrop for inquiry into crime causation, operations of the criminal justice system, and experiences of relevant actors.
Crosslisted with CRJU355.
- BAMS 356 STUDIES IN MODERN/CONTEMPORARY LITERATURE 3-6**
Study of selected topics in 20th century British, American and world literature, e.g., the contemporary epic novel, post-colonial writing and politics.
Crosslisted with ENGL356.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.
- BAMS 361 RACIAL INEQUALITY 3**
A detailed examination of racial inequality, including the social construction of race, the nature of oppression and advantage, government policies and resistance strategies. There will be attention to the status of men and women and social class diversity within racial-ethnic communities.
Crosslisted with SOCI361.
PREREQ: SOCI201.
- BAMS 373 PSYCHOSOCIAL ELEMENTS OF HIP-HOP IN THE BLACK COMMUNITY 3**
Critical look at evolution of Hip-Hop music and culture in the Black community. Focuses on how "street" elements of the Black community organized a socio-political and economic movement through their music.
- BAMS 381 UNDERSTANDING BLACK MEN IN THE STREETS AND IN PRISON 3**
Examines development of a street identity in Black men in the community and criminal justice system, particularly as a result of inadequate economic and educational opportunity.
- BAMS 382 STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH 3**
Consideration of multiculturalism as it pertains to American culture or literature in English from Africa and other non-European societies. Variable in historical range, geography, and genre.
Crosslisted with ENGL382.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.
- BAMS 391 RESEARCH METHODS IN BLACK AMERICAN STUDIES 1-4**
Develops methodology-based skills allowing for systematic thought and conduct of research on Black Americans in the African Diaspora.
- BAMS 395 PAN AFRICANISM 3**
Traces the rise, development and varied expressions of the drive towards the liberation and unity of black people on the continent (Africa) and in the diaspora. Covers liberation struggles in Africa and the Civil Rights movement in the United States.
Crosslisted with HIST395.
- BAMS 415 RACE, CLASS AND GENDER 3**
Analysis of current American social issues that show interrelationship of race, class and gender. Readings from sociology, Afro-American studies, feminist studies, history and literature.
Crosslisted with SOCI415.
- BAMS 416 PSYCHOLOGICAL PERSPECTIVES ON THE BLACK AMERICAN 3**
Experience of Black Americans as viewed from a psychological perspective. Psychological theory and research pertaining to Black Americans; reactions to oppression, collective behavior, personality development, and life styles.
Crosslisted with PSYC416.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- BAMS 418 RACE, GENDER AND POVERTY 3**
An examination of contemporary American poverty with attention to race and gender as fundamental dimensions of inequality. Social policy, employment and

family composition are key topics.
Crosslisted with SOCI418.
PREREQ: SOCI201.

- BAMS 431 CARIBBEAN PLANTATION SOCIETY AND ECONOMY 3**
Examines the establishment and operation of the plantation economy and the evolution of creole society in the Caribbean during slavery. Emphasis will be placed on staple production but attention will also be given to the development of the informal slave economy. Topics include rural and urban slavery, the structure of slave society, creole culture, mechanisms of social control and slave resistance. Crosslisted with HIST431.
- BAMS 439 PROBLEMS IN AFRICAN POLITICS 3**
Examination of selected topics in contemporary African politics. Will focus in-depth on aspects of politics and society in a specific region of Africa or will investigate in greater detail issues confronting Africa today such as economic structural adjustment, democratization and state-society relations. Crosslisted with POSC439.
- BAMS 440 THEMES IN BLACK AMERICAN STUDIES 3-9**
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 649 CIVIL RIGHTS LAW AND POLICY 3**
Examines the origin and evolution of the laws and policies that govern the rights of African-Americans and other people of color in the United States. Examines emerging approaches to civil rights scholarship and considers the implications of the Supreme Court's recent embrace of a conservative posture in civil rights issues. Crosslisted with UAPP649.
- BAMS 650 BLACK COMMUNITY STUDIES 3-6**
Investigation and analysis of various topics and developments of interest and significance to the Black community.
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**
Provides a forum for the discussion of topics in biology that relate to material being covered in BISC207. Papers from the scientific literature and/or world wide web may be discussed.
RESTRICTIONS: Open to freshman majors by faculty invitation only.
- BISC 103 PRINCIPLES OF BIOLOGY 3**
The study of biological principles at multiple levels of organization. Fosters biological literacy through the exploration of concepts, theories, practices, and new developments and their impact on individuals and society.
RESTRICTIONS: Open to non-majors only. Students may not receive credit for both BISC103 and BISC104.
- BISC 104 PRINCIPLES OF BIOLOGY WITH LABORATORY 4**
The study of biological principles at multiple levels of organization. Fosters biological literacy through the exploration of concepts, theories, practices and new developments and their impact on individuals and society. The laboratory component provides concrete examples of some of the principles discussed in the lecture component.
RESTRICTIONS: Open to non-majors only. Students cannot receive credit for both BISC103 and BISC104.
- BISC 105 HUMAN HEREDITY AND DEVELOPMENT 3**
Heredity and human affairs; pedigree analysis; physical and chemical basis of heredity; heredity and environment; radiation and mutation; heredity and diseases; and birth defects.
RESTRICTIONS: Open to non-majors only.
- BISC 106 ELEMENTARY HUMAN PHYSIOLOGY 3**
The structure and function of humans; mechanisms of maintenance and reproductive behavior.
RESTRICTIONS: Open to non-majors only.
- BISC 107 ELEMENTARY EVOLUTIONARY ECOLOGY 3**
Describes the fundamental processes in ecology and evolution: natural selection, adaptation, population biology, competition, predation, symbiosis and ecosystem dynamics.
RESTRICTIONS: Open to non-majors only.
- BISC 110 VIRUSES, GENES AND CANCER 3**
Biology of normal and malignant cells, and current knowledge of the genetic lesions causing malignancy. Environmental and inherited factors contributing to one's risk of cancer, and prospects for prevention. Standard and innovative means for detection and treatment of cancer.
RESTRICTIONS: Open to non-majors only.
- BISC 113 GENERAL BIOLOGY LABORATORY 1**
Structure and function of cells, and selected experiments dealing with the physiology of plants and animals.
COREQ: BISC103.
RESTRICTIONS: Offered only on Associate in Arts Program campuses.
- BISC 115 HUMAN HEREDITY AND DEVELOPMENT LABORATORY 1**
Laboratory exercises dealing with probability, selection, karyotyping and pedigrees of humans.
COREQ: BISC105.
RESTRICTIONS: Offered only on Associate in Arts Program campuses.
- BISC 116 ELEMENTARY HUMAN PHYSIOLOGY LABORATORY 1**
Selected experiments in physiology that demonstrate some of the concepts developed in BISC106, and a study of human anatomy.
COREQ: BISC106.
RESTRICTIONS: Offered only on Associate in Arts Program campuses.
- BISC 117 ELEMENTARY EVOLUTIONARY ECOLOGY LABORATORY 1**
Laboratory exercises to complement the subject matter of BISC107.
COREQ: BISC107.
RESTRICTIONS: Open to non-majors only. Offered only on Associate in Arts Program campuses.
- BISC 127 ENVIRONMENTS AND CULTURES IN CONFLICT 4**
Examines how individual cultures and advances in technology have impacted our environment. Potential solutions for resolving conflicts are developed by the students and presented in class. Relationships between human cultures, technology, and environmental degradation are stressed.
RESTRICTIONS: Open to non-majors only.
- BISC 152 BIOLOGY OF HUMAN SEXUALITY 3**
Discusses human sexual differentiation plus the anatomy and physiology of reproduction by considering the pertinent areas of genetics, cytology, embryology, endocrinology, immunology and physiology. Topics include genetic sex, gonadal sex, phenotypic sex, hormonal sex and behavioral sex.
RESTRICTIONS: Open to non majors only.
- BISC 171 MICROBIOLOGY IN MODERN SOCIETY 3**
Microbial activities and their effect on society and individuals.
RESTRICTIONS: Open to non-majors only.
- BISC 195 BIOLOGICAL EVOLUTION 3**
Historical background of the idea of evolution, the work of Charles Darwin, an exploration of the modern theory of evolution and the contributions to it from other biological disciplines, and philosophical issues related to evolution.
RESTRICTIONS: Open to non-majors only.
- BISC 207 INTRODUCTORY BIOLOGY I 4**
Molecular basis of life. Structure and function of cells, including signal transduction pathways. Energy transformations. Classical Mendelian genetics and the flow of information from DNA to RNA to proteins. Laboratory focuses on the testing of hypotheses, data analysis and scientific writing.
COREQ: CHEM101, CHEM103, CHEM105 or CHEM111.
RESTRICTIONS: Non-majors may take only one of BISC103, BISC104 or BISC207 to fulfill the group D requirement in the College of Arts and Sciences.
- BISC 208 INTRODUCTORY BIOLOGY II 4**
Mechanisms of evolution. Physiology of multicellular plants and animals. Principles of ecology with emphasis on the biology of populations. Laboratory focuses on testing of hypotheses, data analysis and scientific writing. Animal and plant anatomy also studied.
PREREQ: BISC207.
COREQ: CHEM102, CHEM104, CHEM106 or CHEM112.
- BISC 276 HUMAN PHYSIOLOGY 4**
Physiology of the basic organ systems of humans.
PREREQ: BISC207 or BISC208; and CHEM101, CHEM103, CHEM105 or CHEM111.
RESTRICTIONS: Open to non-majors only.
- BISC 280 FUNDAMENTALS OF BIOTECHNOLOGY 1**
Introduction to biotechnology in which students will be exposed to scientific, legal and ethical aspects of biotechnology.
COREQ: BISC208 (may be taken prior to BISC280).
- BISC 300 INTRODUCTION TO MICROBIOLOGY 4**
Major groups of microorganisms (algae, protozoa, fungi and bacteria) are studied. Emphasis is on the physiology, metabolism, diversity and interactions between and among each group and bacteria and their interactions with humans.

Lab included.
PREREQ: BISC208.

BISC 302 GENERAL ECOLOGY 3
Interactions between organisms and their environments, population dynamics and interactions, communities, energy transfer within an ecological system, and components of the ecosystem.
PREREQ: BISC208.

BISC 305 CELL PHYSIOLOGY 3
The structure and function of eucaryotic cell organelles. Emphasis on dynamic processes such as membrane transport, cell motility and protein trafficking. Current studies from the literature and experimental techniques are also stressed.
PREREQ: BISC208 and CHEM104.

BISC 306 GENERAL PHYSIOLOGY 3
Principles underlying function of organisms at the organ system level; ionic composition and regulation, respiration, circulation, nutritive metabolism, excretion and neuromuscular activity.
PREREQ: BISC208 and two semesters of chemistry.

BISC 312 GENERAL ECOLOGY LABORATORY 2
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 can be either a corequisite or a prerequisite.

BISC 315 EXPERIMENTAL CELL BIOLOGY 2
A series of inquiry-based, multisession laboratory experiences in cell biology. Major techniques include quantitative and fluorescent microscopy, cell culture and gene expression assays. Students will learn to keep laboratory notebooks, troubleshoot technical problems and design critical control experiments. A simulated grant proposal will be critiqued.
PREREQ: BISC208, BISC305, and CHEM104.

BISC 316 EXPERIMENTAL PHYSIOLOGY 2
A series of inquiry-based, multisession laboratory experiences in physiology. Experiments will be performed on various organ systems, using computerized data-acquisition systems and appropriate animal models. Students will learn to keep careful laboratory records, troubleshoot technical problems and design critical control experiments.
PREREQ: BISC208, CHEM104, and BISC306.

BISC 317 TROPICAL ECOLOGY 3
Basic aspects of tropical ecology including climatic, geological and adaptive components. Focuses on species' interactions and ecosystems. Includes at least two field trips.
PREREQ: BISC208.
RESTRICTIONS: Taught in Costa Rica.

BISC 318 TROPICAL AMPHIBIANS AND REPTILES 3
Topics in worldwide herpetology with a major focus on Costa Rica. Topics include evolution, extinct groups and the orders Gymnophiona, Caudata, Anura, Testudines, 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: 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 366 INDEPENDENT STUDY 1-6

BISC 401 MOLECULAR BIOLOGY OF THE CELL 3
Introduction to the molecular biology of eucaryotes and procaryotes. Topics include structure and function of proteins and nucleic acids; replication and repair of DNA; biosynthesis of RNA and proteins; membranes, transport, composition and function of the eucaryotic cell, chromosomes, viruses, the immune system and recombinant DNA.
PREREQ: BISC207 and one semester of organic chemistry.

BISC 403 GENETIC AND EVOLUTIONARY BIOLOGY 3
The physical and chemical basis of heredity, the nature and mechanisms of gene action, genes in populations, speciation.
PREREQ: BISC207 and one semester of organic chemistry.

BISC 408 MAMMALIAN HISTOLOGY 4
Microscopic organization, identification and functional anatomy of mammalian

organ systems and tissues.
PREREQ: BISC208.

BISC 411 EXPERIMENTAL MOLECULAR BIOLOGY 2
Introduction to the process of scientific inquiry as it relates to cellular molecular biology. Students perform a series of exercises emphasizing experimental design and data analysis. Students then pose related scientific questions, design experiments and present results in written, poster or oral format.
PREREQ: BISC208, BISC401, CHEM321 or CHEM213.

BISC 413 ADVANCED GENETICS LABORATORY 2
Areas to be covered include Mendelian genetics and eucaryotic gene mapping; bioinformatics and protein structure; karyotype analysis; population and evolutionary genetics. Computer simulations will illustrate each area. Problems will be posed for student groups to solve after a basic understanding of the phenomena has been acquired.
PREREQ: BISC208, BISC403.

BISC 415 VERTEBRATE DEVELOPMENTAL MORPHOLOGY 3
Introduces the basic principles of vertebrate development including the formation of the basic body plan and the molecular control of tissue morphogenesis. The importance of each developmental milestone will be illustrated by discussing the underlying causes of birth defects.
May be crosslisted with ANFS415.
PREREQ: BISC207 and BISC208.

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

BISC 435 WILDLIFE POPULATION DYNAMICS 3
Understand population processes by combining a discussion of theory and practical applications. Studies exponential, logistic, and age specific growth as well as predation, competition, disease, harvest, and metapopulations. Model building exercises actively used to understand wildlife population dynamics.
Crosslisted with ENWC435.
PREREQ: BISC302.

BISC 439 DEVELOPMENTAL NEUROBIOLOGY 3
Developmental biology of the nervous system, including cellular components, neural induction, neurogenesis and neuronal migration, cellular determination, axon outgrowth and pathfinding, synapse formation, programmed cell death, neurotrophic factors, neurodevelopmental disorders, and early critical periods.

BISC 440 CONSERVATION OF TROPICAL BIODIVERSITY 3
A 3-week intensive, field-based experience in the mechanics of conserving tropical biodiversity. Focuses on group projects quantifying and comparing the diversity of montane cloud forests, lowland rainforests and tropical dry forests.
Crosslisted with ENWC444.
RESTRICTIONS: Winter or Summer Session only. Taught in Costa Rica or Peru.

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: BISC208.

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

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

BISC 466 INDEPENDENT STUDY 1-6

BISC 468 RESEARCH 1-6

BISC 471 INTRODUCTORY IMMUNOLOGY 3
The biological basis of adaptive immunity including participating cells, cellular interactions, counted mechanisms and immunopathologies.
PREREQ: BISC208, BISC401, BISC411 or BISC305, BISC300.

BISC 480 VERTEBRATE NATURAL HISTORY 4
Biology of vertebrate organisms dealing specifically with adaptations to the environment, morphology, physiology and taxonomy.
PREREQ: BISC208.

- BISC 484 COMPUTER BASED GENETICS LABORATORY 3**
Explores the use of computer and laboratory tools in the study of inheritance and genomics. Use of genome databases and tools of bioinformatics, and apply those skills to design and carry out wet lab experiments, which will involve the isolation and manipulation of DNA and RNA from human and animal subjects.
PREREQ: BISC401 or BISC403.
- BISC 492 HUMAN AND MAMMALIAN CYTOGENETICS 3**
Introduction to the structure, function and behavior of eukaryotic chromosomes with special emphasis on those from human and mammalian species. Covers methods of chromosome study, gene mapping and medical cytogenetics.
PREREQ: BISC208.
RESTRICTIONS: BISC403 recommended in addition to prerequisite. Offered in spring of odd-numbered years.
- BISC 495 EVOLUTION 3**
Present status of the theory of biological evolution and its implications in the different areas of biology.
PREREQ: BISC208.
- BISC 498 TOPICS IN BIOLOGY 3-6**
Topics may vary from section to section. Information about each section is available in the Biology Office prior to registration.
PREREQ: BISC208 (or two BISC100-level courses).
RESTRICTIONS: Requires junior or senior status. May be taken more than once but only three credits can count towards the major.
- BISC 510 TOPICS IN MIDDLE SCHOOL BIOLOGY EDUCATION: GENETICS 3**
Strengthens the content understanding of the developmentally appropriate genetic concepts for middle school students. Instructors model effective inquiry-based classroom pedagogy and teachers engage in reflective discussions of how to enhance student appreciation of genetics.
RESTRICTIONS: Enrollment limited to in-service high school science educators.
- BISC 530 TOPICS IN BIOLOGY EDUCATION: NATURE OF SCIENCE AND EVOLUTION 3**
Strengthens understanding in key areas of evolutionary biology and the nature of science, using methods that model inquiry-based classroom practices. Discussions focus on best ways to enhance student understanding, and on dealing with controversies in the teaching of evolution in high school.
RESTRICTIONS: Enrollment limited to in-service high school science educators.
- BISC 600 BIOTECHNOLOGY AND MOLECULAR MEDICINE 3**
Application of molecular and cellular biology techniques and principles to the field of biotechnology. Stresses the applied side of science and focuses on the practical side of molecular biology and how scientists and companies reduce the basic knowledge to practice. Emphasis on product formation and the skills required to meet such goals. Covers tangential issues of biotechnology and the ethical choices made in developing clinical trial protocols.
PREREQ: Undergraduate course in biology or chemistry or permission of the instructor.
- BISC 601 IMMUNOCHEMISTRY 4**
Methods as basic as immunization and as complex as developing monoclonal antibodies. Methods used to investigate the genetics and protein structure of B-galactosidase.
PREREQ: BISC401 or biochemistry.
RESTRICTIONS: Requires permission of 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: BISC401 and BISC403.
- BISC 604 NUCLEIC ACIDS LABORATORY 4**
Introduces techniques of gene cloning, amplification, manipulation and expression.
PREREQ: BISC401.
RESTRICTIONS: Biochemistry recommended. Senior or graduate status required.
- BISC 605 ADVANCED MAMMALIAN PHYSIOLOGY 4**
Systemic mammalian physiology: cellular mechanisms, muscle, cardiovascular, respiratory, renal, digestive and endocrine systems. Emphasizes human physiology and includes discussions of primary literature in the field of physiology research.
PREREQ: BISC306 or instructor's approval.
RESTRICTIONS: Priority given to graduate students and seniors seeking research-related careers.
- BISC 612 ADVANCED CELL BIOLOGY 3**
Four major sections: (1) cell structure/function; (2) signaling mechanisms and cell fate; (3) protein biosynthesis and trafficking and (4) integrative cell biology. Requires interpreting and evaluating data from primary scientific literature.
RESTRICTIONS: Instructor approval required. Meets literature requirement for biology majors.
- BISC 615 VERTEBRATE DEVELOPMENTAL BIOLOGY 3**
Introduces the basic principles of vertebrate development including formation of the basic body plan and the molecular control of tissue morphogenesis. The importance of each developmental milestone will be illustrated by discussing the underlying causes of birth defects.
May be crosslisted with ANFS615.
PREREQ: BISC401 and BISC403.
RESTRICTIONS: Requires instructor approval.
- 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 invitro DNA replication, DNA footprinting, DNA melting and/or unwinding and gel retardation.
PREREQ: BISC401.
RESTRICTIONS: Limited to ten students. Preference given to bachelor of science degree students with a concentration in biotechnology.
- BISC 625 CANCER BIOLOGY 3**
Provides an integrated lecture series summarizing current knowledge in cancer biology. Topics include: statistics of incidence/survival, pathology, the process of chemical carcinogenesis and sources of carcinogens, genetic and epigenetic mechanisms and consequences, viral and hormonal carcinogenesis as well as current treatment options.
PREREQ: BISC207, BISC401, CHEM103, CHEM104, CHEM321.
RESTRICTIONS: Permission of instructor.
- BISC 626 NEUROSCIENCE I 4**
Structure and function of the sense organs, nervous system and motor systems in relation to integrated behavior.
Crosslisted with PSYC626.
PREREQ: BISC306, PSYC314, 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 crosslisted with PSYC627.
PREREQ: BISC306, PSYC310 or PSYC312, and PSYC314.
- BISC 630 ICHTHYOLOGY 4**
Biology of fishes including structure and function, reproduction, development, behavior, geographic distribution and systematics.
PREREQ: Physiology course.
- BISC 631 PRACTICE OF SCIENCE 3**
Uses historical, philosophical, and sociological perspectives to better understand the nature of modern science and its practice. Examines "science misconduct," and satisfies the NIH mandate requiring graduate training in "the responsible conduct of research."
May be crosslisted with CHEM631.
- BISC 634 ECOTOXICOLOGY AND RISK ASSESSMENT 3**
Principles of ecotoxicology are applied along with Environmental Risk Assessment (ERA) to solve environmentally related problems. Methodologies to evaluate the effects and fate of biological, chemical and physical stressors are provided along with case studies. Student teams will apply the concepts learned by conducting actual ERAs.
- BISC 635 WILDLIFE POPULATION DYNAMICS 3**
Studies exponential, logistic, and age specific growth as well as predation, competition, disease, and metapopulations. Model building exercises actively used to understand wildlife population dynamics.
Crosslisted with ENWC635.
RESTRICTIONS: Requires permission of instructor.
- BISC 637 POPULATION ECOLOGY 3**
Theoretical and experimental aspects of single species growth and multispecies interactions.
PREREQ: BISC302.
- BISC 639 DEVELOPMENTAL NEUROBIOLOGY 4**
Developmental biology of the nervous system, including cellular components, neural induction, neurogenesis and neuronal migration, cellular determination, axon outgrowth and pathfinding, synapse formation, programmed cell death, neurotrophic factors, neurodevelopmental disorders, and early critical periods.
RESTRICTIONS: Requires permission of instructor.
- BISC 641 MICROBIAL ECOLOGY 3**
Principles of microbial interactions in natural environments, including applications to industrial microbiology and certain types of pollution.
PREREQ: BISC300.
- BISC 643 BIOLOGICAL DATA ANALYSIS 3**
Single-Semester introduction to the numerical analysis of biological data in fields such as molecular and cellular biology. Emphasis on choosing and using the

correct analysis method for each experiment by using small number of relatively simple statistical tests.

- BISC 645 BACTERIAL EVOLUTION 3**
Explores the development of the enormous bacterial diversity beginning with current theories on the origin of life. Examines the evolution of viruses and the "directed evolution" controversy which concerns mechanisms of bacterial evolution. PREREQ: BISC300 or equivalent.
- BISC 654 BIOCHEMICAL GENETICS 3**
Covers the use of genetic model organisms to answer biological questions, including mapping and cloning of human disease genes and the creation of animal models for human genetic diseases. There is an emphasis on examples from the recent scientific literature and building scientific writing skills. PREREQ: BISC403 and BISC401; or permission of instructor.
- 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: BISC403.
- 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 665 ADVANCED MOLECULAR BIOLOGY & GENETICS 3**
Presents concepts and approaches regarding our current understanding of molecular biology and molecular genetics in eukaryotic organisms. Requires a solid background in biochemistry, cell biology and introductory molecular biology. RESTRICTIONS: Requires permission of instructor.
- BISC 671 CELLULAR AND MOLECULAR IMMUNOLOGY 4**
Introduces the basic concepts of immunology and describes how different immune responses can either protect the body from infection or lead to immunological based diseases. Focuses on cellular interactions and the resultant molecular responses that lead to immune protection. PREREQ: BISC401 or BISC305 or BISC300. RESTRICTIONS: Requires permission of instructor.
- BISC 675 CARDIOVASCULAR PHYSIOLOGY 3**
The physiology and biophysics of the mammalian heart and circulation. PREREQ: A physiology course at or above the 300-level.
- BISC 679 VIROLOGY 3**
Molecular biology of animal viruses. Virus structure and organization; mechanisms of penetration, replication, maturation and transformation. PREREQ: BISC401 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 counseling, multi-factorial inheritance and the genetics of cancer. PREREQ: BISC403.
- 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 805 MULTIDISCIPLINARY BIOTECHNOLOGY 3**
Introduces science, engineering, and business graduate students to challenges of conducting and managing scientific inquiry across disciplines and within industry. Focuses on biotechnology industry. Crosslisted with CHEG805.
- BISC 806 ADVANCES IN CELL AND ORGAN SYSTEMS 3**
Literature-based current topics in cell and organ systems. PREREQ: Requires permission of instructor. RESTRICTIONS: May be repeated up to nine credits when topics vary. Offered only in Spring.
- BISC 827 GRADUATE RESEARCH SEMINAR 0-1 PF**
Seminar allowing graduate students in the Department of Biology to report on the progress of their research projects. Both students and faculty attend presentations.
- BISC 833 SPECIAL TOPICS IN BIOLOGY 1-4**
Various topics in biology.

- BISC 864 RESEARCH TUTORIAL 1-8**
First year doctoral students will complete six weeks of research training in the laboratory of a Biological Sciences faculty member. Students may enroll in either one or two sections of BISC864 in a single semester. Students gain breadth of research training and are better able to identify appropriate dissertation advisors. RESTRICTIONS: Requires approval of instructor.
- BISC 868 RESEARCH 1-12**
- BISC 869 MASTER'S THESIS 1-6**
Independent research leading to the Master's Thesis.
- BISC 964 PRE-CANDIDACY STUDY 3-12 PF**
Independent doctoral dissertation research prior to completion of the Ph.D. Candidacy Examination.
- BISC 969 DOCTORAL DISSERTATION 1-12 PF**
Independent dissertation research after completion of the Candidacy Examination.

BUSINESS: MULTIDISCIPLINARY BUSINESS ADMINISTRATION

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

BIOMECHANICS AND MOVEMENT SCIENCE

- BMSC 601 MATH AND SIGNAL PROCESSING 3**
Mathematical techniques for research in biomechanics and related fields, with emphasis on methods useful for biomedical signal processing. Topics include Fourier analysis, matrix algebra, and a signal processing laboratory exercise. PREREQ: College calculus (MATH241 and 242 or equivalent).
- BMSC 630 HUMAN MOVEMENT CONTROL 3**
Examines theoretical, methodological and empirical issues required for understanding of control and coordination of human movement. Readings and group discussion of implication of issues raised in the literature. Development of proposal to study aspect of motor behavior. Crosslisted with PHYT630. RESTRICTIONS: Open to DPT Program students only.
- BMSC 666 SPECIAL PROBLEM 1-12**
- BMSC 686 MATHEMATICS FOR BIOMECHANICS 3**
Mathematical techniques for research in biomechanics and related fields, with emphasis on methods useful for biomedical signal processing. Topics include Fourier analysis, matrix algebra, and signal processing. Crosslisted with HESC686. PREREQ: MATH221 and MATH222 or equivalent.
- BMSC 865 SEMINAR 0 PF**
- BMSC 866 SPECIAL PROBLEM 1-12**
- BMSC 868 RESEARCH 1-6**
- BMSC 869 MASTER'S THESIS 1-6**
- BMSC 964 PRE-CANDIDACY STUDY 3-12 PF**
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.
- BMSC 969 DOCTORAL DISSERTATION 1-12 PF**

BIORESOURCES ENGINEERING

- BREG 113 INTRODUCTION TO SURVEYING 2**
Provides experience with use of equipment, instruments and fundamental techniques of plane surveying. Topics include: distance measurement, leveling, traversing, mapping, and calculation of areas and earth volumes. May be crosslisted with CIEG113. RESTRICTIONS: Requires knowledge of trigonometry. .
- BREG 223 SURVEYING 3**
Error propagation, distance measurement, tacheometry and trigonometric

leveling, traversing, route surveys, field astronomy, coordinate systems, and GPS. May be crosslisted with CIEG223.
PREREQ: EGTE104 or BREG113.

BREG 321 STORM-WATER MANAGEMENT 4
Hydrology for small urban/suburban/rural watersheds. Design of culverts, storm drains, spillways, vegetated waterways, and storm-water management systems.
PREREQ: EGTE215 or CIEG305.

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

BREG 621 NONPOINT SOURCE POLLUTION 3
Understanding sources, transport pathways, and transformations of important pollutants and toxic chemicals generated by anthropogenic activities. Topics include transport, transformation, and fate of these pollutants in watersheds. Impacts of these pollutants on soil, forest, and aquatic ecosystems using specific case studies.
PREREQ: BREG321 or CIEG440 or permission of instructor.

BREG 622 WATERSHED MODELING 3
Application and understanding of mathematical models for quantification and analysis of hydrologic processes. Understanding mechanistic concepts, assumptions behind models, and advantages and limitations associated with using models. Value of observed data in calibrating models and uncertainty associated with model predictions.
PREREQ: BREG321 or CIEG440 or permission of instructor.

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 or CIEG331.

BREG 666 SPECIAL PROBLEM 1-12

BUSINESS ADMINISTRATION

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

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

BUAD 110 BASICS OF BUSINESS 3
Introduction to business for majors to inform them about each of the functional areas of business through lectures, readings, discussions, guest speakers, cases and projects. Includes topics relating to operations, marketing, finance, management, accounting and management information systems, as well as business ethics, and critical thinking and decision making.
COREQ: ENGL110.
RESTRICTIONS: Open only to freshmen in the Alfred Lerner College of Business and Economics.

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 ECON152

BUAD 302 MARKETING RESEARCH 3
Focuses on the marketing research process as an aid in marketing decision making. Defining marketing problems, identifying marketing information needs, developing methods to gather information, and applying research results to marketing problems.
PREREQ: MATH202, BUAD301, and MISY160 or CISC101.

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: MATH202, and MISY160 or CISC101.

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 crosslisted with ECON341, POSC341.
PREREQ: ECON152.
RESTRICTIONS: Counts as a BUAD elective for BS candidates. Credit for BUAD341 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 364 BUSINESS ADMINISTRATION IN PRACTICE 3
Requires completion of at least 120 hours of a management, marketing, operations management, or international business internship with verification by the hiring company. Term paper relating the real-world duties and experiences of the internship to principles learned in traditional business courses also required.
RESTRICTIONS: Registration by permission of instructor only.

BUAD 366 INDEPENDENT STUDY 1-6

BUAD 382 INTERNATIONAL BUSINESS MANAGEMENT 3
Decision-making in the management of multinational business organizations. Problems involving constraints of government environment and organization structures. Evaluation of international business practices.

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 391 SEMINAR ON INTERNATIONAL MANAGEMENT 3
Seminar on selected topics in international management. Combines lectures and visits to local organizations. Research paper typically required.
PREREQ: BUAD309.
RESTRICTIONS: Taught abroad. Counts as BUAD elective for BS candidates.

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

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

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

BUAD 421 HUMAN RESOURCE MANAGEMENT 3
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.

BUAD 422 DESIGNING EFFECTIVE ORGANIZATIONS 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 inter- and intra-organizational processes.
PREREQ: BUAD309.

BUAD 423 NEGOTIATION 3
Improves negotiation and conflict resolution skills by introducing principles for effective negotiation and providing students with opportunities to develop their

skills through the use of simulation exercises. Topics include preparing for negotiation, strategies and tactics of negotiation, dealing with interpersonal conflict, and avoiding common mistakes when negotiating.
PREREQ: BUAD309.

BUAD 425 CURRENT ISSUES IN GLOBAL BUSINESS 3
Current topics and emerging issues in the changing global marketplace. May focus on regional issues, global business sectors, current issues in the globalization of business, or a combination of these.
PREREQ: Senior standing, and at least one of ACCT383, BUAD382, ECON340, or FINC415.

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

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

BUAD 444 ENTREPRENEURSHIP AND SMALL BUSINESS MANAGEMENT 3
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.

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

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

BUAD 448 DECISION SUPPORT SYSTEMS FOR OPERATIONS 3
Effective design and implementation of decision support for operations. Selection of appropriate models for decision support. Emphasis on project work in which an actual decision support system is designed and implemented.
PREREQ: BUAD306, MISY160.
RESTRICTIONS: Open to senior operations management majors only.

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

BUAD 466 INDEPENDENT STUDY 1-6

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

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

BUAD 471 ADVERTISING MANAGEMENT 3
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.

BUAD 472 MARKETING, SOCIETY AND THE ENVIRONMENT 3
Focuses on the interface between marketing management and the social-environmental

dynamics of the surrounding society. Students critically analyze concepts and practices relating to socially responsible marketing management to gain an understanding of emerging social and environmental issues relevant to marketing decision making.
PREREQ: BUAD301.

BUAD 473 BUYER BEHAVIOR 3
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.

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

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

BUAD 477 INFORMATION TECHNOLOGY APPLICATIONS IN MARKETING 3
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.
RESTRICTIONS: Open to marketing majors only.

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

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

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

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

BUAD 811 GLOBALIZATION AND BUSINESS 3
Assesses environmental, institutional, industrial, strategic, and organizational features of globalization and business. Considers frameworks that guide managers' understanding of globalization and business, how managers interpret the challenges and opportunities of globalization and the implications of globalization to professional development.

BUAD 820 DATA ANALYSIS AND QUALITY MANAGEMENT 3
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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BUAD 853 PROJECT PLANNING AND MANAGEMENT 1
Focuses on the innovation process. Various approaches to project planning and management are explored and specific project management techniques such as PACE and Stage Gate process are covered. The objective is to be able to plan an

innovation process, know the various tools that are available and to appropriately apply the tools to an innovation project. Learning assessed through a written exam involving a case application.
PREREQ: BUAD880.

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

BUAD 855 ETHICAL AND REGULATORY ISSUES FOR NEW VENTURES 1
Extension of the legal and regulatory module in the MBA core as it applies to technological innovation and new venture creation. Content may vary depending on students' interests.
PREREQ: BUAD840.

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

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

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

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

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

BUAD 870 UNDERSTANDING PEOPLE IN ORGANIZATIONS 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 experiences.

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

BUAD 875 STRATEGIC HUMAN RESOURCES 3
Examines the personnel/human resources 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 877 SKILLS FOR CHANGE AGENTS 3
Skill and ability for driving change at the individual, team, and organization levels. Team development skills, leadership skills, and negotiation skills are emphasized through simulation exercises.

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

BUAD 879 NEGOTIATION AND CONFLICT RESOLUTION 3
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. Negotiation is broadly defined to include many varieties of bargaining, third party dispute intervention and organizational justice. PREREQ: BUAD870.

BUAD 880 MARKETING MANAGEMENT 3
Management of marketing functions in modern profit and non-profit enterprises. Introduction to the marketing management process. PREREQ: ACCT800 and ECON503.

BUAD 881 RESEARCH METHODS FOR MARKETING DECISIONS 3
Focuses on the techniques of research design, data collection, and data analysis for making marketing decisions. Helps students develop an appreciation for the potential contributions and limitations of marketing research data, enabling them to evaluate marketing research activities. Emphasizes interpretation, not computation, from statistical analyses. PREREQ: BUAD820 and BUAD880.

BUAD 882 INTERNATIONAL MARKETING MANAGEMENT 3
Develops managerial decision-making skills in several areas related to international/global marketing such as environmental analysis, planning/organization, marketing research, segmentation, targeting and positioning/competitive analysis, and method of entry. PREREQ: BUAD880.

BUAD 883 PRODUCT AND PRICE MANAGEMENT 3
Integrates topics in product management and pricing strategy. Special emphasis is given to the use of conceptual frameworks and analytical methods that may be used to improve product and price decisions. The concepts and methods are applied to real-world case studies. PREREQ: BUAD880.

BUAD 884 SPECIAL TOPICS IN MARKETING 1-3
Examines selected current marketing topics: e.g., strategy development, opportunity assessment, modeling and marketing programming. Individual inquiry is stressed. PREREQ: BUAD880.

BUAD 885 MARKETING CHANNELS 3
Analyzes marketing channels as social, economic and political systems. Strong emphasis placed on understanding the behavioral dimension of the channel relationship after focusing on the economic and structural aspects of retailing, wholesaling, and physical distribution. Governmental and other constraints on channel activities are also studied. PREREQ: BUAD880.

BUAD 886 ADVERTISING STRATEGY 3
For those with little or no prior experience in advertising. Intended to improve students' skills with respect to determining advertising strategy. Features a mixture of lecture, case study analysis, class discussion, and team development and presentation of an entire advertising campaign. PREREQ: BUAD880.

BUAD 887 BUYER BEHAVIOR 3
Applied concepts from the social sciences to study factors that influence the acquisition, consumption and disposition of products, services, and ideas. Covers: 1) buyer decision processes; 2) influences on consumer decisions and consumption patterns; and 3) the relationship between buying behavior and strategic decision making. PREREQ: BUAD880.

BUAD 888 ADVANCED MARKETING MANAGEMENT AND STRATEGY SEMINAR 3
Focuses on the issues faced by senior and middle level marketing executives in an organization. Emphasizes developing a comprehensive marketing strategy that is consistent with corporate plans. Issues explored include: opportunity assessment and competitive analysis, segmentation and positioning, and the development of integrated marketing mix programs. PREREQ: BUAD880.

BUAD 889 INDUSTRIAL MARKETING 3
Studies the marketing of goods and services to businesses, institutions, and the government. Covers organizational buying behavior, product/market planning, sales force and distribution management, pricing and promotion from the perspective of both the buyer and the seller. PREREQ: BUAD880.

BUAD 890 CORPORATE STRATEGY 3
Emphasizes total organization function and performance in a global environment. Examines general management responsibilities for determining objectives and future strategies and seeking commitment for their implementation, integrates functional course concepts to enhance decision making and communication skills through individual and group analyses of specific companies. PREREQ: FINC850, BUAD831, BUAD870, BUAD880.

BUAD 892 MARKETING STRATEGY SIMULATION 3
Uses a computer simulation to help students integrate marketing concepts learned in core and elective classes. PREREQ: BUAD880.

BUAD 898 PROFESSIONAL PROJECT SEMINAR 3
Students are required to design and implement a professional field project, compile a portfolio or report of their project and make an oral presentation. Provides a forum for consultation, advice and support from faculty and fellow students. May be taken twice for up to 6 credits. PREREQ: Must have completed at least 12 credits in the MS in OEDC program or permission of instructor.

BUAD 899 BUSINESS CONSULTING PROJECT 3
Designed to assist students gain an integrative, practical and applied industry experience by solving a real life industry problem in a group setting. Projects may be set up in different functional areas and/or concentrations, e.g., New Venture Creation, Marketing, Interdisciplinary Projects, etc. RESTRICTIONS: MBA advanced elective to be taken after completing the core and required courses.

COGNITIVE SCIENCE

CGSC 202 HUMAN EVOLUTION AND THE FOSSIL RECORD 3
A survey of the human fossil record from the origin of the human species to the establishment of agriculture. Includes evolutionary theory, anatomical interpretation and reconstruction of early social behavior. Crosslisted with ANTH202.

CGSC 205 ANTHROPOLOGY AND HUMAN NATURE 3
Archaeological, biological and cultural anthropology organized around the theme of human nature. Crosslisted with ANTH205.

CGSC 266 SPECIAL PROBLEM 1-3

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 the 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
Study of the brain mechanisms underlying hunger, sex, aggression, learning, memory, perception, sleep and waking. Crosslisted with PSYC314. PREREQ: Grades of C- or better in PSYC207 and PSYC209. RESTRICTIONS: Open to psychology majors and minors only.

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

CGSC 330 PHILOSOPHY OF MIND 3
Coverage of central issues in the philosophy of mind including such topics as the relation between mind and body, the nature of thought, consciousness, perception, personal identity and the relation of cognitive psychology, neuroscience and computer science to the philosophy of mind. Crosslisted with PHIL330.

CGSC 340 COGNITION	3	Survey of major themes in human thought processes, concept formation, problem solving, creativity, language use and cognitive development. Crosslisted with PSYC340. PREREQ: Grades of C- or better PSYC207 and PSYC209. RESTRICTIONS: Open to psychology majors and minors only.
CGSC 366 INDEPENDENT STUDY	1-3	
CGSC 404 ANIMAL MINDS	3	Examines philosophical, theoretical, and methodological issues raised by study of animal cognition and behavior. Topics may include mental continuity between human and nonhuman animals, animal communication and deception, self-recognition, emotions, culture, as well as the ethical treatment of animals. May be crosslisted with PHIL404.
CGSC 418 MEANING AND LANGUAGE USE	3	Introduction to theories of meaning based on the notion of truth and their application to language use. Crosslisted with LING418. PREREQ: LING101.
CGSC 421 PHILOSOPHY, BIOLOGY, SOCIETY	3	Recent topics in philosophy of biology, with emphasis on those related to self, community, and society at large. Topics may include intelligent design, evolutionary altruism, psychological altruism, evolutionary psychology, cultural evolution, evolutionary game theory, and evolutionary ethics. May be crosslisted with PHIL421.
CGSC 450 RECENT TOPICS IN PHILOSOPHY OF MIND	3	Recent topics in the philosophy of mind such as theory of mind, naturalized semantics, animal cognition, evolution of language. Crosslisted with PHIL450.
CGSC 451 TOPICS IN COGNITIVE SCIENCE	3	Current topics in cognitive science. PREREQ: CGSC270. RESTRICTIONS: May be repeated for credit when topics vary.
CGSC 466 INDEPENDENT STUDY	1-6	
CGSC 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. Crosslisted with CISC481. PREREQ: CISC280 and CISC304. RESTRICTIONS: Credit cannot be received for both CISC481 and CISC681.
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: LING101.
CGSC 604 ANIMAL MINDS	3	Examines philosophical, theoretical, and methodological issues raised by study of animal cognition and behavior. Topics may include mental continuity between human and nonhuman animals, animal communication and deception, self-recognition, emotions, culture, as well as ethical treatment of animals. May be crosslisted with PHIL604.
CGSC 618 MEANING AND LANGUAGE USE	3	A graduate introduction to theories of meaning based on the notion of truth and their application to language use. Crosslisted with LING618.
CGSC 621 PHILOSOPHY, BIOLOGY, SOCIETY	3	Recent topics in philosophy of biology, with emphasis on those related to self, community, and society at large. Topics may include intelligent design, evolutionary altruism, psychological altruism, evolutionary psychology, cultural evolution, evolutionary game theory, and evolutionary ethics.
CGSC 630 NEURONS AND NETWORKS	3	Introduction to computational neuroscience: computing by real and artificial neurons and networks, and modeling of brain function. Covers theoretical background and involves hands-on projects to explore processing of sensory information, pattern discrimination, learning, memory and behavior. Crosslisted with PSYC630. RESTRICTIONS: Requires permission of instructor.
CGSC 642 MENTAL REPRESENTATION AND MEMORY	3	Human memory can be conceptualized in terms of representation and information storage within various interrelated mental systems. Critically evaluates research on human memory and representation within the context of major cognitive models. Crosslisted with PSYC642. RESTRICTIONS: Requires permission of instructor.
CGSC 650 RECENT TOPICS IN THE PHILOSOPHY OF MIND	3	Recent topics in the philosophy of mind such as theory of mind, naturalized semantics, animal cognition, evolution of language. Crosslisted with PHIL650.
CGSC 651 TOPICS IN COGNITIVE SCIENCE	3	Current topics in cognitive science. RESTRICTIONS: May be repeated for credit when topics vary.
CGSC 666 SPECIAL PROBLEM	1-12	
CGSC 670 ELEMENTS OF COGNITIVE SCIENCE	3-6	An introduction to the interdisciplinary study of the mind. Concentrates on interdisciplinary (linguistic, psychological, anthropological, philosophical and computational) approaches to the domains of language and visual perception and other areas of cognition, as well as the role of representation and algorithm in theories of processing and development.
CGSC 671 DISCOVERING HUMAN LANGUAGE: INTRODUCTION TO FIELD LINGUISTICS	3	Examines how languages are put together through a face-to-face encounter with an unknown language. Determine how this language - and human language in general - is constructed. Also learn about culture, people and even the food where the language is spoken. Crosslisted with LING670. PREREQ: LING101, LING609, LING610, LING677 or equivalent experience.
CGSC 681 ARTIFICIAL INTELLIGENCE	3	Programming techniques for problems not amenable to algorithmic solutions. Problem formulation, search strategies, state spaces, applications of logic, knowledge representation, planning and application areas. Crosslisted with CISC681. PREREQ: CISC220 and CISC304 or equivalent. RESTRICTIONS: Credit cannot be received for both CISC681 and CISC481.
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: LING101.
CGSC 848 SEMINAR IN LANGUAGE DEVELOPMENT	3	Covers aspects of semantic, syntactic and phonological development through examination of current research and theory in the field. Treats educational implications of language development. Crosslisted with EDUC848.
CGSC 850 TOPICS IN EXPERIMENTAL METHODS	3	Detailed examination of one or more issues in cognitive science studied by the use of experimental methods. RESTRICTIONS: May be repeated for credit when topics vary.
CGSC 866 INDEPENDENT STUDY	1-12	
CGSC 890 STUDIES IN LINGUISTICS	3-9	Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing. Crosslisted with LING890.
<hr/> CHEMICAL ENGINEERING <hr/>		
CHEG 009 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. PREREQ: A minimum grade of C- in MATH242. COREQ: MATH243.

CHEG 166	SPECIAL PROBLEM	1-3
RESTRICTIONS: Cannot count toward graduation in chemical engineering.		
CHEG 231	CHEMICAL ENGINEERING THERMODYNAMICS	3
The first law energy balance; the entropy balance; thermodynamic constitutive equations for gases and liquids; thermodynamic cycles and energy conversion; and stability. Kinetic Theory and Partition functions. PREREQ: A minimum grade of C- in CHEG112 or, for environmental engineering majors, in CIEG233. A minimum grade of C- in MATH243.		
CHEG 266	SPECIAL PROBLEM	1-3
RESTRICTIONS: Cannot count toward graduation in chemical engineering.		
CHEG 305	APPLIED MATHEMATICS FOR CHEMICAL ENGINEERING	3
A special applied mathematics course designed for chemical engineering majors. Emphasis is given on the interaction between mathematical theory and its engineering applications. Crosslisted with MATH305. PREREQ: A minimum grade of C- in MATH243 and CHEG112. RESTRICTIONS: For chemical engineering majors only.		
CHEG 320	ENGINEERING ECONOMICS AND RISK ANALYSIS	3
Introduction to chemical process simulation, process safety, and the principles of engineering economics, uncertainty and risk assessment within the context of chemical engineering analysis and design. PREREQ: A minimum grade of C- in MATH305 and CHEG325.		
CHEG 325	CHEMICAL ENGINEERING THERMODYNAMICS	3
A continuation of CHEG231. The thermodynamics of mixtures; phase and chemical equilibrium. Application to staged separation processes, particularly distillation. PREREQ: A minimum grade of C- in CHEG231.		
CHEG 332	CHEMICAL ENGINEERING KINETICS	3
Systematic description of rates of homogeneous and heterogeneous chemical reactions of industrial importance. Application of these principles to analysis and design of chemical reactors. PREREQ: A minimum grade of C- in MATH305, CHEG325 and CHEM444		
CHEG 341	FLUID MECHANICS	3
Theory of flow of incompressible viscous and nonviscous fluids; flow of non-Newtonian fluids; empirical correlations for laminar and turbulent flow; and applications in chemical processing. PREREQ: A minimum grade of C- in CHEG231 and MATH305.		
CHEG 342	HEAT AND MASS TRANSFER	3
Teaches proficiency in engineering analysis of mass contactors and heat exchangers. Learn use of transport theory required to quantify analysis and to tailor experiments needed for the design, operation and control of laboratory, pilot or commercial scale equipment. PREREQ: Minimum grade of C- in CHEG341, or for environmental engineering majors, in CIEG305.		
CHEG 345	CHEMICAL ENGINEERING LABORATORY I	3
Laboratory studies demonstrating the principles of fluid mechanics, reaction engineering, heat transfer, mass transfer and thermodynamics. Emphasis on correlation of experimental results and on written and oral presentation. PREREQ: A minimum grade of C- in CHEG325, CHEG332 and CHEG341 COREQ: CHEG342.		
CHEG 366	INDEPENDENT STUDY	1-6
CHEG 401	CHEMICAL PROCESS DYNAMICS AND CONTROL	3
Analysis of transient behavior of chemical processing equipment and chemical reactors. Modeling and identification of process systems. Design of linear control systems. Introduction to model-based, multivariable and statistical process control. PREREQ: A minimum grade of C- in MATH305, CHEG332 and CHEG342. COREQ: CHEG443.		
CHEG 432	CHEMICAL PROCESS ANALYSIS	3
A study of the economic/energy utilization/ environmental principles of conceptual process design. The optimization of a design along with the safety and ethics issues are taught by several case process synthesis studies. PREREQ: A minimum grade of C- in CHEG320, CHEG332, CHEG401 and CHEG443.		
CHEG 443	MASS TRANSFER OPERATIONS	3
Application of chemical engineering fundamentals to the analysis and design of mass transfer processes for separation and purification. Applications of computer-aided design for distillation-based separations. Examples involving absorption, extraction, membrane separations etc. with special emphasis on bioseparations. PREREQ: A minimum grade of C- in CHEG325 and CHEG342.		
CHEG 445	CHEMICAL ENGINEERING LABORATORY II	3
Intensive laboratory experiments illustrate the application of chemical and		

physical principles to industrial processes. Expands upon CHEG332 and CHEG443. Technical report writing emphasized.
PREREQ: A minimum grade of C- in CHEG332, CHEG342 and CHEG345.
COREQ: CHEG443.

CHEG 460	INTRODUCTION TO SYSTEMS BIOLOGY	3
Systems biology approach, mathematical modeling of biological systems; examples from biomedical and agricultural research areas, biotechnology, industrial processes, and others. Differential equations, stochastic, feedback and control, or network models are discussed. Hands-on work via PBL modules. Crosslisted with MATH460. PREREQ: CHEM527, MATH535 and one of BISC302, 305, 306, 401 or 403.		
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. PREREQ: A minimum grade of B in CHEG345.		
CHEG 474	CHEMICAL ENGINEERING PROJECTS	3
A continuation of CHEG473.		
CHEG 595	INTELLECTUAL PROPERTY FOR ENGINEERS AND SCIENTISTS	3
Methods of protecting intellectual property. Patents, trademarks, copyrights, trade secrets and unfair methods of competition, including analyses of significant court decisions in each area. Directed to innovators in all fields interested in legal protection of their ideas.		
CHEG 600	INTRODUCTION TO 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.		
CHEG 601	STRUCTURE AND PROPERTIES OF POLYMER MATERIALS	3
Measurement and control of the microstructure and properties of solid polymers. Structure generation, structure-property models and effects of processing on properties. Crosslisted with MSEG601. PREREQ: MSEG302.		
CHEG 604	PROBABILITY AND STATISTICS FOR ENGINEERING PROBLEM SOLVING	3
Fundamental approach to modeling, characterization and analysis of random phenomena with the objective of providing students with the basic principles, methods and tools for solving engineering problems involving randomly varying phenomena. Application areas explored include experimental design, manufacturing, system reliability, and cellular biology. PREREQ: MATH302 or equivalent with permission of instructor.		
CHEG 606	INTRODUCTION TO CATALYSIS	3
Introduction to modern principles of catalysis with emphasis on industrial catalytic reactions, mechanisms and kinetics. Principles of homogeneous organometallic catalysis, supported-metal and solid acid heterogeneous catalysis. PREREQ: CHEM331 and CHEM444.		
CHEG 612	APPLIED PROCESS HEAT TRANSFER	3
Principles of heat transfer by conduction, convection and radiation illustrated through the case study approach. Emphasis on analyzing heat balance and heat transfer equations with their proper boundary conditions. PREREQ: CHEG342.		
CHEG 614	SPECIAL TOPICS IN ENERGY	3
Introduces fundamental and engineering aspects of energy production technology with emphasis on emerging technologies such as microreactors, fuel cells and others. PREREQ: CHEG320 and CHEG322 or equivalents.		
CHEG 615	SPECIAL TOPICS IN MIXING	3
Introduces basic principles of fluid dynamics, rheology and turbulence that dictate the mixing behavior required to implement a desired process result. Agitation in vessels and pipeline and viscous mixing discussed. Emphasis on recent research on the effects of mixing on chemical reactions. PREREQ: CHEG341.		
CHEG 616	CHEMISTRY AND PHYSICS OF SURFACES AND INTERFACES	3
Fundamental and engineering aspects of metal, semiconductor, and oxide surfaces; their structure and defects, characterization, electronic properties, adsorption and reaction kinetics and thermodynamics. Applications to catalysis, microelectronics, and environment sensitive behavior. May be crosslisted with MSEG616. PREREQ: CHEG342 and CHEM444. RESTRICTIONS: Open to seniors and graduate students only.		

- CHEG 617 COLLOID SCIENCE AND ENGINEERING 3**
Surface thermodynamics and intermolecular forces are related to the properties of colloidal dispersions and micellar and surfactant structures. Applications to biological systems, nanotechnology, powder dispersions and supramolecular structures.
PREREQ: CHEG325 and CHEM444.
- CHEG 620 BIOCHEMICAL ENGINEERING 3**
Application of chemical engineering principles to analyze different molecular engineering approaches, evaluate bioreactors and product recovery processes, analyze cellular engineering approaches and critically evaluate primary bioengineering data from literature and laboratory experiments.
PREREQ: MATH243 and CHEM527 or CHEM641 and CHEM642.
- CHEG 621 METABOLIC ENGINEERING 3**
Focuses on design and control of cellular metabolism and includes analysis of metabolic function using systems engineering and molecular biology tools. Goals are to learn computational approaches for analyzing metabolic behavior, and experimental techniques to measure cellular components, metabolites, proteins and nucleic acids.
PREREQ: CHEM527 or CHEM641; MATH305.
RESTRICTIONS: Open only to graduate students, seniors and juniors.
- CHEG 622 CHEMICALS, RISK AND THE ENVIRONMENT 3**
Develops the foundation for understanding the transport and fate of chemical materials in the environment, and how these materials may possibly affect human health and ecology. The principles of heat, mass and momentum transfer, and chemical reaction kinetics are used to develop a quantitative understanding of transport and fate. These are used in conjunction with risk analysis and risk assessment practices to understand how environmental policy evolves.
PREREQ: CHEG325 and CHEG341.
COREQ: CHEG342.
- CHEG 623 RESEARCH TUTORIAL 1-3**
First year doctoral students complete research training in the laboratory of a faculty member and report on the progress of their research training experience.
RESTRICTIONS: May enroll in one or two sections in a single semester.
- CHEG 625 GREEN ENGINEERING 3**
Design, commercialization and use of processes and products which are feasible and economical while minimizing generation of pollution at the source and risk to human health and environment.
- CHEG 649 MOLECULAR BIOPHYSICS 3**
Biophysical principles and methods: thermodynamic and kinetic analysis of folding; protein-nucleic acid interactions; ligand binding; spectroscopy; structural methods; modeling; calorimetry; ultracentrifugation; SPR. Problem solving in macromolecular interactions: protein refolding; altering ligand affinity; increasing protein stability; drug design and HTS; protein expression and solubility; protein engineering.
May be crosslisted with CHEM649.
PREREQ: Introductory-level courses in chemistry, physics biochemistry.
- 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
COREQ: CHEG443.
- CHEG 801 PROCESS CONTROL AND DYNAMICS 3**
Advanced concepts on MIMO system modeling, identification, analysis and control appropriate to the chemical and allied industries. Model Predictive Control; robust control and Nonlinear control; statistical methods. Introduction to control systems in physiological processes.
PREREQ: Undergraduate control course.
- CHEG 805 MULTIDISCIPLINARY BIOTECHNOLOGY 3**
Introduces science, engineering, and business graduate students to challenges of conducting and managing scientific inquiry across disciplines and within industry. Focuses on biotechnology industry.
May be crosslisted with BISC805, BUAD805, CHEM805.
- CHEG 823 TRANSMISSION ELECTRON MICROSCOPY IN MATERIALS SCIENCE 3**
Transmission electron microscope, lens defects and resolution. Diffraction and Kikuchi pattern formation and analysis. Image formation: kinematical and dynamical theories of electron diffraction. Burger's vector and other fault analysis. Convergent beam and microdiffraction techniques. High resolution electron microscopy.
Crosslisted with MSE823.
- CHEG 825 CHEMICAL ENGINEERING THERMODYNAMICS 3**
Applications of classical and molecular thermodynamics to industrial problems in chemical and phase equilibrium. Topics include nonideal solutions, high pressure systems, complex reaction equilibria, generalized correlations and equations of state.
PREREQ: CHEG325 and CHEM444.

- CHEG 827 CHEMICAL ENGINEERING PROBLEMS 2-3**
The application of numerical methods for the solution of chemical engineering problems. Linear and nonlinear analysis. Numerical methods applied to the solution of ODE's, PDE's and optimization problems with applications to fluid flow, heat and mass transfer reaction engineering. Monte-Carlo and molecular dynamics.
PREREQ: Undergraduate linear algebra and differential equations.
- CHEG 828 STATISTICAL THERMODYNAMICS 2-3**
A discussion of the concepts of classical statistical mechanics, with special emphasis on applications, thermodynamic modeling and physical properties correlations.
PREREQ: CHEG825 or equivalent.
- CHEG 831 CHEMICAL ENGINEERING PRINCIPLES I 3**
Equips incoming graduate students with necessary applied mathematical background emerging from a discussion of Chemical Engineering Principles in Kinetics, Thermodynamics, and Transport phenomena. Linear algebra, ordinary differential equations, and stochastic differential equations are typical topics covered.
- CHEG 835 APPLIED CHEMICAL KINETICS 3**
Principles of collision theory and transition-state theory. Development of reaction rate expressions based on networks of elementary reaction steps. Analysis of non-isothermal and non-steady state reactors.
PREREQ: Requires undergraduate reaction engineering and physical chemistry.
- CHEG 836 ADVANCED CHEMICAL KINETICS 3**
Examination of the physical interpretation of kinetic rate expressions via elementary reaction steps, transition state theory, estimation of enthalpies and entropies of activation. Development of reaction networks from elementary kinetic steps using concepts of the steady-state approximation, rate determining step and most abundant reaction intermediate. Application to thermal cracking, pyrolysis, polymerization, combustion and heterogeneous catalysis.
- CHEG 841 CHEMICAL ENGINEERING PRINCIPLES II 4**
Second of two required courses (first one CHEG831) to equip graduate students with applied mathematical and statistical background emerging from a discussion of Chemical Engineering Principles in Kinetics, Thermodynamics and Transport Phenomena. Topics include vector and tensor analysis, partial differential equations, statistical analysis of experiments, design of experiments and molecular dynamics, and stochastic simulations.
- CHEG 845 ADVANCED TRANSPORT PHENOMENA 4**
Principles and applications of momentum, mass and energy transfer. Topics include molecular analysis of transport, continuum and macroscopic conservation and constitutive equations, scaling and dimensional analysis, and exact and approximate solutions for problems of practical importance.
PREREQ: Undergraduate studies in transport phenomena.
- CHEG 868 RESEARCH 1-9**
- CHEG 869 MASTER'S THESIS 1-6**
Laboratory study of some phase of chemical engineering on which information is lacking, with the goals of contributing new data and theory. Although supervised, work will be independent in nature to encourage the development of initiative.
- CHEG 964 PRE-CANDIDACY STUDY 3-12 PF**
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.
- CHEG 969 DOCTORAL DISSERTATION 1-12 PF**

CHEMISTRY AND BIOCHEMISTRY

- CHEM 100 CHEMISTRY AND HUMAN ENVIRONMENT 3**
Non-mathematical introduction to chemistry, emphasizing how chemistry can be employed to help understand phenomena in the student's environment, demonstrating relationships between chemistry and energy, food, toxic and solid waste, air and water pollution, drugs and other student-generated topics.
- CHEM 101 GENERAL CHEMISTRY 4**
Fundamental laws of chemical action and the properties, uses and methods of preparation of the more important elements and their compounds. Includes 42 hours of laboratory work that introduces basic experiments in general chemistry.
RESTRICTIONS: One year of high school chemistry recommended; high school algebra or concurrent enrollment in MATH010 or higher mathematics course strongly recommended. Only one course among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.
- CHEM 102 GENERAL CHEMISTRY 4**
A continuation of CHEM101. Includes 42 hours of laboratory work that is a

continuation of the laboratory experience begun in CHEM101.

PREREQ: CHEM101.

RESTRICTIONS: Only one course among CHEM102, CHEM104 and CHEM112 can count toward graduation.

CHEM 103 GENERAL CHEMISTRY 4

Matter, the changes that matter undergoes, and the laws governing these changes, with greater emphasis on atomic and molecular structure, chemical bonding, and energy relationships. Properties of gases, liquids, solids and solutions. Includes 42 hours of laboratory work.

COREQ: MATH114 or higher.

RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. One year of high school chemistry strongly recommended. Only one course among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.

CHEM 104 GENERAL CHEMISTRY 4

Continuation and application of CHEM103 with additional emphasis on chemical spontaneity, equilibrium, rates of reactions, electrochemistry and organic chemistry. Includes 42 hours of laboratory work.

PREREQ: CHEM101, CHEM103 or CHEM105.

RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. Only one course among CHEM102, CHEM104 and CHEM112 can count toward graduation.

CHEM 105 GENERAL CHEMISTRY 4

Nuclear chemistry, periodicity, structure and bonding, states of matter, classes of reactions, stoichiometry, solution chemistry, chemical kinetics, equilibria and electrochemistry.

COREQ: MATH101.

RESTRICTIONS: For nursing majors who will continue with CHEM106. High school algebra required in lieu of corequisite; one year of high school chemistry recommended. Only one course from among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.

CHEM 106 ELEMENTARY BIOORGANIC CHEMISTRY 5

Survey of organic chemistry and biochemistry, with emphasis on the latter. Includes one three-hour laboratory per week that deals with selected concepts in biochemistry and bioorganic chemistry.

PREREQ: CHEM105.

RESTRICTIONS: For nursing majors.

CHEM 111 GENERAL CHEMISTRY 3

Fundamental laws of chemical action with emphasis on atomic structure, chemical bonding and important classes of substances.

PREREQ: One year of high school chemistry, two years strongly preferred.

COREQ: CHEM119, and MATH115 or higher math course.

RESTRICTIONS: For biochemistry, chemistry, and chemical engineering majors. Only one course among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.

CHEM 112 GENERAL CHEMISTRY 3

Introduction to most of the major sub-fields of chemistry: descriptive inorganic chemistry, coordination chemistry, organic chemistry, nuclear chemistry, thermodynamics, kinetics and electrochemistry.

PREREQ: CHEM103 or CHEM111.

COREQ: CHEM120.

RESTRICTIONS: For biochemistry, chemistry, and chemical engineering majors. Only one course among CHEM102, CHEM104 and CHEM112 can count toward graduation.

CHEM 119 QUANTITATIVE CHEMISTRY I 3

Chemical equilibrium theory applied to basic gravimetric and volumetric analyses. Includes one three-hour laboratory per week.

PREREQ: One year of high school chemistry, two years strongly preferred.

COREQ: CHEM111 and MATH115.

RESTRICTIONS: For biochemistry, chemistry, and chemical engineering majors.

CHEM 120 QUANTITATIVE CHEMISTRY II 3

The theory of analytical chemistry with introductory practice in UV-visible spectroscopy, electrochemistry and separation science. Includes two three-hour laboratories per week.

PREREQ: CHEM104, or CHEM111 and CHEM119 COREQ: CHEM112.

RESTRICTIONS: For biochemistry and chemistry majors.

CHEM 165 FRESHMAN MAJORS SEMINAR 0 PF

Introduction to the CHEM/BIOC Department, as well as to the CHEM/BIOC professions. Discussion topics include courses and curricula, subdisciplines in the field, communication tools, and career and research opportunities. Social activities help integrate new students into the Department community.

RESTRICTIONS: Freshmen majoring in CHEM, BIOC, or XCE only.

CHEM 166 SPECIAL PROBLEM 1-12 PF

CHEM 210 SCIENCE OF COLOR PHENOMENA 4

Introduction to basic physical and chemical principles which describe nature of light and the phenomena of color. Targeted for non-science majors who seek a descriptive understanding of scientific principles underlying formation of color phenomena found in nature and works of art.

Crosslisted with ARTC210.

PREREQ: High school chemistry and algebra.

CHEM 213 ELEMENTARY ORGANIC CHEMISTRY 4

Fundamentals of organic chemistry. Includes 42 hours of laboratory work that introduces basic laboratory techniques of organic chemistry.

PREREQ: CHEM102 or CHEM104 or CHEM105.

RESTRICTIONS: Designed for students of agriculture, human resources and medical technology.

CHEM 214 ELEMENTARY BIOCHEMISTRY 3

Principal classes of biomolecules and their structural and metabolic interrelationships.

PREREQ: CHEM213.

CHEM 216 ELEMENTARY BIOCHEMISTRY LABORATORY 1

Basic manipulations and techniques for the characterization of biomolecules.

PREREQ: CHEM213.

COREQ: CHEM214

CHEM 220 QUANTITATIVE ANALYSIS 3

Chemical equilibria in aqueous solutions; volumetric and gravimetric analysis; and introduction to chromatography and spectrometry.

PREREQ: CHEM102, CHEM104 or CHEM105.

COREQ: CHEM221.

CHEM 221 QUANTITATIVE ANALYSIS LABORATORY 1

The practice and application of volumetric and gravimetric analysis, as well as basic chromatographic and spectrometric measurements.

PREREQ: CHEM102, CHEM104 or CHEM105.

COREQ: CHEM220.

CHEM 311 SURVEY OF ORGANIC CHEMISTRY I 3

First half of two-semester survey of structure, synthesis, and reactions of organic compounds.

PREREQ: CHEM104.

RESTRICTIONS: Not for CHEM/BIOC BS majors. Neither CHEM311 and CHEM321 nor CHEM311 and CHEM331 can both count toward graduation.

CHEM 312 SURVEY OF ORGANIC CHEMISTRY II 3

Second half of two-semester survey of structure, synthesis and reactions of organic compounds.

PREREQ: CHEM311.

RESTRICTIONS: Not for CHEM/BIOC BS majors. Neither CHEM312 and CHEM322 nor CHEM312 and CHEM332 can both be counted toward graduation.

CHEM 321 ORGANIC CHEMISTRY 4

First half of two-semester survey of structure, synthesis, and reactions of organic compounds. Includes 42 hours of laboratory work that introduces basic laboratory techniques of organic chemistry.

PREREQ: CHEM104.

RESTRICTIONS: Not for CHEM/BIOC BS majors. CHEM321 and CHEM331 cannot both be counted toward graduation.

CHEM 322 ORGANIC CHEMISTRY 4

Second half of two-semester survey of structure, synthesis and reactions of organic compounds. Includes 42 hours of laboratory work that introduces basic laboratory techniques of organic chemistry.

PREREQ: CHEM321.

RESTRICTIONS: Not for CHEM/BIOC 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 majors 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: CHEM331, CHEM333.

COREQ: CHEM334.

RESTRICTIONS: For chemistry, biochemistry, chemical engineering and other majors desiring fuller treatment than in CHEM322. Neither CHEM312 and CHEM322, nor CHEM322 and CHEM332 can both be counted toward graduation.

- CHEM 333 ORGANIC CHEMISTRY MAJORS LABORATORY I** 1-2
The theory and practice of basic techniques of laboratory work with organic compounds, including separation methods and instrumental methods of analysis and identification.
PREREQ: CHEM104, or preferably CHEM112, or CHEM120.
COREQ: CHEM331.
RESTRICTIONS: Registration for two credits involves both a lecture period and a laboratory period each week. Registration for one credit involves only the weekly lecture.
- CHEM 334 ORGANIC CHEMISTRY MAJORS LABORATORY II** 2
Continuation of CHEM333. Two lab periods each week.
PREREQ: CHEM333.
COREQ: CHEM332.
- CHEM 342 INTRODUCTION TO BIOCHEMISTRY** 3
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 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 I** 3
Introduction to the principles of physical chemistry with a focus on thermodynamics, using minimal calculus, for B.A. chemistry and B.S. biochemistry majors.
PREREQ: General chemistry; MATH241; PHYS202 or PHYS208.
RESTRICTIONS: Not acceptable for B.S. degree in chemistry. CHEM418 and CHEM443 cannot both be counted toward graduation.
- CHEM 419 INTRODUCTORY PHYSICAL CHEMISTRY** 3
Introduction to the principles of physical chemistry with a focus on kinetics and spectroscopy, using minimal calculus, for B.A. chemistry and B.S. biochemistry majors.
PREREQ: CHEM418.
RESTRICTIONS: Not acceptable for B.S. degree in chemistry. CHEM419 and CHEM444 cannot both be counted toward graduation.
- CHEM 424 QUANTUM MECHANICS I** 3
First in a sequence with PHYS425 that provides introduction to basic principles and applications of quantum mechanics. Emphasis on formalism of quantum mechanics. Schrodinger equation is solved for simple cases such as free-particle motion, simple harmonic oscillator and hydrogen atom, with a basic treatment of angular momentum. Topic of identical particles also considered.
Crosslisted with PHYS424.
PREREQ: MATH 341 and MATH 342 or MATH302 and MATH349.
- CHEM 437 INSTRUMENTAL METHODS** 3
Study of the principles of design and application of spectroscopic, chromatographic and electroanalytical instrumentation in chemical analysis.
PREREQ: CHEM322 or CHEM332.
COREQ: CHEM418 or CHEM443.
- CHEM 438 INSTRUMENTAL METHODS LABORATORY** 1
Application of spectroscopic, chromatographic and electroanalytical techniques to the solution of chemical problems.
PREREQ: CHEM322 or CHEM334.
COREQ: CHEM445.
- CHEM 443 PHYSICAL CHEMISTRY I** 3
Application of the principles and methods of mathematics and physics to the quantitative study of chemistry, focusing on thermodynamics.
PREREQ: CHEM119, or CHEM220 and CHEM221; MATH242 (MATH243 recommended); PHYS208 (recommended) or PHYS202.
RESTRICTIONS: CHEM418 and CHEM443 cannot both be counted toward graduation.
- CHEM 444 PHYSICAL CHEMISTRY II** 3
Application of the principles and methods of physics and mathematics to the quantitative study of chemistry, focusing on kinetics and quantum mechanics.
PREREQ: CHEM119, or CHEM220 and CHEM221; MATH242 (MATH243 recommended); PHYS208 (recommended) or PHYS202.
RESTRICTIONS: CHEM419 and CHEM444 cannot both be counted toward graduation.
- CHEM 445 PHYSICAL CHEMISTRY LABORATORY I** 1
Physical methods for studying properties of matter.
PREREQ: CHEM119, or CHEM220 and CHEM221.
RESTRICTIONS: To be taken concurrently with or subsequent to CHEM418 or CHEM443 or CHEG231.
- CHEM 446 PHYSICAL CHEMISTRY LABORATORY II** 1
Physical methods for studying properties of matter.
PREREQ: CHEM120, or CHEM220 and CHEM221.
RESTRICTIONS: To be taken concurrently with or subsequent to CHEM419 or CHEM444.
- CHEM 457 INORGANIC CHEMISTRY** 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** 1
Laboratory synthesis and characterization of inorganic and organometallic compounds and independent study.
COREQ: CHEM457.
- CHEM 465 SENIOR SEMINAR** 1 PF
RESTRICTIONS: Requires senior status.
- CHEM 466 INDEPENDENT STUDY** 1-3 PF
- CHEM 468 UNDERGRADUATE RESEARCH** 1-6 PF
Chemistry research on an assigned subject under the supervision of a member of the faculty.
RESTRICTIONS: Requires permission of instructor. (Letter grade upon completion of written report).
- CHEM 527 INTRODUCTORY BIOCHEMISTRY** 3
A one-semester survey of the fundamentals of biochemistry.
PREREQ: CHEM321 or CHEM331; CHEM322 or CHEM332 recommended.
RESTRICTIONS: For undergraduate majors in biology and chemistry, graduate students in agriculture, biology, nutrition, marine sciences and engineering not using biochemistry professionally. BISC104 or BISC207 strongly recommended.
- CHEM 601 INTRODUCTION TO LABORATORY INSTRUCTION** 1 PF
Inservice required of first-year graduate teaching assistants. Prepares teaching assistants to become effective instructors. Topics relate to the theory and practice of teaching in a laboratory setting.
COREQ: Having a chemistry (or another science) teaching assistantship.
- CHEM 603 PRACTICAL NMR SPECTROSCOPY** 1
Elements of NMR spectroscopic techniques, the practical operation of NMR spectrometers, spectral acquisition and special analysis techniques.
COREQ: CHEM444 recommended.
RESTRICTIONS: Requires permission of instructor.
- CHEM 604 PRACTICAL MASS SPECTROMETRY** 1
Laboratory experimentation with mass spectrometry.
COREQ: CHEM624 recommended as corequisite or prerequisite.
RESTRICTIONS: Requires permission of instructor.
- CHEM 605 SPECTROSCOPY OF ORGANIC COMPOUNDS** 1
Introductory organic structure determination by modern spectroscopic methods.
PREREQ: One year of general chemistry.
RESTRICTIONS: Restricted to graduate students.
- CHEM 606 INTRODUCTION TO RESEARCH AT THE CHEMISTRY/BIOLOGY INTERFACE** 3
Research experiences in biochemistry, molecular biology, bioanalytical chemistry, bioorganic chemistry, biochemical engineering, materials science, protein crystallography, agricultural biochemistry, virology, and cell biology. Attendance at the weekly Chemistry-Biology Interface Seminar is required.
RESTRICTIONS: Restricted to graduate students admitted to the Chemistry/Biology Interface Program.
- CHEM 608 ENVIRONMENTAL SOIL CHEMISTRY** 3
Principles of soil chemical reactions and their application to environment including: inorganic and organic soil components, soil solution-solid phase equilibria, sorption phenomena, ion exchange reactions, kinetics of soil chemical processes, redox chemistry, soil acidity and salinity.
Crosslisted with PLSC608.
PREREQ: CHEM102 or CHEM104.
- CHEM 620 ANALYTICAL SPECTROSCOPY** 3
Experimental aspects of electronic and vibrational spectroscopy. Linear and nonlinear optics; photon counting; Fourier transformation; and topics from the current literature.
PREREQ: CHEM437 and CHEM438.
- CHEM 621 CHEMICAL SEPARATIONS** 3
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 PRINCIPLES OF MASS SPECTROMETRY 3
Principles of mass spectral measurements for the elucidation of molecular structure; applications to biomolecular materials and topics from the current literature.
PREREQ: CHEM437.

CHEM 626 INSTRUMENTAL METHODS IN MASS SPECTROMETRY 1
Experimental techniques in analytical mass spectrometry: ionization methods, mass analyzers, tandem mass spectrometry, coupled chromatographic methods and applications.
COREQ: CHEM624 recommended as corequisite or prerequisite.

CHEM 631 PRACTICE OF SCIENCE 3
Uses historical, philosophical, and sociological perspectives to better understand the nature of modern science and its practice. Examines "science misconduct," and satisfies the NIH mandate requiring graduate training in "the responsible conduct of research."
Crosslisted with BISC631.

CHEM 633 ADVANCED ORGANIC CHEMISTRY: PHYSICAL 3
Stereochemistry and reactivity of organic compounds; and reaction mechanisms, structure and bonding.
PREREQ: CHEM332.

CHEM 634 ADVANCED ORGANIC CHEMISTRY: SYNTHESIS AND REACTIVITY 3
Reactions of organic compounds with emphasis on synthetic methods.
PREREQ: CHEM332.
COREQ: CHEM633, or permission of instructor.

CHEM 635 ORGANIC REACTIVITY AND TOTAL SYNTHESIS 3
Focuses on the development of new organic reactivity, as exemplified by current accomplishments in the total synthesis of natural products. Additional focus on the strategies of total synthesis.
PREREQ: CHEM634, or permission of instructor.

CHEM 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
DNA: The vehicle of inheritance. The topology of DNA. Central dogma of molecular biology. The mechanisms of replication, transcription and translation. DNA recombination and repair. Recombinant DNA technology, Chromosomal DNA and its packaging. Gene expression and its control.
PREREQ: CHEM641.

CHEM 643 INTERMEDIARY METABOLISM 3
General principles of intermediary metabolism with emphasis on biosynthetic pathways of amino acids, nucleotides, coenzymes, antibiotics and toxic secondary metabolites.
PREREQ: CHEM641.

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

CHEM 645 PROTEIN STRUCTURE AND FUNCTION 3
Overview of structural biology, including how x-ray crystallography, NMR spectroscopy, homology modeling and other techniques are used to solve or model structures of macromolecules. Representative proteins discussed in terms of how a protein's structure relates to its function.
PREREQ: CHEM641.

CHEM 646 DNA-PROTEIN INTERACTIONS 3
Current topics of DNA-protein interactions which focus on DNA replication, DNA recombination, DNA damage repair, transcription and translation processes.
PREREQ: CHEM642.

CHEM 649 MOLECULAR BIOPHYSICS 3
Biophysical principles and methods: thermodynamic and kinetic analysis of folding; protein-nucleic acid interactions; ligand binding; spectroscopy; structural methods; modeling; calorimetry; ultracentrifugation; SPR. Problem solving in macromolecular interactions: protein refolding; altering ligand affinity; increasing protein stability; drug design and HTS; protein expression and solubility; protein engineering.
Crosslisted with CHEG649.
PREREQ: Introductory-level courses in chemistry, physics biochemistry.

CHEM 651 ADVANCED INORGANIC CHEMISTRY I 3
Inorganic chemistry: application of the principles of structure and reactivity, examples from compounds of both the representative elements and the transition metals.
PREREQ: CHEM444 and CHEM457.

CHEM 652 ORGANOMETALLIC CHEMISTRY 3
Chemistry of carbon to transition-metal bonds beginning with rules governing structure and stability; effects of metal and ancillary ligand environment; general mechanistic steps; NMR and IR spectroscopy; fluxional processes. Followed by applications in homogeneous catalysis and stoichiometric organic synthesis.
PREREQ: CHEM444 and CHEM457.

CHEM 653 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 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 synthesis, physical structures and phase transitions, structure/property relationships, material properties, characterization methods and current trends in polymer technology.
PREREQ: CHEM322 or CHEM332; and CHEM419 or CHEM444.

CHEM 681 GREEN CHEMISTRY 3
Pollution prevention - how to eliminate toxic chemicals and hazardous wastes while using less energy and, preferably, starting with renewable materials.
PREREQ: One year of organic chemistry, or permission of the instructor.

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

CHEM 810 KINETICS AND SURFACE CHEMISTRY OF SOILS 3
Kinetics and mechanisms of soil chemical reactions, including application of chemical kinetics to natural systems, rates of sorption/desorption, redox, precipitation/dissolution, and ion exchange processes and application of surface spectroscopic and microscopic techniques to elucidate reactions at the soil mineral/water interface.
Crosslisted with PLSC810.
PREREQ: PLSC608, and either CHEM418 or CHEM443.

CHEM 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
Principles of inorganic chemistry are used to explain and to understand the speciation and reactivity of the elements in the marine environment. Emphasis on the mechanistic aspects of important marine processes including mineral dissolution and formation, electron transfer reactions and the role of metals in biogeochemical reactions.
Crosslisted with MAST850.
PREREQ: MAST646, aquatic chemistry or physical chemistry

CHEM 865 SEMINAR 0 PF

CHEM 868 RESEARCH 1-9

CHEM 869 MASTER'S THESIS 1-6

CHEM 874 SPECIAL TOPICS IN PHYSICAL CHEMISTRY 1-3
RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.

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

CHEM 969 DOCTORAL DISSERTATION 1-12 PF

CHINESE

CHIN 105 CHINESE I - ELEMENTARY 4
Introduction to the contemporary Mandarin Chinese language through developing listening comprehension, speaking, reading, and writing skills, including mastery of the pinyin pronunciation system and introduction to Chinese characters.

CHIN 106 CHINESE II - ELEMENTARY/INTERMEDIATE 4
Continued practice in the aural, oral, reading and writing skills of Mandarin Chinese including the identification and reproduction of basic Chinese characters. Introduction to formality levels and to reading and writing texts in Chinese characters.
PREREQ: CHIN105.

CHIN 107 CHINESE III - INTERMEDIATE 4
Development of aural, oral, reading and writing skills at the intermediate Chinese level, including continued practice in identifying and reproducing Chinese characters, handling a greater variety of formality levels, and further comprehending spoken (Koutouyu) and written (Shumianyu) language differences.
PREREQ: CHIN106.
RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.

CHIN 200 CHINESE GRAMMAR AND COMPOSITION 3
Further study of Mandarin Chinese grammar, and further development of all four language skills for communication. Emphasis on grammar and essay writing.
PREREQ: CHIN107 or instructor's permission.

CHIN 205 CHINESE CONVERSATION 3
Practical use of Mandarin Chinese by means of oral reports on a variety of topics including family, school, and work life. Emphasis on improvement of conversational skills for social situations which require grammatical and written competence.
PREREQ: CHIN107 or instructor's permission.

CHIN 206 CULTURE THROUGH CONVERSATION 3
Discussion of topics drawn from contemporary Chinese life. Designed for students who wish to broaden their knowledge of Chinese culture while improving their oral and aural language skills.
PREREQ: CHIN107.
RESTRICTIONS: Taught abroad only.

CHIN 208 CONTEMPORARY CHINESE SOCIETY 3
Introduction to contemporary China, its culture, people, way of life and issues confronting them.
RESTRICTIONS: Taught abroad only, in both English and Chinese. Not for major credit. Does not satisfy College of Arts and Sciences language requirement.

CHIN 266 SPECIAL PROBLEM 1-4

CHIN 305 CHINESE CONVERSATION AND COMPOSITION 3
Discussion of current cultural, social and political topics in Mandarin Chinese. Vocabulary building, grammar exercises and frequent compositions.
PREREQ: Two courses at the 200-level, one of which must be CHIN200 or CHIN205 or instructor's permission.

CHIN 355 SPECIAL TOPICS 3
Explores an area of special interest in Chinese literature or culture studies. Topics vary and will be announced in the registration booklet.
PREREQ: Two courses at the 200-level, one of which must be CHIN200 or CHIN205 or instructor's permission.
RESTRICTIONS: May be repeated for credit when topics vary.

CHIN 366 INDEPENDENT STUDY 1-3
Discussion of subject matters of students' special interest related to Chinese language, literature, and/or culture.
PREREQ: Two courses at the 200 level, one of which must be CHIN200 or CHIN205 or instructor's permission.

CHIN 466 INDEPENDENT STUDY 1-3
Discussion of subject matters of students' special interest related to Chinese language, literature, and/or culture.
PREREQ: Two courses at the 300 level, one of which must be CHIN305 or CHIN355, or instructor's permission.

CIVIL AND ENVIRONMENTAL ENGINEERING

CIEG 113 INTRODUCTION TO SURVEYING 2
Provides experience with use of equipment, instruments and fundamental techniques of plane surveying. Topics include: distance measurement, leveling, traversing, mapping, and calculation of areas and earth volumes.
Crosslisted with BREG113.
RESTRICTIONS: Requires knowledge of trigonometry.

CIEG 125 INTRODUCTION TO CIVIL ENGINEERING 2 PF
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 126 INTRODUCTION TO SURVEYING AND COMPUTER AIDED DRAFTING 3
Introduction to computer aided drafting with applications from land surveying. Fundamental principals of land surveying and use of surveying instruments. Use of CAD software for drafting, design layout, two dimensional and isometric drafting, creation and modification of entities and attributes. Computer lab and field work.

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
Analysis of force systems and equilibrium of rigid bodies in two and three dimensions. Determination of centers of gravity and of centroids. Analysis of statically determinate trusses, simple frames and "machines." Introduction to the analysis of beams.
COREQ: MATH243.

CIEG 212 SOLID MECHANICS 3
Stresses and displacements in axially loaded beams and in bars subjected to torsion. Analysis of stresses and deflections of laterally loaded beams. Study of stresses and strains in a plane. Mohr's circle for stresses. Failure theories. Design of structural members using strength criteria.
PREREQ: CIEG211.
COREQ: MATH302 or MATH351.

CIEG 213	CIVIL ENGINEERING MATERIALS LABORATORY	1	Experiments in the mechanics of materials and the strength of materials to complement the content of CIEG212. Emphasis on the behavior of civil engineering materials including steel, aluminum, concrete and timber. COREQ: CIEG212.
CIEG 223	SURVEYING	3	Error propagation, distance measurement, tacheometry and trigonometric leveling, traversing, route surveys, field astronomy, coordinate systems, and GPS. Crosslisted with BREG223. PREREQ: EGTE104 or BREG113.
CIEG 233	ENVIRONMENTAL ENGINEERING PROCESSES	3	Quantified descriptions of physical, chemical and biological processes of environmental importance. Introductory level analysis of pollution transport, treatment, containment, remediation. Process engineering approach to contaminant removal methods, including use of appropriate computer software. PREREQ: CHEM104 or CHEM120; MATH242. RESTRICTIONS: Open to majors only.
CIEG 301	STRUCTURAL ANALYSIS	4	Design procedures and criteria. Moment, shear and axial force diagrams of statically determinate structures like beams, frames and arches. Displacement, stress and stability analyses of statically determinate and indeterminate structures, using differential equations and the slope deflection method. Energy methods. Introduction to matrix methods. PREREQ: CIEG212, MATH302.
CIEG 302	STRUCTURAL DESIGN	3-4	Basic concepts of structural design including methodologies, applicable limit states and design codes. Structural members and systems, fabrication issues, loads and load paths. Design of steel and concrete members subjected to tension, compression and bending. Additional topics including connections and combined axial compression and bending. PREREQ: CIEG301.
CIEG 305	FLUID MECHANICS	3	Incompressible fluid mechanics: fluid statics, control volume analysis of fluid flows, differential analysis of inviscid and viscous fluid flows and dimensional analysis. PREREQ: MATH302 or MATH351, and CIEG311 or MEEG211.
CIEG 306	FLUID MECHANICS LABORATORY	1	Experiments in fluid mechanics.
CIEG 311	DYNAMICS	3	An intermediate-level development of the kinematics and dynamics of particles, systems of particles and rigid bodies. Vibrations of machines and structures. Emphasis on solution of engineering problems by force, energy and momentum methods of analysis. Applications to the dynamics of machines, structures and vehicles. PREREQ: PHYS207 and MATH243.
CIEG 315	PROBABILITY AND STATISTICS FOR ENGINEERS	3	The role of chance and variability in engineering activities. Topics include set operations, probability, Bayes' theorem, random variables, common probability distributions, data reduction, statistical estimation and inference, probability model selection, regression analyses and introduction to probability-based design and Monte-Carlo simulation. PREREQ: MATH242 and MATH243 or equivalents.
CIEG 320	SOIL MECHANICS	3	Soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures. PREREQ: CIEG212. COREQ: CIEG323.
CIEG 321	GEOTECHNICAL ENGINEERING	3	Introduction to Geotechnical Engineering. Topics include shallow foundation analysis and design, deep foundation analysis and design, earth retaining structure analysis and design and introduction to slope stability analysis. PREREQ: CIEG320 and CIEG323.
CIEG 323	SOIL MECHANICS LABORATORY	1	Demonstrates soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures. PREREQ: CIEG212. COREQ: CIEG320.
CIEG 331	ENVIRONMENTAL ENGINEERING	3	Introduction to environmental engineering topics faced by consulting engineers and public works and regulatory agencies. Topics include water treatment, water quality management, wastewater treatment, air pollution control, solid waste management and hazardous waste management. PREREQ: CIEG305.
CIEG 337	ENVIRONMENTAL ENGINEERING LABORATORY	3	Unit operations and unit processes in environmental engineering, with an emphasis on biological processes. Introduction to contaminant transport processes in the subsurface. Utilizes collaborative, problem-based learning within a laboratory context. PREREQ: CIEG438.
CIEG 351	TRANSPORTATION ENGINEERING	3	Four components of transportation: vehicle, way, terminal and control; design and dynamic characteristics of vehicles; geometric design of highways and railroad tracks; operation and design of stations, airports and bus terminals; highway traffic flow analysis. RESTRICTIONS: Requires junior status in civil engineering.
CIEG 366	INDEPENDENT STUDY	1-6	
CIEG 401	INTRODUCTION TO THE FINITE ELEMENT METHOD	3	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 407	BUILDING DESIGN	3	Design of building structural systems and elements. Topics include dead and live loading; earthquake and wind forces; load paths; and gravity and lateral load resisting systems. Approximate analysis of building frames and details regarding design elements for steel and concrete buildings. PREREQ: CIEG301 and CIEG302.
CIEG 408	INTRODUCTION TO BRIDGE DESIGN	3	Provides practical insight into the art and science of bridge design. Various design methodologies in use today in the field of bridge design and evaluation are investigated. Bridges of steel, reinforced concrete, prestressed concrete, wood and composite materials are included. PREREQ: CIEG302.
CIEG 409	FORENSIC ENGINEERING	3	Provides practical insight into structural engineering by examining failures. Examples include bridge and building failures; infamous catastrophic collapses to little known examples of design criteria being violated to the structures detriment. The main objective is to learn sound engineering practices through the study of failures. PREREQ: CIEG301 and CIEG302.
CIEG 410	EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS	3	Study of the micromechanical and thermomechanical response of composite materials. Execution and assessment of experiments conducted to investigate strength and stiffness characteristics of composite materials. Crosslisted with MSE410.
CIEG 421	FOUNDATION ENGINEERING	3	Field investigation techniques; interpretation of data; theory and design of shallow and deep foundations, retaining walls, sheet pile walls, cofferdams braced excavations and geosynthetically reinforced soil. PREREQ: CIEG320/323.
CIEG 422	EARTH STRUCTURES ENGINEERING	3	Properties of soils and methods to determine them: water flow through inhomogeneous and anisotropic earth mass; predictions of pore-water pressures; stresses and settlement predictions; slope stability: type and causes of slope failures, effective and total stability analyses, design strength parameters and safety factors, construction considerations; design of earth dams; and predictions vs. field performance. Computer software used in problem solving. PREREQ: CIEG320/323.
CIEG 427	DEEP FOUNDATIONS	3	Application, selection, design, construction and inspection of deep foundations. Examines driven piles, drilled shafts, augercast and micropiles. Development of cost comparisons, specifications, contract documents and bidding practices. Design issues address the geotechnical and structural considerations.
CIEG 428	GROUND IMPROVEMENT METHODS	3	Design and construction principles of ground improvement methods to soil and rock engineering problems. Topics include: grouting, prefabricated vertical drains, stone columns, mechanically stabilized earth systems, soil nailing, soil mixing, vibro compaction, lightweight fill materials and geosynthetics.
CIEG 430	WATER QUALITY MODELING	3	Water quality modeling and criteria. Application to lakes, streams, and estuaries. Dissolved oxygen, BOD, nitrification. Eutrophication: carbon, nitrogen, phosphorus and silica mass balances; chlorophyll, primary production and dissolved oxygen; Toxic chemicals: PCBs, PAHs, toxic metals: partitioning theory, organic carbon normalization; coupled water column-sediment models. PREREQ: MATH302.

CIEG 433 HAZARDOUS WASTE MANAGEMENT	3	CIEG 466 INDEPENDENT STUDY	1-6
Toxicological, risk assessment and regulatory aspects of hazardous waste management; characterization of hazardous wastes and materials; waste reduction strategies; storage and transportation methods; engineering processes for the chemical, physical and biological treatment of toxic and hazardous wastes; remediation of contaminated soil and groundwater at existing disposal sites. PREREQ: CIEG233.		CIEG 468 PRINCIPLES OF WATER QUALITY CRITERIA	3
CIEG 434 AIR POLLUTION CONTROL	3	Toxicological and chemical background and technical basis necessary for understanding the models of water and sediment quality criteria for individual and mixtures of organic chemicals and metals that focus on bioavailability; narcosis models of toxicity, complexation models applied to both the water column and sediments. PREREQ: CHEM104 or CHEM103. RESTRICTIONS: Requires permission of instructor.	
Introduces the origins, characteristics and environmental and health effects of priority air pollutants and the equipment commonly used to control emissions of these pollutants from stationary sources. Emphasis placed on understanding the principles, operation and design of different control devices. PREREQ: CIEG233, CIEG305, and CHEG231 or equivalent.		CIEG 471 INTRODUCTION TO COASTAL ENGINEERING	3
CIEG 436 PROCESSING, RECYCLING, MANAGEMENT OF SOLID WASTES	3	Problems of design in the ocean and coastal environment. Mechanics of wave motion, tides and storm surge, littoral processes, wave forces on structures and design of coastal structures. Includes observations of hydraulic model tests in the Ocean Engineering Laboratory. PREREQ: CIEG305.	
Examines the problem of solid waste management in a throw-away society: landfills, incineration, composting, recycle and reuse options are described from regulatory, economic, and engineering perspectives. Includes design and operational aspects of common processes and landfills, management of hazardous wastes, and future alternatives. PREREQ: CIEG233 or CIEG331.		CIEG 486 CONSTRUCTION METHODS AND MANAGEMENT	3
CIEG 437 WATER AND WASTEWATER QUALITY	3	Different methods, management and techniques of construction including earthmoving, heavy construction, building construction and construction management including planning and scheduling, contract administration and construction safety.	
Principles and applications of analysis of solids, organic load, dissolved oxygen, disinfectants, nutrients, trace metals, trace organic compounds and microorganisms. Lecture and laboratory. PREREQ: CIEG233.		CIEG 498 GROUNDWATER FLOW AND CONTAMINANT TRANSPORT	3
CIEG 438 WATER AND WASTEWATER ENGINEERING	3	Development and application of models for fluid flow and contaminant transport in porous media. Derivation of governing equations, analytical and numerical solutions, and application to movement of groundwater and transport of contaminants at an actual field site. PREREQ: Previous coursework in fluid mechanics and partial differential equations, or permission of instructor.	
Sources and characteristics of water and wastewater; water quality criteria and monitoring; principles and application of physical, chemical, and biological processes for water purification and wastewater treatment. Design and operation of treatment systems to meet water quality and effluent standards. PREREQ: CIEG233.		CIEG 601 INTRODUCTION TO THE FINITE ELEMENT METHOD	3
CIEG 440 WATER RESOURCES ENGINEERING	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.	
Basics of water resources systems and analysis and introduction to hydraulics. Covers water resources systems, rainfall analysis and flood routing, pipe flow and hydraulic machinery, open channel flow and computer models. PREREQ: CIEG305 and CIEG306.		CIEG 604 PRESTRESSED CONCRETE DESIGN	3
CIEG 443 WATERSHED ENGINEERING, PLANNING AND 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: CIEG302.	
Engineering of watershed management practices to protect and restore quality and quantity of surface and ground waters. Complete water resources projects as part of a service based learning approach. Various projects include rain gardens, bicycle trail drainage, wet detention ponds, bioretention areas, wetlands, stream restoration, and bioengineering. Field oriented course.		CIEG 605 INTERMEDIATE TOPICS IN FINITE ELEMENT ANALYSIS	3
CIEG 451 TRANSPORTATION ENGINEERING LABORATORY	1	Topics include finite element analysis in linear elastostatics, linear steady state scalar "field" problems, analysis techniques for linear transient and dynamic analyses and matrix structural analysis. In each case, element formulations and solution algorithms are assessed, limitations and possible improvements presented and numerical methods examined. PREREQ: CIEG601.	
Exercises related to transportation: design, control, measurement, calculation/simulation, reasoning, and communication. Topics may include geometric roadway design, traffic signal control, design of transportation terminals, traffic simulation and pedestrian flow, pavement design and maintenance, design justification, and contemporary issues involving transportation policies and technologies. PREREQ: CIEG351.		CIEG 606 OCEAN AND ATMOSPHERE REMOTE SENSING	3
CIEG 452 TRANSPORTATION FACILITIES DESIGN	3	Fundamentals of ocean and atmosphere remote sensing including space platforms, their orbits, instruments, data retrieval and image processing methods. Oceanographic and atmospheric applications of remote sensing and new developments in sensors and data analyses. Crosslisted with MAST606.	
Theoretical concepts of general transportation demand, supply and flow analysis. Planning and design of multi-modal transportation facilities including streets and highways, railways and guideways, airports, and harbors and ports. Engineering, social and economic evaluation of alternative design schemes for simple case studies and existing transportation facilities. PREREQ: CIEG351.		CIEG 608 INTRODUCTION TO BRIDGE DESIGN	3
CIEG 453 ROADWAY GEOMETRIC DESIGN	3	Provides practical insight into the art and science of bridge design. Various design methodologies in use today in the field of bridge design and evaluation are investigated. Bridges of steel, reinforced concrete, prestressed concrete, wood and composite materials are included. PREREQ: CIEG302.	
Physical dimensions of roadways such as vertical and horizontal curvatures, superelevation rates, lane widths, cross sections, and grades. Topics include roadway functions, design controls and criteria, elements of design, local roads and streets, collector roads and streets, rural and urban arterials, freeways, intersections, and grade separations.		CIEG 610 EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS	3
CIEG 454 URBAN TRANSPORTATION PLANNING	3	Study of the micromechanical and thermomechanical response of composite materials. Execution and assessment of experiments conducted to investigate strength and stiffness characteristics of composite materials. Crosslisted with MSE610.	
Characteristics of urban travel demand, travel demand forecasting models, urban transportation modes and their characteristics, urban transportation planning processes and issues, evaluation of plans, economic analysis, transportation financing, transportation policy and regulations, and urban transportation systems management. PREREQ: CIEG351.		CIEG 611 STRUCTURAL DYNAMICS DESIGN	3
CIEG 461 SENIOR DESIGN PROJECT	1-4	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.	
Work with advisors from engineering firms and faculty on design projects requiring knowledge and skills acquired in previous courses. RESTRICTIONS: Requires senior status in engineering.		CIEG 612 ADVANCED MECHANICS OF MATERIALS	3
		Covers unsymmetrical bending, shear center in thin-walled beams, torsion in thin-	

walled structures, lateral-torsional buckling, curved beams, energy methods, principal stress and strain in three dimensions. Theory and applications.

CIEG 619 MECHANICAL BEHAVIOR OF MATERIALS AND STRUCTURES 3
Examines how material properties influence structural response and failure mechanisms under the influence of external loads. Includes plasticity; thermal stresses; fracture and damage mechanics; and buckling. Problem solving based on both analytical methods and computational mechanics.
Crosslisted with MEEG619.
PREREQ: MEEG610 or similar.

CIEG 620 SOIL MECHANICS II 3
Behavior of cohesionless and cohesive soils; failure theories and lateral earth pressures; stresses within earth mass; steady-state flow through porous media; consolidation and time rate settlement; shear strength of cohesive soils.
PREREQ: CIEG302/323.

CIEG 621 FOUNDATION ENGINEERING 3
Field investigation techniques; interpretation of data; theory and design of shallow and deep foundations, retaining walls, sheet pile walls, cofferdams braced excavations and geosynthetically reinforced soil.

CIEG 622 EARTH STRUCTURES ENGINEERING 3
Properties of soils and methods to determine them: water flow through inhomogeneous and anisotropic earth mass; predictions of pore-water pressures; stresses and settlement predictions; slope stability: type and causes of slope failures, effective and total stability analyses, design strength parameters and safety factors, construction considerations; design of earth dams; and predictions vs. field performance. Computer software used in problem solving.
PREREQ: CIEG320/323.

CIEG 623 SOIL MECHANICS LAB 3
Enhances knowledge of soil properties and behavior. Generally, the following tests are performed: Atterberg limits, sieve and hydrometer analysis, compaction, relative density, permeability, flow-net simulation, consolidation, specific gravity, direct shear, triaxial (CU, CD, UU) tests simulating various loading paths, and liquefaction.
PREREQ: CIEG320/323.

CIEG 626 SOIL BEHAVIOR 3
Measuring the shear strength of soils. Shear behavior of soil examined from a fundamental soil perspective. Review of methods of testing to define response; rationale for choosing shear strength and deformation parameters of soils for design applications.

CIEG 627 DEEP FOUNDATIONS 3
Addresses the application, selection, design, construction and inspection of deep foundations. Examines driven piles, drilled shafts, augercast and micropiles. Includes development of cost comparisons, specifications, contract documents and bidding practices. Design issues address the geotechnical and structural considerations.

CIEG 628 GROUND IMPROVEMENT METHODS 3
Design and construction principles of ground improvement methods to address soil and rock engineering problems. Topics include: grouting, prefabricated vertical drains, stone columns, mechanically stabilized earth systems, soil nailing, soil mixing, vibro compaction, lightweight fill materials and geosynthetics.

CIEG 630 WATER QUALITY MODELING 3
Water quality modeling and criteria. Application to lakes, streams, and estuaries. Dissolved oxygen, BOD, nitrification. Eutrophication: carbon, nitrogen, phosphorus and silica mass balances; chlorophyll, primary production and dissolved oxygen; Toxic chemicals: PCBs, PAHs, toxic metals: partitioning theory, organic carbon normalization; coupled water column- sediment models.
PREREQ: MATH302.

CIEG 632 CHEMICAL ASPECTS OF ENVIRONMENTAL ENGINEERING 3
The principles and applications of aqueous chemistry to environmental systems. Includes a review of general chemistry, with emphasis on the structure of matter and stoichiometry; chemical thermodynamics; chemical kinetics; equilibrium reactions in homogeneous and heterogeneous solutions; applied electrochemistry and Redox reaction; and interfacial phenomena.

CIEG 633 HAZARDOUS WASTE MANAGEMENT 3
Toxicological, risk assessment and regulatory aspects of hazardous waste management, characterization of hazardous wastes and materials, waste reduction strategies, storage and transportation methods, engineering processes for the chemical, physical and biological treatment of toxic and hazardous wastes, remediation of contaminated soil and groundwater of existing disposal sites.

CIEG 634 CONTAMINANT TRANSPORT AND SEPARATION IN ENVIRONMENTAL SYSTEMS 3
Physical aspects of environmental engineering: processes governing behavior of pollutants and natural substances in the environment, incl. settling, diffusion, particle aggregation, adsorption. Transport and transformation of substances in soils, surface and ground waters, and the atmosphere.

CIEG 635 AIR POLLUTION AND ITS CONTROL 3
Sources and effects of atmospheric pollutants: meteorological and solar radiation phenomena and atmospheric chemistry. Emphasis on gas cleaning operations such as absorption, chemical conversion and particulate removal process design, among other control measures.
RESTRICTIONS: Requires upper division or graduate standing in engineering.

CIEG 636 BIOLOGICAL ASPECTS OF ENVIRONMENTAL ENGINEERING 3
Presents fundamental molecular biological concepts which pertain to cellular function in the environment and in engineered environmental treatment systems. Briefly reviews elementary organic chemical classifications.
PREREQ: CIEG233.

CIEG 637 WATER AND WASTEWATER QUALITY 3
Principles and applications of analysis of solids, organic load, dissolved oxygen, disinfectants, nutrients, trace metals, trace organic compounds and microorganisms. Lecture and laboratory.
PREREQ: CIEG233.

CIEG 638 ALLIED ENVIRONMENTAL STATISTICS AND DATA ANALYSIS 3
Statistical and graphical tools useful for practicing environmental scientists and engineers. Modern computer based methods: tests of significance, maximum likelihood estimates; bootstrap based confidence limits; linear, nonlinear and errors-in-variables regression; censored (less/greater than) data; probability and box and whisker plots; analysis of variance.

CIEG 639 OCEAN FLUID DYNAMICS 4
Kinematics and dynamics of incompressible fluids with emphasis on coastal and ocean problems. governing equations, examples of solutions for viscous flows, potential flows, vorticity, flows on a rotating planet, density vary flows, boundary layers, turbulence. May be crosslisted with MAST691.
PREREQ: CIEG305.

CIEG 643 WATERSHED ENGINEERING, PLANNING AND DESIGN 3
Engineering of watershed management practices to protect and restore quality and quantity of surface and ground waters. Complete water resources projects as part of a service based learning approach. Various projects include rain gardens, bicycle trail drainage, wet detention ponds, bioretention areas, wetlands, stream restoration, and bioengineering. Field oriented course.

CIEG 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 ORES650.
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 multi-modal transportation facilities including streets and highways, railways and guideways, airports, and harbors and ports. Engineering, social and economic evaluation of alternative design schemes for case studies and existing transportation facilities.
RESTRICTIONS: Requires permission of instructor.

CIEG 653 ROADWAY GEOMETRIC DESIGN 3
Physical dimensions of roadways such as vertical and horizontal curvatures, superelevation rates, lane widths, cross sections, and grades. Topics include roadway functions, design controls and criteria, elements of design, local roads and streets, collector roads and streets, rural and urban arterials, freeways, intersections, and grade separations.

CIEG 654 URBAN TRANSPORTATION PLANNING 3
Characteristics of urban travel demand, travel demand forecasting models, urban transportation modes and their characteristics, urban transportation planning processes and issues, evaluation of plans, economic analysis, transportation financing, transportation policy and regulations, and urban transportation systems management.
RESTRICTIONS: Requires permission of instructor.

CIEG 655 CIVIL INFRASTRUCTURE SYSTEMS 3
Presents unified approach to management of civil infrastructure systems. Topics include analytical methods, development of data collection technologies, life cycle cost, prioritization, and optimization. Software tools for infrastructure management decision making introduced and critical infrastructure protection addressed. Types of infrastructure considered include pavements (roads and airports), bridges, drainage and sewer systems, water supply systems, and power supply facilities.

CIEG 668 PRINCIPLES OF WATER QUALITY CRITERIA 3
Toxicological and chemical background and technical basis necessary for understanding the models of water and sediment quality criteria for individual and mixtures of organic chemicals and metals that focus on bioavailability; narcosis models of toxicity, complexation models applied to both the water column and sediments.
PREREQ: CHEM 104 (or 103) or permission of instructor.

CIEG 672	WATER WAVE MECHANICS	3	Primary emphasis on linear water wave theory and its applications. Shoaling, refraction and diffraction of waves. Basic aspects of wave-structure and wave-bottom interaction. Introduction to basic wave propagation models. May be crosslisted with MAST648. PREREQ: CIEG305.	and lumped mass models; wave propagation; random excitations; and structural control. PREREQ: CIEG611.
CIEG 675	MATLAB FOR ENGINEERING ANALYSIS	1	Description and usage of commercial Matrix Laboratory (Matlab) software for analyzing multi-dimensional engineering data sets and formulating numerical models of engineering processes.	CIEG 817 STABILITY OF STRUCTURES 3 Structural instability phenomena caused by static and dynamic loads. Stability analyses of structures by equilibrium, energy and dynamic methods. Conservative and non-conservative problems. Elastic and non-elastic buckling of beams, frames and arches caused by mechanical and thermal loads. Buckling of continuously supported beams, plates, and shells. Delamination buckling in composites. PREREQ: CIEG212 and MATH302.
CIEG 678	TRANSPORT AND MIXING PROCESSES	3	Application of hydrodynamics to mixing and transport processes in the water environment. PREREQ: CIEG672.	CIEG 820 INELASTIC BEHAVIOR OF GEOMATERIALS 3 Introduces constitutive laws and numerical methods used to characterize the stress-strain-time behavior of geomaterials. Correlation between laboratory experiments and numerical predictions. Finite element analyses of coupled stress-flow problems (e.g., consolidation), reinforced earth structures and slopes. Discussion of anisotropy, time effects and frictional interfaces. PREREQ: CIEG601. RESTRICTIONS: CIEG620 is highly recommended as a prerequisite.
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: CIEG305.	CIEG 832 THEORY OF WASTEWATER TREATMENT 3 Composition of wastes; physical, chemical and biological methods of wastewater treatment; treatment and disposal of sludges produced at wastewater treatment plants. PREREQ: CIEG636.
CIEG 680	LITTORAL PROCESSES	3	Coastal morphology, equilibrium beach profiles, onshore-offshore response, sediment transport relationships, sand budgets around inlets and along open coasts, modeling of shoreline response, analyses of beach problems and recommendations of remedial measures.	CIEG 833 FATE OF ORGANIC POLLUTANTS IN THE ENVIRONMENT 3 Study of processes governing the distribution and transformation of organic pollutants in natural and engineered environments. Equilibrium and kinetics of exchange among soil, water, sediment, air, and biota. Photolysis, hydrolysis, oxidation, and reduction reactions of organic chemicals involving naturally-occurring and man-made agents. Mechanisms and model prediction of different fate processes. PREREQ: CIEG632, CIEG634, CIEG636.
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 865 CIVIL ENGINEERING SEMINAR 1-2 PF Graduate seminar covering current topics in structural, environmental, ocean and transportation engineering.
CIEG 682	NEARSHORE HYDRODYNAMICS	3	The mechanics of waves and currents in the nearshore zone: wave breaking, surf zone dynamics, cross- and long-shore currents, turbulence and bottom boundary layers, infra-gravity and edge waves and nearshore modeling. PREREQ: CIEG672 and CIEG639.	CIEG 868 RESEARCH 1-6
CIEG 684	NUMERICAL METHODS FOR COASTAL MODELING	3	Principles of finite difference, finite volume and finite element approaches for basic parabolic, hyperbolic and elliptic partial differential equations. Stability and conservation properties of basic schemes. Coastal engineering applications for surface waves, nearshore circulation, sediment transport and morphology. Introduction to popular models in each area. PREREQ: CIEG672 and CIEG639.	CIEG 869 MASTER'S THESIS 1-6 An independent investigation under supervision of a member of the civil engineering graduate faculty.
CIEG 693	WAVES IN THE MARINE ENVIRONMENT	3	General principles of wave mechanics, kinematics and dynamics. Applications to surface gravity waves, acoustic waves, electromagnetic waves and large scale geophysical waves. Crosslisted with MAST693. PREREQ: MEEG690.	CIEG 870 OFFSHORE DESIGN 3 Naval hydrodynamics, behavior of submerged and floating bodies, and ship waves. Tsunamis and harbor response. PREREQ: CIEG672 and CIEG639.
CIEG 698	GROUNDWATER FLOW AND CONTAMINANT TRANSPORT	3	Development and application of models for fluid flow and contaminant transport in porous media. Derivation of governing equations, analytical and numerical solutions, and application to the movement of groundwater and transport of contaminants at an actual field site. PREREQ: CIEG305 and MATH302, or permission of instructor.	CIEG 871 COASTAL STRUCTURES 3 Advanced design procedures of coastal structures. Includes statistics and spectra of random sea waves, random sea transformation in the nearshore, design of vertical and rubble mound breakwaters, harbor oscillations and tranquility, and hydraulic model tests.
CIEG 801	ADVANCED TOPICS IN FINITE ELEMENT ANALYSIS	3	Review of elementary aspects of the finite element method. Application of the method to linear and nonlinear one-, two- and three-dimensional problems in applied mechanics. Basic and advanced numerical methods and computer programming techniques appropriate to finite element analyses (includes two to three computational laboratory classes). PREREQ: CIEG401.	CIEG 872 ADVANCED WATER WAVE MECHANICS 3 Development of finite amplitude wave theories such as solitary, conoidal stokes and stream function. Application to coastal and ocean engineering problems. PREREQ: CIEG639, CIEG672.
CIEG 802	ADVANCED STEEL DESIGN	3	Application of ultimate and elastic design procedures to continuous beams and frames, composite members, statically indeterminate trusses and arches. Projects and special topics focus attention to the basis and limitations of codes and specifications for steel structures. PREREQ: CIEG302.	CIEG 964 PRE-CANDIDACY STUDY 3-12 PF Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.
CIEG 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	CIEG 969 DOCTORAL DISSERTATION 1-12 PF
<hr/> COMPUTER AND INFORMATION SCIENCE <hr/>				
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, databases, 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 103	INTRODUCTION TO COMPUTER SCIENCE WITH WEB APPLICATIONS	3	Principles of computer science illustrated through programming in scripting languages	

such as JavaScript and VBScript. Topics include control structures, arrays, functions, and procedures. Programming projects illustrate web-based applications.
 RESTRICTIONS: Open to non-majors. Students may not get credit for both CISC103 and CISC105.

- 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.
 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 Matlab and C. Programming projects illustrate computational problems, styles, and issues that arise in computation.
- CISC 181 INTRODUCTION TO COMPUTER SCIENCE II 3**
 Principles of computer science illustrated and applied through programming in the object oriented language C++. Programming projects illustrate computational problems, styles and issues that arise in computer systems development and in all application areas of computation.
 PREREQ: Grade of C- or better in CISC108 or CISC106.
 COREQ: MATH115, MATH 117, MATH171, MATH221, 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: A minimum grade of C- in CISC181.
 COREQ: MATH210 or MATH241.
- CISC 250 BUSINESS TELECOMMUNICATION NETWORKS 3**
 Examines technologies of information transmission currently utilized in the business environments and the implications of these technologies upon the development and implementation of information systems. Provides a basic background in the convergence of voice, data and video services into common digital networks. Security issues also considered.
 PREREQ: CISC181.
 RESTRICTIONS: Degree credit will not be given for both CISC250 and CISC450.
- 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: A minimum grade of C- in CISC181.
 RESTRICTIONS: CISC220 recommended as a prerequisite.
- CISC 275 INTRODUCTION TO SOFTWARE ENGINEERING 3**
 Object oriented software design and development through use of the Java programming language. Topics include team programming, design patterns, graphical user interfaces, software engineering tools (e.g., integrated development environments, version control, build management, bug tracking, automated testing).
 PREREQ: CISC220.
- 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: A minimum grade of C- in CISC220.
 COREQ: MATH221 or MATH241.
- CISC 303 AUTOMATA THEORY 3**
 Automata and formal language theory. Background for advanced applications in compilers, computer networks, operating systems, and natural language processing. Finite automata and regular languages. Push down automata and context free grammars. Turing machines.
 PREREQ: A minimum grade of C- in both MATH210 and CISC220
- CISC 304 LOGIC AND PROGRAMMING 3**
 Propositional and predicate logic for general reasoning and advanced applications in knowledge representation in artificial intelligence and database, program correctness and programming semantics. Models, resolution, logic programming, and natural deduction.
 PREREQ: CISC220, MATH210 (with minimum C- grade).
- 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, forming and traversal of strings, trees and graphs. Categorization of computational problems: classes P and NP. NP completeness.
 PREREQ: MATH210 and a minimum grade of C- in CISC220.
- CISC 355 COMPUTERS, ETHICS AND SOCIETY 3**
 Explains relationships among information technology, society and ethics by

examining issues raised by increasingly widespread use of computers. Topics include ethics for computer professionals, computer impact on factory work, office work, personal privacy and social power distribution.

- 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: CPEG210 and CPEG211, or CPEG202, and a minimum grade of C- in CISC220 and CISC260 (or equivalent courses).
- 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: A minimum grade of C- in both CISC220 and CISC260. CPEG222 may be substituted for CISC260.
 RESTRICTIONS: CISC360 recommended as a prerequisite.
- CISC 364 SYSTEM SECURITY 3**
 Concepts in maintaining a secure network of computers connected to the Internet. Topics include information security, classic/common exploits of operating system and networking weaknesses (e.g., buffer overflows, denial of service) and how to prevent them, symmetric and public-key cryptography, digital signatures, wireless LAN security, and firewalls.
 PREREQ: CISC361.
- CISC 366 INDEPENDENT STUDY 1-6**
- CISC 370 OBJECT ORIENTED PROGRAMMING USING JAVA 3**
 Object oriented programming through use of the Java programming language. Use of Java's extensive library of API's (application programming interfaces). Study of the design issues of large program systems.
 PREREQ: 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 decomposition, 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: CISC303.
 RESTRICTIONS: Credit cannot be received for both CISC401 and CISC601.
- CISC 403 PROGRAM VALIDATION 3**
 Specification and verification of programs. Testing through the use of formal and informal verification techniques, program design is made more effective and product quality (meeting specifications) is enhanced.
 PREREQ: CISC304.
 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 CISC304.
 RESTRICTIONS: Credit cannot be received for both CISC404 and CISC604.
- CISC 409 TOPICS IN THEORETICAL COMPUTER SCIENCE 3**
 Contents vary to coincide with the interests of students and current faculty.
 PREREQ: CISC401.
 RESTRICTIONS: Credit cannot be received for both CISC409 and CISC609.
- CISC 410 INTRODUCTION TO NUMERICAL ANALYSIS AND ALGORITHMIC COMPUTATION 3**
 Direct and iterative methods for solution of algebraic equations and systems of linear equations, matrix inversion, pseudo-inverses, algebraic eigenvalue problems, linear least-square problems and nonlinear equations. Stresses both numerical analysis and algorithmic aspects.
 Crosslisted with MATH426.
 PREREQ: MATH349 or MATH341 or MATH351; and CISC105 or CISC181.
 RESTRICTIONS: Requires familiarity with computing (e.g., programming language).
- CISC 411 ALGORITHMIC AND NUMERICAL SOLUTION OF DIFFERENTIAL EQUATIONS 3**
 Algorithms for numerical integration and differentiation. Initial value problems; boundary value problems in ordinary differential equations; finite difference (explicit and implicit) methods; polynomial and spline approximation; finite elements and collocation; and introduction to numerical methods for partial differential equations.
 Crosslisted with MATH428.
 PREREQ: MATH426 or CISC410.

CISC 429	TOPICS IN ALGORITHMS AND COMPLEXITY THEORY	3	Syntax, semantics, pragmatics, parameter passing, abstract data types and comparisons between languages. PREREQ: CISC280. RESTRICTIONS: Credit cannot be received for both CISC429 and CISC629.
CISC 436	INTRODUCTION TO BIOINFORMATICS	3	Introduction to concepts, methodologies, and tools in bioinformatics. Abstraction of biological problems for computational solutions. Genome sequencing and assembly, bio-sequence comparison and database search, dynamics programming, hidden Markov models, and phylogenetic trees. PREREQ: CISC220 or permission of instructor.
CISC 437	DATABASE SYSTEMS	3	Physical and logical organization of databases. Data retrieval languages, relational database languages, security and integrity, concurrency, distributed databases. PREREQ: A minimum grade of C- in CISC220. RESTRICTIONS: Credit cannot be received for both CISC437 and CISC637.
CISC 440	COMPUTER GRAPHICS	3	Computer graphics technology, two- and three-dimensional systems, graphics software systems, modeling and object hierarchy, and animation. PREREQ: CISC220 and MATH241. RESTRICTIONS: CISC320 recommended. Credit cannot be received for both CISC440 and CISC640.
CISC 449	TOPICS IN COMPUTER APPLICATIONS	3	Contents will vary to coincide with the interests of students and current faculty. RESTRICTIONS: Credit cannot be received for both CISC449 and CISC649.
CISC 450	COMPUTER NETWORKS	3	Foundation principles, architectures and techniques employed in computer and communication networks. Focuses on mechanisms used in TCP/IP protocol suite. Topics include connection management, end-to-end reliable data transfer, sliding window protocols, quality of service, flow control, congestion control, routing, LANs, framing, error control, analog versus digital transmission, packet versus circuit switching, multiplexing. PREREQ: CISC303, CISC360 and either MATH205 or MATH350. COREQ: CISC361. RESTRICTIONS: Knowledge of probability recommended. Credit cannot be received for both CISC450 and CISC650. Credit cannot be received for both CISC250 and CISC450.
CISC 451	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 compress, facsimile. Lossy techniques: scalar/vector quantization, differential/subband/transform/wavelet encoding. Lossy applications: JPEG, JPEG200, MPEG, MP3. PREREQ: CISC220, MATH210, MATH241, MATH205.
CISC 452	TELECOMMUNICATIONS SYSTEMS	3	Presents basic concepts in telecommunications, emphasizing topics such as SONET, Cell and Frame Relay and multimedia switching. Concepts of operation and maintenance of large communications networks discussed. PREREQ: CISC250, or CISC450, or CPEG419. RESTRICTIONS: Open to CIS and EE majors and minors only.
CISC 453	SIMULATION OF COMPUTER NETWORKS	3	Modeling and computer simulation of discrete systems using discrete event simulation techniques. Application to the performance evaluation and modeling of computer networks and networking protocols. Study and use of simulation systems such as OPNET, Qualnet, and ns-2.
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 or CPEG419.
CISC 459	TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING AND NETWORKS	3	Contents vary to coincide with the interests of students and current faculty. PREREQ: CISC450. RESTRICTIONS: Credit cannot be received for both CISC459 and CISC659.
CISC 464	INTRODUCTION TO NETWORK SECURITY	3	Practical introduction to network security field. Covers material on cryptography, intrusions, denial-of-service attacks, worms, honeynets and other hot topics in network security. PREREQ: CISC450 or equivalent.
CISC 466	INDEPENDENT STUDY	1-6	
CISC 470	PROGRAMMING LANGUAGES	3	Selection, use and implementation of appropriate language(s) for given problems.
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 CISC303.
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 474	ADVANCED WEB TECHNOLOGIES	3	Programming and architecture of web servers and the technologies for implementing high performance, sophisticated web sites for applications like e-commerce. Students learn how to install and set-up a web server, how to write and install programs for a web server, and how to design and implement multi-tier client/server applications with database backends. PREREQ: CISC220 and CISC370. COREQ: CISC437.
CISC 475	ADVANCED SOFTWARE ENGINEERING	3	Understand and apply a complete modern software engineering process. Topics include requirements analysis, specification, design, implementation, verification, and project management. Real-life team projects cover all aspects of the software development lifecycle, from the requirements to acceptance testing. PREREQ: CISC275 and senior status. CISC361 is recommended. RESTRICTIONS: Credit cannot be received for both CISC475 and CISC675.
CISC 477	SYSTEMS ADMINISTRATION	3	Introduces students to the internals of UNIX, trouble-shooting system and network problems, hardware and software configuration and installation, and security aspects of hosts on the internet. Multi-operating system integration will also be discussed. PREREQ: CISC361.
CISC 479	TOPICS IN ARCHITECTURE AND SOFTWARE	3-6	Contents will vary to coincide with the interests of students and faculty. PREREQ: CISC361 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 crosslisted with CGSC481. PREREQ: CISC280 and CISC304. RESTRICTIONS: Credit cannot be received for both CISC481 and CISC681.
CISC 483	INTRODUCTION TO DATA MINING	3	Concepts, techniques, and algorithms for mining large data sets to discover structural patterns that can be used to make subsequent predictions. Emphasis on practical approaches and empirical evaluation. Use of a workbench of data mining tools, such as the Weka toolkit. PREREQ: CISC-275, or permission of instructor.
CISC 485	MECHATRONICS	3	Mechatronics 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 CISC485 and CISC685. Permission of instructor required. Offered in alternate years.
CISC 489	TOPICS: 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 VALIDATION	3	Specification and verification of programs. Testing through the use of formal and informal verification techniques, program design is made more effective and product quality (meeting specifications) is enhanced. PREREQ: CISC304 equivalent. 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, completeness, compactness and undecidability. Automated theorem proving also covered.
 PREREQ: CISC304 equivalent.
 RESTRICTIONS: Credit cannot be received for both CISC604 and CISC404.

CISC 609 TOPICS IN THEORETICAL COMPUTER SCIENCE 3-12
 Contents vary to coincide with the interests of students and current faculty.
 PREREQ: CISC601.
 RESTRICTIONS: Credit cannot be received for both CISC609 and CISC409.

CISC 621 ALGORITHM DESIGN AND ANALYSIS 3
 Emphasis on developing expertise in the design and analysis of algorithms. Equal importance given to techniques and specific algorithms. Particular topics include advanced data structures, graph algorithms, disjoint set manipulation, sorting and selection, amortized analysis, NP-completeness, and matrix and polynomial multiplication.
 PREREQ: Undergraduate algorithms and discrete math courses

CISC 636 INTRODUCTION TO BIOINFORMATICS 3
 Introduction to concepts, methodologies, and tools in bioinformatics. Abstraction of biological problems for computational solutions. Genome sequencing and assembly, bio-sequence comparison and database search, dynamics programming, hidden Markov models, and phylogenetic trees.
 PREREQ: CISC220 or permission of instructor.
 RESTRICTIONS: Credit can not be earned for both CISC636 and CISC436.

CISC 637 DATABASE SYSTEMS 3
 Physical and logical organization of databases. Data retrieval languages, relational database languages, security and integrity, concurrency, distributed databases.
 PREREQ: CISC220 and CISC304 or equivalent.
 RESTRICTIONS: Credit cannot be received for both CISC637 and CISC437.

CISC 640 COMPUTER GRAPHICS 3
 Computer graphics technology, two- and three-dimensional systems, graphics software systems, modeling and object hierarchy, and animation.
 PREREQ: CISC220 or equivalent.
 COREQ: CISC320 recommended.
 RESTRICTIONS: Credit cannot be received for both CISC640 and CISC440.

CISC 649 TOPICS IN COMPUTER APPLICATIONS 3-12
 Contents will vary to coincide with the interests of students and current faculty.
 RESTRICTIONS: Credit cannot be received for both CISC649 and CISC449.

CISC 650 COMPUTER NETWORKS 3
 Foundation principles, architectures, and techniques employed in computer and communication networks. Focuses on mechanisms used in TCP/IP protocol suite. Topics include connection management, end-to-end reliable data transfer, sliding window protocols, quality of service, flow control, congestion control, routing, LANs, framing, error control, analog versus digital transmission, packet versus circuit switching, multiplexing.
 PREREQ: CISC360; CISC361 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 compress, facsimile. Lossy techniques: scalar/vector quantization, differential/subband/transform/wavelet encoding. Lossy applications: JPEG, JPEG200, MPEG, MP3.
 PREREQ: CISC220, MATH210, MATH241, MATH205, or equivalent.

CISC 652 TELECOMMUNICATIONS SYSTEMS 3
 Presents basic concepts in telecommunications emphasizing topics such as SONET, Cell and Frame Relay and multimedia switching. Concepts of operation and maintenance of large communications networks discussed.
 PREREQ: CISC450 or CPEG419 or ELEG651 or equivalent.
 RESTRICTIONS: Open to CIS and EE majors and minors, and graduate students only.

CISC 653 COMPUTER NETWORK SIMULATION 3
 Modeling and computer simulation of discrete systems using discrete event simulation techniques. Application to the performance evaluation and modeling of computer networks and networking protocols. Study and use of simulation systems such as OPNET, Qualnet, and ns-2.
 PREREQ: CISC450 or CISC650.

CISC 659 TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING AND NETWORKS 3
 Contents vary to coincide with the interests of students and faculty.

PREREQ: CISC650.
 RESTRICTIONS: Credit cannot be received for both CISC659 and CISC459.

CISC 662 COMPUTER SYSTEMS: ARCHITECTURE 3
 Recent advances in computer architecture and their impact on architectural design. Multicomputer and multiprocessor architectures. Parallel machines.
 PREREQ: CISC360 or equivalent.
 RESTRICTIONS: Credit cannot be received for both CISC662 and CISC462.

CISC 663 OPERATING SYSTEMS 3
 Comparison and analysis of strategies for the management of memory, processors, I/O devices and file systems.
 PREREQ: CISC260 or equivalent.

CISC 664 INTRODUCTION TO NETWORK SECURITY 3
 Detailed, in-depth overview of pressing network security problems and discusses potential solutions. Covers a broad variety of security topics, such as cryptography, authentication, denial-of-service attacks, worms, viruses, etc. Lecture and optional reading provide background information on the key network security concepts, and course projects create opportunity to exercise concepts learned in class.
 PREREQ: CISC450 or CISC650.

CISC 670 PROGRAMMING LANGUAGES 3
 Selection, use and implementation of appropriate language(s) for given problems. Syntax, semantics, pragmatics, parameter passing and abstract data types.
 PREREQ: CISC303 or equivalent.
 RESTRICTIONS: Credit cannot be received for both CISC670 and CISC470.

CISC 672 COMPILER CONSTRUCTION 3
 Advanced design and implementation of programming language translators. Emphasis on parsing methods, run-time, storage management techniques, code generation and optimization.
 PREREQ: CISC320 or equivalent, and CISC601 recommended.
 RESTRICTIONS: Undergraduates must obtain instructor's permission.

CISC 673 PROGRAM ANALYSIS AND TRANSFORMATION 0
 Analysis and transformation of software with applications to code optimization and software engineering. Topics include control flow analysis, advanced program representations, intraprocedural and interprocedural data flow analysis, and code-improving transformations.
 PREREQ: CISC672, or permission of instructor.

CISC 675 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 681 ARTIFICIAL INTELLIGENCE 3
 Programming techniques for problems not amenable to algorithmic solutions. Problem formulation, search strategies, state spaces, applications of logic, knowledge representation, planning and application areas.
 May be crosslisted with CGSC681.
 PREREQ: CISC220 and CISC304 or equivalent.
 RESTRICTIONS: Credit cannot be received for both CISC681 and CISC481.

CISC 683 INTRODUCTION TO DATA MINING 3
 Concepts, techniques, and algorithms for mining large data sets to discover structural patterns that can be used to make subsequent predictions. Emphasis on practical approaches and empirical evaluation. Use of a workbench of data mining tools, such as the Weka toolkit.

CISC 685 MECHATRONICS 3
 Mechatronics 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. Offered in alternate years.

CISC 689 TOPICS: ARTIFICIAL INTELLIGENCE 3-12
 Contents vary to coincide with the interests of students and faculty.
 PREREQ: CISC681.
 RESTRICTIONS: Credit cannot be received for both CISC689 and CISC489.

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

CISC 801 ADVANCED COMPUTABILITY THEORY 3
 Advanced abstract computability (or recursive function) theory with emphasis on the

tools underpinning research in the area. Topics include universal programming systems, complexity results, oracular computations and quantifier hierarchies, classification of algorithmically enumerable sets, machine self-reference and priority arguments.
PREREQ: CISC601.

CISC 805 COMPUTABILITY THEORETIC LEARNING 3

Mathematically circumscribes the absolute boundaries of what algorithms can do about learning grammars for languages and programs for functions. Proves results in the recursion-theoretic theory of machine learning. Provides interpretations of results regarding human language learning and philosophy of science.
PREREQ: CISC601.

CISC 809 ADVANCED TOPICS IN THEORETICAL COMPUTER SCIENCE 3-12

Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC601.

CISC 822 ALGEBRAIC ALGORITHMS 3

Algorithms for exact symbolic computation with integers of arbitrary size, polynomials, matrices. Key algorithmic problems: GCD, factorization and solution of linear and polynomial equations. Key issues: correctness, cost analysis and system design. Key techniques: Chinese remaindering, Hensel lifting and Transforms (FFT).
PREREQ: CISC621 and/or an abstract algebra course or permission of instructor.
RESTRICTIONS: Offered in alternate years.

CISC 829 ADVANCED TOPICS IN ALGORITHMS AND COMPLEXITY THEORY 3-12

Contents vary to coincide with the interests of students and faculty.

CISC 841 BIOINFORMATICS 3

Advanced topics in current bioinformatics research, such as hidden Markov models, kernel based methods, and bayesian based analysis with applications to functional annotation, structural prediction, and biological networks inferences.
PREREQ: CISC436 or CISC636 or permission of instructor.

CISC 849 ADVANCED TOPICS IN COMPUTER APPLICATIONS 3-12

Contents vary to coincide with the interests of students and faculty.
RESTRICTIONS: Requires permission of instructor.

CISC 852 COMPUTER NETWORK PERFORMANCE 3

Performance analysis of computer networks and network protocols. Introduction to queuing theory, stochastic processes, Markov chains, and various queuing models. Open and closed queueing networks. Analysis of ARQ retransmission strategies, multi-access communication, routing, flow control, and congestion control schemes.
PREREQ: CISC650 or ELEG651 or equivalent.

CISC 853 NETWORK MANAGEMENT 3

Introduction to network management concepts. Network management architectures and protocols: the Internet and OSI frameworks, management functionalities, management domains and objects, protocols and services (SNMP, CMIS/P). Design of management agents and clients. Concepts of performance management, fault management, configuration management and other management applications.
PREREQ: CISC650 or ELEG651.

CISC 856 TCP/IP AND UPPER LAYER PROTOCOLS 3

Advanced principles and techniques of the TCP/IP protocol suite. Emphasis on network, transport and application layers, and recent new protocols as proposed by the IETF. Examples: FTP, SMTP, telnet, NTP, HTTP, DNS, Multicast, DHCP, ECN, IMPP, CNDN, ICMP, SCTP.
PREREQ: CISC650 or ELEG651.

CISC 859 ADVANCED TOPICS IN COMMUNICATIONS, DISTRIBUTED COMPUTING NETWORKS 3-12

Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC650 or ELEG651.

CISC 861 WIRELESS NETWORKS AND MOBILE COMPUTING 3

Provides an in-depth study of networking protocol and system software in wireless networks and mobile computing. Topics include MAC layer and 802.11, ad hoc networks, sensor networks, GloMoSim simulation package, Mobile IP, Cellular IP, wireless TCP, middleware for mobile computing, and 3G wireless networks.
PREREQ: CISC650 or ELEG651.

CISC 864 RESEARCH TOPICS IN NETWORK SECURITY 3

Focuses on research and emphasizes reading and writing of technical papers, and project work. Covers a variety of network security topics, such as denial-of-service, worm and virus attacks, privacy, anonymization techniques, IP spoofing, social engineering, etc.
PREREQ: CISC450 or CISC650 or ELEG651.

CISC 868 RESEARCH 1-9

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 873 COMPILING FOR ADVANCED ARCHITECTURES 3

Techniques for generating code for advanced uniprocessor and multiprocessor architectures. Topics include register allocation, code generation for pipelined, superscalar, VLIW architectures, dependence analysis, locality transformations, compiling for shared memory, message passing, distributed shared memory and multi-threaded architectures.
PREREQ: CISC662 or previous course in compilers, and CISC662 or previous course in computer architecture.
RESTRICTIONS: CISC872 is recommended.

CISC 875 IMPLEMENTING OBJECT ORIENTED LANGUAGES 3

Program analysis and code generation for object oriented languages. Program analysis in the presence of polymorphism, threads, exceptions, templates and multiple inheritance. Compiling high-level languages to virtual machines (like JVM) and compiling virtual machine codes to register instruction sets. Garbage collection and memory management.
PREREQ: CISC672 or previous compiler course and exposure to object oriented programming.
RESTRICTIONS: CISC872 is recommended.

CISC 879 ADVANCED TOPICS IN ARCHITECTURE AND SOFTWARE SYSTEMS 3-12

Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC662 or CISC663.

CISC 882 NATURAL LANGUAGE PROCESSING 3

Introduction to computational models of syntax, semantics and pragmatics for natural language understanding. Emphasis on design of English interfaces to data bases and ill-formed input.
PREREQ: CISC681.

CISC 883 NATURAL LANGUAGE GENERATION 3

Current research directions in generation, models of generation, differences between generation and understanding, text structure and coherence, grammars for generation.
PREREQ: CISC681 and CISC882.

CISC 885 DISCOURSE AND DIALOGUE 3

Pragmatic issues involved in developing intelligent discourse and dialogue systems. Topics: speech acts, characteristics of a coherent dialogue, explicit versus implicit communication, discourse models, planning and plan recognition, ill-formed input, cooperative responses, user models and default reasoning.
PREREQ: CISC681.

CISC 886 MULTI-AGENT SYSTEMS 3

Introduction to the field of Multi-Agent Systems, examining issues that arise when groups of self-interested or cooperating autonomous agents interact to solve shared problems. Issues include reasoning about the knowledge and beliefs of other agents, communication and negotiation, computational organization, coordination and control.
PREREQ: CISC681 or equivalent.

CISC 887 INTERNET INFORMATION GATHERING 3

Approaches to information gathering, filtering, and integration including work in the heterogeneous database, information retrieval and agent-oriented communities. Text indexing, vector-based and probabilistic retrieval, semantic web technologies, wrappers and mediators, query planning and optimization, collaborative filtering, information agents, applications.
PREREQ: CISC681 or equivalent.

CISC 888 MACHINE LEARNING 3

Concepts and algorithms underlying computer programs that learn from data to solve a task will be discussed. A range of modern machine learning algorithms will be covered.
RESTRICTIONS: Requires permission of instructor.

CISC 889 ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE 3-12

Contents vary to coincide with the interests of students and faculty.
PREREQ: CISC681.

CISC 890 COLLOQUIUM: COMPUTER SCIENCE 0 PF

Weekly lectures by faculty and visiting researchers provide a broad overview of the scope as well as an insight into significant results of current research in computer science.

CISC 964 PRE-CANDIDACY STUDY 3-12 PF

Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

CISC 969 DOCTORAL DISSERTATION 1-12 PF

COMPARATIVE LITERATURE

CMLT 202	BIBLICAL AND CLASSICAL LITERATURE	3
Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts. Crosslisted with ENGL202. PREREQ: ENGL110.		
CMLT 207	GREAT WRITERS OF THE WESTERN WORLD I: 1100-1700	3
Studies writers such as Dante, Chaucer, Rabelais and Cervantes, in translation. May be crosslisted with ENGL211. PREREQ: ENGL110.		
CMLT 208	GREAT WRITERS OF THE WESTERN WORLD II: 1650-1950	3
Studies writers such as Moliere, Voltaire, Goethe, Dostoevski, Thomas Mann and Herman Hesse, in translation. May be crosslisted with ENGL212. PREREQ: ENGL110.		
CMLT 217	INTRODUCTION TO FILM	3
Focuses on different techniques of acting, mise-en-scene, cinematography, editing, sound and color to assess how films encourage audiences to respond in the ways they do. Crosslisted with ENGL217. PREREQ: ENGL110.		
CMLT 218	INTRODUCTION TO DRAMA	3
Representative masterworks from the classical era to the present. Crosslisted with ENGL208. PREREQ: ENGL110.		
CMLT 219	INTRODUCTION TO THE NOVEL	3
Representative masterworks of fiction, emphasizing those of Europe and America. Crosslisted with ENGL209. PREREQ: ENGL110.		
CMLT 316	CLASSICAL MYTHOLOGY	3
Cosmological myths and heroic sagas in the literature and art of Greece and Rome. The influence of the mythology in later art and literature. Crosslisted with FLIT316. RESTRICTIONS: Open to first-year students.		
CMLT 317	FILM HISTORY	3
History of American or various foreign national cinemas. Crosslisted with ENGL317. PREREQ: ENGL110. RESTRICTIONS: May be repeated for credit when topics vary.		
CMLT 318	STUDIES IN FILM	3-6
Special topics such as film genres, major directors and Soviet cinema. Crosslisted with ENGL318. PREREQ: ENGL110. RESTRICTIONS: May be repeated for credit when topics vary.		
CMLT 320	VARYING AUTHORS AND GENRES	3
Cultural, especially cross-cultural and/or interdisciplinary studies with primary emphasis on the aesthetic context of the announced topic, e.g., Nordic Saga and Myth; Courtly Love; and the European Postwar Novel. Crosslisted with FLIT320. RESTRICTIONS: May be repeated for credit when topics vary.		
CMLT 321	MEDIEVAL LITERATURE AND CULTURE	3
Study of selected topics in medieval literature (romance, Chaucer's contemporaries, drama). Texts usually read in English translations. Emphasis on medieval culture as a European phenomenon. Variable content. Crosslisted with ENGL321. PREREQ: ENGL110.		
CMLT 322	TOPICS: CLASSICAL LITERATURE IN TRANSLATION	3
Special topics in Greek and Roman culture and civilization. Particular areas and writers to be announced, e.g., ancient epic, ancient drama, Greek literature in translation. Crosslisted with FLIT322. RESTRICTIONS: May be repeated for credit when topics vary.		
CMLT 330	VARYING AUTHORS, THEMES AND MOVEMENTS	3
Cultural, especially cross-cultural, study with primary emphasis on the historical development of the announced area, e.g., The Faust Theme in Western Literature, Dante Through the Ages, Don Juan, and the Transformation of a Myth. Topics vary and are announced in registration booklet. Crosslisted with FLIT330. RESTRICTIONS: May be repeated for credit when topics vary.		

CMLT 341	THEATRE/DRAMA: CLASSIC/MEDIEVAL	3
Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period. Crosslisted with THEA341.		
CMLT 342	THEATRE/DRAMA: RENAISSANCE TO 1700	3
Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period. Crosslisted with THEA342.		
CMLT 343	THEATRE/DRAMA: 1700 - 1900	3
Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period. Crosslisted with THEA343.		
CMLT 344	THEATRE/DRAMA: 1900 - PRESENT	3
Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period. Crosslisted with THEA344.		
CMLT 360	HUMANITIES COLLOQUIUM	3
CMLT 361	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. Crosslisted with ENGL361. PREREQ: ENGL110.		
CMLT 366	INDEPENDENT STUDY	1-3
CMLT 385	STUDIES IN LITERARY CRITICISM AND THEORY	3-12
Studies in selected topics in literary criticism and critical theory. Crosslisted with ENGL385. PREREQ: ENGL110. RESTRICTIONS: May be repeated for credit when topics vary.		
CMLT 390	HONORS COLLOQUIUM	3
CMLT 466	INDEPENDENT STUDY	1-3

COMMUNICATION

COMM 200	HUMAN COMMUNICATION SYSTEMS	3
Analysis of various human communication systems which may include interpersonal, organizational and/or mass. RESTRICTIONS: May be repeated up to 3 times when topics vary.		
COMM 204	GENDER AND COMMUNICATION	3
Deals with gender differences in communication in varied contexts, such as conflict, marriage, family, friendship, and work. May be crosslisted with WOMS204.		
COMM 212	ORAL COMMUNICATION IN BUSINESS	3
Includes an analysis of the types and principles of the communication inherent in the business and professional setting; a concentration upon the development of presentational skills: analyzing audiences, questioning, interviewing, researching, supporting, organizing and delivering information; an opportunity to develop and present materials within dyads, small groups and public contexts. RESTRICTIONS: Not open to communication and communication interest majors. Credit not given for both COMM212 AND COMM255.		
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 251	COMMUNICATING EFFECTIVELY	1 PF
Teaches the fundamentals of written communication techniques that are used in communication industries, such as broadcast journalism, public relations, and organizational communication.		
COMM 255	FUNDAMENTALS OF COMMUNICATION	3
Introduction to theories in communication with applications. Developing, analyzing and critiquing communication in different settings. Includes the practice of oral communication skills. RESTRICTIONS: Not open to seniors or communication majors. Credit not given for both COMM255 and COMM212.		

COMM 256 PRINCIPLES OF COMMUNICATION THEORY	3	Introduction to theories and research in communication including a survey of the areas of the field.
COMM 263 INTERNATIONAL SOCIAL CONDUCT	3	Introduction to basic attitudes toward interpersonal relations and socioeconomic and political responsibilities in various cultures. An experiential course integrating foreign and U.S. students. RESTRICTIONS: Offered only in Winter. Not for major credit.
COMM 300 INTRODUCTION TO COMMUNICATION PRINCIPLES	3	A survey of communication theories as applied to practical experiences in all contexts ranging from interpersonal communication and small group processes to informative and persuasive speaking. Focuses on the same material as COMM212, but without the practice of oral communication skills. RESTRICTIONS: Not open to communication majors. Students cannot earn credit for COMM300 and COMM212 or COMM255.
COMM 301 INTRODUCTION TO COMMUNICATION RESEARCH METHODS	3	The conceptual bases of research methodology: formulating questions, designing, conducting and analyzing research. PREREQ: COMM256 or COMM245 or COMM330. RESTRICTIONS: Not open to freshmen.
COMM 309 INTRODUCTION TO PUBLIC RELATIONS	3	Examination of the public relations process, practices and principles in various settings, including corporations, non-profit organizations, educational institutions and government. Insights are gained through case studies and interviews with public relations professionals.
COMM 310 TOPICS: MASS COMMUNICATION HONORS PRO-SEMINAR	1-4	Focus on areas of study in mass communication. Will enhance and expand on other communication courses offered as a co-requisite. COREQ: A list of co-requisites will be available to students each semester. RESTRICTIONS: Students with 3.0 or higher GPA. May be repeated up to three times for credit when topics vary.
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.
COMM 313 COMMUNICATION PRINCIPLES IN ADVERTISING	3	Provides a comprehensive overview of the marketing function, emphasizing integrated marketing communication. Includes historical perspective and current advertising and promotion principles and practices. Combines both individual and small team projects, such as developing an Integrated Marketing Communication campaign.
COMM 318 TOPICS IN MASS COMMUNICATION	3	Focus on introductory areas of study in mass communication. RESTRICTIONS: May be repeated three times for credit when topics vary.
COMM 319 TOPICS IN POLITICS AND BROADCAST JOURNALISM	3	Topics vary and may include the influence of the media on foreign policy, the responsibility of the media on foreign policy or for policy failures or successes. May be crosslisted with POSC319. RESTRICTIONS: For majors only. May be repeated up to three times for credit when topics vary.
COMM 320 TOPICS: INTERPERSONAL COMMUNICATION HONORS PRO-SEMINAR	1-4	Focus on areas of study in interpersonal communication. Will enhance and expand on other communication courses offered as a co-requisite. COREQ: Vary from semester to semester. Students will be supplied with a list of co-requisites each semester. RESTRICTIONS: Students with a 3.0 GPA or higher. May be repeated three times for credit when topics vary.
COMM 325 STUDIO TELEVISION PRODUCTION	3	Television as a mass communication media. Background, programming, production and studio procedures in educational television, broadcasting and closed circuit. Laboratory observation and practices.
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.
COMM 327 TELEVISION PRODUCTION LABORATORY I	1 PF	Practice of TV production techniques. RESTRICTIONS: Permission required from department.
COMM 328 TELEVISION PRODUCTION LABORATORY II	1 PF	Further practice of TV production techniques. RESTRICTIONS: Permission required from department.
COMM 329 BROADCAST NEWSWRITING	3	Emphasizes broadcast news writing fundamentals and comparisons to other forms of writing. Includes news judgment, news gathering, and news editing, as well as integration of current events.
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	Political roles of the media in socialization, political competence, agenda setting, the electoral process and political crises. Emphasis on media-political system interaction and its import in a democratic society. Crosslisted with POSC340. RESTRICTIONS: Open to majors only.
COMM 341 THEORIES OF INTERPERSONAL COMMUNICATION	3	Survey of concepts and theories in interpersonal communication. Focuses on dyadic interaction and relationships as created, maintained, and modified through verbal and nonverbal behavior.
COMM 342 TOPICS IN ORGANIZATIONAL COMMUNICATION	3	Focuses 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 crosslisted with LEST345.
COMM 350 PUBLIC SPEAKING	3	Analyzes and applies theory and research in public speaking. Develops skills in preparation, presentation and evaluation of speeches. Includes classroom performances.
COMM 351 ORAL COMMUNICATION FELLOWS	3	Oral Communication Fellows training. PREREQ: COMM350. RESTRICTIONS: Enrollment by department invitation only.
COMM 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: Offered in spring and fall semesters only. Open to junior and senior communication majors only. May be repeated 2 times for credit.
COMM 366 INDEPENDENT STUDY	1-3	
COMM 370 THEORIES OF MASS COMMUNICATION	3	An examination of the foundations and development of theories of mass communication. Specific areas of study include media, society and the individual, media violence, cultivation theory, personal influence, social learning theory, diffusion theory and general media effects.
COMM 388 VIDEO PRODUCTION PRACTICUM	3	Involves intensive work on specific productions. Includes practice in various aspects of video production: development, direction, management, production, and editing. RESTRICTIONS: Enrollment requires permission of instructor.
COMM 401 CAREERS IN COMMUNICATION	1 PF	Offers insights into the many careers open to those with communication degrees and includes guest lectures from successful alumni. Provides strategies for career development. RESTRICTIONS: Open to junior and senior communication majors only.
COMM 408 NEW MEDIA PROJECT DEVELOPMENT	3	Application of communication research processes to designing new media (e.g., web sites, streaming video, electronic communication, interactive media) for a

client. Involves conducting research for planning, developing strategies, designing prototypes, and making recommendations for implementation and evaluation.

COMM 409 PUBLIC RELATIONS CAMPAIGN PLANNING 3
Comprehensive recap of the Integrated Marketing Communication function, with an emphasis on public relations research, objectives, strategies, integrated tactics, and campaign evaluation. Utilizes a small team "service learning" setup, wherein the teams adopt a community non-profit organization and work closely with Board and staff members to produce and present a comprehensive public relations campaign plan.
PREREQ: COMM309.

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 non-profit client and several writing projects geared to specific audiences.
PREREQ: COMM309.

COMM 417 COMMUNICATION AND THE MANAGEMENT OF CONFLICT 3
An overview of communication and the conflict process in face-to-face interaction. Emphasis on theories concerning the structure, analysis, and management of conflict situations.

COMM 418 TOPICS IN MASS COMMUNICATION 3-9
Current directions in mass communication theory and practice including new technologies, politics, broadcast programming and research, advertising and audience responses to media content.
RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 421 INTERCULTURAL COMMUNICATION 3
Enhances students' understanding of cultures, communication and intercultural communication processes. In addition, communicative strategies for improving intercultural communication is discussed.
RESTRICTIONS: Some sections offered in Madrid, Spain and Costa Rica.

COMM 424 MEDIA MESSAGE ANALYSIS 3
Examination of methodology used to study media content and effects. Focus on past and ongoing research in broadcast, nonbroadcast and print media. Method of how to conduct and assess research relating to mass media.

COMM 425 ADVANCED TOPICS IN POLITICS AND BROADCAST JOURNALISM 3-9
Topics vary and may include influence of crisis news on national and international politics, effectiveness of political documentaries and ethical and historical underpinnings of broadcast journalism.
May be crosslisted with POSC425.
RESTRICTIONS: Open to junior and senior communication majors only. May be repeated for credit when topics vary.

COMM 427 BROADCAST NEWS 4
Communication students learn the pressures and standards of broadcast news while writing and producing a scheduled studio TV program. Emphasis on writing news for broadcast, program story-selection issues, video selection, interviewing techniques, professionalism. Students produce a weekly news program in the lab.
RESTRICTIONS: Open to communication majors only.

COMM 440 TOPICS IN INTERPERSONAL COMMUNICATION 3
Topics vary and focus on significant areas of theory and research in interpersonal communication. Topics may include nonverbal communication, lifespan communication and communication in intimate relationships.
May be crosslisted with WOMS440.
RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 442 TOPICS IN ORGANIZATIONAL COMMUNICATION 3-9
Focuses on significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships.
May be crosslisted with PSYC443, WOMS442.
RESTRICTIONS: May be repeated for up to nine credits when topics vary.

COMM 444 GLOBAL AGENDA 3
Seminar survey of current geopolitical problems facing the US government and global news media. Guest lecturers and practitioners in diplomacy and the international media explore the problems, US foreign policy and media influence upon both.
Crosslisted with POSC444.
RESTRICTIONS: May be repeated for credit when topics vary.

COMM 450 MASS COMMUNICATION EFFECTS 3
Examines history and nature of research on effects of mass media, particularly television, in such areas as attitude change, socialization, role modeling and sex and violence.
PREREQ: COMM370.

COMM 452 COMMUNICATION AND PERSUASION 3
An examination of how influence is created and resisted through communication in various settings, including personal relationships, public relations, advertising and political campaigns. Emphasis on contemporary theories of persuasion and attitude change, with applications to the various content areas studied.

COMM 454 CHILDREN AND THE MASS MEDIA 3
Mass media research and theory as they relate to children. Substantive areas include children's use and comprehension of media, content of children's television programming, television and the family, children and advertising and the media's contribution to social values and roles.

COMM 456 COMMUNICATION IN ORGANIZATIONS 3
Introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretive approaches are emphasized.

COMM 466 INDEPENDENT STUDY 1-3

COMM 468 UNDERGRADUATE RESEARCH IN COMMUNICATION 1-6
Undergraduate research in area of communication conducted on or off campus, out of class, and under supervision of faculty member.
RESTRICTIONS: Open to junior and senior communication majors only. Requires permission of instructor.

COMM 485 ANALYSIS OF FACE-TO-FACE COMMUNICATION 3
An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.

COMM 486 MULTIMEDIA LITERACY 3
Defines multimedia and discusses its impact on society. Surveys applications across the curriculum and reflects on the effects of multimedia on current teaching practice. Provides a multimedia toolbox and shows how to use it to create and publish multimedia applications on the Internet. Discusses multimedia frontiers, emerging technology and societal issues including human impact, regulation, copyright, fair use, equity, cost and universal access.
Crosslisted with EDUC485.

COMM 601 EPISTEMOLOGY AND THEORY IN COMMUNICATION 3
General issues in the philosophy of knowledge and science critical for the understanding of theoretical conceptions and a comprehensive survey of theories in communication.
RESTRICTIONS: Open to graduate students only.

COMM 603 COMMUNICATION RESEARCH METHODS - PROCEDURES 3
Introduction to communication research methods including general research procedures, sampling, laboratory research and experimental design, survey research, field research, content analysis and longitudinal research. Includes an introduction to using the computer in research.
RESTRICTIONS: Open to graduate students only.

COMM 604 COMMUNICATION RESEARCH METHODS - ANALYSIS 3
Introduction to the tools and techniques of data analysis in communication research including descriptive statistics, hypothesis testing, inferential statistics, as well as advanced statistical procedures.
RESTRICTIONS: Open to graduate students only.

COMM 609 PUBLIC RELATIONS CAMPAIGN PLANNING 3
Comprehensive recap of the Integrated Marketing Communication function, with an emphasis on public relations research, objectives, strategies, integrated tactics, and campaign evaluation. Utilizes a small team "service learning" setup, wherein the teams adopt a community non-profit organization and work closely with Board and staff members to produce and present a comprehensive public relations campaign plan.

COMM 610 ORGANIZATIONAL COMMUNICATION THEORY 3
An examination of major theories of organizations including functionalist paradigm; interpretive paradigm; neoclassical paradigms (classical, social exchange systems theory and structural systems theory); and modern paradigms (technological systems theory, adaptive systems theory and integrative organizational theory).
RESTRICTIONS: Open to graduate students only.

COMM 613 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 non-profit client and several writing projects geared to specific audiences.

COMM 617 COMMUNICATION AND THE MANAGEMENT OF CONFLICT 3
An overview of communication and the conflict process in face-to-face interaction. Emphasis on theories concerning the structure, analysis, and management of conflict situations.

COMM 618 TOPICS IN MASS COMMUNICATION 3-9
Current directions in mass communication theory and research, cable television,

radio and TV regulations, public policy.

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

COMM 621 INTERCULTURAL COMMUNICATION 3
Enhances students' understanding of cultures, communication and inter-cultural communication processes. In addition, communicative strategies for improving inter-cultural communication discussed.
RESTRICTIONS: Open to graduate students only.

COMM 624 MEDIA MESSAGE ANALYSIS 3
Examination of methodology used to study media content and effects. Focus on past and ongoing research in broadcast, nonbroadcast and print media. The method of how to conduct and assess research relating to the mass media.

COMM 625 ADVANCED TOPICS IN POLITICAL AND BROADCAST JOURNALISM 3
Topics vary and focus on significant areas in politics and broadcast journalism. Topics may include crises news, political documentaries, broadcast presentations and credibility.
RESTRICTIONS: Open to graduate students only.

COMM 630 INTERPERSONAL COMMUNICATION THEORY 3
An examination of the theoretical orientations taken by scholars who study interpersonal relationships as well as a number of focused research areas. Of particular importance is the development of an understanding of the role of communication in creating and maintaining relationships.
RESTRICTIONS: Open to graduate students only.

COMM 640 TOPICS IN INTERPERSONAL COMMUNICATION 3-9
Significant research, theories and literature in communication, research design and theory building.
RESTRICTIONS: May be repeated three times for credit when topics vary.

COMM 642 TOPICS IN ORGANIZATIONAL COMMUNICATION 3-9
Significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships.
RESTRICTIONS: May be repeated for up to nine credits when topics vary.

COMM 652 COMMUNICATION AND PERSUASION 3
An examination of how influence is created and resisted through communication in various settings, including personal relationships, public relations, advertising and political campaigns. Emphasis on contemporary theories of persuasion and attitude change, with applications to the various content areas studied.

COMM 654 CHILDREN AND THE MASS MEDIA 3
Mass media research and theory as they relate to children. Substantive areas include children's use and comprehension of media, content of children's television programming, television and the family, children and advertising, and the media's contribution to social values and roles.
RESTRICTIONS: Open to graduate students only.

COMM 656 COMMUNICATION IN ORGANIZATIONS 3
An introduction to concepts and research related to communication processes in organizational settings. Both traditional and interpretive approaches are emphasized.

COMM 657 CHILDREN, TELEVISION AND EDUCATION 3
Issues relating to education, academic achievement, and the development of critical viewing skills; media and comprehension; content of children's television programming and advertising directed toward children; and the media's contribution to social values and roles; development of critical viewing skills curriculum.
May be crosslisted with EDUC657.

COMM 664 INTERNSHIP 1-6
Provides the student with practical, on-the-job training in the field of his or her interest, i.e., interpersonal, mass media, public relations or organizational communication.
RESTRICTIONS: Open to graduate students only.

COMM 670 MASS COMMUNICATION THEORY 3
Examination of theories of mass communication focusing upon media, society and the individual; sociocultural influences; the social context of the broadcast media; theories relating to effects of media violence; personal influence; social learning theory; diffusion theory; and media effects.
RESTRICTIONS: Open to graduate students only.

COMM 685 ANALYSIS OF FACE-TO-FACE COMMUNICATION 3
An examination of methods for analyzing face-to-face interaction, message construction, and message interpretation.

COMM 686 MULTIMEDIA LITERACY 3
Defines multimedia and discusses the impact it is having on society. Surveys applications across the curriculum and reflects on the effects of multimedia on current teaching practice. Provides a multimedia toolbox and shows how to use it

to create and publish multimedia applications on the Internet. Discusses multimedia frontiers, emerging technology, and societal issues including human impact, regulation, copyright, fair use, equity, cost and universal access.
Crosslisted with EDUC685.

COMM 868 RESEARCH 1-12

COMM 869 MASTER'S THESIS 1-6

COMPUTER ENGINEERING

CPEG 202 INTRODUCTION TO DIGITAL SYSTEMS 3
Analysis and design of logic circuits. Topics include: Boolean algebra and its application to switching circuits, simplification of switching functions, design of logic circuits at gate level and with MSI and LSI components. Analysis and design of synchronous and asynchronous sequential state machines.

CPEG 210 INTRODUCTION TO COMBINATIONAL LOGIC 2
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 2
Analysis and design of asynchronous sequential logic circuits, synchronous sequential machines and algorithmic state machines.
PREREQ: CPEG210.

CPEG 220 MICROPROCESSOR BASED SYSTEMS I 2
Introduction to small computing machines including the architecture, organization and programming of microprocessors. Emphasizes basic machines language and assembly language coding.
PREREQ: CPEG211 and CISC181.

CPEG 221 MICROPROCESSOR BASED SYSTEMS II 2
Extension 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.
PREREQ: CPEG220.

CPEG 222 MICROPROCESSOR SYSTEMS 4
Introduction to microprocessors as embedded devices. Emphasizes Input/Output techniques, interrupts, real-time operation, high-level code debugging and interfacing to various types of sensors and actuators. Projects that address various embedded applications are a major part of the course.
PREREQ: CPEG202.

CPEG 323 INTRODUCTION TO COMPUTER SYSTEMS ENGINEERING 3
Studies general purpose, special purpose and embedded computer architecture. Principles of digital system design introduced including an introduction to tools for automated design and use of programmable logic devices.
PREREQ: CPEG222.

CPEG 324 COMPUTER SYSTEMS DESIGN I 3
Principles of computer system design are studied emphasizing tradeoffs involving cost, performance, testability, reliability and manufacturability. Topics include timing analysis, component and subsystem interconnect, noise effects debugging techniques, boundary scan testing and printed circuit layout. Laboratory work involves design and implementation of a computer subsystem.
PREREQ: CPEG323.

CPEG 409 SIGNALS AND COMMUNICATION DESIGN I 4
Part I of two semester design series, ELEG/CPEG409/410. Learn background material for development of a major design project in signal processing or communications.
Crosslisted with ELEG409. PREREQ: CISC181, ELEG305.

CPEG 410 SIGNALS AND COMMUNICATIONS DESIGN II 4
Design of signal processing, control and communications systems. A major design project is required. Students study, design, build and test their projects. Periodic oral and written reports are required.
Crosslisted with ELEG410.
PREREQ: ELEG409.

CPEG 419 COMPUTER COMMUNICATION NETWORKS 3
Introduction to computer communication networks based on circuit switching and on packet switching. Layered architectures and layer protocols are described and models are developed to analyze network performance. Other topics include multiple access, local area networks and integrated networks.
PREREQ: ELEG310.

CPEG 420 COMPUTER NETWORK DESIGN AND MANAGEMENT 3
Introduces data networks and telecommunications, with emphasis on practical

design and engineering. Covers fundamental computer and voice networking, aided by case studies and hands-on laboratories. Explores standards, protocols, current tools and technologies. Examines issues such as security, convergence, wireless, IPv6 and network management.

CPEG 421 COMPILER DESIGN 3
Introduction to compiler design, syntax and semantics, code generation and optimization. Design of high performance computers together with high performance optimizing compilers as an integral unit. Software/hardware tradeoffs in pipelined computers, superscaler computers and computers embedded in other systems.
PREREQ: CPEG323 and CISC361.

CPEG 422 COMPUTER SYSTEMS DESIGN II 4
Examines modern digital computer design methods using industry standard electronic CAD synthesis tools. Topics include hardware design using VHDL, logic synthesis tools, simulation methods for synthesis and efficient coding techniques for synthesis. Includes experimental laboratory work to design and evaluate FPGA-based digital computer hardware.
PREREQ: CPEG324 and CISC361.

CPEG 455 HIGH-PERFORMANCE COMPUTING WITH COMMODITY HARDWARE 3
New commodity computing devices, e.g., GPUs, bring the originally elite high performance computing into the reach of general public. Principles of program optimization, GPU and IBM Cell architecture, along with concepts and techniques for optimizing general purpose computing on the new hardware.
Crosslisted with ELEG455.

CPEG 460 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: ELEG312.

CPEG 490 CAREER SKILLS FOR ENGINEERS 1
Covers a variety of skills engineers need in their careers, including ethics, the need for life-long learning, societal and global impact of engineering solutions, teaming and team dynamics, resume writing, interviewing and communications. May be crosslisted with ELEG490.
RESTRICTIONS: Open to engineering seniors, or by permission of instructor.

CPEG 621 COMPILER DESIGN 3
Introduction to compiler design, syntax and semantics, code generation and optimization. Design of high performance computers together with high performance optimizing compilers as an integral unit. Software/hardware tradeoffs in pipelined computers, super-scaler computers and computers embedded in other systems.
PREREQ: CPEG323 and CISC361.

CPEG 622 COMPUTER SYSTEM DESIGN II 3
Examines modern digital computer design methods using industry standard electronic CAD synthesis tools. Topics include hardware design using VHDL, logic synthesis tools, simulation methods for synthesis, and efficient coding techniques for synthesis. Includes experimental laboratory work to design and evaluate FPGA-based digital computer hardware.
PREREQ: CPEG324 and CISC361.

CPEG 630 NEURONS AND NETWORKS 3
Introduction to computational neuroscience: computing by real and artificial neurons and networks, and modeling of brain function. Covers theoretical background and involves hands-on projects to explore processing of sensory information, pattern discrimination, learning, memory and behavior.
Crosslisted with PSYC630.
RESTRICTIONS: Requires permission of instructor.

CPEG 655 HIGH-PERFORMANCE COMPUTING WITH COMMODITY HARDWARE 3
New commodity computing devices, e.g., GPUs, bring the originally elite high performance computing into the reach of general public. Principles of program optimization, GPU and IBM Cell architecture, along with concepts and techniques for optimizing general purpose computing on the new hardware.
Crosslisted with ELEG655.

CPEG 660 INTRODUCTION TO VLSI SYSTEMS 4
Study of CMOS VLSI devices, circuits and systems implemented in VLSI. CAD tools for the design and simulation of VLSI. Topics include the performance and limitations of VLSI systems, low level circuit design and system design with an emphasis on digital systems. Major chip design project required.
PREREQ: CPEG221 and ELEG312.

CPEG 810 TELECOMMUNICATIONS AND NETWORKS I 3
Leadership skills in information technology, telecommunications and internet technology for technology management. Introduces concepts in data and image

compression, digital audio and digital cellular telephony. Provides fundamental knowledge of transmission and storage technology and a system-level understanding of computer networks and the internet.
May be crosslisted with MISY810.

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

CPEG 811 TELECOMMUNICATIONS AND NETWORKS II 3
Considers technology trends and their impact on industry and the global economy. Topics include the convergence of computation and communications; emerging standards in high-capacity cellular telephony; the impact of global positioning systems on business applications; and the future capabilities of the internet.
May be crosslisted with MISY811.
COREQ: CPEG810. May also be taken as prerequisite.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management Program.

CRIMINAL JUSTICE

CRJU 110 INTRODUCTION TO CRIMINAL JUSTICE 3
Responses in American society to the problems of crime. Examines criminal behavior, criminal law, the police, the courts and corrections, as well as selected issues in criminal justice.

CRJU 120 ILLICIT DRUG USE IN AMERICA 3
The nature and extent of illicit drug use in the United States and the sociocultural context. The history and effects of the major drugs of abuse and the social issues since the 1950s that contributed to the increased use of illicit drugs.

CRJU 201 PROBLEMS OF LAW ENFORCEMENT 3
Introduction to a range of historical, political, philosophical and sociological problems in institutions vested with the responsibility to enforce laws and/or preserve order.

CRJU 202 PROBLEMS OF CRIMINAL JUDICIARY 3
Focuses on problems and issues found in the American criminal court system. Includes judicial procedure, organization, judicial personnel and basic criminal law.

CRJU 203 PROBLEMS OF CORRECTIONS 3
General overview of the American corrections system and a survey of the most pressing correctional problems of the twenty-first century. Philosophy of punishment extensively discussed. Major emphasis on the nature of the prison experience, alternatives to incarceration, judicial intervention in correctional affairs and the controversy over the efficacy of rehabilitation programs.

CRJU 301 INTRODUCTION TO LEGAL STUDIES 3
Introduces legal studies as a multidisciplinary field.
Crosslisted with LEST301.

CRJU 302 SOCIAL DEVIANCE 3
Defining deviance, research on deviance and explaining deviance.
Crosslisted with SOC1302.

CRJU 303 JUVENILE DELINQUENCY 3
Historical definition of delinquency, abuse and neglect, research in delinquency, causes and treatment of delinquents.
Crosslisted with SOC1303.
PREREQ: SOCI201 or SOCI209

CRJU 304 CRIMINOLOGY 3
The nature, kinds and causes of crime. Criminal liability, criminal careers and organized racketeering.
Crosslisted with SOC1304.
PREREQ: SOCI201 or SOCI209.

CRJU 311 CAPITAL PUNISHMENT AND THE LAW 3
Overview of the law of capital punishment. Emphasizes the U. S. Supreme Court's major death-penalty decisions and the effects of these decisions.
PREREQ: CRJU110 or CRJU203.

CRJU 312 HISTORY OF CRIME AND CRIMINAL JUSTICE 3
Examines changing perceptions of criminal and deviant behavior and development of laws, institutions, and social policies to counteract crime from seventeenth century to present.
May be crosslisted with HIST312.

CRJU 320 INTRODUCTION TO CRIMINAL LAW 3
An analysis of the evolution of criminal law within the larger societal context, and an overview of the basic structure and administration of criminal law in the United States.
PREREQ: CRJU110.

CRJU 322 CROWDS, CULTS AND REVOLUTIONS 3
Analysis of forms of behavior in relatively unstructured situations such as crowds, panics, riots and demonstrations; and processes of interaction: susceptibility, contagion, polarization and communication.
Crosslisted with SOCI322.
PREREQ: SOCI201.

CRJU 324 AMERICAN CONSTITUTIONAL HISTORY 3
A survey of the development of judicial review since Reconstruction, emphasizing the Supreme Court's response to urbanization and industrialization, the growth of executive authority, and the extension of civil rights and civil liberties in the twentieth century.
May be crosslisted with HIST324.

CRJU 332 CRIMINAL VIOLENCE IN AMERICA 3
Investigates the patterns and causes of violence in America, including crimes such as homicide, rape, assault, and domestic abuse and collective violence such as terrorism. Examines social control of violence, including adjudication within the criminal justice system. Places trends of violence in cross-national perspective.

CRJU 335 CRIME AND JUSTICE IN FILM AND LITERATURE 3
Examines the issues and ideologies found in noteworthy American and international films and writings that emphasize themes of justice, punishment, and social control. Contrasts cinematic and literary depictions of these themes with empirical research on criminality, violence, victimization, and the practices of criminal justice institutions.

CRJU 336 THE DETECTIVE IN FILM AND FICTION 3
Study of detective fiction and film has applications to a liberal arts approach to crime and justice. Blends literary analysis with the insights of social science research on the work of private and police detectives.
May be crosslisted with ENGL330, SOCI336.
PREREQ: CRJU201.

CRJU 340 THE JUVENILE JUSTICE SYSTEM 3
An in-depth view of the juvenile justice system in the United States focusing on crime patterns, police-juvenile relations, juvenile courts and correctional practices.

CRJU 345 SOCIOLOGY OF LAW 3
Analysis of law as a social process in both historical and comparative perspective. Focuses on various theories of law and society and relevant empirical research.
Crosslisted with SOCI345.

CRJU 346 PSYCHOLOGY AND THE LAW 3
Seminar exploring the rapidly expanding field of psychology and the law. Review 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 crosslisted with PSYC346.

CRJU 350 GENDER AND CRIMINAL JUSTICE 3
Reviews historical and contemporary explanations for women's participation in crime and evaluates these explanations in light of current research on gender. Other topics include treatment of women offenders by judicial and correctional systems, women as victims of crime and women as criminal justice personnel.
May be crosslisted with WOMS350.

CRJU 351 COMPARATIVE CRIMINAL JUSTICE SYSTEMS 3
Study of different criminal justice systems across the world including discussions of their approaches to law, policing, courts, and corrections, common law, civil law, Islamic traditions as well as others.

CRJU 352 INTERNATIONAL CRIMINAL JUSTICE 3
Introduction to basic structures of international criminal justice system including international and transnational crime, international courts, transnational policing, and international criminal law.

CRJU 355 INEQUALITY, CRIME AND JUSTICE 3
Introduction to challenges in addressing crime in multiracial, multiethnic, class-stratified society. This context serves as backdrop for inquiry into crime causation, operations of the criminal justice system, and experiences of relevant actors.
May be crosslisted with BAMS355, SOCI356.

CRJU 357 SEMINAR ON THE POLICE 3
Teaches students to criticize and analyze research and theory in the scholarly literature on policing.

CRJU 366 INDEPENDENT STUDY 1-6

CRJU 368 INDEPENDENT RESEARCH 1-6
Independent research under the supervision of a faculty member. Requirements include preparation of a research report consistent with the professional literature in the field. Student and faculty member will file a learning contract describing the research and a report with the department chair.
RESTRICTIONS: Requires permission of instructor.

CRJU 369 ALCOHOL, DRUGS AND CRIME 3
Examines the relationship between alcohol, drugs and crime, including societal response to offenders who commit alcohol/drug related offenses and offenders who engage in crime over drug markets.
May be crosslisted with SOCI369.
PREREQ: CRJU110 or SOCI201.

CRJU 370 PRISON AND PRISON SUBCULTURES 3
Provides an intensive examination of the culture and lifestyles of prisoners. Special emphasis on how gender and race 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 SENIOR SEMINAR 3
Culminates the legal studies minor by requiring an independent research project resulting in a term paper. Seminar focuses on a specific substantive issue, provides guidance from professor and chance to share ideas and problems with fellow students.
Crosslisted with LEST401.

CRJU 409 DOMESTIC VIOLENCE SERVICES 3
Examines issues in providing services to families in which domestic violence is occurring. Multiple service systems are explored, with emphasis on service coordination, service gaps, and public policy.
Crosslisted with IFST409.
PREREQ: IFST235 or SOCI201 or WOMS201.
RESTRICTIONS: Open to juniors and seniors only.

CRJU 413 HATE CRIMES 3
New to the legal vernacular, hate crimes have become problems of law and justice that have received increased political, academic, and public attention. Explores causes and constitutional issues revolving around hate crime and resulting laws.
PREREQ: CRJU110.

CRJU 420 CRIMINAL JUSTICE ADMINISTRATION 3
Aids those planning a career as an administrator in the criminal justice system. Topics typically include basic administrative policy and budgetary matters.
PREREQ: CRJU110.

CRJU 425 CRIMINAL LAW AND SOCIAL POLICY 3
Analyzes the role of the American judiciary in making social policy and examines the manner in which the courts have adjudicated controversial socio-legal issues. Topics typically include capital punishment, abortion, the right to privacy, search and seizure, the Miranda rule, and freedom of speech and press.

CRJU 428 CORPORATE CRIME 3
Nature and causes of the deviant behaviors and crimes of large organizations. How organizations act, are accused of deviance and defend themselves in cases such as price-fixing, sale of unsafe drugs and illegal spying.
Crosslisted with SOCI428.

CRJU 435 PUNISHING SPEECH 3
Examines the use of the criminal law and other regulatory sanctions to punish certain types of speech and the efforts of courts to determine which speech is deserving of constitutional protection and therefore beyond governmental control.

CRJU 437 SEMINAR ON CORRECTIONS 3
An in-depth examination of central topics in corrections including philosophy of punishment, history of punishment; structure and change of correctional settings and programs; and prison reform.

CRJU 444 CAPITAL PUNISHMENT AND AMERICAN CULTURE 3
Over time, American values about crime, law, and order have come to shape politics and therefore the penalty of death. Explores death penalty in public consciousness and in practice.

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 450 PRISONERS AND THE LAW 3
An examination of the legal rights available to prisoners seeking to challenge their convictions or their conditions of confinement. Emphasis on analyzing the capacity of courts to spur prison reform and the impact of court decisions on American penal practices.

CRJU 452 DRUGS AND THE CRIMINAL JUSTICE SYSTEM 3
Covers both drug and criminal justice issues, focusing on the drugs-crime nexus and the criminal justice system response. Examines issues of race, gender,

victimization, international policy, and new policy responses including drug treatment, harm reduction, and restorative justice. Class is held at a local correctional facility, and half the students are inmates.

May be crosslisted with SOCI452.

RESTRICTIONS: Permission of instructor.

CRJU 455 YOUTH STREET OUTREACH 4
Implements an outreach program to youth in a low income, urbanized community in Wilmington. Students trained and monitored as outreach workers by their professor and by community volunteers. Outreach workers trained to approach youth hanging out on the street, engage them (through conversation and recreational activities), identify their needs, and direct them to resources. Students keep journals to record their observations and feelings. The goal of the class is to increase social capital among youth by encouraging and facilitating youth participation in community educational, recreational, and social support services/activities.
Crosslisted with SOCI455.

CRJU 457 CRIMINAL EVIDENCE 3
The study of the laws of evidence, how they are used in the criminal courts, and their effect on the administration of justice.

CRJU 460 CRIMINAL JUSTICE POLICY 3
A critical examination of criminal justice policy in the United States over the past thirty years, with emphasis on the major theoretical positions that have dominated criminal justice policy making during that period.

CRJU 466 INDEPENDENT STUDY 1-6

CRJU 475 SOCIAL SCIENCE AND THE LAW 3
Examines the relationship of social science to law and the legal process, how social science has contributed to our understanding of law, and how social science has been employed in litigation.
May be crosslisted with LEST475.

CRJU 480 CIVIL LIABILITY IN CRIMINAL JUSTICE 3
Examines the circumstances under which the law provides remedies for individuals harmed by agents of the government. May also include discussion of the use of civil remedies, such as asset forfeiture, to complement criminal prosecutions.

CRJU 489 CRIME VICTIMS AND VICTIMS' RIGHTS 3
Examines victim-offender relationships, interactions between victims and the criminal justice system, and the connections between victims and other social groups and institutions (such as the media, social movements, advocacy groups, legislatures and the state). Explores victims' rights and compensation, fear of crime, measurement of victimization and the impact of victimization on the individual.

CRJU 495 FIELD EXPERIENCE IN CRIMINAL JUSTICE 4 PF
Practicum involving actual field experience in a criminal justice agency; e.g., law enforcement, courts or correctional agencies. Emphasis on relating the field experience to academic work.
May be crosslisted with SOCI495.
RESTRICTIONS: Requires permission of instructor. Not for major credit.

AMERICAN MATERIAL CULTURE

EAMC 601 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.
RESTRICTIONS: Requires permission of instructor.

EAMC 602 MATERIAL LIFE IN 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 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 archeology, cultural geography, sociology and history.
May be crosslisted with ARTH630, HIST605.
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 vary.

May be crosslisted with HIST606, MSST606.

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
One or two subject areas within the decorative arts in which students work closely with a specialist on the Winterthur faculty. Emphasis on close analytical examination of objects stressing identification and evaluation.
RESTRICTIONS: Requires permission of instructor.

EAMC 869 MASTER'S THESIS 3-6

EAST ASIAN STUDIES

EAST 136 TOPICS IN EAST ASIA IN FILM 1-3
Explores East Asian cinema and society via readings, discussion and viewing of films by and/or about East Asians. Topics vary.
May be crosslisted with HIST136.
RESTRICTIONS: May be repeated for credit when topics vary.

EAST 266 SPECIAL PROBLEM 1-6

EAST 386 ASIAN AMERICA: CULTURE AND HISTORY 3
Explore the literature, culture and history of Asian Americans and immigrants to the United States variously using fiction, drama, poetry, documentary, photography, narrative film, drama, court cases, primary and secondary historical materials. Patterns of Asian immigration, anti-Asian violence and internment, Asian American resistance in litigation, legislation, and cultural activities, from Gold Rush to globalization.
Crosslisted with ENGL386.

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 102 CIVICS AND ECONOMICS FOR TEACHERS 3
Provides teacher candidates with an understanding of the fundamental content and concepts embedded within the core social studies subjects of civics and economics as they relate to K-8 standards-based instruction. Focuses on developing an understanding of the content in the two subject areas and how that content might be taught effectively.
Crosslisted with POSC102.
RESTRICTIONS: Elementary teacher education majors only. Cannot be taken for credit toward economics major or minor.

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: One of the following: MATH114, MATH115, MATH221, MATH241, MATH242, MATH243 or higher. Can be either a prerequisite or a corequisite.

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 MATH201.

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. BS majors must take 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 problem of short-run fluctuations and secular growth; relative merits of monetary and fiscal policy.

PREREQ: ECON152 or permission of instructor.

ECON 311 ECONOMICS OF DEVELOPING COUNTRIES 3
Surveys policy issues related to economic growth and development. Special emphasis on problems facing contemporary developing countries.

PREREQ: ECON151 and ECON152.

ECON 315 ECONOMIC HISTORY OF COLONIAL AMERICA 3
Simple economic models and quantitative evidence used to explain colonial American history. Includes migration, servant and slave markets, government financing and the creation of paper money, causes of the Revolution, colonial growth, foreign trade, education and witchcraft.

PREREQ: 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: ECON332 and ECON433 cannot both count for degree credit.

ECON 333 CURRENT READINGS IN ECONOMICS 3
Books on controversial economic topics such as the Asian financial crisis, income distribution in America, environmental regulation, economic aid to developing countries, healthcare reform, privatizing Social Security and education vouchers are studied. Student papers and discussion form the essence of class sessions.

PREREQ: ECON151

ECON 340 INTERNATIONAL ECONOMICS 3
Theory, problems and policy in international trade and finance with emphasis on developments since World War II.

PREREQ: ECON151 and ECON152.

RESTRICTIONS: ECON340 cannot be taken for credit after ECON441 and/or ECON443.

ECON 341 ENVIRONMENT OF MULTINATIONAL CORPORATIONS 3
Interdisciplinary approach explores the multinational corporation: its political and economic environment; current attitude of policy makers; and techniques used to earn profits. Material supplemented by practicing economists, financial experts, business executives and political analysts.

Crosslisted with BUAD341.

PREREQ: ECON152.

RESTRICTIONS: Counts as a BUAD elective for BS candidates. Credit for BUAD341 given only once.

ECON 343 ENVIRONMENTAL ECONOMICS 3
Analyzes benefits and costs of environmental policy; reviews valuation techniques; assesses efficiency of decentralized, regulatory, tax and marketable permit policies

to protect the environment. Uses graphical (non-calculus) economic analysis.

Crosslisted with FREC343. PREREQ: ECON151 or FREC150.

ECON 350 ECONOMICS OF ENTREPRENEURSHIP 3
Analyzes impact of economic environment on behavior and development of new businesses. Reviews economic forces that influence new and developing businesses, including role of public policy. Requires development of a business plan which carefully considers economic factors most relevant to proposed business.

PREREQ: ECON151.

ECON 360 GOVERNMENT REGULATION OF BUSINESS 3
Normative, economic and legal foundations of government intervention in business, particularly antitrust and regulation; and the process and the effects of government policies.

PREREQ: ECON151.

ECON 364 ECONOMICS IN PRACTICE 3
Requires completion of at least 120 hours of an economics-related internship with verification by the hiring company. Term paper relating the real-world duties and experiences of the internship to principles learned in standard economics courses also required.

PREREQ: ECON300/301 or ECON303.

RESTRICTIONS: Registration by permission of instructor only.

ECON 366 INDEPENDENT STUDY 1-6

ECON 381 ECONOMICS OF HUMAN RESOURCES 3
Analysis of labor markets and of the family. Topics include labor supply and demand, human capital, labor market discrimination, the distribution of income and theories of fertility and family structure. Public policy applications stressed.

PREREQ: ECON151.

RESTRICTIONS: ECON381 and ECON483 cannot both count for degree credit.

ECON 385 WOMEN AND THE ECONOMY 3
Examines a wide range of economic issues relating to women's lives, with special emphasis on family, work and income. Public policy applications and international comparisons are stressed.

May be crosslisted with WOMS385.

PREREQ: ECON151.

ECON 390 ECONOMICS OF HEALTHCARE 3
Introduction to the United States healthcare system. Analysis of existing policies and proposals. Examines the roles of markets and government. Topics include costs, quantity and quality of healthcare systems, managed care and alternative delivery systems.

PREREQ: ECON151.

RESTRICTIONS: ECON390 and ECON490 cannot both count for degree credit.

ECON 393 URBAN ECONOMICS 3
Uses simple microeconomic analysis to explain why cities exist, where they develop, how they grow, and how different activities are arranged within cities. Explores the economics of urban problems and policies related to local governments, land rent and land use patterns, poverty, housing, transportation, education, and crime.

PREREQ: ECON151.

ECON 406 ECONOMICS OF INFORMATION AND UNCERTAINTY 3
Investigates impact of costly information on behavior of individuals and markets. Topics include decision making under risk and uncertainty, insurance, consumer-employer search behavior, product liability, industrial safety, futures markets and problems of contract enforcement.

PREREQ: ECON251, ECON300 or ECON301; MATH221 or MATH241; and MATH202.

ECON 408 ECONOMICS OF LAW 3
Effect of legal rules on resource allocation both in and between the public and private sectors. Considers common law, regulation and constitutional rules.

May be crosslisted with LEST408.

PREREQ: ECON300 or ECON301.

ECON 415 ECONOMIC FORECASTING 3
A practically oriented introduction to the art of managerial forecasting. Includes an integration of microeconomic and macroeconomic theory with statistical and econometric techniques to provide meaningful forecasts of the future values of series such as prices, sales, inventory levels and costs.

PREREQ: ECON151, ECON152 and MATH202.

ECON 418 ECONOMIC HISTORY OF AMERICAN LABOR MARKETS 3
Economic models used to explain the evolution of various American labor markets, including: immigrant labor, female labor markets, slavery, labor unions, internal labor migration, southern labor institutions, and the impact of human capital on industrial expansion and productivity.

PREREQ: ECON251, ECON300 or ECON301.

- ECON 419 ECONOMICS OF THE GREAT DEPRESSION** 3
Analysis of modern theoretical explanations of the economic downturn of 1929-1933, with implications for understanding current economic problems. Theories considered include those based on monetary contractions, consumption and investment instability and international disturbances.
PREREQ: ECON303.
- ECON 422 ECONOMETRIC METHODS AND MODELS I** 3
Uses statistical methods, especially multiple regression, to quantify economic models, including situations when the assumptions of classical statistics do not hold.
PREREQ: MATH221 or MATH241; MATH202 and ECON152.
- ECON 423 ECONOMETRIC METHODS AND MODELS II** 3
Class discussion and research in advanced economic statistics and applied econometrics.
PREREQ: ECON422.
- ECON 426 MATHEMATICAL ECONOMIC ANALYSIS** 3
Uses mathematical tools to formulate and analyze economic propositions. Topics include the use of calculus to analyze comparative statics, optimization and constrained optimization, interest and growth and dynamic models.
PREREQ: ECON251, ECON300 or ECON301; and MATH221 or MATH241.
- ECON 430 ADVANCED MACROECONOMIC THEORY** 3
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: ECON303.
- ECON 433 ECONOMICS OF THE PUBLIC SECTOR** 3
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 energy, environmental problems, negative income tax, urban finances and the national debt.
PREREQ: ECON251, ECON300 or ECON301.
RESTRICTIONS: ECON332 and ECON433 cannot both count for degree credit.
- ECON 435 CONTEMPORARY MACROECONOMIC POLICY** 3
Unfolding events in the economy and the actions of policymakers are studied. Special emphasis on current policy actions of the Federal Reserve. Macroeconomic models studied in earlier courses are used to analyze current events.
PREREQ: ECON303.
- ECON 436 SEMINAR IN PUBLIC POLICY ECONOMICS** 3
Investigates current topics in economics, such as healthcare reform, privatizing social security, international trade restrictions and energy policy. Recent books and journal articles serve as basis for investigating these topics. Student papers and class discussion form the essences of class sessions.
PREREQ: ECON251, ECON300 or ECON301; and ECON303.
- ECON 441 INTERNATIONAL TRADE** 3
Focuses on international trade theory and policy, and exchange rates. Topics include trade based on competitive 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: ECON251, ECON300 or ECON301.
- ECON 442 ECONOMICS OF ENVIRONMENTAL MANAGEMENT** 3
Review of benefit-cost analysis and welfare theory; techniques for evaluating environmental amenities; the evolution of environmental legislation; and review of case studies of environmental conflicts.
Crosslisted with FREC444.
PREREQ: ECON300 or 301.
- ECON 443 INTERNATIONAL MONETARY ECONOMICS** 3
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: ECON300 or ECON301, and ECON303.
- ECON 460 STRATEGIC BEHAVIOR OF FIRMS** 3
Traditional microeconomic theory and game theory to analyze cooperative and non-cooperative strategic behavior of firms. Topics include predatory pricing, price discrimination, limit pricing, collusion, mergers, vertical restrictions, franchise arrangements, technological change, and the role of prices in clearing markets.
PREREQ: ECON251 OR ECON300 OR ECON301 AND MATH221 (or higher-level math).
- ECON 463 THE ECONOMICS OF REGULATION** 3
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, with emphasis on efficiency and regulatory reform.
PREREQ: ECON251, ECON300 or ECON301; and MATH221 or MATH241.
RESTRICTIONS: ECON360 and ECON463 cannot both count for degree credit.

- ECON 465 TRANSPORTATION ECONOMICS** 3
Applies microeconomics theory to analysis of modes of passenger transportation with special emphasis on planes, trains, and automobiles. Empirical analysis of transportation data used to examine policy choices in transportation sector.
PREREQ: ECON251, ECON300 or 301; and ECON422.

ECON 466 INDEPENDENT STUDY 1-6

- ECON 468 INTERNET ECONOMICS** 3
Explores internet markets and strategic interactions between market participants. Applies microeconomic theory to investigate sources of competitive advantage and monopoly power, pricing practices, network structure and network externalities, technological standards, copyright, and other economic issues relevant to Internet and e-commerce.
PREREQ: ECON251, ECON300 or ECON301.

- ECON 471 FUTURES AND OPTIONS MARKETS** 3
Analysis of futures and options markets of agricultural and nonagricultural commodities. Trading and hedging theory and techniques, cash and futures price relationships. Students trade commodities via a satellite information system.
Crosslisted with FREC471.
PREREQ: FREC404 or ECON300 or ECON301.

- 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: ECON251, ECON300 or ECON301.

- ECON 490 ECONOMICS OF HEALTH POLICY** 3
Theoretical analysis of healthcare issues and policies. Examination of changing relationships between patients, providers, hospitals, insurers, employers, communities and government. Analysis of spending policies, cost containment, hospital competition, care of the elderly, Medicare, Medicaid, managed care regulation, medical malpractice and provider (physician) manpower planning.
PREREQ: ECON251, ECON300 or ECON301.
RESTRICTIONS: ECON390 and ECON490 cannot both count for degree credit.

- ECON 503 ECONOMIC ANALYSIS FOR BUSINESS POLICY** 3
Business-oriented overview of microeconomic and macroeconomic theory. Approximately two-thirds of the course will focus on microeconomics and one-third on macroeconomics.
RESTRICTIONS: Can not be taken for credit by economics graduate students.

- ECON 530 APPLICATION OF MATHEMATICS IN ECONOMICS** 3
Provides students with experience in the application of mathematics in economics. Applications may vary from semester to semester. Mathematical topics may include applications of ordinary and partial differential equations, game theory, linear programming, dynamic programming, stochastic programming and calculus of variations.
Crosslisted with MATH530.
PREREQ: MATH 302, MATH 349, ECON 301 and ECON 303.

- ECON 540 INTERNATIONAL ECONOMICS FOR MANAGERS** 3
Survey of international economic issues relevant to managers operating in a global context.
PREREQ: ECON503 or instructor permission required.

ECON 668 RESEARCH 1-3

- ECON 670 APPLIED POLICY ANALYSIS** 3
Empirical analysis of environmental and natural resource policy issues. Topics include valuation of natural resources, decision making under uncertainty, dynamic control and intertemporal issues in resource use and institutional aspects of policy analysis.
Crosslisted with MAST672.
PREREQ: ECON300 or ECON301.

- ECON 671 MICROECONOMICS FOR ECONOMIC EDUCATORS** 3
Studies supply and demand, theory of price determination in perfectly and imperfectly competitive markets and role of government in the economy. Emphasizes applications such as industrial regulation antitrust policy, the environment and taxation.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

- ECON 672 MACROECONOMICS FOR ECONOMIC EDUCATORS** 3
Includes national income accounting, theory of income determination, monetary and fiscal policies, budget deficits and surpluses, and national debt.
RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.

ECON 673	CURRICULUM STRATEGIES FOR ELEMENTARY ECONOMIC EDUCATORS	3
Curriculum applications incorporating proper treatment of economic concepts at elementary level. Strategies include techniques of motivation, training and reinforcement. RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators		
ECON 674	CURRICULUM STRATEGIES FOR SECONDARY ECONOMIC EDUCATORS	3
Curriculum applications incorporating proper treatment of economic concepts at secondary level. Strategies include techniques of motivation, training and reinforcement. RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.		
ECON 675	ECONOMICS OF NATURAL RESOURCES	3
Study of the allocation of natural resources, especially marine and coastal zone resources, in modern economics. Application of economic theory to the problems of misallocations and the means of correction, under both free and planned markets. Crosslisted with MAST675. RESTRICTIONS: Requires permission of instructor.		
ECON 676	ENVIRONMENTAL ECONOMICS	3
Study of the choice of policies to protect the environment, including land, air and water resources. Theory of market failure and externalities, use of economic incentives in policy design, valuation of environmental resources and examination of inefficiencies in existing U.S. environmental policies. Crosslisted with MAST676. PREREQ: ECON300.		
ECON 677	PRACTICUM IN ECONOMIC EDUCATION	1-6
Research and analysis of public policy issues. Projects must demonstrate applicability to economic education. RESTRICTIONS: Requires enrollment in Master of Arts in Economic Education.		
ECON 678	MONETARY AND INTERNATIONAL TRADE THEORIES FOR ECONOMIC EDUCATORS	3
Studies international trade, free trade vs. protectionism, cartels, balance of trade and payments, role of the financial sector, and monetary policy. RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.		
ECON 679	CONTEMPORARY ISSUES FOR ECONOMIC EDUCATORS	3
Emphasizes contemporary economic issues, problems and controversies. RESTRICTIONS: Requires enrollment in Master of Arts in Economics for Educators.		
ECON 801	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 805	GAME THEORY FOR ECONOMISTS	3
Study of the theory of games with complete and incomplete information in both static and dynamic contexts with applications to economic problems, primarily in the areas of labor economics, economics of information and uncertainty, international trade and macroeconomics. PREREQ: ECON801 or equivalent.		
ECON 810	MATHEMATICS FOR ECONOMISTS	3
Introduces fundamental mathematical tools utilized in theoretical economic analysis. Topics include basic set theory and real analysis, optimization in both static and dynamic environments, linear algebra, difference and differential equations and probability theory. The use of these tools in constructing and analyzing economic models is emphasized.		
ECON 811	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, core theory, information, public goods, and externalities. PREREQ: ECON801.		
ECON 812	ADVANCED MACROECONOMIC ANALYSIS	3
Examines recent research and literature in macroeconomics. Topics include 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. Intended for doctoral students. PREREQ: ECON802.		
ECON 815	MANAGERIAL FORECASTING	3
Reviews quantitative methods commonly used in forecasting within a business and economics 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. PREREQ: MATH202.		
ECON 819	ECONOMICS OF INFORMATION	3
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: MATH202 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
Econometric techniques used in applied microeconomic analysis. Cross-section techniques, limited dependent variables, panel data analysis. Additional topics may also be covered. Intended for doctoral students. PREREQ: ECON822 and ECON823 or equivalent.		
ECON 825	TIME-SERIES ECONOMETRICS	3
Introduction to time-series methods, including modeling multivariate systems. Development of methods to test and insure goodness-of-fit of time-series models. Additional topics may also be covered. Intended for doctoral students. PREREQ: ECON822 and ECON823 or equivalent.		
ECON 827	ADVANCED PRODUCTION ECONOMICS	3
Specification, identification and estimation of dual models for use in the evaluation, hypothesis testing and control of firm-level technological and production problems. Crosslisted with FREC827. PREREQ: ECON801 and an econometrics/statistics course. RESTRICTIONS: Requires permission of instructor.		
ECON 832	PUBLIC FINANCE	3
Examines recent research and literature in public finance. Topics include public goods, public choice, externalities and environmental policy, expenditure programs for the poor, social insurance, social security, health insurance, unemployment insurance, cost-benefit analysis, tax incidence, optimal taxation. COREQ: ECON801.		
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
Topics of current interest to economists, such as labor markets, populations, human capital and income distribution in less developed countries. Additional or substitute topics may also be covered. COREQ: ECON801 (ECON822 is recommended).		
ECON 852	MONETARY ECONOMICS	3
Compares the role of money in various macroeconomic models: transactions demand for money, long term effects of inflation and government deficit finance decisions in intertemporal models, capital theory and the pricing of financial securities as well as theories of the term structure of interest rates. PREREQ: ECON552 or ECON802 or equivalent.		
ECON 861	INDUSTRIAL ORGANIZATION AND ANTITRUST POLICIES	3
Analyzes industrial markets in terms of structure, competition and performance, with concentration on oligopolistic and differentiated competition, statistical relationships between profits and concentration, entrepreneurship and hierarchy, and innovation. Also discusses government antitrust policies to promote competition. PREREQ: ECON551 or ECON801 or equivalent.		
ECON 862	ECONOMICS OF REGULATION	3
Economic rationale for government regulation of industries. Regulatory		

mechanisms to induce optimal behavior. Case studies of transportation, telecommunications and electric utility industries with empirical applications. COREQ: ECON801, ECON822 or equivalent.

ECON 868	RESEARCH	1-9
ECON 869	MASTER'S THESIS	1-6
ECON 875	ADVANCED FISHERY ECONOMICS	3
Theoretical and applied study of the optimal utilization and management of commercial and recreational fisheries with emphasis on equity issues and the difficulty of deriving regulations which are biologically effective and which provide incentives for economic efficiency at reasonable costs. Crosslisted with MAST875. PREREQ: MAST675 or ECON675.		
ECON 880	LABOR ECONOMICS	3
Covers topics in labor economics, including labor demand, labor supply, investment in human capital, wage determination, and labor market discrimination. Applications to public policy issues will be stressed throughout. COREQ: ECON801, ECON822 or equivalent.		
ECON 890	COLOQUIUM: ECONOMICS SEMINAR SERIES	0 PF
Regularly-scheduled lectures by faculty and visiting researchers providing exposure to current research in economics.		
ECON 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.		
ECON 969	DOCTORAL DISSERTATION	1-12 PF

EDUCATION LIBRARY MEDIA

EDLM 621	REFERENCE SERVICES AND RESOURCES	3
Explores and evaluates the role of information in our society and the range of reference materials supporting the school library media program. Includes the use of print and electronic systems, reference procedures, and instructional role of information in the school curriculum.		
EDLM 622	INTRODUCTION TO CATALOGING AND CLASSIFICATION	3
Explores and evaluates standardized cataloging and classification systems with special emphasis on the organization of the school library media center. Topics include: Anglo-American Cataloging Rules; Library of Congress Subject Headings; and Dewey Decimal Classification.		
EDLM 624	LIBRARY COLLECTION DEVELOPMENT	3
Explores and evaluates theory and practice of building and managing library collections with 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 administration and management of school library media center. Topics include: planning and evaluation; policy making; personnel; budget; facilities; standards; research trends in 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.		
EDLM 628	SCHOOL LIBRARY MEDIA PROGRAM CURRICULUM	3
Explores the role of the school library media program in meeting information literacy and other education standards. Topics include information literacy, state education standards, advocacy, instructional technology and collaboration. PREREQ: EDLM626. RESTRICTIONS: Permission of instructor.		

EDUCATION

EDUC 100	INTRODUCTION TO ELEMENTARY AND MIDDLE SCHOOL EDUCATION	1 PF
First year seminar covers issues in K-8 learning and instruction. Topics include overviews of discipline options within the ETE major and examinations of K-8 education practices. RESTRICTIONS: ETE majors.		

EDUC 166	SPECIAL PROBLEM	1-3
EDUC 205	HUMAN DEVELOPMENT: GRADES K-8	3
Explores theories of child and early adolescent development as they pertain to education. Topics include biological, cognitive, linguistic, and social-emotional development and are taught through lecture, large- and small-group discussion, and case studies. There is a required field placement in the schools. RESTRICTIONS: Limited to ETE majors and minors that require this course.		
EDUC 210	BEGINNING LITERACY INSTRUCTION	3
Introduces research-based perspectives on literacy acquisition during kindergarten and first-grade years and emphasizes the integration of basic literacy skills, reading, writing, oral language and literature during instruction. Takes a cognitive orientation and highlights the influence of vocabulary development, phonemic awareness, and establishment of the alphabetic principle on literacy learning. Includes field experience. RESTRICTIONS: Open to ETE and ECE majors.		
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. RESTRICTIONS: Open to ETE and ECE majors and minors only.		
EDUC 240	PROFESSIONAL ISSUES: PHILOSOPHICAL AND LEGAL PERSPECTIVES	3
Explores ethical dilemmas and legal controversies encountered in school discipline, intellectual freedom, equal treatment of students, 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 259	CULTURAL DIVERSITY IN COMMUNITY CONTEXTS	3
Examines roles and responsibilities of the classroom teacher through critical examination of field placement experiences in diverse community contexts. Topics include race, ethnicity, gender, sexual orientation, social class, poverty and language. RESTRICTIONS: Open only to elementary education majors.		
EDUC 266	SPECIAL PROBLEM	1-6
EDUC 286	EDUCATIONAL TECHNOLOGY: PROFESSIONAL TOOLS	1
Topics include educational resources and communication on the internet, word processing, authoring for the web, electronic grade books, statistics, presentation technology and assessment tools. RESTRICTIONS: Open to education majors only or with permission of instructor.		
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 texts and the implications for educational practice are addressed.		
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-8 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: EDUC400 and EDUC433.		
EDUC 310	READING AND WRITING IN ELEMENTARY SCHOOL	3
Focuses on literacy development of second through sixth grade children. Explores relevant research and developmentally appropriate practices. Includes a field experience in a second through sixth grade classroom. PREREQ: EDUC210.		
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: EDUC310.		

EDUC 335 ELEMENTARY CURRICULUM: MATHEMATICS 3
Selection and use of appropriate methods and curriculum for teaching arithmetic in grades K-6. Focuses on curriculum materials, teaching strategies, lesson planning and implementation and the appraisal of pupil achievement. Practicum included.
PREREQ: MATH253.

EDUC 336 MIDDLE SCHOOL MATHEMATICS CURRICULUM AND METHODS 3
Investigates curriculum and teaching methods for presenting mathematical concepts to middle school students (grades 5 through 8). Activities include reviewing materials, examining topics and preparing lessons appropriate for this level. Clinical experience included.
PREREQ: MATH253, MATH221 and MATH230.
RESTRICTIONS: Requires permission of advisor.

EDUC 341 ELEMENTARY CURRICULUM: SCIENCE 3
Introduction to teaching science in the elementary school. Includes the study of current elementary school programs, instructional materials, teaching strategies, lesson planning and implementation and the appraisal of pupil achievement. Practicum included.

EDUC 346 ELEMENTARY CURRICULUM: SOCIAL STUDIES 3
Introduction to teaching social studies in the elementary school. Includes the study of current elementary school programs, instructional materials, teaching strategies, lesson planning and implementation and the appraisal of pupil achievement. Practicum included.

EDUC 348 INVESTIGATING SOCIAL STUDIES IN MIDDLE SCHOOL COMMUNITIES 3
Encourages and supports professional development as a social studies teacher. Students investigate teaching, learning and assessing at the middle school level and consider their roles as educators in diverse classrooms and communities. Field experience is required.
PREREQ: EDUC346.

EDUC 360 LEARNING IN COMMUNITY CONTEXTS 3
Study of the educational process in institutions and organizations with a focus on non-profit groups oriented toward community service. Emphasis upon the relation of these groups' educational practices to their overall public service mission. May be crosslisted with IFST360.

EDUC 366 INDEPENDENT STUDY 1-6

EDUC 387 INTEGRATING TECHNOLOGY IN EDUCATION 2
Introduces prospective teachers to technology available for use in classroom content areas. Enables students to evaluate technology use and identify and create classroom lessons that demonstrate effective use of technology integration. Concludes with development of a teaching project incorporating the use of technology.
PREREQ: EDUC286.
RESTRICTIONS: Open to ETE majors only.

EDUC 390 BUILDING COMMUNITIES OF LEARNERS 3
Designing teaching and learning communal environments sensitive to diverse needs of all elementary school children: academic, emotional, moral, and relational. Holistic integration of instruction, classroom management, and students' whole person growth guided by mutual respect, caring, self-reflection, problem solving, community of learners' educational philosophy, and professional collaboration. Field experience included.
RESTRICTIONS: Open to ETE majors only.

EDUC 391 HONORS COLLOQUIUM 3
First year interdisciplinary Honors seminar. May be team-taught, specific topics vary.

EDUC 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 I and must present evidence (copy of test scores) of taking a state-designated certification test in their academic content field. See student teaching program coordinator/course instructor for portfolio requirements.

EDUC 403 LITERATURE FOR ADOLESCENTS: MULTIMEDIA TEXTS 3
Explores classic and contemporary reading materials and non-print texts pervasive in lives of adolescents. Addresses selection of texts for middle school classes as well as techniques for developing and promoting critical reading and informed interpretation of non-print texts.
May be crosslisted with ENGL403.

EDUC 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 ADOLESCENT DEVELOPMENT AND EDUCATIONAL PSYCHOLOGY 4
Examines social, emotional, moral, and cognitive development of adolescent learners; psychological processes underlying learning, motivation, and classroom behaviors; and teacher-student and group processes. Looks at the implications of these psychological processes for instruction; motivational strategies; classroom management; and assessment, with an emphasis on creating a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
RESTRICTIONS: Open only to sophomore, junior, and senior secondary education majors. High school practicum of 18 hours is required. Students must keep a 4-5 hour block of time free between 7am-2pm once a week or keep a 3-4 hour block of time free between 7am-2pm twice a week.

EDUC 414 TEACHING EXCEPTIONAL ADOLESCENTS 3
Examines characteristics of exceptional adolescents and the historical, legal and philosophical bases for special education. Focuses on teaching students with special needs within general education settings using research-based instructional strategies, classroom management, and related services.
RESTRICTIONS: Open only to secondary education majors and students in the disabilities minor.

EDUC 415 PRACTICUM IN SECONDARY SPECIAL EDUCATION 1-2
Practicum field experience in a Professional Development School that incorporates observation of teachers' strategies to differentiate instruction and opportunities to tutor a student with special needs.

EDUC 416 SECONDARY CLASSROOM MANAGEMENT & POSITIVE BEHAVIOR SUPPORT 3
Research based inquiry and practice in methods of classroom management, including time and space allocation, grouping of students, strategies for building rapport, self management, and motivation of students with special needs. Practice with collaboratively developed functional behavior analysis and positive behavior support plans.

EDUC 417 TEACHING READING TO ADOLESCENTS WITH SPECIAL EDUCATION NEED 3
Foundations of teaching reading to adolescents with special needs, including literacy instruction, readability formulas, strategies to connect reading with study skills, and methods of diagnosing reading difficulties and making instructional modifications and accommodations for students.

EDUC 419 DIVERSITY IN SECONDARY EDUCATION 3
Examines aspects of diversity (e.g., gender, class, language) in secondary schools and classrooms. Reviews the foundations of multicultural education and considers implications for curriculum, instruction and classroom management.
RESTRICTIONS: Open only to secondary education majors. Eighteen hour field placement required.

EDUC 420 READING IN THE CONTENT AREAS 1-3
Overview of reading comprehension issues at middle and high school levels based primarily upon task analyses of content-area materials (math, social studies and science). Students apply current theories of reading comprehension to texts in their areas of interest.

EDUC 429 METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS 3
Familiarizes students with appropriate teaching methods and techniques for the elementary foreign language classroom. Includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials and course design.
Crosslisted with FLT429.

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 explanation 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
Focuses on understanding the special instructional needs of students with mild to moderate educational disabilities and on planning and monitoring instruction. Emphasis is placed on diagnostic assessment of learning problems, design and implementation of instructional interventions, and monitoring of progress. Methods for preventing early reading problems are included.
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.
- EDUC 437 DIAGNOSIS AND INSTRUCTION: LITERACY PROBLEMS 3**
Prepares special education teachers to meet the needs of students with significant problems in reading and writing. Emphasis is placed on understanding and analysis of learning problems and the design and implementation of instructional interventions in reading and language arts. A field experience is required.
PREREQ: EDUC431, EDUC432, EDUC435, EDUC310.
RESTRICTIONS: Open to students in the Elementary Teacher Education program who are seeking dual certification in elementary education and special education.
- 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. Clinical experience required.
PREREQ: EDUC341.
COREQ: SCEN550.
- EDUC 451 EDUCATIONAL ASSESSMENT FOR CLASSROOM TEACHERS 3**
Explores principles and methods for construction and evaluation of student learning assessments, including knowledge, understanding and skills. Presents methods to enhance teacher inquiry into student learning. Considers strengths and limitations of each method in regard to informing teachers' 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 on-going language acquisition projects.
May be crosslisted with LING462, PSYC462.
- EDUC 466 INDEPENDENT STUDY 1-6**
- EDUC 469 RESEARCH INTERNSHIP EXPERIENCE 3**
Research apprenticeship with faculty mentor.
- EDUC 473 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.
RESTRICTIONS: Requires permission of instructor.
- EDUC 474 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.
RESTRICTIONS: Requires permission of instructor.
- EDUC 475 SENIOR THESIS 3**
Substantial research paper directed by faculty mentor.
- EDUC 476 SECOND LANGUAGE ACQUISITION AND BILINGUALISM 3**
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.
Crosslisted with LING476.
PREREQ: LING101.
- EDUC 477 THE STRUCTURE OF ENGLISH 3**
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish).
Crosslisted with LING477.
PREREQ: LING101.
- EDUC 485 MULTIMEDIA LITERACY 3**
Defines multimedia and discusses its impact on society. Surveys applications across the curriculum and reflects on the effects of multimedia on current teaching practice. Provides a multimedia toolbox and shows how to use it to create and publish multimedia applications on the Internet. Discusses multimedia frontiers, emerging technology and societal issues including human impact, regulation, copyright, fair use, equity, cost and universal access.
May be crosslisted with COMM486.
- EDUC 498 TEACHING ENGLISH AS A SECOND LANGUAGE 3**
Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English; and devising and presenting lesson plans.
Crosslisted with LING498.
- EDUC 566 SPECIAL PROBLEM 1-12**
- EDUC 588 GEOMETRY AND MEASUREMENT FOR MIDDLE SCHOOL TEACHERS 3**
Properties of 2-D and 3-D figures; measurement of length, area and volume; spatial relationships; transformations; connections with coordinate geometry; fundamentals of deductive system; van Hiele model of development of geometric reasoning, and use of Geometer's Sketchpad software to enhance package to enhance both teaching and learning of geometry and measurement.
Crosslisted with MATH588.
- EDUC 600 TEACHER AS RESEARCHER 3**
Helps develop strategies to be used by teachers and administrators to bridge the gap between theory and practice. Assists teachers and administrators in initiating research on classroom problems related to teacher and student behavior and assessment.
- EDUC 601 LANGUAGE DEVELOPMENT IN THE CLASSROOM 3**
Focuses on applying knowledge about language development in school-age children to the development of language processes and the assessment of language performance. Explores language processes that provide a foundation for reading, speaking and listening.
- EDUC 602 CHILDHOOD LITERATURE 3**
Survey of literature of children and its application to the curriculum. A study of literary genre, elements and devices found in children's books, aids for selection, criteria for evaluation and techniques for promoting reading.
- EDUC 603 LITERATURE FOR ADOLESCENTS 3**
Evaluation of classic and contemporary reading materials and their application to the junior-senior high school curriculum. Study of criteria, methods and tools for selection of books. Techniques for developing and promoting reading.
- EDUC 604 TEACHING WRITING IN THE ELEMENTARY AND MIDDLE SCHOOL 3**
Focuses on the development of appropriate instructional programs for elementary and middle school children. Provides information on the writing process, the beginnings of writing, exemplary programs, evaluation of children's writing and functions/forms of writing.
- EDUC 605 MEASUREMENT APPLICATIONS IN EDUCATION 3**
Focuses on educational measurement strategies and processes that teachers use to assess student learning. Emphasis is on assessment skills and knowledge that can enhance professional practice and promote student learning.
RESTRICTIONS: Open to persons teaching in the public schools.
- EDUC 606 METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS 3**
Appropriate teaching methods and techniques for the elementary foreign language classroom. Includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials and course design.
Crosslisted with FLT629.
- EDUC 607 EDUCATIONAL RESEARCH PROCEDURES 3**
An introduction to quantitative methods and procedures in education through the study of the logic and procedures of educational and social research. Provides information about the various stages of the research process with attention on measurement, sampling, design, data analysis and application.
- EDUC 608 LITERACY ASSESSMENT AND INSTRUCTION I 3**
This course is the first in a two-course sequence designed to prepare reading specialists and special education teachers to assess and instruct struggling readers and writers in the elementary and middle grades. Course focuses primary

attention on effective literacy assessment and instruction in the following areas: phonemic awareness, phonics and word analysis, fluency, and spelling.
PREREQ: EDUC620.

RESTRICTIONS: Permission of instructor.

EDUC 609 LITERACY ASSESSMENT AND INSTRUCTION II 3

This course is the second in a two-course sequence designed to prepare reading specialists and special education teachers to assess and instruct struggling readers and writers in the elementary and middle grades. Course focuses primary attention on effective literacy assessment and instruction in the following areas: comprehension, vocabulary, and writing.
PREREQ: EDUC608.

EDUC 612 ETHNIC STUDIES AND MULTICULTURAL EDUCATION 3

Content, strategies, concepts and resources for teaching comparative ethnic studies and integrating these studies into the regular curriculum. Techniques for evaluating multicultural education outcomes. Surveys the culture and history of major American ethnic groups; emphasizes the major ethnic groups in our geographic area.

EDUC 613 ADOLESCENT DEVELOPMENT AND EDUCATIONAL PSYCHOLOGY 3

Examines (a) social, emotional, moral, and cognitive development of adolescent learners, (b) psychological processes underlying learning, motivation, and classroom behaviors, and (c) teacher-student and group processes. Also looks at the implications of these psychological processes for (a) instruction, (b) motivational strategies, (c) classroom management, and (d) assessment, with an emphasis on creating a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
RESTRICTIONS: Open only to secondary education majors. 18-hour field placement required. Students must keep a 4-5 hour block of time free between 7am-2pm once a week or keep a 3-4 hour block of time free between 7am-2pm twice a week.

EDUC 614 TEACHING EXCEPTIONAL ADOLESCENTS 3

Examines characteristics of exceptional adolescents and the historical, legal and philosophical bases for special education. Focuses on teaching students with special needs within general education settings using research-based instructional strategies, classroom management, and related services.
RESTRICTIONS: Open to secondary education majors/certification candidates only.

EDUC 615 TCHNG CHLDREN/LRNG DISABILITIES 1-12

EDUC 617 DELAWARE READING PROJECT SUMMER INSTITUTE 6
The Delaware Reading Project (DRP) focuses on research, theory, and practice in literacy instruction for grades K-12. DRP's central purpose is for students to become familiar with and evaluate best practices in literacy instruction in order to develop a workshop for other teachers.
PREREQ: EDUC608, EDUC622 or equivalent.
RESTRICTIONS: Approval of instructor.

EDUC 618 INTRODUCTION TO SCHOOL PSYCHOLOGY 3

Explores roles and functions of school psychologists and current issues pertaining to assessment, education, and prevention/intervention for children with disabilities. Professional standards in school psychology, the history of school psychology, special services in the schools, and legal and ethical issues pertaining to school psychology and special education also are examined.

EDUC 619 DIVERSITY IN SECONDARY EDUCATION 3

Examines aspects of diversity (e.g., ethnicity, gender, class, language) in secondary schools and classrooms. Reviews the foundations of multicultural education and considers implications for curriculum, instruction, and classroom management.
RESTRICTIONS: Field placement of 18 hours is required. Open to secondary education majors/certification candidates only.

EDUC 620 FOUNDATIONS OF READING INSTRUCTION 3

Psychology and pedagogy of reading instruction. Lectures and demonstrations covering the following areas: psychology of the reading process, recent trends in reading instruction, initial reading procedures, directing reading activities, developing word recognition competence, developing efficient comprehension and differentiating instruction.

EDUC 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 crosslisted 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 severe 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 prerequisite.

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 prerequisite.

EDUC 626 FUNCTIONAL COMMUNICATION FOR INDIVIDUALS WITH AUTISM AND SEVERE DISABILITIES 3

Reviews appropriate functionally relevant communication objectives for students with autism and severe disabilities. Highlights the impact of functional communication upon social skills and behavior management. Presents a variety of alternative communication methods and modalities.
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.

EDUC 630 SUPERVISED READING CLINIC 6

Supervised practice and lecture in assessing and instructing students who struggle with reading and writing. Participants will have opportunities to implement and discuss a wide range of instructional approaches, methods, and materials as they work closely with school-age students.
PREREQ: EDUC608 and EDUC609 or permission of instructor.

EDUC 631 ORGANIZATION AND SUPERVISION OF LITERACY PROGRAMS 3

Contextualizes assessment and instruction for reading in the whole-school context. Designed to introduce the leadership roles currently held by Reading Specialists and Literacy Coaches and includes an extensive school-level case study.
PREREQ: EDUC609 required; EDUC608, EDUC630, and EDUC668 recommended.
RESTRICTIONS: Requires permission of instructor.

EDUC 632 INTERNET CURRICULUM APPLICATIONS 3

Explore uses 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), listservs, newsgroups, and e-mail to access 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 634 TOPICS IN MATHEMATICS CURRICULA: GRADES K-8 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 THE 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 or MATH252.
RESTRICTIONS: Grade of C or better in EDUC634 or MATH252.

EDUC 636 TEACHING MATHEMATICS IN THE MIDDLE SCHOOL 3

Acquaints students with historic and recent information from theory and research on teaching and learning mathematics in grades 5-8, and engages in methods and

materials for instruction that such information suggests. Field experience included.
PREREQ: EDUC634 or MATH252.
RESTRICTIONS: Grade of C or better in EDUC634 or MATH252.

- EDUC 639 EDUCATIONAL TECHNOLOGY TOPICS** 3
In-depth study of a major problem in educational technology. Problems to be studied will vary with each offering.
RESTRICTIONS: May be repeated for credit when topics vary.
- EDUC 640 INTRODUCTION TO CURRICULUM** 3
Focuses on the curriculum that actually makes a difference - the curriculum that finds its way into the classroom. The three main topics are: a) major goals of education and their influence on curriculum policy and teacher planning; b) operational curriculum (what happens in the classroom); and c) strategies suitable for evaluating the operational curriculum.
- EDUC 641 SCIENCE CURRICULUM AND INSTRUCTION** 3
Examination of the goals of science education and their relation to science curricula. Examination of theories of learning and motivation as they relate to how individuals develop scientific concepts. Discussion and development of science instructional materials and strategies that are consistent with current learning theories.
- EDUC 642 TOPICS IN SCIENCE EDUCATION** 3
In-depth study of a major problem in science education.
RESTRICTIONS: May be repeated for credit when topics vary.
- EDUC 643 ENVIRONMENTAL EDUCATION** 3
Survey of and practice with existing environmental education materials and programs; the development of lessons in environmental education; and practical experiences with curriculum development and teaching procedures.
- EDUC 644 SOCIAL STUDIES CURRICULUM AND INSTRUCTION** 3
Compares the goals of the social studies curriculum with research on how teaching and learning 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 ADVANCED METHODS IN TEACHING ENGLISH AS A SECOND LANGUAGE** 3
Examines the application of current methods, techniques and procedures in EFL and ESL instructional settings. Although theoretical concerns are included, emphasis is on their practical use in listening, speaking, pronunciation, reading, writing and grammar.
PREREQ: EDUC698.
- EDUC 648 MASTER'S PORTFOLIO: STANDARDS AND FRAMEWORK** 1 PF
Use of National Board standards and multiple assessments for reflecting on and evaluating teaching effectiveness. Must be completed within first two semesters in the M.I. program.
RESTRICTIONS: Restricted to candidates in the Master of Instruction program.
- EDUC 649 DELAWARE WRITING PROJECT SUMMER INSTITUTE** 6
Provides teachers opportunities to read and write professionally and create workshops on the teaching of writing. Develops knowledge of best teaching of writing practices.
PREREQ: At least three years in the classroom. Must be nominated and invited.
- EDUC 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 657 CHILDREN, TELEVISION AND EDUCATION** 3
Issues relating to education, academic achievement, and the development of critical viewing skills; media and comprehension; content of children's television programming and advertising directed toward children; and the media's contribution to social values and roles; development of critical viewing skills curriculum.
Crosslisted with COMM657.
- 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 660 EDUCATIONAL STATISTICS AND MEASUREMENT** 3
Basic statistics necessary for research studies and educational and psychological measurement. Addresses measurement issues including norm-referenced vs. criterion-referenced assessment, interpretation of various derived scores, types of norms, reliability, validity and how statistics can be applied to research studies.
- EDUC 661 SCHOOL SITE FINANCES AND RESOURCE MGT** 3
Focuses on the management and allocation of financial resources in PK-12 schools and school districts. Students will learn about school funding, budget management, and the larger state/district finance framework.
RESTRICTIONS: Restricted to students in the School Leadership M.Ed. program.
- EDUC 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 PSYCHOLOGISTS** 3
Provides students the opportunity to develop skills necessary for facilitating counseling relationships. Students observe, participate in and critique a variety of role playing exercises and actual counseling sessions as a means of mastering particular skills.
- EDUC 664 LAW AND ETHICS IN SCHOOL LEADERSHIP** 3
Examines legal and ethical aspects of school leadership in PK-12 schools and school districts. Focuses on schooling's legal framework and moral perspectives informing ethically defensible decisions.
RESTRICTIONS: Restricted to students in the M.Ed. School Leadership program.
- EDUC 665 ELEMENTARY STATISTICS** 3
Provides a conceptual understanding of some useful statistical techniques along with practical computer and statistical skills which will enable the student to answer realistic research questions. Topics include descriptive statistics, regression, exploratory data analysis and hypothesis testing.
- EDUC 666 SPECIAL PROBLEM** 1-12
- EDUC 668 ASSESSMENT AND INSTRUCTION FOR READING: INTERMEDIATE GRADES** 3
Second in a three-course sequence on assessment and instruction of reading and writing for students with learning problems. Focuses on assessment of reading and writing problems in the intermediate grades (4-6) and appropriate instruction.
PREREQ: EDUC608 or EDUC620.
- EDUC 670 PROGRAM DESIGN AND INSTRUCTIONAL STRATEGY 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 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.
 PREREQ: EDUC230 or EDUC697 and EDUC435 or EDUC680; or permission of instructor.

EDUC 675 LANGUAGE ACQUISITION 4
 Examines the factors which distinguish human language from animal communication as well as the development of many facets of language (semantics, syntax and phonology). Main emphasis on how children in the first three years acquire language.
 May be crosslisted with LING675, PSYC675.

EDUC 676 SECOND LANGUAGE ACQUISITION AND BILINGUALISM 3
 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.
 Crosslisted with LING676.

EDUC 677 THE STRUCTURE OF ENGLISH 3
 Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish).
 Crosslisted with LING677.

EDUC 678 HUMAN RESOURCE MANAGEMENT 3
 Considers the ways in which organizations accommodate and utilize their human resources. Focuses on personnel management functions such as selection, maintenance and development.

EDUC 679 INSTRUCTING ELEMENTARY/MIDDLE SCHOOLERS WITH MILD DISABILITIES 3
 Presents principles, techniques and materials associated with effective instruction for elementary and middle school students with mild disabilities 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. Participants 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: EDUC679.

EDUC 684 VOCATIONAL TRAINING AND ASSESSMENT: SEVERE DISABILITIES 3
 Focuses on designing and implementing vocational assessments and task modifications for students with multiple and severe disabilities. Participants learn hands-on training techniques.

EDUC 685 MULTIMEDIA LITERACY 3
 Defines multimedia and discusses the impact it is having on society. Surveys applications across the curriculum and reflects on the effects of multimedia on current teaching practice. Provides a multimedia toolbox and shows how to use it to create and publish multimedia applications on the Internet. Discusses multimedia frontiers, emerging technology, and societal issues including human impact, regulation, copyright, fair use, equity, cost and universal access.
 May be crosslisted with COMM686.

EDUC 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 688 INTERNSHIP IN SCHOOL PSYCHOLOGY 3-6
 Supervised experience in school psychology. Provides experience in a variety of areas, including consultation, psychological and educational assessment, counseling and intervention.
 RESTRICTIONS: Requires completion of all courses in the school psychology program. Requires permission of instructor.

EDUC 689 ADMINISTRATION OF ELEMENTARY AND MIDDLE SCHOOLS 3
 Study of administrative practices and procedures in the elementary schools with emphasis on the role of the elementary school principal.

EDUC 690 ADMINISTRATION OF SECONDARY SCHOOLS 3
 A study of administrative practices and procedures in secondary school with emphasis on the senior high school administrator.

EDUC 691 APPLIED STATISTICS AND RESEARCH DESIGN 3
 Designed to develop students' skills in statistics and research for use in educational practice, and designing and implementing program evaluation projects in educational settings.
 PREREQ: EDUC660.

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 curricula.
 May be crosslisted with PSYC692.

EDUC 693 SUPERVISION AND PROFESSIONAL DEVELOPMENT OF EDUCATORS 3
 Examines the intellectual, moral, and practical dimensions of supervisory leadership in PK-12 school settings; connects theory and practice related to performance appraisal; and promotes the professional learning of educators.
 RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership program.

EDUC 694 ORGANIZATIONAL MANAGEMENT 3
 An introduction to the function and structure of educational organizations. Emphasis on the sociopsychological foundations of management principles dealing with organizational theory and development, decision making, planned change, group process and leadership styles.

EDUC 695 INTRODUCTION TO LEADERSHIP THEORY 3
 Studies current applications of leadership research to educational administration. Includes some history of leadership studies. Focuses on instructional leadership, leadership style and the development of leadership skills.

EDUC 696 METHODS OF TEACHING SECONDARY SCIENCE 3-4
 Teaching science, science standards, design of curriculum, instructional strategies and assessment of student learning. Includes classroom-based 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 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 assessments, 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 to ARTC candidates.

EDUC 710 READING IN THE SECONDARY CONTENT AREAS 1-3

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 practice 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 719 STUDENT DIVERSITY IN THE SECONDARY CLASSROOM 3

Examines the implications of student diversity for secondary content-area teachers. Explores best practice in multicultural education and inclusion of students with special learning needs in regular classrooms.

RESTRICTIONS: Restricted to teachers enrolled in the Alternative Routes to Certification program. May not be used as a program requirement in a School of Education graduate program.

EDUC 730 IMPLEMENTING MIDDLE SCHOOL MATHEMATICS USING TECHNOLOGY 3

Explores how to use technology in the context of current middle school mathematics classroom materials and lessons. Features the use of graphing calculators, TI-Interactive, Geometer's Sketchpad, and Fathom. Examines the use of these tools in the learning of algebra, geometry, statistics, and probability.

EDUC 731 TEACHING MATHEMATICS TO SPECIAL NEEDS STUDENTS: K-12 3

Explores current learning theories in mathematics education and pedagogy for special needs students based on these theories. Topics include number and operations, algebra, geometry, measurement, and data analysis. Examines how school math curricula develop these topics and differentiation in math classroom.

RESTRICTIONS: Open to students in the certification track of the M.Ed. in Exceptional Children and Youth program or with permission of instructor.

EDUC 732 COMMUNITY BASED PRACTICUM 1-3 PF

Provides graduate students with a community based field experience working with children and adolescents in a variety of non-school settings such as after-school programs, community centers, and residential facilities. Sociocultural approaches to conducting research in these settings is examined.

RESTRICTIONS: Permission of department.

EDUC 733 LEADING THE INSTRUCTIONAL PROGRAM I 3

Understanding the characteristics of effective instruction and classroom management across the content areas at the classroom level in PK-12 schools. First of a two-course sequence.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.

EDUC 734 LEADING THE INSTRUCTIONAL PROGRAM II 3

PK-12 instructional leadership at the program, departmental, and school level. Second in a two-course sequence. Topics include theory and practice of standards-based curriculum, including concepts of curriculum scope, sequence, coherence, and integration. Lead and collaborate to develop, implement, and monitor standards-based curriculum.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.

EDUC 735 DATA-BASED DECISION MAKING FOR SCHOOL LEADERS 3

Prepares teachers and aspiring PK-12 educational leaders to understand, manage, and use data for student assessment, instructional planning, and school improvement. First of a two-course sequence.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.

EDUC 736 PRACTICUM: DATA ANALYSIS PROJECT 3

Second of a two-course sequence. Builds on concepts and methods of data

management and analysis from EDUC 735 and requires field-based projects.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.

EDUC 737 ORGANIZATIONAL CULTURE AND COMMUNITY RELATIONS 3

Focuses on building a cohesive, improvement-oriented organizational culture in PK-12 schools, on developing a shared program vision among school and community stakeholders, and on maintaining positive school-community relations.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.

EDUC 738 SCHOOL MANAGEMENT AND IMPROVEMENT PLANNING 3

Organizational management and effective planning and decision-making for PK-12 school improvement. Tasks and responsibilities of school management, challenges of implementing change, and best practice models of program design and school improvement will be covered.

RESTRICTIONS: Restricted to students in the M.Ed. in School Leadership Program.

EDUC 739 INTERNSHIP IN SCHOOL LEADERSHIP 2-4 PF

Engage in leadership-related field experiences in approved school settings. 2

credits of internship over 3 consecutive academic terms for total of 6 credits.

RESTRICTIONS: Open to students in the M.Ed. in School Leadership program. 24 credits of required coursework in School Leadership program. Must take and submit scores from the School Leadership Licensure Assessment (found at www.ets.org) prior to enrollment.

EDUC 740 LITERACY INSTRUCTION FOR ENGLISH LANGUAGE LEARNERS 3

Focuses on effective literacy instruction for English Language Learners in the elementary and middle school levels in the following areas: language development, vocabulary instruction, decoding, reading fluency, comprehension strategy instruction, and motivation and engagement.

RESTRICTIONS: MATESL or MI Literacy.

EDUC 742 PRACTICUM IN TEACHING ENGLISH AS A SECOND LANGUAGE 3-6

Closely supervised experiences in various school and community settings. Provides the opportunity to develop and practices skills in teaching English as a Second Language to non-native English speakers.

PREREQ: EDUC647 and EDUC698.

RESTRICTIONS: Requires permission of instructor.

EDUC 743 INTERNSHIP IN HIGHER EDUCATION ADMINISTRATION 3 PF

Supervised experience in a higher education or adult education setting.

Opportunities to engage in leadership-related field experiences in approved higher education or adult education settings.

PREREQ: At least 24 credits of required coursework in Higher Education Administration program.

RESTRICTIONS: Restricted to students in the M.Ed. in Higher Education Administration program.

EDUC 744 EDUCATIONAL MEASUREMENT AND PROGRESS MONITORING 3

Measurement issues related to academic assessment such as norms, reliability and validity. Standardized and curriculum-based assessments of academic skills. The use of curriculum-based measurement for progress monitoring is taught within a response to intervention model.

RESTRICTIONS: Requires permission of instructor.

EDUC 745 COLLABORATIVE TEAMING IN SPECIAL EDUCATION 3

Examines key components of successful teams serving students with special education needs. Skills to be developed include setting common goals, identifying and solving problems creatively, communicating effectively, and implementing and evaluating education plans that address student, family, and system needs.

PREREQ: EDUC697 or equivalent.

EDUC 746 INTERNSHIP IN SCHOOL LIBRARY MEDIA 3 PF

School library media concentration within the Master of Instruction program.

Capstone experience for candidates seeking certification as a School Library Media Specialist. Ten hours and complete directed assignments in three school library placements: an elementary, a middle, and a high school.

RESTRICTIONS: Completion of all other courses in school library media concentration of the Masters in Instruction program.

EDUC 750 GRADUATE TEACHING INTERNSHIP 3-9 PF

Full-time extended teaching internship in a classroom setting. Students are under the guidance and supervision of a mentor teacher in the classroom and a University of Delaware supervisor.

PREREQ: Must show evidence of passing Praxis I and complete all other pre-

requisite coursework specified in the student's program requirements. Evidence of passing Praxis II for content area may be required in some programs.

RESTRICTIONS: Requires permission of department. Students must apply for this internship during the academic year prior to their enrollment in the internship.

May be repeated for up to a total of 9 credits.

EDUC 769 MASTER'S PORTFOLIO: EVALUATING EFFECTIVENESS 2 PF

Uses data from candidates' classrooms to develop skills in reflecting on and evaluating their own teaching effectiveness. Capstone course for the MI program.

PREREQ: EDUC648.

RESTRICTIONS: Must have completed at least 25 credits towards the MI degree prior to enrolling.

EDUC 802 SEMINAR: READING 3-12

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 805 PROSEMINAR IN EDUCATION I 4

Required first-year seminar presents PhD students with the key domains of education research and the dominant quantitative research designs and statistical procedures used to investigate these domains.
COREQ: EDUC856.

EDUC 806 PROSEMINAR IN EDUCATION II 4

Required first-year seminar introduces Ph.D. students to the key domains of education research examined from the perspective of qualitative analyses.
COREQ: EDUC850.

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 809 MANAGING PK-12 STUDENT/PARENT/COMMUNITY RELATIONS 3

Intended for PK-12 educators in leadership positions, including teachers in leadership roles. Focuses on issues of managing discipline, positive school climate, and communications and relationships with parents and community constituencies.
RESTRICTIONS: Ed.D. majors only.

EDUC 810 MODELS AND PRACTICES OF INSTRUCTIONAL LEADERSHIP: PK-12 3

Intended for PK-12 educators in leadership positions, including teachers in leadership roles. Develops knowledge and skills for planning, managing, improving and evaluating PK-12 instructional programs.
RESTRICTIONS: Ed.D. majors only.

EDUC 811 TOPICS IN EDUCATIONAL POLICY 3

In depth examination of select topics that reflect the expertise of the instructor, and build on the themes introduced in EDUC875, Introduction to Educational Policy.

EDUC 812 REGRESSION AND STRUCTURAL EQUATION MODELING 3

Introduces theory and application of regression and structural equation modeling. Topics include: regression, logistic regression, path analysis, confirmatory factor analysis, structural regression models, and latent growth models.
RESTRICTIONS: Graduate level general statistics course.

EDUC 813 CHILDHOOD PSYCHOPATHOLOGY 3

Survey of various developmental and behavioral disorders in childhood. Seminar will examine the issues of diagnosis and treatment theoretical perspectives. Special emphasis on current major psychological research.
May be crosslisted with PSYC845.
RESTRICTIONS: Requires permission of instructor.

EDUC 814 PSYCHOLOGICAL ASSESSMENT OF CHILDREN 3

Assessment techniques used to evaluate the social, emotional and behavioral well-being of children and adolescents. Provides instruction and experience in selecting, administering and interpreting psychological tests; the use of classification systems for defining learning, behavioral, and emotional problems in public schools; training in report writing and the development of educational recommendations.
RESTRICTIONS: Permission of instructor and program area.

EDUC 816 SEMINAR: LITERACY PROBLEMS 3

Addresses the complex process of literacy development and explores the range of problems that can occur. Special attention devoted to how literacy development is affected by instructional methods, biological factors, and demographic factors such as poverty, ethnicity, and school location.
PREREQ: EDUC609 or equivalent.
RESTRICTIONS: Open only to doctoral level and advanced master's students.

EDUC 817 INDIVIDUAL INTELLIGENCE TESTING 3

Administration and interpretation of major individually administered intelligence tests used in school and child clinical psychology. Five tests will be highlighted: the Stanford Binet, EISC-R, WPPSI, WAIS-R and K-ABC.
May be crosslisted with PSYC817.
RESTRICTIONS: Requires permission of instructor.

EDUC 818 EDUCATIONAL TECHNOLOGY FOUNDATIONS 3

Overview of the following topics related to planning and using educational technology: instructional technology models; internet resources; web design; networking and database fundamentals; educational technology standards; technology integration strategies; assessment and evaluation; societal, legal and ethical issues; and collaborative planning of technology programs.
RESTRICTIONS: Open only to Ed.D. majors with specializations in curriculum, higher education, and education technology; otherwise requires permission of instructor.

EDUC 820 CONTEXTS FOR LEARNING 3

Course considers how contexts shape learning in informal and formal education settings. Implications for cognition and instructional design will be evaluated from a cross disciplinary perspective.

EDUC 821 COGNITION AND INSTRUCTION 3

Current approaches to the analysis of instruction and schooling. Topics include teacher decision making and effectiveness, classroom processes, instructional methods and design, models for schooling and theories of school-based learning.
RESTRICTIONS: Open only to Ph.D. students in education. Requires permission of instructor.

EDUC 822 LITERACY AND EDUCATIONAL POLICY 3

Doctoral seminar using federal educational policy to frame an examination of literacy research, advocacy, and policy. Readings include research targeted in the legislation as well as critiques of that research.
RESTRICTIONS: Open only to Ph.D. and Ed.D.

EDUC 823 LEARNING AND DEVELOPMENT 3

The study of contemporary theory and research in human development, with an emphasis on issues of educational significance, and mechanisms that affect development.
May be crosslisted with PSYC823.

EDUC 824 EFFECTIVE COMMUNICATION FOR LEADERSHIP IN EDUCATION 3

Focuses on improving communication skills in the exercise of leadership in administrative and policy settings in education.
RESTRICTIONS: Open only to Ed.D. majors.

EDUC 825 PROSEMINAR: SOCIAL AND URBAN POLICY 3

Social policy attempts to promote the well-being of individuals, families and communities through public action. Explores efforts to address social and economic problems in urban society. Considers differential policy impacts by social class, race/ethnicity, gender and age. Topics: welfare, housing, social security, health, education, criminal justice and employment.
Crosslisted with UAPP823.

EDUC 827 DATA ANALYSIS FOR PK-12 SCHOOL IMPROVEMENT 3

Intended for PK-12 educators in leadership roles, including teachers in leadership roles. Covers the management and statistical analysis of PK-12 student achievement data and related student, staff, program, and community data for purposes of instructional planning and school improvement.
RESTRICTIONS: Open only to Ed.D. majors in PK-12 system.

EDUC 828 PERFORMANCE ASSESSMENT AND ACCOUNTABILITY IN SCHOOLS 3

Concepts, practices, and data requirements of performance measurement in schools at different levels (student, staff, program, school) and the uses of measurement results for purposes of professional and organizational improvement and accountability.
PREREQ: EDUC827.

EDUC 829 RESEARCH ON TEACHING 3

A survey of scientific studies of classroom teaching. Teacher characteristics, teaching methods, learning environments, models of teaching, research methods and results of recent research.

EDUC 830 CONSULTATION AND INTERVENTION: SCHOOL DISCIPLINE 3

Surveys the major theoretical approaches and research related to consultation and intervention involving the school-age child. Provides skills in consultation and intervention techniques employed by school psychologists, counselors and other professionals working with teachers, parents and administrators.
RESTRICTIONS: Restricted to School Psychology students.

EDUC 831 ADVANCED COUNSELING TECHNIQUES WITH CHILDREN AND ADOLESCENTS 3

The application of brief therapy techniques with children and adolescents from diverse backgrounds. Attention is given to a solution-focused perspective and specific intervention strategies for frequently encountered school problems.
PREREQ: EDUC663.
COREQ: EDUC671.
RESTRICTIONS: Requires permission of instructor.

EDUC 832 ADVANCED PRACTICUM IN SCHOOL PSYCHOLOGY 3-12

Students will work in school, clinic or community settings under supervision to

further develop their applied skills.

RESTRICTIONS: Permission of instructor; enrollment limited to Ph.D. students in school psychology or closely related field of study.

EDUC 833 RESEARCH/THEORY OF MATH LEARNING 3
Examines research and theories of mathematics learning. Traces development of mathematical thinking from grades K to 12. Examines factors that influence the nature of what and how mathematics is learned.

EDUC 834 RESEARCH/THEORY OF MATH TEACHING 3
Examines research and theories of mathematics teaching in grades K-12. Explores components of classroom teaching, relationships between methods of teaching and students' learning, and the factors that influence the selection of teaching methods.
PREREQ: EDUC833 or permission of instructor.

EDUC 835 RESEARCH/THEORY OF MATH CURRICULUM 3
Examines research and theories of mathematics curricula, grades K-12. Analyzes features of traditional and reform curricula, and issues of curricula design and implementation.

EDUC 836 RESEARCH/THEORY OF MATH TEACHER EDUCATION AND SCHOOL IMPROVEMENT 3
Examines research and theories of mathematics teacher education and school improvement, grades K-12. Studies factors that influence the effectiveness of mathematics teacher education programs and factors that support teacher learning in schools.
PREREQ: EDUC835 or permission of instructor.

EDUC 838 RESEARCH ISSUES IN MATH EDUCATION 1 PF
Examines current issues in mathematics education from methodological and conceptual perspectives. Design and critique local research projects.
PREREQ: Admission to doctoral program.

EDUC 839 PK-12 EDUCATION, GOVERNANCE, POLICY AND LAW 3
Intended for PK-12 educators in leadership roles. Covers federal/state/local systems of governance in public education and different district governance/management models; evolution of federal/state education reform policy and implications for school leadership; organizational planning, change, and leadership issues associated with current federal and state education improvement legislation and department of education initiatives; legal framework and legal issues shaping education policy and practice.
RESTRICTIONS: Open only to Ed.D. majors with A&P concentration; otherwise instructor permission required.

EDUC 840 RESEARCH COLLOQUIUM IN EDUCATION 1-3 PF
A detailed analysis of the research currently under way at the University of Delaware and other institutions, including doctoral dissertations, that has application to human learning in an educational environment.
RESTRICTIONS: Open to Ph.D. and advanced master's students.

EDUC 841 CONSULTATION AND INTERVENTION: MENTAL HEALTH 3
Advanced theories of consultation (e.g. Mental Health, Conjoint Behavioral Consultation) through discussion and application in the schools. Crisis intervention and conducting a school needs assessment with emphasis on individual and systems level consultation and intervention.
PREREQ: EDUC830.
RESTRICTIONS: Requires permission of instructor.

EDUC 842 ASSESSMENT OF SPECIAL POPULATIONS 3
Methods of assessing the needs and strengths of young children, ages birth to 5, and children with low incidence disabilities (including physical, cognitive, and sensory). Planning interventions that include progress monitoring within a response to intervention model.
RESTRICTIONS: Requires permission of instructor.

EDUC 843 PROSEMINAR IN SCIENCE EDUCATION 3
Covers critical issues in curriculum, research on learning and teaching.
RESTRICTIONS: Topics vary. May be repeated for credit.

EDUC 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 847 POSTSECONDARY STUDENT AFFAIRS ISSUES AND MANAGEMENT 3
Intended for higher education professionals in leadership positions. Covers student affairs issues, co-curricular programming, and related public relations.
RESTRICTIONS: Open only to Ed.D. majors.

EDUC 848 SEMINAR IN LANGUAGE DEVELOPMENT 3
Covers aspects of semantic, syntactic and phonological development through

examination of current research and theory in the field. Treats educational implications of language development.
May be crosslisted with CGSC848, LING848.

EDUC 849 GOVERNANCE, PLANNING, AND FINANCE IN HIGHER EDUCATION 3
Program development, planning, budgeting, and management in higher education settings; resource acquisition; alumni/trustee relations.
RESTRICTIONS: Open only to Ed.D. majors.

EDUC 850 QUALITATIVE RESEARCH IN EDUCATIONAL SETTINGS 3
Theory and practice are combined as students critique exemplary qualitative studies, explore theoretical frameworks and conduct short-term field research activities designed to develop students' capacity to collect and analyze qualitative data. First part of a two-semester introduction to qualitative research.

EDUC 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, ethics and style in qualitative research reporting.
PREREQ: EDUC850.

EDUC 852 CRITICAL AND INTERPRETIVE METHODS IN EDUCATION RESEARCH 3
Introduction to non-social science approaches to educational inquiry such as philosophy, history, legal studies and others. Stresses epistemological and normative assumptions underlying education research programs. Selected relevant controversies are examined.

EDUC 853 TOPICS: CULTURALLY RELEVANT PEDAGOGIES 3-9
Focuses on diverse pedagogical theories, practices, and research discussing how to provide culturally relevant guidance to diverse students. Involves investigation of the role of the local community, popular culture, dialogue, and collaboration in establishing culturally relevant pedagogies.

EDUC 854 TOPICS: EQUITY IN EDUCATION 3-9
Focuses on diverse theories, practices, and research discussing issues of equity in education. Involves discussion of race, ethnicity, gender, sexual orientation, policy, economy, and structural and dynamic forces of power that promote or inhibit educational equity.

EDUC 855 TOPICS: SOCIOCULTURAL THEORIES OF EDUCATION 3-9
Focuses on sociocultural approaches to education focusing on how cultures, institutions, and practices shape participants' learning. Involves situated cognition, dialogic pedagogy, activity theory, cultural-historical approach, ecological approach, and neo-Vygotskian approaches.

EDUC 856 INTRODUCTION TO STATISTICAL INFERENCE 3
Quantitative analysis topics include describing univariate and bivariate data distributions, calculating and interpreting summary statistics, the logic of least squares estimation, the rudiments of probability theory, selected probability models and their interrelationships, the logic of null hypothesis testing, interval estimation and selected inferential techniques.
PREREQ: EDUC665 or equivalent.
RESTRICTIONS: Requires admission to doctoral program.

EDUC 857 PREPARING TO TEACH EDUCATION OR RELATED COURSES IN ACADEMIA 3
Designed for graduate students planning on becoming university professors who must meet the SOE teaching requirement. Design or redesign a course, teach lessons from the course in form of micro-teaching, and discuss issues pertaining to academic life.
RESTRICTIONS: Open to doctoral students in CHEP; otherwise instructor permission required.

EDUC 860 CURRICULUM THEORY 3
Introduces curriculum theory and the history of curriculum as a field of study. Topics include societal forces influencing curriculum, assumptions underlying curriculum decisions and conflicting views of curriculum.

EDUC 862 DESIGN AND ANALYSIS OF EXPERIMENTS 3
Intermediate topics in the design of experiments and quasi-experiments, including analysis of variance, factorial designs, analysis of covariance, repeated measures, non-parametric statistics and selected multivariate techniques. Organized by the Campbell-Stanley framework for planning and critiquing experimental efforts.
PREREQ: EDUC665 or equivalent.
RESTRICTIONS: Requires admission to doctoral program. Offered once every two years.

EDUC 863 PROGRAM EVALUATION IN EDUCATION 3
Focuses on models, theories and practice of program evaluation and applied research in education. Topics include experimental and quasi-experimental designs, validity, political and ethical issues of evaluation and the implementation and practice of process and outcome program evaluation.
RESTRICTIONS: Ed.D. majors or permission of instructor.

EDUC 865	EDUCATIONAL MEASUREMENT THEORY	3
Focuses on both classical and modern test theory including scaling, scoring, reliability, validity, generalizability theory, bias, item analysis, item response theory and equating with applications to norm-referenced and criterion-referenced assessment frameworks. PREREQ: EDUC665 or equivalent.		
EDUC 869	MASTER'S THESIS	1-6
EDUC 870	CHILD NEUROPSYCHOLOGY	3
Examines approaches to neuropsychological assessment and application to childhood learning and neurodevelopmental disorders. RESTRICTIONS: Requires permission of instructor.		
EDUC 872	ADVANCED EDUCATIONAL MEASUREMENT	3
Focuses on theories of measurement with special emphasis on item response theory. The first two classes will be devoted to classical test theory and remaining class sessions will emphasize item response theory. PREREQ: EDUC856 and EDUC865.		
EDUC 873	MULTILEVEL MODELS IN EDUCATION	3
Introduction to multilevel modeling. Considers the analysis of growth and change as a special case of multilevel modeling. PREREQ: EDUC812 and EDUC856, or equivalent.		
EDUC 874	APPLIED MULTIVARIATE DATA ANALYSIS	3
Introduces applied use of multivariate models of data analysis. Topics include multiple regression, logistic regression, discriminant function analysis, MANOVA, and exploratory factor analysis. PREREQ: Graduate level general statistics course.		
EDUC 876	LATENT VARIABLES FOR EDUCATIONAL RESEARCH	3
Introduces models for latent variables with applications to educational and social science research. Topics divided into models for continuous and categorical latent variables. Continuous latent variables models include confirmatory factor analysis, structural equation modeling, and growth curve modeling. Models for categorical latent variables include latent class analysis and latent Markov chain modeling. Advanced methods such as latent transition analysis and general growth mixture modeling are also covered. PREREQ: EDUC812 or equivalent.		
EDUC 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 (i.e., administration, guidance, etc.), in which such internships are required as a part of graduate degree programs. RESTRICTIONS: Credit during any semester varies according to the time spent in internship.		
EDUC 883	ADMINISTRATION OF ADULT AND POSTSECONDARY EDUCATION PROGRAMS	3
Considers the administration, design and implementation, and evaluation of programs for postsecondary students in formal and informal training, degree or nondegree programs. Will consider factors influencing the administration and design of programs such as institutional demands.		
EDUC 885	EDUCATIONAL TECHNOLOGY TOPICS	3-6
In-depth study of a major problem in educational technology. RESTRICTIONS: May be repeated for credit when topics vary.		
EDUC 888	DOCTORAL INTERNSHIP IN SCHOOL PSYCHOLOGY	3-6
Full-time internship in school settings under supervision. Final field-based experience for doctoral students in which they integrate and apply skills learned throughout their course of study. RESTRICTIONS: By permission of instructor only; enrollment limited to school psychology Ph.D. students who have completed their course work.		
EDUC 890	LEADERSHIP: THEORY AND RESEARCH	3
Theories and research relating to leadership and management style. Fundamental principles of leadership as viewed from the fields of philosophy, sociology, psychology and applied behavioral science are discussed. Emphasis on analysis of personal style. RESTRICTIONS: Open only to students in the Ed.D. program in educational leadership.		
EDUC 891	ORGANIZATIONAL PROBLEM ANALYSIS/PLANNING IN EDUCATION	3
Focuses on conceptualizing, designing, and reporting decision-oriented studies for education administrators and policymakers.		

RESTRICTIONS: Core requirement for all Ed.D. majors in SOE educational leadership program.

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 896	EDUCATION REFORM: TOPICS AND STRATEGIES	3
Intended for PK-12 educators in leadership roles, including teachers in leadership roles. Covers different perspectives on and issues in education reform and impacts at the school and district level. Flexible in content to enable study of current and changing education reform initiatives and to engage students in academic and work-related projects documenting leadership knowledge and competencies in their study of and response to these initiatives. RESTRICTIONS: Open to Ed.D. majors with PK-12 concentration: otherwise by permission of instructor.		
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 964	PRE-CANDIDACY STUDY	3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.		
EDUC 969	DOCTORAL DISSERTATION	1-12 PF

ENGINEERING GRAPHICS AND GENERAL

EGGG 101	INTRODUCTION TO ENGINEERING	2
Introduction to profession, including disciplines of chemical, civil, computer, electrical, environmental, and mechanical engineering. Prepares students for success through integration of: technical problem solving and engineering design, ethical decision-making, teamwork, and communicating to diverse audiences.		

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, rainfall, 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.		
EGTE 107	WELDING AND METALS	2
Arc welding, gas welding, soldering, sheet metal layout and fabrication, and properties of metals.		
EGTE 108	UTILITIES	2
Domestic water supply and waste disposal, house wiring, heating systems.		
EGTE 112	PERSONAL COMPUTERS AND TECHNOLOGY	3
Introduction to personal computers. PC operation systems, programming, and software packages such as spreadsheets and word processing. Statistical and numerical analysis techniques applied to production problems in engineering technology.		
EGTE 115	INTRODUCTION TO COMPUTER BASED PROBLEM SOLVING	4
Provides foundation in the application of computers and engineering principles for agriculture, industry and the environmental sciences. Emphasizes fundamentals of computer programming, problem solving and practical applications within the field. Includes a design project and laboratory. COREQ: MATH117 or higher.		
EGTE 165	FRESHMAN SEMINAR	0 PF
Focuses on academic services, career exploration and preparation, campus resources, and practical skills helpful in mastering freshman year. RESTRICTIONS: Limited to freshmen in College of Agriculture and Natural Resources.		

EGTE 209	TECHNICAL AND COMPUTER AIDED DRAFTING	3
Two dimensional drafting including layouts, geometric constructions, lettering, dimensioning, multiview projections, sectional and auxiliary views using AutoCAD for drafting, entity creation and modification and data management.		
EGTE 215	APPLIED FLUID MECHANICS	4
Fluid properties, fluid statics, conservation of mass, energy, and momentum as applied to engineering systems. Pipe flow, distribution systems, pumps, open channel flow, hydraulics structures. Laboratory includes flow measurements, energy measurements and analysis of data. PREREQ: EGTE115, MATH221/241 and PHYS201/207.		
EGTE 231	FUNDAMENTALS OF STATICS AND STRENGTH OF MATERIALS	4
Analysis of forces and equilibrium on bodies in two and three dimensions and forces on building components. Stresses, displacement and failure in beams and columns. Strength of wood, steel, concrete and masonry. PREREQ: MATH221/241, PHYS201/207.		
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 245	ANALOG ELECTRONICS	3
Foundation in the analysis, selection and integration of analog electronics to meet modern industrial challenges. Selected applications include diodes, field effect and bipolar transistors, amplifiers, thyristors and introduction to frequency analysis. PREREQ: EGTE244.		
EGTE 306	COST ESTIMATING	3
Building components, bill of materials and cost estimating using cost of materials plus labor system. PREREQ: EGTE209.		
EGTE 311	FUNDAMENTALS OF THERMODYNAMICS	3
Basic properties and concepts. Zeroth, first and second laws. Closed and open systems. Gas cycles, vapor cycles, mixtures of gases and vapors, psychrometry and transfer of heat energy. PREREQ: EGTE215. COREQ: MATH222 or MATH242.		
EGTE 312	FUNDAMENTALS OF SOIL MECHANICS	3
Engineering properties of soils, soil testing and classification, permeability and drainage, soil stresses, shear strength, bearing capacity, compaction, slope stability, and design of foundations. PREREQ: EGTE231.		
EGTE 321	STORM WATER MANAGEMENT	4
Hydrology for small (urban/suburban/rural) watersheds. Design of culverts, storm drains, spillways, vegetated waterways, and storm-water management systems. PREREQ: EGTE215.		
EGTE 328	WASTEWATER TREATMENT SYSTEMS	3
Properties of municipal and food processing wastes. Wastewater treatment, biosolids management and wastewater utilization. PREREQ: CHEM101 or 103, and MATH221.		
EGTE 366	INDEPENDENT STUDY	1-4
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. Use of computer applications and differential calculus in economic analysis. PREREQ: MATH221 or equivalent, EGTE115.		
EGTE 417	PROJECT MANAGEMENT	3
Basic procedures for finding limiting sequence of events, constructing flow network describing project steps, and project planning and control for optimum scheduling. Project analysis using Critical Path Method (CPM), Project Evaluation and Review Technique (PERT) and linear programming. PREREQ: EGTE115. RESTRICTIONS: Junior or senior standing.		
EGTE 418	MANUFACTURING	3
Basic processes, technologies, and process systems. Processes include metal cutting, forming, plastic molding, packaging, and food processing. Current advances and technologies include lean manufacturing, robotics, just-in-time inventory control, ergonomics, controls and quality management. RESTRICTIONS: Junior or senior standing in engineering technology or engineering or permission of instructor.		
EGTE 420	SAFETY AND HEALTH IN THE WORKPLACE	3
Managing safety and health issues, including laws (OSHA) and standards,		

accident investigations, injury prevention techniques, job safety analysis, and ethical aspects. Case study method used to develop a corporate safety plan. Developing safety inspection sheets, analyzing incident data, and designing hazard control programs.

PREREQ: Statistics, biology, chemistry, and computer use.

RESTRICTIONS: Intended for juniors, seniors and graduates.

EGTE 435 MACHINE DESIGN 3

Various aspects of machine design including static and fatigue failure, and the design of machine elements including fasteners, welded joints, bearings, shafts, and power transmission components. Projects include a semester-long design problem with a customer, a design-draw-build exercise in a machine shop, and the programming of a computer-based design tool.

PREREQ: MATH243/222; EGTE115; EGTE209; EGTE231.

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: EGTE115, EGTE209, EGTE215, EGTE231, and EGTE244.

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: PHYS202 or 208, EGTE244 or equivalent.

EGTE 444 PROGRAMMABLE LOGIC CONTROL APPLICATIONS 3

Designed to teach application of PLCs and how to use them effectively. Major topics include control systems and terminology, PLC structure and instruction sets, control of sequential processes, and safety and implementation. Applications will be programmed and tested on actual PLCs.

PREREQ: EGTE115, EGTE244 or equivalent

EGTE 445 FOOD ENGINEERING TECHNOLOGY 4

Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations.

Crosslisted with ANFS443.

PREREQ: MATH222, and PHYS104 or PHYS201.

RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

EGTE 449 APPLIED CONTROLS 3

The selection, operating principles and application of electrical, mechanical and mechatronic systems for industrial, agricultural and environmental applications. Includes a laboratory and design project.

PREREQ: EGTE115, EGTE245, CPEG202 and MATH222/242.

RESTRICTIONS: Requires junior or senior status in the major or approval of the department.

EGTE 450 TECHNICAL PRACTICUM IN INDUSTRY 1-3

Structured experience in industry. A minimum of 40 hours of technical activities per credit hour. Upon completion, students present results to the department faculty and industrial sponsor through written reports and oral presentations. May be repeated twice for credit. Proposals approved in advance by the department faculty, and a designated faculty advisor is required.

RESTRICTIONS: Junior standing.

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 engineering technology.

EGTE 454 WOOD AND STEEL STRUCTURES 3

Analysis and design of structures using wood and steel for building materials.

Design aspects of building construction.

PREREQ: EGTE231 and PHYS201 (or 207).

EGTE 455 CONCRETE AND MASONRY STRUCTURES 3

The use of concrete and masonry in building structures. Includes analysis and design with concrete and masonry.

PREREQ: EGTE231, PHYS201/PHYS207.

EGTE 456 FUNDAMENTALS OF HEATING, VENTILATION AND AIR CONDITIONING 3

Heating, ventilating and air conditioning of rural, residential and light commercial buildings. Heat transmission in structures, space heating and cooling loads, air distribution, piping and fluid flow, heat and water production in livestock and poultry structures, environmental systems for specific plant and animal structures.

PREREQ: EGTE115, EGTE215 and EGTE311.

EGTE 466 INDEPENDENT STUDY 1-3

ELECTRICAL ENGINEERING

ELEG 205	ANALOG CIRCUITS I	4
Laws of the electric circuit, analysis of DC and AC circuits, network equations and network theorems. PREREQ: MATH242 and PHYS207.		
ELEG 212	SIGNALS AND COMMUNICATIONS	4
Introduction to signals, systems and communications. Covers discrete and continuous time systems, sampling, and conversion between analog and digital signals. Example systems studied may include voice coding, telephony, television and digital audio. PREREQ: MATH242.		
ELEG 240	PHYSICAL ELECTRONICS	4
Introduction to semiconductor devices, electromagnetic fields and waves, and optics. Covers basic electronic devices including diodes, transistors, lasers, antennas and optical elements. PREREQ: MATH243, ELEG205. COREQ: MATH341.		
ELEG 302	INTRODUCTION TO DEVICES AND MATERIALS	3
Emphasizes concepts and properties of materials important in modern solid state electronics; topics include structure and processing of electrical materials, band structure, carrier concentration and dynamics, junction phenomena and optical and magnetic phenomena. PREREQ: MATH243 and PHYS208.		
ELEG 305	SIGNAL PROCESSING I	3
Continuous and discrete time signals and systems at the introductory and intermediate levels. Covers transforms, filtering, sampling, and reconstruction. Applications discussed may include digital signal processing, communications and multimedia. PREREQ: ELEG212.		
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 probability and estimation as applied to random signals and noise. Includes random variables, densities, distributions, random processes, spectral representations and statistics. PREREQ: ELEG212.		
ELEG 312	ELECTRONIC CIRCUIT ANALYSIS II	4
Low-frequency and high-frequency response of RC-coupled amplifiers, Class A tuned amplifiers, tuned power amplifiers, frequency response and stability of feedback amplifiers, oscillators, modulation and demodulation circuits. PREREQ: ELEG309.		
ELEG 320	FIELD THEORY I	4
Study of theory and problems in electrostatic and magnetostatic fields. Maxwell's equations. PREREQ: PHYS208 and ELEG205. COREQ: MATH243 can be either a prerequisite or a corequisite.		
ELEG 340	SOLID STATE ELECTRONICS	3
Introduction to concepts necessary to establish electronic phenomena in solids. Application to electronic devices such as diodes, transistors, FETS and integrated circuits. Emphasis on reduction of physical device to circuit model. PREREQ: ELEG240. COREQ: MATH342.		
ELEG 341	SOLID STATE ELECTRONICS II	3
Theory of multi-terminal semiconductor devices, with emphasis on bipolar junction transistors (BJTs) and field-effect transistors (FETs). Applications extended to charge-coupled devices (CCDs), floating-gate devices including flash memory, and high-frequency and high-power devices. PREREQ: ELEG340.		
ELEG 366	INDEPENDENT STUDY	1-6
ELEG 370	ENGINEERING ELECTROMAGNETICS	4
Electromagnetic fields and waves. Static and dynamic solutions of Maxwell's		

equations, transmission lines, waves and radiating systems. Associated computational methods.
PREREQ: MATH342, ELEG240.

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; based band data transmission, modulation, noise in analog systems and digital carrier modulation. PREREQ: ELEG305.		
ELEG 409	SIGNALS AND COMMUNICATION DESIGN I	4
Part I of two semester design series, ELEG/CPEG409/410. Learn background material for development of a major design project in signal processing or communications. May be crosslisted with CPEG409. PREREQ: CISC181, ELEG305.		
ELEG 410	SIGNALS AND COMMUNICATIONS DESIGN II	4
Design of signal processing, control and communications systems. A major design project is required. Students study, design, build and test their projects. Periodic oral and written reports are required. May be crosslisted with CPEG410. PREREQ: ELEG409.		
ELEG 413	FIELD THEORY II	3
Electrodynamics based on Maxwell's equations. Energy storage and flow in electromagnetic fields. Transmission lines, waves and radiating systems. PREREQ: ELEG320.		
ELEG 415	ELECTRIC POWER AND RENEWABLE ENERGY SYSTEMS	3
Introduction to electric power systems and interfaces with renewable energy sources. Covers electric power generation, transmission, distribution; residential, commercial, and industrial systems; components, operation, losses, metering and load management. PREREQ: ELEG205 or equivalent.		
ELEG 418	DIGITAL CONTROL SYSTEMS	3
Study of closed-loop digital control systems. Emphasis is on simulation methods and pole placement techniques for controller development. Both root-locus and input/output pole placement using the Diphantine equation are used to generate designs. MATLAB is used for computer aided design.		
ELEG 419	MULTIMEDIA COMMUNICATIONS	3
The theory and principles of multimedia communications, including data compression, CD-ROMs, multimedia networking and standards (JPEG, MPEG, H261, H263, RTP, etc.).		
ELEG 421	SOLID STATE NANOTECHNOLOGY	3
Introduces the principles of solid state physics for electronics and photonics. Topics including material structure, the states and statistics of charge carriers, and the properties of conductors, insulators, and semiconductors. Provides a foundation for understanding nanotechnology applications and nanophase materials. PREREQ: Senior standing.		
ELEG 422	SEMICONDUCTOR MATERIALS PROCESSING	3
The basic goals, principles and techniques of semiconductor materials processing are discussed. Emphasis is on physical explanations of how devices and processes work rather than on elaborate mathematical models.		
ELEG 423	ELECTRICAL PROPERTIES OF MATTER	3
Provides basic understanding of electronic behavior in materials used for fabricating semiconductor devices. Introduces fundamentals of electron theory; elementary quantum mechanics (as applied to semiconductors); concept of energy bands; electronic behavior in crystals; electrical conduction in metals, alloys, semiconductors and insulators; metal-semiconductor contacts and metallization. PREREQ: ELEG340, ELEG370.		
ELEG 424	QUANTUM MECHANICS I	3
First in a sequence with PHYS425 that provides introduction to basic principles and applications of quantum mechanics. Emphasis on formalism of quantum mechanics. Schroedinger equation is solved for simple cases such as free-particle motion, simple harmonic oscillator and hydrogen atom, with a basic treatment of angular momentum. Topic of identical particles also considered. Crosslisted with PHYS424. PREREQ: MATH 341 and MATH 342 or MATH302 and MATH349.		
ELEG 426	PHOTONIC CRYSTAL DEVICES	3
Introduces design and fabrication tools required for photonic crystal structures. Begins with working knowledge of basic operation physics and introduces mathematical and computational methods for their design. Various fabrication methods discussed such as lithographic and self-assembly methods. PREREQ: ELEG370.		

- ELEG 427 TERAHERTZ AND MILLIMETER-WAVE LIGHT GENERATION AND DETECTION 3**
Light is treated as an antenna phenomenon at radio wavelengths and a quantum effect near the visible. At terahertz frequencies and millimeter-wavelengths, these distinctions are blurred and both technologies exist. These technologies are described and a unified view of their principles is provided.
PREREQ: ELEG240 Physical Electronics.
- ELEG 429 LOW POWER ELECTRONICS AND LIGHTING 3**
Presents various techniques whereby electronics can be designed for lower power consumption. Considers various lighting devices available, from incandescent to light emitting diodes, showing their principles of operation and their energy efficiency.
PREREQ: ELEG205, ELEG240.
- ELEG 438 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 and ELEG370.
- ELEG 439 MAGNETISM AND SPINTRONICS 3**
Surveys field with focus on fundamentals of magnetism in solids, magnetic materials, thin film spintronics devices (such as magnetic tunnel junctions and Giant Magneto-Resistance (GMR) sensors), metal-semiconductor spintronics devices, and semiconductor spin transport and optical methods.
- ELEG 440 OPTO-ELECTRONICS 3**
Provides an introduction to the operating principles of optoelectronic devices used in various digital transmission and information processing systems. Emphasis is on the generation (via lasers) and detection of optical signals.
PREREQ: Senior standing with completion of all core physics and math courses required or permission of instructor.
- ELEG 441 ANTENNA THEORY AND DESIGN 3**
The radiation characteristics of antennas, numerical and analytical antenna analysis methods and design techniques for many types of antenna. Topics include wire antennas, antenna arrays, broadband antennas and microstrip antennas.
PREREQ: ELEG370.
- ELEG 442 BIOMEDICAL NANOTECHNOLOGY 3**
Applications of nanotechnology in biomedical engineering. Topics include nanomedicine in medical diagnostics, molecular manufacturing and transport, nano-scale manipulation, nanomaterials and nano-sensors for medical applications.
- ELEG 444 MICRO-ELECTRO-MECHANICAL SYSTEMS 3**
Explores the world of silicon-based micromachines. Topics include lithography, pattern transfer with etching and additive techniques, bulk and surface micromachining, LIGA, scaling laws and applications.
- ELEG 445 OPTICAL COMMUNICATION SYSTEMS 3**
Studies the components and system design issues of fiber optic based communications systems. Topics include the propagation of lightwaves in fibers, the coupling of light into fibers, a review of sources and detectors used in fiber-based systems, link analysis, and overall architecture issues.
PREREQ: ELEG440 or permission of instructor.
- ELEG 446 NANOELECTRONIC DEVICE PRINCIPLES 3**
Introduction to the operating principles of nanoscale optical and electronic devices, with emphasis on how nanotechnology and quantum mechanics affect devices with reduced sizes and dimensions. Develops the performance and limitations of devices based on quantum wells, wires, dots, and nanophase materials.
- ELEG 447 OPTICAL PROPERTIES OF SOLIDS 3**
Techniques for the design of optical filters and optoelectronic devices with thin films and the fundamental electromagnetic and solid state physics that determine the optical properties of solids.
PREREQ: ELEG240.
- ELEG 449 NANOMATERIALS AND APPLICATIONS 3**
Practical introduction to various areas of nanomaterials with applications in engineering and science. Includes details of processing and characterization of materials for nanotechnology such as nanoparticles, carbon nanostructures, nanostructured ferromagnetism, quantum wires, organic compounds and polymers, and biological materials.
PREREQ: PHYS208.
- ELEG 450 SEMICONDUCTOR DEVICE DESIGN AND FABRICATION 4**
Instruction in design and fabrication of semiconductor devices and circuits. Specific topics include photolithography and mask design, diffusion, etching, metallization, metrology, and device testing. The laboratory component of this course will focus on the design, fabrication, testing, and reporting of basic devices in silicon and/or compound semiconductors. Students will work in small teams.
- ELEG 454 SENSOR AND DATA WIRELESS NETWORKS 3**
Design of sensor and data wireless networks and design protocols for these networks. Implementation of wireless protocols required. Topics include wireless propagation, energy usage in wireless terminals, MAC, routing, transport, localization, and standards for sensor, data, and mesh wireless networks.
PREREQ: Background in networking with knowledge of routing and transport layer protocols as well as a strong background in programming.
- ELEG 455 HIGH-PERFORMANCE COMPUTING W/COMMODITY HARDWARE 3**
New commodity computing devices, e.g., GPUs, bring the originally elite high performance computing into the reach of general public. Principles of program optimization, GPU and IBM Cell architecture, along with concepts and techniques for optimizing general purpose computing on the new hardware.
May be crosslisted with CPEG455.
- ELEG 456 ELECTRIC POWER DISTRIBUTION DESIGN 4**
Aerial and underground electric power distribution design. Design a system to replace an existing multi-circuit out-dated system using new-generation technology. Through field trips and lectures, develop hands-on knowledge of construction materials, equipment and practices used to install electric power distribution facilities. Written proposal and presentation to UD faculty the local electric utility and city government.
PREREQ: ELEG415.
- ELEG 460 HIGH TECHNOLOGY ENTREPRENEURSHIP 3**
Focuses on critical financial, legal, scientific and engineering issues confronted during initial planning stages of a start-up enterprise. Students work in teams to develop a real world business product offering.
Crosslisted with ENTR460.
RESTRICTIONS: Senior status, permission of instructor.
- ELEG 466 INDEPENDENT STUDY 1-6**
- ELEG 470 BIOPHYSICS OF EXCITABLE MEMBRANES 3**
Includes passive and active membrane properties, temporal/spatial integration of synaptic inputs, saltatory conduction, and the relationship between the molecular structure and conduction properties of the major classes of voltage-gated and ligand-gated ion channels.
PREREQ: ELEG471, or BISC306, or PSYC320, or PSYC626, or permission of instructor.
RESTRICTIONS: Open to all seniors and graduate students.
- ELEG 471 INTRODUCTION TO BIOMEDICAL ENGINEERING 3**
Introduction to human physiology at all hierarchical levels including molecular, biochemical, cellular, tissue, organ, and integrated systems.
RESTRICTIONS: Seniors only.
- ELEG 472 CELL AND MOLECULAR BIOLOGY FOR ENGINEERS 3**
Overview of cell biology and molecular mechanisms. Covers some intercellular interactions, but main focus is on intracellular structure, organization, and function.
- ELEG 473 SIGNAL PROCESSING IN NEURAL SYSTEMS 3**
Signal processing in real neural systems, with emphasis on mammalian/human sensory systems. Stimulus transduction, complex receptive fields, encoding, feature binding, and experimental techniques in visual, somatosensory, auditory and olfactory systems.
PREREQ: ELEG471 or instructor's permission.
- ELEG 474 NONLINEAR DYNAMICS IN NEURAL SYSTEMS 3**
Introduction to the mathematical tools, theory, and experimental observations that concern nonlinear dynamics of biological nervous systems. Classical methods employed to develop a unified approach to the study and understanding of nonlinear dynamics, chaos, synchronicity, bifurcation, and self-organization.
PREREQ: MATH243.
- ELEG 475 IMAGE PROCESSING WITH BIOMEDICAL APPLICATIONS 3**
Fundamentals of digital image processing, including image formation, acquisition, transforms, enhancement, restoration, coding, and reconstruction from projections. Attention is to biomedical imaging modalities, including X-ray, computed tomography (CT), magnetic resonance (MR) imaging, and ultrasound.
PREREQ: ELEG305.
- ELEG 477 BIOSIGNAL PROCESSING 3**
Biomedical signal characteristics, biomedical systems and models, applications of Fourier transform, wavelet transforms, and joint-time frequency analysis of biomedical signals. Systems studies include ultrasounds, EKG's, CAT scans, MRI's, X-rays, and others.
PREREQ: ELEG305, ELEG310, or equivalent.
- ELEG 478 INTRODUCTION TO NANO AND BIOPHOTONICS 3**
Multidisciplinary approach covers fundamentals of light-matter interactions and nano-scaled materials and discusses their use in understanding, characterizing and manipulating biological systems. Covers several applications including laser manipulation and dissection, bio-imaging, flow cytometry and biosensors, optical biopsy and spectroscopy and photodynamic therapy.

- ELEG 479 INTRODUCTION TO MEDICAL IMAGING SYSTEMS 3**
Physics, instrumentation, system design, and image reconstruction algorithms will be covered for the following modalities: radiography, x-ray computed tomography (CT), single photon emission computed tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), and real-time ultrasound. PREREQ: Requires permission of instructor.
- ELEG 482 OPTICS AND PHOTONICS 3**
Principles of classical optics and their applications. Topics include wave optics, material dispersion, geometrical optics, ray tracing, ABCD matrices, birefringence and Jones' formalism, Gaussian optics, coherence, interference, diffraction, pulse propagation and non-linear optics. Specific applications including optical components and instrumentation, imaging techniques, resonators and Fourier optics. Apply fundamental principles of optics and interaction between light and matter (photonics).
- ELEG 490 CAREER SKILLS FOR ENGINEERS 1**
Covers a variety of skills engineers need in their careers, including ethics, the need for life-long learning, societal and global impact of engineering solutions, teaming and team dynamics, resume writing, interviewing and communications. Crosslisted with CPEG490.
RESTRICTIONS: Open to engineering seniors, or by permission of instructor.
- ELEG 491 ETHICS/IMPACTS OF ENGINEERING 2**
Covers a variety of topics of which engineers should be aware, including ethics, the need for life-long learning, societal and global impact of engineering solutions, team dynamics, and communications.
RESTRICTIONS: Open to engineering seniors, or others by permission of instructor.
- ELEG 606 OCEAN AND ATMOSPHERE REMOTE SENSING 3**
Fundamentals of ocean and atmosphere remote sensing including space platforms, their orbits, instruments, data retrieval and image processing methods. Oceanographic and atmospheric applications of remote sensing and new developments in sensors and data analyses.
Crosslisted with MAST606.
- ELEG 615 ELECTRIC POWER AND RENEWABLE ENERGY SYSTEMS 3**
Introduction to electric power systems and interfaces with renewable energy sources. Covers electric power generation, transmission, distribution; residential, commercial, and industrial systems; components, operation, losses, metering and load management.
- ELEG 616 KINETIC THEORY AND THERMODYNAMICS 3**
Postulates of equilibrium thermodynamics; review of relevant mathematics; entropy maximum principle; energy minimum principle; Legendre transformations. Entropy representation, internal energy representation, Helmholtz representation and Gibbs representation. Maxwell relations; reduction of partial derivatives; phase transitions; statistical mechanics via Boltzmann's elementary method; equipartition of energy; applications.
Crosslisted with PHYS616.
- 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 NANOTECHNOLOGY 3**
Introduces the principles of solid state physics for electronics and photonics. Topics include material structure, the states and statistics of charge carriers, and the properties of conductors, insulators, and semiconductors. Provides a foundation for understanding nanotechnology applications and nanophase materials.
- ELEG 622 ELECTRONIC MATERIALS PROCESSING 3**
Theory and current technology of semiconductor fabrication processes, including crystal growth, wafer preparation, lithography, liquid and vapor phase epitaxy, molecular-beam epitaxy of ultra-thin layers and superlattices, oxide growth, thin-film deposition, diffusion, ion implantation, etching and metallization.
- ELEG 626 PHOTONIC CRYSTAL DEVICES 3**
Introduces design and fabrication tools required for photonic crystal structures. It begins with a working knowledge of their basic operation physics and then introduces mathematical and computational methods for their design. Various fabrication methods are discussed such as lithographic and self-assembly methods. PREREQ: ELEG648.
- ELEG 627 TERAHERTZ AND MILLIMETER-WAVE LIGHT GENERATION AND DETECTION 3**
Light is treated as an antenna phenomenon at radio wavelengths and a quantum effect near the visible. At terahertz frequencies and millimeter-wavelengths, these distinctions are blurred and both technologies exist. These technologies are described unified view of their principles is provided.
PREREQ: ELEG240 Physical Electronics.
- ELEG 628 SOLAR ENERGY TECHNOLOGY AND APPLICATION 3**
Introduces basics of solar cell technology, applications, and systems. Presents critical issues in research, manufacturing, cost and performance. Compares Si

wafer and thin film solar technology. Analyzes off-grid, residential, building integrated, centralized power systems. Discusses other solar energy concepts.

- ELEG 629 LOW POWER ELECTRONICS AND LIGHTING 3**
Presents various techniques whereby electronics can be designed for lower power consumption. Considers various lighting devices available, from incandescent to light emitting diodes, showing their principles of operation and their energy efficiency. PREREQ: ELEG205, ELEG240.
- ELEG 630 INFORMATION THEORY 3**
Information theory establishes the theoretical limits that can be achieved in communications systems, and provides insights about how to achieve these limits in practical systems. Covers lossless and lossy compression, and studies the maximum information rate achievable in communications over noisy channels.
- ELEG 631 DIGITAL SIGNAL PROCESSING 3**
Theory of discrete-time signals and systems with emphasis on the frequency domain description of digital filtering and discrete spectrum analysis, fast Fourier transform, z-transform, digital filter design, relationship to analog signal processing. PREREQ: ELEG305 or equivalent.
- ELEG 632 MATHEMATICAL METHODS FOR SIGNAL PROCESSING 3**
The application of mathematics to signal processing. Topics include, among others, applications of linear and matrix algebra, iterative and recursive methods, and optimization techniques. Example applications include: Karhunen-Loeve approximation, subspace techniques, steepest descent, expectation maximization and Hidden Markov Models, Viterbi algorithm. PREREQ: Linear and matrix algebra and digital signal processing.
RESTRICTIONS: Undergraduates needs permission of the instructor.
- ELEG 633 IMAGE PROCESSING 3**
Review of concepts of linear systems and spectral analysis, human visual response, scanning and display of images, Fourier optics, image enhancement and feature extraction, design of digital filters for image processing, 2D fast Fourier transform algorithms and computed tomography.
RESTRICTIONS: Requires permission of instructor.
- ELEG 634 SIGNALS AND SYSTEMS 3**
Reviews basic concepts of discrete and continuous time signals, control systems, and linear algebra. Transforms, sampling, aliasing, linear algebra and systems of equations, matrix factorizations, eigenvalues and eigenvectors, least squares, and the Cayley-Hamilton theorem are studied. PREREQ: ELEG305 and MATH342 or MATH349 or equivalents.
- ELEG 635 DIGITAL COMMUNICATION 3**
The theory and applications of digital communications including modulation, pulse shaping, and optimum receiver design for additive, white gaussian noise and bandlimited channels.
PREREQ: Undergraduate course in probability, signals and linear systems.
- ELEG 636 STATISTICAL SIGNAL PROCESSING 3**
Introduction to random vectors and random processes and second-order moment and spectral characterizations. Linear transformations of stationary processes. Parameter estimation. Orthogonality principle and optimal linear filtering. Levinson recursion and lattice prediction filters. AR and ARMA models and their Yule-Walker characterizations. Classical and modern spectrum estimation. 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 and ELEG320.
- ELEG 639 MAGNETISM AND SPINTRONICS 3**
Surveys field with focus on fundamentals of magnetism in solids, magnetic materials, thin film spintronics devices (such as magnetic tunnel junctions and Giant Magneto-Resistance (GMR) sensors), metal-semiconductor spintronics devices, and semiconductor spin transport and optical methods.
- ELEG 640 OPTO-ELECTRONICS 3**
Provides an introduction to the operating principles of optoelectronic devices used in various digital transmission and information processing systems. Emphasis is on the generation (via lasers) and detection of optical signals.
- ELEG 641 ANTENNA THEORY AND DESIGN 3**
The radiation characteristics of antennas, numerical and analytical antenna analysis methods and design techniques for many types of antenna. Topics include wire antennas, antenna arrays, broadband antennas and microstrip antennas. PREREQ: ELEG370 or ELEG413.
- ELEG 642 BIOMEDICAL NANOTECHNOLOGY 3**
Applications of nanotechnology in biomedical engineering. Topics include nanomedicine in medical diagnostics, molecular manufacturing and transport, nano-scale manipulation, nanomaterials and nano-sensors for medical applications.

- ELEG 644 MICRO-ELECTRO-MECHANICAL SYSTEMS 3**
Explores the world of silicon-based micromachines. Topics include lithography, pattern transfer with etching and additive techniques, bulk and surface micromachining, LIGA, scaling laws and applications.
- ELEG 645 OPTICAL COMMUNICATION SYSTEMS 3**
Studies the components and system design issues of fiber optic based communications systems. Topics include the propagation of lightwaves in fibers, the coupling of light into fibers, a review of sources and detectors used in fiber-based systems, link analysis, and overall architecture issues.
PREREQ: ELEG640 or permission of instructor.
- ELEG 646 NANO-ELECTRONIC DEVICE PRINCIPLES 3**
Introduction to the operating principles of nanoscale optical and electronic devices, with emphasis on how nanotechnology and quantum mechanics affect devices with reduced sizes and dimensions. Develops the performance and limitations of devices based on quantum wells, wires, dots, and nanophase materials.
- ELEG 647 OPTICAL PROPERTIES OF SOLIDS 3**
Techniques for the design of optical filters and optoelectronic devices with thin films and the fundamental electromagnetic and solid state physics that determine the optical properties of solids.
PREREQ: ELEG240 or equivalent.
- ELEG 648 ADVANCED ENGINEERING ELECTROMAGNETICS 3**
Development and application of Maxwell's equations as they apply to the analysis of guided wave, radiation, and scattering problems. Topics include wave propagation, reflection and transmission, vector potentials, transmission lines and cavities, and special emphasis on antennas and scattering structures.
- ELEG 649 NANOMATERIALS AND APPLICATIONS 3**
Introduction to various areas of nanomaterials with practical applications in engineering and science. Includes details of processing and characterization of materials for nanotechnology such as nanoparticles, carbon nanostructures, nanostructured ferromagnetism, quantum wires, organic compounds and polymers, and biological materials.
PREREQ: PHYS207, PHYS208 or equivalent.
- ELEG 650 SEMICONDUCTOR DEVICE DESIGN AND FABRICATION 3**
Instruction in design and fabrication of simple bi-polar and MOS integrated circuits. Specific topics include semiconductor device and integrated circuit design, photolithographic mask design and fabrication, photolithography, N-diffusion and P-diffusion, P-MOS, metallization, and device and integrated circuit testing.
PREREQ: 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 653 COMPUTER SYSTEM SECURITY 3**
Surveys current topics in computer network security, including technology to protect networks, protocols and applications from intrusion and theft. Topics include techniques for authentication, privacy, denial of service and non-repudiation.
PREREQ: ELEG651 or CISC650 or permission from the instructor.
- ELEG 654 SENSOR AND DATA WIRELESS NETWORKS 3**
Design of sensor and data wireless networks and design protocols for these networks. Implementation of wireless protocols required. Topics include wireless propagation, energy usage in wireless terminals, MAC, routing, transport, localization, and standards for sensor, data, and mesh wireless networks.
PREREQ: Background in networking with knowledge of routing and transport layer protocols as well as a strong background in programming.
- ELEG 655 HIGH-PERFORMANCE COMPUTING W/COMMODITY HARDWARE 3**
New commodity computing devices, e.g., GPUs, bring the originally elite high performance computing into the reach of general public. Principles of program optimization, GPU and IBM Cell architecture, along with concepts and techniques for optimizing general purpose computing on the new hardware.
May be crosslisted with CPEG655.
- ELEG 656 ELECTRIC POWER DISTRIBUTION DESIGN 3**
Aerial and underground electric power distribution design. Design a system to replace an existing multi-circuit out-dated system using new-generation technology. Through field trips and lectures, develop hands-on knowledge of construction

materials, equipment and practices used to install electric power distribution facilities. Written proposal and presentation to UD faculty, the local electric utility and city government.
PREREQ: ELEG615.

- ELEG 660 HIGH TECHNOLOGY ENTREPRENEURSHIP 3**
Focuses on the critical financial, legal, scientific and engineering issues that must be confronted during the initial planning stages of a start-up enterprise. Students work in teams to develop a business plan for a real world/business product offering.
- ELEG 661 MATERIALS AND DEVICES SEMINAR 0 PF**
Lectures and discussions by faculty and students on specialized topics in materials and devices.
- ELEG 662 DIGITAL SYSTEMS SEMINAR 0 PF**
Lectures and discussions by faculty and students on specialized topics in digital systems.
- ELEG 663 SIGNAL PROCESSING & COMMUNICATIONS SEMINAR 0 PF**
Lectures and discussions by faculty and students on specialized topics in signal processing and communications.
- ELEG 664 BIOMEDICAL ENGINEERING SEMINAR 0**
Lectures and discussions by guest speakers, faculty, and students on specialized topics in biomedical engineering.
- ELEG 670 BIOPHYSICS OF EXCITABLE MEMBRANES 3**
Includes passive and active membrane properties, temporal/spatial integration of synaptic inputs, saltatory conduction, and the relationship between the molecular structure and conduction properties of the major classes of voltage-gated and ligand-gated ion channels.
PREREQ: ELEG471 or BISC306 or PSYC320 or PSYC626 or instructor's permission.
RESTRICTIONS: Open to all seniors and graduate students.
- ELEG 671 INTRODUCTION TO BIOMEDICAL ENGINEERING 3**
Introduction to human physiology at all hierarchical levels including molecular, biochemical, cellular, tissue, organ, and integrated systems.
RESTRICTIONS: Seniors, graduate students only.
- ELEG 672 CELL AND MOLECULAR BIOLOGY FOR ENGINEERS 3**
Overview of cell biology and molecular mechanisms. Covers some intercellular interactions, but main focus is on intracellular structure, organization, and function. Emphasis placed on application of cell properties to analysis of common biological data sets, including genomic, proteomic data.
- ELEG 673 SIGNAL PROCESSING IN NEURAL SYSTEMS 3**
Signal processing in real neural systems, with emphasis on mammalian/human sensory systems. Stimulus transduction, complex receptive fields, encoding, feature binding, and experimental techniques in visual, somatosensory, auditory and olfactory systems.
PREREQ: ELEG471/671 or instructor's permission.
- ELEG 674 NONLINEAR DYNAMICS IN NEURAL SYSTEMS 3**
Introduction to the mathematical tools, theory, and experimental observations that concern nonlinear dynamics of biological nervous systems. Classical methods are employed to develop a unified approach to the study and understanding of nonlinear dynamics, chaos, synchronicity, bifurcation, and self-organization.
PREREQ: MATH243.
- ELEG 675 IMAGE PROCESSING WITH BIOMEDICAL APPLICATIONS 3**
Fundamentals of digital image processing, including image formation, acquisition, transforms, enhancement, restoration, coding, and reconstruction from projections. Attention given to biomedical imaging modalities, including X-ray, computed tomography (CT), magnetic resonance (MR) imaging, and ultrasound.
PREREQ: ELEG305 or equivalent.
- ELEG 677 BIOSIGNAL PROCESSING 3**
Biomedical signal characteristics, biomedical systems and models, applications of Fourier transform, wavelet transforms, and joint-time frequency analysis of biomedical signals. Systems studies include ultrasounds, EKG's, CAT scans, MRI's, X-rays, and others.
PREREQ: ELEG305, ELEG310, or equivalent.
- ELEG 678 INTRODUCTION TO NANO AND BIOPHOTONICS 3**
Multidisciplinary approach covers fundamentals of light-matter interactions and nano-scaled materials and discusses their use in understanding, characterizing and manipulating biological systems. Covers several applications including laser manipulation and dissection, bio-imaging, flow cytometry and biosensors, optical biopsy and spectroscopy and photodynamic therapy.
- ELEG 679 INTRODUCTION TO MEDICAL IMAGING SYSTEMS 3**
Physics, instrumentation, system design, and image reconstruction algorithms will be covered for the following modalities: radiography, x-ray computed tomography

(CT), single photon emission computed tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), and real-time ultrasound. PREREQ: Requires permission of instructor.

- ELEG 680 IMMUNOLOGY FOR ENGINEERS 3**
Human adaptive immune response to viruses, both cellular and humoral. Generation of the immune response cells and response to types of immunogen as well as basic nonlinear differential model analysis, basic mathematical models of their interactions and implications of these models for the treatment of disease. Access significant amount of current literature. No prior knowledge of biology required.
- ELEG 681 REMOTE SENSING OF ENVIRONMENT 3**
Detection and mapping of land and ocean resources with optical, infrared and microwave sensors. Digital analysis of satellite images using multispectral and spatial analysis techniques and correlation with ground/ship data. Application to oceanography, coastal processes, geology, land use, geography, agriculture, climate and pollution studies. Includes hands-on image analysis in GIS laboratory. Crosslisted with MAST681.
RESTRICTIONS: Requires permission of instructor.
- ELEG 682 OPTICS AND PHOTONICS 3**
Principles of classical optics and their applications. Topics include wave optics, material dispersion, geometrical optics, ray tracing, ABCD matrices, birefringence and Jones' formalism, Gaussian optics, coherence, interference, diffraction, pulse propagation and non-linear optics. Specific applications including optical components and instrumentation, imaging techniques, resonators and Fourier optics. Apply fundamental principles of optics and interaction between light and matter (photonics).
- ELEG 809 ELECTROMAGNETIC THEORY I 3**
Review of statics; Maxwell's equations, physical optics and wave guides. Crosslisted with PHYS809.
- ELEG 810 ELECTROMAGNETIC THEORY II 3**
Geometric optics limit of Maxwell's equations, Lienard-Wiechert fields, radiation fields, radiation damping, Wheeler-Feynman theory. Crosslisted with PHYS810.
PREREQ: PHYS809.
- ELEG 811 CHANNEL CODING THEORY AND PRACTICE 3**
Standard and modern developments in channel coding. Reviews information theory topics, then introduces convolutional codes and trellis-coded modulation, iterative decoding, including turbo codes and low-density parity check codes.
- ELEG 812 WIRELESS DIGITAL COMMUNICATIONS 3**
Fundamentals and current techniques in wireless digital communications, including propagation, modem design, fading countermeasures, and multiple access techniques, such as FDMA, TDMA, and CDMA.
PREREQ: Probability and linear systems.
- ELEG 813 STATISTICAL MECHANICS AND THERMODYNAMICS 3**
Review of equilibrium thermodynamics and probability theory. Kinetic theory including the Boltzmann equation. Gibbsian ensemble theory in classical and quantum statistical mechanics. Classical ideal gases with internal degrees of freedom. Dissociation equilibrium. The ideal Bose and Fermi gases with elementary applications to fluids and solids. Crosslisted with PHYS813.
PREREQ: PHYS616.
- ELEG 819 TOPICS IN NETWORKING I 3**
Examines standard routing protocols for wired networks such as OSPF and BGP, protocols for wireless mesh and ad hoc networks. Includes theoretical analysis of protocols and examination of data collected from networks. Topics such as load balancing, multicasting, and cross-layer interactions are covered.
PREREQ: CPEG419, CISC450, CISC650, or ELEG651.
- ELEG 820 TOPICS IN NETWORKING II 3**
Examines standard and recently proposed transport layer protocols for wired single-hop wireless, and multi-hop wireless networks. Includes analysis of transport layer protocols based on hybrid-systems models, stochastic models, and utility-based models. Examines contemporary active queue management algorithms. Traffic analysis and network provisioning are covered.
PREREQ: CPEG419, CISC450, CISC650, or ELEG651.
- ELEG 823 ULTRAFAST OPTICS 3**
Techniques and applications involving femtosecond and picosecond lasers. Topics include: temporal and spectral properties of ultrashort pulses, linear propagation in bulk media, dispersion control, nonlinear optical propagation, active and passive modelocking, chirped pulse amplification, and pulse measurement techniques.
- ELEG 832 WAVELETS AND FILTER BANKS 3**
Systematically studies wavelets, wavelet transforms, multi rate filter bank theory and their applications in digital communications and signal and image processing. Applications considered include wavelet denoising and wavelet

subband image/video compression.
PREREQ: ELEG631 and linear algebra.

- ELEG 833 NONLINEAR SIGNAL PROCESSING 3**
Fundamental theory and applications of nonlinear signal processing. Topics include stable random processes, order statistics, fractional lower order statistics, maximum likelihood estimation and the filtering problem, weighted order-statistic filters, medianization of linear FIR filters, myriad filters and adaptive optimization of nonlinear filters. Applications of nonlinear signal processing include digital imaging and video, digital communications and time-frequency analysis.
PREREQ: Statistical digital signal processing.
- ELEG 841 ADVANCED COMPUTATIONAL ELECTROMAGNETICS II 3**
Introduces the major modern computational methods for the analysis of frequency domain electromagnetics problems. The finite element method and the method of moments are covered. Students will apply these techniques to radiation and scattering problems involving metal and dielectrics.
PREREQ: ELEG648.
- ELEG 842 RADIO FREQUENCY AND MICROWAVE TECHNOLOGY 3**
Modern telecommunications and datacom systems operate at frequencies in the radio frequency (RF) and microwave range. The basic concepts and technologies required to design RF and microwave devices and circuits are explained. Examples of applications to wireless and lightwave systems are discussed.
RESTRICTIONS: Undergraduates require permission from the instructor.
- ELEG 843 FOURIER OPTICS 3**
Provides an understanding of the basic principles underlying the field of optical information processing. Emphasis are on coherent optical image processing based on Fourier optics, holography, and acousto-optics.
PREREQ: ELEG640 and ELEG648 or permission of instructor.
- ELEG 844 NANO-ELECTRO-MECHANICAL SYSTEMS 3**
Explores the world of quantum controlled nano-electro-mechanical systems(NEMS). Topics such as quantum mechanics, scaling laws, principles for NEMS, modeling of NEMS devices and structures, nanoelectromagnetics, nanomaterials and nanofabrication for NEMS sensors.
- ELEG 853 INTEGRATED OPTICS 3**
Explains basic goals, principles and techniques of integrated optics. Topics include optical wave guides, scattering and absorption, couplers, electro-optic modulators, acousto-optic modulators, semiconductor lasers, photonic crystals and optical detectors. Includes applications of optical integrated circuits. Emphasis on physical explanations of how devices and systems work rather than on elaborate mathematical models.
- ELEG 855 MICROWAVE AND MILLIMETER-WAVE TECHNOLOGY 3**
Principles of device operation and circuit characteristics for microwave/millimeter-wave FET, IMPATT, TRAPPATT, Gunn diode, varactor diode, p-n diode, tunnel diode. Sub-millimeter-wave and terahertz-frequency devices also described. Covers both waveguide circuits and microwave integrated circuits. Emphasis on physical explanations of how devices and systems work rather than on elaborate mathematical models.
- ELEG 860 EPITAXIAL GROWTH AND BAND ENGINEERING 3**
Fundamentals and recent developments in the growth of epitaxial films of electronic/optical materials and devices. Topics include vacuum technology, growth thermodynamics, heterojunction physics, materials characterization, and practical considerations. Focus on molecular beam epitaxy, but discuss complementary techniques.
May be crosslisted with MSEG860.
- ELEG 868 RESEARCH 1-6**
- ELEG 869 MASTER'S THESIS 1-6**
Laboratory study conducted for the purpose of contributing new data and theory in some fields of electrical engineering in which information is lacking. Although supervised, the work will be independent in character to encourage the development of initiative.
- ELEG 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**
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- ENERGY AND ENVIRONMENTAL POLICY**
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- ENEP 666 SPECIAL PROBLEM 1-12**
- ENEP 820 INTERNATIONAL PERSPECTIVES ON ENERGY AND ENVIRONMENT 3**
Policy analysis and political economy at international energy and environmental

issues and problems. Encompasses international and multi-national government and private sector organizations, as well as non-governmental, non-profit organizations. Crosslisted with POSC820.

ENEP 834	SUSTAINABLE ENERGY POLICY AND PLANNING	3
Analyzes sustainable energy strategies in terms of their technology, economics, impacts on the environment and governance attributes. Also analyzes policy options to facilitate a sustainable energy future. Crosslisted with UAPP824. RESTRICTIONS: Graduate students with a background in policy, economics and/or technology. Senior-level undergraduate students only with permission of the instructor.		
ENEP 863	DOCTORAL DISSERTATION PROPOSAL	3
ENEP 864	INTERNSHIP FIELDWORK	2
ENEP 866	SPECIAL PROBLEM	1-12
ENEP 868	RESEARCH	1-6
ENEP 869	MASTER'S THESIS	1-6
ENEP 870	READINGS	1-6
Crosslisted with UAPP870.		
ENEP 872	ANALYTICAL PAPER	3
Demonstrates the student's ability to analyze a particular policy or administrative problem and develop an appropriate response. Crosslisted with UAPP872. RESTRICTIONS: A requirement of the M.A. and M.P.A. programs.		
ENEP 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.		
ENEP 969	DOCTORAL DISSERTATION	1-12 PF

ENGLISH

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 101	TOOLS OF TEXTUAL ANALYSIS	3
Gateway introduction to basic tools and strategies used in critical engagement with poetry fiction, drama, and nonfiction. Includes fundamental concepts of textual analysis. RESTRICTIONS: Offered in two formats, one coupled with a section of ENGL110 and another that is writing intensive with an enrollment cap of 22 students.		
ENGL 102	TEXTS IN TIME	3
How texts are shaped by social, political, scientific, technological, artistic, religious, and economic concerns of a given period and how texts, in turn, shape these concerns. Topics vary according to expertise of instructor. PREREQ: ENGL101, 110.		
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: ENGL110. 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: ENGL110.		
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 crosslisted with CMLT202, FLT202, JWST202. PREREQ: ENGL110.		
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: ENGL110. RESTRICTIONS: Not for major credit.		
ENGL 205	BRITISH LITERATURE - 1660	3
Study of representative Medieval and Renaissance British works, set in their historical and cultural contexts, introducing appropriate critical concepts. PREREQ: ENGL110.		
ENGL 206	BRITISH LITERATURE 1660 - PRESENT	3
Study of representative eighteenth through twentieth century British works, set in their historical and cultural contexts and introducing appropriate critical concepts. PREREQ: ENGL110.		
ENGL 207	INTRODUCTION TO POETRY	3
Representative masterworks of English, American and world verse. PREREQ: ENGL110.		
ENGL 208	INTRODUCTION TO DRAMA	3
Representative masterworks from the classical era to the present. May be crosslisted with CMLT218. PREREQ: ENGL110.		
ENGL 209	INTRODUCTION TO THE NOVEL	3
Representative masterworks of fiction, emphasizing those of Europe and America. May be crosslisted with CMLT219. PREREQ: ENGL110.		
ENGL 210	INTRODUCTION TO SHORT STORY	3
Study of short story as a narrative form, with readings from American and foreign short story traditions. PREREQ: ENGL110. RESTRICTIONS: Not for major credit.		
ENGL 211	GREAT WRITERS OF THE WESTERN WORLD I: 1100-1700	3
Studies writers such as Dante, Chaucer, Rabelais and Cervantes, in translation. Crosslisted with CMLT207. PREREQ: ENGL110.		
ENGL 212	GREAT WRITERS OF THE WESTERN WORLD II: 1650-1950	3
Studies writers such as Moliere, Voltaire, Goethe, Dostoevski, Thomas Mann and Herman Hesse, in translation. Crosslisted with CMLT208. PREREQ: ENGL110.		
ENGL 214	LITERATURE AND GENDER	3
Specific concepts of gender in society, as manifested in the literature of writers of both sexes. PREREQ: ENGL110.		
ENGL 217	INTRODUCTION TO FILM	3
Focuses on different techniques of acting, mise-en-scene, cinematography, editing, sound and color to assess how films encourage audiences to respond in the ways they do. May be crosslisted with CMLT217. PREREQ: ENGL110.		
ENGL 266	SPECIAL PROBLEM	1-3
ENGL 278	STUDIES IN DIVERSITY	3
Representations of ethnicity, race, social class, gender, and other constructions of difference in literature, arts, and folk culture. PREREQ: ENGL110.		
ENGL 280	APPROACHES TO LITERATURE FOR NON-MAJORS	3
Dual emphasis on reading and writing. Offers an introduction to poetry, fiction, and drama, and provides extensive practice in writing about literary subjects. PREREQ: ENGL110.		
ENGL 281	BRITISH LITERATURE-1660 FOR NON-MAJORS	3
Study of representative Medieval and Renaissance British works, set in their historical and cultural contexts, introducing appropriate critical concepts. PREREQ: ENGL110.		
ENGL 282	BRITISH LITERATURE 1660-PRESENT FOR NON-MAJORS	3
Study of representative eighteenth through twentieth century British works, set in their historical and cultural contexts and introducing appropriate critical concepts. PREREQ: ENGL110.		
ENGL 283	AMERICAN LITERATURE FOR NON-MAJORS	3
Study of representative works of American literature, set in their historical and cultural contexts, introducing appropriate critical concepts. PREREQ: ENGL110.		

ENGL 284 SHAKESPEARE FOR NON-MAJORS	3	PREREQ: ENGL307. RESTRICIONS: Counts toward English major only as part of journalism concentration.
Representative histories, comedies, and tragedies. PREREQ: ENGL110.		
ENGL 285 INTRODUCTION TO POETRY FOR NON-MAJORS	3	ENGL 309 FEATURE AND MAGAZINE WRITING 3
Representative masterworks of English, American, and world verse. PREREQ: ENGL110.		All aspects of the newspaper and feature article. Developing ideas, researching, interviewing, writing, and marketing. PREREQ: ENGL307. RESTRICIONS: Counts toward English major only as part of journalism concentration.
ENGL 286 INTRODUCTION TO DRAMA FOR NON-MAJORS	3	ENGL 310 COPY EDITING AND LAYOUT 3
Representative masterworks from the classical era to the present. PREREQ: ENGL110.		Newspaper copy editing, headline writing and layout, with emphasis on practical experience. Explores improvement or updating of news stories by rewriting. PREREQ: ENGL307. RESTRICIONS: Counts toward English major only as part of journalism concentration.
ENGL 287 INTRODUCTION TO SHORT STORY FOR NON-MAJORS	3	ENGL 312 WRITTEN COMMUNICATIONS IN BUSINESS 3
Study of the short story as a narrative form, with readings from American and foreign short story traditions. PREREQ: ENGL110.		Examines the role of written communication in corporate decision making. Students write memos, letters, proposals and reports that simulate on-the-job communication tasks, and are encouraged to use materials from their fields of specialization. PREREQ: ENGL110. RESTRICIONS: Counts toward English major only as part of the concentration in business and technical writing.
ENGL 288 INTRODUCTION TO THE NOVEL FOR NON-MAJORS	3	ENGL 316 PEER TUTORING/ADVANCED COMPOSITION 3
Representative masterworks of fiction, emphasizing those of Europe and America. PREREQ: ENGL110.		Trains a selected group of upper-division students in writing techniques by applying recent composition theories to students' own writing. Explores and evaluates fundamental theories of teaching writing. Crosslisted with ARSC316.
ENGL 289 INTRODUCTION TO FILM FOR NON-MAJORS	3	ENGL 317 FILM HISTORY 3
History of American or various foreign national cinemas. PREREQ: ENGL110.		History of American or various foreign national cinemas. May be crosslisted with CMLT317. PREREQ: ENGL110. RESTRICIONS: May be repeated for credit when topics vary.
ENGL 290 STUDIES IN LITERATURE FOR NON-MAJORS	3	ENGL 318 STUDIES IN FILM 3-6
Allows for exploration of a particular aspect of the intersection of literature and culture, and enables in-depth study beyond the period survey course. Topics vary according to the expertise of the instructor. PREREQ: ENGL110.		Special topics such as film genres, major directors and Soviet cinema. May be crosslisted with CMLT318, JWST318, WOMS318. PREREQ: ENGL110. RESTRICIONS: May be repeated for credit when topics vary.
ENGL 294 ENGLISH LANGUAGE: GRAMMAR AND USAGE	3	ENGL 320 THE BIBLE AS LITERATURE 3
Descriptive study of patterns and structures of language use, with an emphasis on standard written and spoken English; attention to punctuation, mechanics, and style. PREREQ: ENGL110. RESTRICIONS: Intended for prospective English teachers.		Studies the cultural contexts, narrative strategies, poetic forms, and literary archetypes of the Hebrew and Christian scriptures. PREREQ: ENGL110.
ENGL 300 TEXTS AND CONTEXTS	3	ENGL 321 MEDIEVAL LITERATURE AND CULTURE 3
Examines cultural, historical, and theoretical contexts of a broad range of literary, critical and nontraditional texts. PREREQ: ENGL202, ENGL205 and ENGL206. RESTRICIONS: Any two of the three prerequisites acceptable.		Study of selected topics in medieval literature (romance, Chaucer's contemporaries, drama). Texts usually read in English translations. Emphasis on medieval culture as a European phenomenon. Variable content. May be crosslisted with CMLT321. PREREQ: ENGL110.
ENGL 301 EXPOSITORY WRITING	3	ENGL 322 CHAUCER 3
Expository writing, with related studies in grammar, diction and rhetoric. PREREQ: ENGL110. RESTRICIONS: Does not count toward English major.		The Canterbury Tales (in part), Troilus and Criseyde, and some of the shorter poems. PREREQ: ENGL110.
ENGL 302 ADVANCED COMPOSITION	3	ENGL 323 STUDIES IN MEDIEVAL LITERATURE 3
Expository writing in a variety of forms, with emphasis on literary analysis. PREREQ: ENGL110.		Allows for exploration of a particular aspect of medieval literature and culture, and enables a depth of study beyond the period survey course. Topics vary according to expertise of instructor. PREREQ: ENGL110.
ENGL 303 SCRIPT WRITING	3	ENGL 324 SHAKESPEARE 3
Instruction in script writing and preparation of a script. PREREQ: ENGL110. RESTRICIONS: Final enrollment set after first class and submission of a script.		Representative histories, comedies and tragedies. PREREQ: ENGL110.
ENGL 304 POETRY WRITING	3	ENGL 325 RENAISSANCE LITERATURE 3
Practice in writing a variety of verse forms. PREREQ: ENGL110. RESTRICIONS: Final enrollment set after first class and submission of five poems.		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 305 FICTION WRITING	3	ENGL 326 STUDIES IN RENAISSANCE LITERATURE 3
Practice in writing the short story. PREREQ: ENGL110. RESTRICIONS: Final enrollment set after first class and submission of a short story.		Allows for exploration of a particular aspect of Renaissance literature and culture, and enables a depth of study beyond the period survey course. Topics vary according to expertise of instructor. PREREQ: ENGL110.
ENGL 306 TOPICS IN WRITING	3	ENGL 328 MILTON 3
Special topics in writing (for example, autobiography). Variable content. PREREQ: ENGL110. RESTRICIONS: Final enrollment set after first class and submission of appropriate written sample.		Milton's major poetry and selected prose. PREREQ: ENGL110.
ENGL 307 NEWS WRITING AND EDITING	3	
News judgment, news gathering, feature writing, libel problems, and ethics. Assignments include writing for the campus newspaper. PREREQ: ENGL110. RESTRICIONS: Minimum grade of B required in ENGL110. Counts toward English major only as part of journalism concentration.		
ENGL 308 REPORTER'S PRACTICUM	3	
Builds on ENGL307 with extensive reporting and writing for the campus newspaper. Attention to libel and privacy issues.		

- ENGL 330 THE DETECTIVE IN FILM AND FICTION** 3
Study of detective fiction and film has applications to a liberal arts approach to crime and justice. Blends literary analysis with the insights of social science research on the work of private and police detectives.
Crosslisted with CRJU336.
PREREQ: CRJU201.
- 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 333 BRITISH ROMANTICISM** 3
Poetry and prose of the British Romantic writers.
- ENGL 336 VICTORIAN POETRY** 3
Tennyson, the Brownings, Arnold, the Brontes 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 crosslisted with WOMS337.
PREREQ: ENGL110.
- ENGL 340 AMERICAN LITERATURE-THE CIVIL WAR** 3
PREREQ: ENGL110.
- ENGL 341 AMERICAN LITERATURE: CIVIL WAR-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 crosslisted with BAMS313.
PREREQ: ENGL110.
- ENGL 345 AFRICAN AMERICAN LITERATURE II** 3
Literature by African American writers from the Harlem Renaissance to the present.
May be crosslisted with BAMS345.
PREREQ: ENGL110.
- ENGL 347 STUDIES IN AMERICAN LITERATURE** 3-6
Special topics, ranging from the beginnings to contemporary American literature; may include studies in a single author or authors (e.g., the detective stories of Poe) or period and genre studies (e.g., the Harlem Renaissance or the humor of the old southwest). Variable content.
May be crosslisted with BAMS347.
RESTRICTIONS: May be 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 crosslisted 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 crosslisted 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 Bolomod. 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.
May be crosslisted with WOMS352.
- 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 crosslisted with WOMS353.
PREREQ: ENGL110.
- ENGL 356 STUDIES IN MODERN/CONTEMPORARY LITERATURE** 3-6
Study of selected topics in 20th century British, American and world literature, e.g., the contemporary epic novel, post-colonial writing and politics.
May be crosslisted with BAMS356.
PREREQ: ENGL110.
RESTRICTIONS: May be 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 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 crosslisted with CMLT361.
PREREQ: ENGL110.
- ENGL 365 STUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS** 3
Particular areas or writers to be announced.
May be crosslisted with JWST365.
PREREQ: ENGL110.
- 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, history of science and theory, history of literature and the analysis of individual scientific and literary texts.
PREREQ: ENGL110.
- ENGL 369 LITERATURE AND MEDICINE** 3
Critical examination of the relationship between medicine and literature; ways society has viewed the physician as reflected in literature.
- ENGL 371 STUDIES IN FICTION** 3-12
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** 3-12
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** 3-12
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 375 INTRODUCTION TO FOLKLORE AND FOLKLIFE** 3
Traditional forms of folklore with emphasis on modern folklore as it functions in contemporary societies.
- ENGL 376 WORLD LITERATURE** 3
Introduction to and appreciation for broad range of literatures written in English. Encompasses both Western and non-Western literature, with some emphasis on post-Colonial literature.
PREREQ: ENGL110.
- ENGL 378 CARIBBEAN LITERATURE** 3
Multicultural survey of Anglophone, Francophone, and Hispanic Caribbean literature in its historical and cultural contexts. Emphasis on contemporary novels, short stories, drama, and poems.
PREREQ: ENGL110.
- 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: ENGL202, ENGL205, ENGL206, ENGL324.
RESTRICTIONS: 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 a women's tradition, formation of the canon, use of genre, language and form.
May be crosslisted with 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 crosslisted 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 crosslisted with BAMS382, JWST382, WOMS382.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 385 STUDIES IN LITERARY CRITICISM AND THEORY 3-12
Studies in selected topics in literary criticism and critical theory.
May be crosslisted with CMLT385.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 386 ASIAN AMERICA: CULTURE AND HISTORY 3
Explore the literature, culture and history of Asian Americans and immigrants to the United States variously using fiction, drama, poetry, documentary, photography, narrative film, drama, court cases, primary and secondary historical materials. Patterns of Asian immigration, anti-Asian violence and internment, Asian American resistance in litigation, legislation, and cultural activities, from Gold Rush to globalization.
May be crosslisted with EAST386, HIST386.

ENGL 390 ENGLISH LINGUISTICS 3
General introduction to the study of the English language, with emphasis on modern linguistic approaches.
May be crosslisted with LING390.
PREREQ: ENGL110.

ENGL 391 HONORS COLLOQUIUM 3
May be crosslisted with JWST390, MUSC390.

ENGL 394 ENGLISH LANGUAGE: RHETORICAL AND CULTURAL CONTEXTS 3
Language variation over time and across geography, culture and dialect. Rhetorical analysis of written and spoken English, attending to style, situation and genre. Applications of grammatical knowledge to describing language use in various contexts. Intended for prospective English teachers.

ENGL 403 LITERATURE FOR ADOLESCENTS: MULTIMEDIA TEXTS 3
Explores classic and contemporary reading materials and non-print texts pervasive in lives of adolescents. Addresses selection of texts for middle school classes as well as techniques for developing and promoting critical reading and informed interpretation of non-print texts.
Crosslisted with EDUC403.

ENGL 404 ADVANCED POETRY WRITING 3-6
Intensive practice in composition. Group discussion and individual conferences. Wide reference to professional poems as well as models. Emphasis on student competence in traditional prosody as well as exploring freer forms.
PREREQ: ENGL304.
RESTRICTIONS: 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, research methods, ethics, and other topics.
PREREQ: ENGL307 and either ENGL308 or ENGL309 or both.
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.

ENGL 409 TOPICS IN JOURNALISM 3-6
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: ENGL415 or equivalent.

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: ENGL415 or equivalent.

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.

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.

ENGL 416 DESIGNING ONLINE INFORMATION 3
Focuses on the design of information displayed on websites including the theory of information design and its practical application. Lecture sessions cover such topics as user and task analysis, interface design, website navigation, information architecture, and usability. The lab sessions provide instruction on Dreamweaver and Fireworks, as well as some HTML.

ENGL 417 FILM THEORY AND CRITICISM 3
Survey of major theories of film.
PREREQ: ENGL217.

ENGL 464 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: ENGL415, ENGL411 and ENGL412 or permission of instructor.
RESTRICTIONS: Open to qualified students on the basis of a portfolio review by all concentration faculty.

ENGL 466 INDEPENDENT STUDY 1-9

ENGL 468 UNDERGRADUATE RESEARCH 1-3
Faculty sponsored research.

ENGL 469 INTERNSHIP 1-3
Internship experiences that have been arranged or are currently sponsored by an English Department faculty member.

ENGL 472 STUDIES IN THE DRAMA 3-12
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
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish).
Crosslisted with LING477.
PREREQ: LING101.

- ENGL 479 LITERACY AND LITERATURE 1-4**
Explores the concept of literacy using a variety of perspectives: scientific, historical, cultural, sociological, political, and literary. Designed for teacher education students and incorporates field work and addresses the state standards that teachers are asked to have their students meet.
RESTRICTIONS: Offered for students in the Milford ETE program.
- ENGL 480 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., autobiography). Stresses critical writing and literary research.
May be crosslisted with JWST480, 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: EDUC400.
RESTRICTIONS: Open only to student teachers in English.
- ENGL 482 SEMINAR IN TEACHING ENGLISH I 3**
Prepares English education seniors and graduate students to teach oral and written composition at the secondary school level.
COREQ: ENGL483.
RESTRICTIONS: Enrollment limited to English education seniors.
- ENGL 483 SEMINAR IN TEACHING ENGLISH II 3**
Prepares English education seniors and graduate students to teach adolescent literature, classic literature and non-print literary expression at the secondary school level.
COREQ: ENGL482/682.
RESTRICTIONS: Enrollment limited to English education seniors.
- ENGL 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 in 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).
- ENGL 625 STUDIES IN THE RENAISSANCE 3-6**
Survey of a wide selection of authors (e.g., More, Wyatt, Sidney, Spenser, Marlowe, Donne, Herbert, Marvell, Jonson, Webster, Middleton, the Cavalier poets, Marvell, Milton); some of Shakespeare's works may also be included.
RESTRICTIONS: May be repeated once for credit when topics vary.
- ENGL 627 SEVENTEENTH CENTURY LITERATURE 3**
Survey of representative examples of prose, poetry, and drama from Jacobean comedies, tragedies, and masques to the satire, burlesque, and mannured literature of the Restoration. Points of focus are the counsels 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 3-6**
Topics may include (but are not restricted to) general survey (i.e., selected poetry, drama, fiction), genre survey, gender studies (e.g., women writers), or thematic issues (e.g., literature and politics).
RESTRICTIONS: May be repeated once for credit when topics vary.
- ENGL 634 STUDIES IN NINETEENTH CENTURY LITERATURE 3**
Survey of Romantic and/or Victorian Literature.
RESTRICTIONS: May be repeated once for credit when topics vary.
- ENGL 636 TWENTIETH CENTURY LITERATURE 3**
Broadly focused to include multiple genres and/or movements (e.g., turn-of-the-century realism, war poets, modernism, postmodern drama) from before and after World War II. May include American, European and post-colonial, in addition to British literature.
- ENGL 639 STUDIES IN MODERN/CONTEMPORARY LITERATURE 3**
Study of selected poetry, prose, and drama of the twentieth century, with an emphasis on the major texts of English and American literature during the period. Some attention given to other literary traditions and writings.
RESTRICTIONS: May be repeated for credit when topics vary.
- ENGL 641 AMERICAN LITERATURE: PERIOD STUDIES 3**
Historical survey of American literature of the Colonial, Romantic, or Realistic 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 3-9**
Special topics on an author or authors, a type or types of drama, a period or theme.
RESTRICTIONS: May be repeated for credit when topics vary.
- ENGL 673 STUDIES IN POETRY 3-9**
Special topics on a poet or poets, a type or movement, a period or theme.
RESTRICTIONS: May be repeated for credit when topics vary.
- ENGL 677 THE STRUCTURE OF ENGLISH 3**
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish).
Crosslisted with LING677.
- ENGL 680 SEMINAR 3-12**
- ENGL 682 SEMINAR IN TEACHING ENGLISH I 3**
Prepares English education seniors and graduate students to teach oral and written composition at the secondary school level.
COREQ: ENGL683.
RESTRICTIONS: Enrollment limited to English education seniors and graduate students.
- ENGL 683 SEMINAR IN TEACHING ENGLISH II 3**
Prepares English education seniors and graduate students to teach adolescent literature, classic literature and non-print literary expression at the secondary school level.
COREQ: ENGL682.
RESTRICTIONS: Enrollment limited to English education seniors and graduate students.
- ENGL 684 LITERARY THEORY AND CRITICISM 3-6**
Introduction to some of the leading problems in contemporary literary theory, with some attention to their historical precedents.
RESTRICTIONS: May be repeated once for credit when topics vary.
- ENGL 685 CULTURAL THEORY AND CRITICISM 3**
Topical introduction to cultural theory, emphasizing 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.
May be crosslisted with ARTH685.
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.
May be crosslisted with LING802.
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-Poet, The Age of Langland, The Romance.
RESTRICTIONS: May be repeated once for credit when topics vary.

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 writers (Donne and Jonson; Bacon, Browne, Hobbes, and Locke; the Fletchers, Cowley, and Milton); genres (classical, metaphysical, and neo-classical 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 topics include: 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	3-6
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	SPECIAL TOPICS IN AMERICAN LITERATURE	3-12
RESTRICTIONS: May be repeated for credit when topics vary.		
ENGL 846	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 topics include: The Avant-Garde, Literature and Aesthetics, The Novel in a Global Context. RESTRICTIONS: May be repeated once for credit when topics vary.		
ENGL 850	STUDIES IN COLONIAL AMERICAN LITERATURE	3-9
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	3-6
Classic works by Clemens, James, Crane, Chopin, Dreiser, Stein, and Wharton, with focus on theoretical and aesthetic assumptions or on general categories for the period (Realism, Naturalism). RESTRICTIONS: May be repeated for credit when topics vary.		
ENGL 853	MODERN/POSTMODERN AMERICAN LITERATURE	3
Modern American novelists (Fitzgerald, Hemingway, Faulkner); modern and postmodern American novelists (Fitzgerald, Hemingway, Faulkner, Bellow, Barth, Heller, Morrison, Pynchon); modernist poetry (Pound, 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	3-9
Close examination of a single topic or a closely related group of topics (e.g., psychoanalysis and interpretation, genre theory, literary historiography, feminist critique) in textual study. RESTRICTIONS: May be repeated for credit when topics vary.		
ENGL 890	STUDIES IN LINGUISTICS	3-9
Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing. Crosslisted with LING890.		
ENGL 964	PRE-CANDIDACY STUDY	3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.		
ENGL 969	DOCTORAL DISSERTATION	1-12 PF

ENVIRONMENTAL SCIENCE

ENSC 166	SPECIAL PROBLEM	1-3
ENSC 266	SPECIAL PROBLEM	1-3
ENSC 366	INDEPENDENT STUDY	1-6

ENSC 425	ENVIRONMENTAL FIELD METHODS	3
Introduction to the instrumentation and measurement techniques involved in the observation and monitoring of environmental systems. Issues concerning experimental design, instrument performance, instrument calibration and data quality control are discussed in the context of field experiments. RESTRICTIONS: Environmental science majors are given preference in enrolling.		
ENSC 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.		
ENSC 450	PROSEMINAR IN ENVIRONMENTAL SCIENCE	3
Discussion of the history and state of environmental science as well as its relation to current environmental problems. Survey of research topics and methodologies in the current scientific literature. RESTRICTIONS: Open to environmental science majors only, or requires permission of instructor.		
ENSC 464	INTERNSHIP IN ENVIRONMENTAL SCIENCE	1-6
On the job experience in governmental or private planning, consulting, environmental or engineering agencies.		
ENSC 466	INDEPENDENT STUDY	1-6
ENSC 475	STATISTICS FOR ENVIRONMENTAL SCIENCE	3
Introduction to statistical methods for analyzing environmental data. Relevant probability and sampling theory is introduced, as well as procedures for summarizing, modeling and estimating and making inferences from environmental data. A computer-based statistical package is used to explore behavior of different statistical techniques with a variety of environmental data sets. Crosslisted with STAT475. PREREQ: MATH243 and GEOG250. RESTRICTIONS: If STAT475 is taken, degree credit cannot be given for any of the following courses: MATH300, STAT370, STAT371 or MATH450.		

ENTREPRENEURSHIP

ENTR 301	INTRODUCTORY ENTREPRENEURSHIP	3
Introduction to entrepreneurship, focusing on development of the business idea, and communication through a business plan. Specific attention paid to market research and marketing strategy. PREREQ: ACCT200 and ECON100 or equivalent. RESTRICTIONS: Junior status.		
ENTR 364	ENTREPRENEURSHIP IN PRACTICE	3
Requires completion of at least 120 hours of entrepreneurship-related internship with verification by the hiring company. Term paper relating real-world duties and experiences to principles learned in the classroom also required. PREREQ: ENTR301. RESTRICTIONS: Requires approval of entrepreneurial studies director.		
ENTR 410	BUSINESS VENTURE COMPETITION I	3
Focuses on identification of business opportunities, market research, and analysis. PREREQ: ENTR301.		
ENTR 411	BUSINESS VENTURE COMPETITION II	3
Focuses on development of business model, financial analysis, and creation of formal business plan. PREREQ: ENTR410 or equivalent.		
ENTR 460	HIGH TECHNOLOGY ENTREPRENEURSHIP	3
Focuses on critical financial, legal, scientific and engineering issues confronted during initial planning stages of a start-up enterprise. Students work in teams to develop a real world business product offering. May be crosslisted with ELEG460. RESTRICTIONS: Senior status, permission of instructor.		
ENTR 860	HIGH TECHNOLOGY ENTREPRENEURSHIP	3
Focuses on critical financial, legal, scientific and engineering issues confronted during initial planning stages of a start-up enterprise. Students work in teams to develop a business plan for a real world business product offering.		

ENTOMOLOGY AND WILDLIFE CONSERVATION

ENWC 165	NEW STUDENT SEMINAR	1
Study and careers in entomology and wildlife conservation: opportunities,		

expectations, duties and preparation, including skills for success in college. Readings, discussions, written and oral assignments, speakers and field trips. RESTRICTIONS: First term majors.

- ENWC 166 SPECIAL PROBLEM** 1-3
- ENWC 201 WILDLIFE CONSERVATION AND ECOLOGY** 3
Basic principles of ecology. Ecological and sociological problems and solutions in the conservation of biodiversity (i.e., habitat, species, and genetic variety). RESTRICTIONS: Should precede BISC302.
- ENWC 205 ELEMENTS OF ENTOMOLOGY** 3
Lives of insects, emphasizing interactions with humans. Basic insect identification, structure, function, behavior, ecology, evolution, pest control and impact on human society, history and culture.
- ENWC 214 APIOLOGY AND APICULTURE** 2
Scientific study of the life of honey bees, including their biology, behavior and communication; introduction to techniques of culturing and managing honey bees for honey production and crop pollination.
- ENWC 215 ENTOMOLOGY LABORATORY** 1
Insect structure, physiology, behavior, taxonomy, evolution and ecology studied through field trips, dissection and experiments. Insect collection (with identification to orders) required. COREQ: ENWC205.
- ENWC 224 APIOLOGY AND APICULTURE LABORATORY** 1
Laboratory and field course to complement topics in ENWC214. Bee identification and culture; hive management. Work with bees in an apiary to develop confidence in keeping bee colonies. COREQ: ENWC214.
- ENWC 300 PRINCIPLES OF ANIMAL AND PLANT GENETICS** 3
Introduction to the theory and application of genetics as related to the improvement of plants and animals. Crosslisted with ANFS300. PREREQ: ANFS101 and ANFS140, or PLSC101.
- ENWC 310 ANIMAL AND PLANT GENETICS LABORATORY** 1
Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems. Crosslisted with ANFS310. COREQ: ANFS300.
- ENWC 314 COMPARATIVE TERRESTRIAL AND MARINE ECOLOGY** 3
Comparative overview of similarities and dissimilarities of life in terrestrial and marine environments. Topics include geological history, subsistence, growth and development, life history, reproduction, dispersal, population regulation, and impact of humans. May be crosslisted with MAST314. PREREQ: BISC208.
- ENWC 325 WILDLIFE MANAGEMENT** 3
Introduction to solving wildlife management problems. Development of management plan with consideration of habitat, human and animal population components. PREREQ: ENWC201 and BISC302. RESTRICTIONS: Requires junior status.
- ENWC 340 PLANTS OF ECUADOR** 3
See PLSC340 for course description.
- ENWC 341 TROPICAL FOREST ECOLOGY** 3
Ecology of major forest types in Ecuador and the Galapagos Islands. Lectures and field trips to demonstrate techniques and provide field experience in forest ecology. Guest experts will be used for their experience in particular forest types. PREREQ: BISC207 and BISC208. COREQ: PLSC340. RESTRICTIONS: Taught in Ecuador in Winter Session.
- ENWC 344 FOREST ECOLOGY** 2
Dendrology, measurement techniques, tree biology, forest ecology, and concepts of forest management. Field work, demonstrations and guest lecturers in major forest types of the mid-Atlantic region. May be crosslisted with PLSC344. PREREQ: BISC208.
- ENWC 351 NATURE AND WILDLIFE PHOTOGRAPHY** 3
Basic principles and techniques of nature and wildlife photography. Students execute projects that demonstrate their technical skill and knowledge of exposure, composition and content. RESTRICTIONS: Students must have own camera equipment. Usually offered as part of international or domestic trips in Winter or Summer Sessions.

- ENWC 366 INDEPENDENT STUDY** 1-6
- ENWC 405 INSECT STRUCTURE AND FUNCTION** 4
Comparative functional anatomy and evolution of arthropods, especially the Insecta. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems. PREREQ: ENWC215.
- ENWC 406 INSECT IDENTIFICATION - TAXONOMY** 3
Lecture and laboratory; the collection, preservation and classification of common insect families. PREREQ: ENWC205.
- ENWC 408 INSECT FIELD TAXONOMY** 3
Collection, preservation and classification of common insect families. Includes lecture and laboratory. PREREQ: ENWC406.
- ENWC 410 MEDICAL, VETERINARY, AND FORENSIC ENTOMOLOGY** 3
Ecology, transmission, and control of diseases carried by insects, ticks and mites; interactions of vectors, animal hosts, and humans. Biting and stinging arthropods and forensic entomology, including evidence collection and species succession. Labs and field trips emphasize identification and field assessment of medically important arthropods. PREREQ: BISC208, ENWC205, or permission of instructor.
- ENWC 411 INSECT PEST MANAGEMENT** 3
Principles of managing insect populations in an environmentally compatible manner to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human populations. Diagnostic recognition, control and habits of major pest species. PREREQ: ENWC205.
- ENWC 413 WILDLIFE POLICY AND ADMINISTRATION** 3
This course is an introduction to policy issues that relate to wildlife management and natural resources. Students will gain an understanding of current laws, federal agencies, policy formation, and debate the policies of current hot topics. PREREQ: ENWC201. RESTRICTIONS: Open to juniors and seniors only.
- ENWC 415 WILDLIFE RESEARCH TECHNIQUES** 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. PREREQ: ENWC325. RESTRICTIONS: Open only to seniors.
- ENWC 416 WILDLIFE HABITAT MANAGEMENT** 3
Basic principles and methods of habitat modeling and management to enhance wildlife habitat in forests, grasslands, agriculture, and wetlands. Labs include field trips and hands-on habitat manipulation across the mid-Atlantic region. Field clothes required. PREREQ: ENWC325.
- ENWC 418 ORNITHOLOGY** 3
Avian biology: diversity, evolution, form and function, behavior and communication, reproduction and development, and conservation. Natural history and identification of taxa. Labs with frequent field trips. PREREQ: BISC208.
- ENWC 419 BIOLOGICAL CONTROL** 3
The use of beneficial organisms to manage and control populations of other organisms. Theory, practices, and case histories for manipulation of natural enemies to minimize the impact of pests. PREREQ: ENWC205 or equivalent. RESTRICTIONS: Requires junior or senior status.
- ENWC 424 HERPETOLOGY** 3
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 status.
- ENWC 425 MAMMALOLOGY** 3
Mammal biology: evolution, feeding, homeostasis, communication and reproduction. Natural history and identification of taxa. Occasional field trips. PREREQ: BISC208. RESTRICTIONS: Requires junior status.
- ENWC 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: ENWC215. RESTRICTIONS: Requires junior status.

- ENWC 435 WILDLIFE POPULATION DYNAMICS** 3
Understand population processes by combining a discussion of theory and practical applications. Studies exponential, logistic, and age specific growth as well as predation, competition, disease, harvest, and metapopulations. Model building exercises actively used to understand wildlife population dynamics. May be crosslisted with BISC435.
PREREQ: BISC302.
- ENWC 444 CONSERVATION OF TROPICAL BIODIVERSITY** 3
A 3-week intensive, field-based experience in the mechanics of conserving tropical biodiversity. Focuses on group projects quantifying and comparing the diversity of montane cloud forests, lowland rainforests and tropical dry forests. May be crosslisted with BISC440.
RESTRICTIONS: Winter or Summer Session only. Taught in Costa Rica or Peru.
- ENWC 450 DEBATES IN CONSERVATION BIOLOGY** 3
Global debate about anthropocentric use and misuse of earth's biological and physical resources.
- ENWC 451 ADVANCED NATURE AND WILDLIFE PHOTOGRAPHY** 3
Builds on basic principles and skills learned in ENWC351. Students develop a journal of technical aspects and intended outcome of each image and complete projects to demonstrate increased technical skill and knowledge of exposure, composition, and content.
PREREQ: ENWC351.
RESTRICTIONS: Students must have own camera equipment. Usually offered as part of international and domestic trips in Winter and Summer Sessions.
- ENWC 452 CONSERVATION OF AFRICAN WILDLIFE** 3
Unique challenges facing African wildlife. Identifying and surveying terrestrial vertebrates, human-wildlife interactions, ecotourism, and development of African wildlife conservation. First-hand experience in wildlife conservation by visiting various ecosystems, living with aboriginal people, and seeing the effects of ecotourism and development.
RESTRICTIONS: Offered only during Winter Session in Tanzania.
- ENWC 453 COMMUNITY-BASED CONSERVATION** 3
Basic philosophical, economic, and ecological aspects of the bottom-up approach to conservation. Students experience this form of conservation first-hand by living with aboriginal people and seeing how they conserve natural resources.
RESTRICTIONS: Offered only during Winter Session in Tanzania.
- ENWC 456 CONSERVATION BIOLOGY** 3
Biological principles to the conservation of biological diversity. Integrates topics, and theories from ecology, economics, genetics, biogeography, behavior, reproductive biology, sociology, and wildlife management. Divided into four parts: 1) describing patterns and scales of biological diversity, 2) examining threats, 3) managing populations and ecosystems, 4) social aspects of conservation.
RESTRICTIONS: Requires junior status.
- ENWC 464 FIELD EXPERIENCE** 1-3 PF
Faculty-supervised employment (usually part-time) or volunteer service at an entomology, ecology, or wildlife conservation-related site such as a research laboratory, pest control firm, museum, government agency or nature center. A signed agreement with faculty sponsor prior to placement and a journal or written report are required.
RESTRICTIONS: Maximum of six credits may count toward degree. Only three credits among Independent Study, Research, ENWC464 and UNIV401 count toward entomology or wildlife conservation major requirements.
- ENWC 465 SENIOR CAPSTONE EXPERIENCE** 1
Preparation, presentation, and discussion, both oral and written, of an issue based topic in entomology, wildlife conservation, natural resource management, or a related area for peers in a manner similar to that in scientific communication. Preparation includes reading and assessment of research articles.
RESTRICTIONS: Must be taken as senior in last fall term.
- ENWC 466 INDEPENDENT STUDY** 1-6
- ENWC 468 RESEARCH** 1-6
- ENWC 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.
- ENWC 601 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: ENWC215.
- ENWC 602 LARVAL TAXONOMY** 3
Lecture-laboratory treating the collection, preservation and classification of immature stages of insects. Emphasis on holometabolous orders, with special attention to aquatic immatures.
PREREQ: ENWC215 and ENWC406.
- ENWC 605 INSECT STRUCTURE AND FUNCTION** 4
Comparative functional anatomy and evolution of arthropods, especially Insecta. Emphasis on structures and their functions as adaptive responses to selective pressures. Laboratory dissections emphasizing anatomical variation within external and internal systems.
PREREQ: ENWC215.
- ENWC 606 INSECT IDENTIFICATION - TAXONOMY** 3
Collection, preservation and classification of common insect families. Includes lecture and laboratory.
- ENWC 608 INSECT FIELD TAXONOMY** 3
The collection, classification, preservation and curation of insects. An insect collection is required.
PREREQ: ENWC606.
- ENWC 610 MEDICAL, VETERINARY, AND FORENSIC ENTOMOLOGY** 3
Ecology, transmission, and control of diseases carried by insects, ticks and mites; interactions of vectors, animal hosts, and humans. Biting and stinging arthropods and forensic entomology, including evidence collection and species succession. Labs and field trips emphasize identification and field assessment of medically important arthropods.
PREREQ: BISC208, ENWC205 or permission of instructor.
- ENWC 611 INSECT PEST MANAGEMENT** 3
Principles of managing insect populations in an environmentally compatible manner to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals, and human population. Diagnostic recognition, control and habits of major pest species.
PREREQ: ENWC205.
- ENWC 613 WILDLIFE POLICY AND ADMINISTRATION** 3
Introduction to policy issues that relate to wildlife management and natural resources. Students will gain an understanding of current laws, federal agencies, policy formation, and debate the policies of current hot topics.
RESTRICTIONS: Open to graduate students only or by permission of instructor.
- ENWC 615 WILDLIFE RESEARCH TECHNIQUES** 3
Research design, field sampling techniques, data analysis and interpretation, and preparation of publication quality manuscripts. Class and individually designed field projects focus on regional wildlife and their habitats.
PREREQ: ENWC325; FREC408 or STAT200; and two courses from ENWC318, ENWC418, ENWC424, or ENWC425. COREQ: PLSC212 or PLSC402 or ENWC344.
RESTRICTIONS: Open to graduate students only or by permission of instructor.
- ENWC 616 WILDLIFE HABITAT MANAGEMENT** 3
Basic principles and methods of habitat modeling and management to enhance wildlife habitat in forests, grasslands, agriculture, and wetlands. Labs include field trips and hands-on habitat manipulation across the mid-Atlantic region. Field clothes required.
PREREQ: ENWC325.
- ENWC 618 ORNITHOLOGY** 3
Avian biology: diversity, evolution, form and function, behavior and communication, reproduction and development, and conservation. Natural history and identification of taxa. Labs with frequent field trips.
PREREQ: BISC208.
- ENWC 619 BIOLOGICAL CONTROL** 3
Use of beneficial organisms to manage and control populations of other organisms. Theory, practices, and case histories for manipulation of natural enemies to minimize the impact of pests.
- ENWC 620 BEHAVIORAL ECOLOGY** 3
Theoretical treatment of the factors that have dominated the evolution of animal behavior; hypothesis testing emphasized.
PREREQ: BISC302.
- ENWC 624 HERPETOLOGY** 3
Biology and ecology of reptiles and amphibians. Evolution, feeding behavior, life history, reproduction, physiology, population structure and dynamics, migration and movements, and conservation.
PREREQ: BISC302.
- ENWC 625 MAMMALOLOGY** 3
Mammal biology: evolution, feeding, homeostasis, communication and reproduction. Natural history and identification of taxa. Occasional field trips.
PREREQ: BISC208.
RESTRICTIONS: Open to graduate students only or by permission of instructor.

ENWC 626 AQUATIC INSECTS	3
Biology and systematics of aquatic insects with emphasis on the fauna of North America. Collection of immature aquatic insects required. PREREQ: ENWC215. RESTRICTIONS: Requires junior status.	
ENWC 635 WILDLIFE POPULATION DYNAMICS	3
Studies exponential, logistic, and age specific growth as well as predation, competition, disease, and metapopulations. Model building exercises actively used to understand wildlife population dynamics. May be crosslisted with BISC635. RESTRICTIONS: Requires permission of instructor.	
ENWC 652 CONSERVATION OF AFRICAN WILDLIFE	3
Unique challenges facing African wildlife. Identifying and surveying terrestrial vertebrates, human-wildlife interactions, ecotourism, and development of African wildlife conservation. First-hand experience in wildlife conservation by visiting various ecosystems, living with aboriginal people, and seeing the effects of ecotourism and development. RESTRICTIONS: Offered only during Winter Session in Tanzania.	
ENWC 653 COMMUNITY-BASED CONSERVATION	3
Basic philosophical, economic, and ecological aspects of the bottom-up approach to conservation. Students experience this form of conservation first-hand by living with aboriginal people and seeing how they conserve natural resources. RESTRICTIONS: Offered only during Winter Session in Tanzania.	
ENWC 656 CONSERVATION BIOLOGY	3
Biological principles to the conservation of biological diversity. Integrates topics, and theories from ecology, economics, genetics, biogeography, behavior, reproductive biology, sociology, and wildlife management. Divided into four parts; 1) describing patterns and scales of biological diversity, 2) examining threats, 3) managing populations and ecosystems, 4) social aspects of conservation. RESTRICTIONS: Requires junior status.	
ENWC 805 INSECT-PLANT CHEMICAL ECOLOGY	3
Chemically mediated interactions between insects and plants and other organisms involved in the relationship. Perceptual organs, behavioral and physiological response, plant-insect interactions, insect and plant defense, and intraspecific interactions that relate to natural chemicals produced by plants and insects. Presentation-discussion format. May be crosslisted with PLSC805.	
ENWC 814 ADVANCED ECOLOGY	3
Interaction of animals with their environment as it influences their distribution, abundance, life history and evolution. Emphasis on primary research literature. PREREQ: BISC302 or equivalent.	
ENWC 815 READINGS IN ECOLOGY	1
Discussion-based seminar on a current text and/or topic in the ecological sciences.	
ENWC 868 RESEARCH	1-9
ENWC 869 MASTER'S THESIS	1-6
ENWC 870 GRADUATE RESEARCH SEMINAR	0 PF
Students give an oral scientific presentation that describes the theory and development of their individual research projects.	
ENWC 888 TOPICS IN ENTOMOLOGY AND WILDLIFE ECOLOGY	0 PF
Seminar with lectures on a variety of topics related to entomology and wildlife ecology.	
ENWC 964 PRE-CANDIDACY STUDY	1-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.	
ENWC 969 DOCTORAL DISSERTATION	1-12 PF

FASHION AND APPAREL STUDIES

FASH 110 SEEING AND BEING IN A VISUAL WORLD	3
Focuses on how people see, process and respond to visual information embedded in the world, from immediate personal environments to the larger places in which we live. Creative problem solving and innovation are highlighted.	
FASH 114 FASHION, STYLE AND CULTURE	3
Introduces the concepts of fashion, style, and culture as they relate to how products are conceived and developed. The impact of cultural contexts and societal diversity on apparel industry practices are considered.	

FASH 122 APPAREL PRODUCT ASSEMBLY	3
Basic clothing construction procedures, fitting techniques and methods of evaluation for apparel.	
FASH 213 TWENTIETH CENTURY DESIGN: ETHNIC INFLUENCE	3
Examines the culture and clothing practices of various ethnic groups and their influences on Western apparel fashion and textile arts during the 20th Century.	
FASH 214 COSTUME HISTORY BEFORE 1600	3
Costume as a mirror of civilization in Western Europe and the Middle East from antiquity through the 16th century. Influence of societal, economic and aesthetic factors upon the development of costume.	
FASH 215 FUNDAMENTALS OF TEXTILES I	3
Fundamental concepts related to textile materials. Emphasis on structure/property relationships in fibers. Related chemical concepts are included. PREREQ: CHEM102. RESTRICTIONS: Limited to majors only.	
FASH 217 ACCOUNTING PRACTICE FOR MERCHANDISE	3
Introduction to basic accounting principles used in the retailing of apparel and other fashion products. Emphasis placed on the retail method of inventory, perpetual and periodic systems, LIFO, FIFO, development of gross margin statement and the effects of cash/trade discounts and cumulative mark-on on profitability.	
FASH 218 FASHION MERCHANDISING	3
An overview of the fashion industry which examines the interrelationship between primary, auxiliary and retail fashion markets; trends in fashion retailing, promotion and manufacturing.	
FASH 220 FUNDAMENTALS OF TEXTILES II	3
Fundamental concepts relating to yarns, fabric structures coloration and finishes. Emphasis placed upon structural properties as they relate to end-use characteristics and finishing processes. PREREQ: FASH215. RESTRICTIONS: Fashion merchandising and apparel design majors only.	
FASH 221 APPAREL STRUCTURES	3
Comparative study of foundation principles and processes of apparel design utilizing draping, flat pattern, drafting and computer-aided design techniques. Includes development of master patterns. Execution of advanced garment assembly processes. PREREQ: FASH122.	
FASH 222 APPAREL PRODUCT ANALYSIS	3
Concepts of apparel product development: standards of quality and value, anthropometrics, sizing, fit evaluation, specification writing, costing, and overview of computer practices in apparel product development processes. PREREQ: FASH122 for APD majors.	
FASH 224 CLOTHING DESIGN AND PRODUCTION: 1600-EDWARDIAN PERIOD	3
Clothing design and production in America and Western Europe since 1600. Study of craft skills, growth of ready-to-wear industry, and Haute Couture.	
FASH 233 FASHION DRAWING AND RENDERING	3
Drawing from the fashion model; emphasis on rendering clothing character, fabrics and fashion details using various media; introduction to flat sketching via computer; translation of drawings to finished fashion illustrations. PREREQ: ART129.	
FASH 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 are emphasized. Students produce accessories inspired by self-conducted research. PREREQ: FASH122.	
FASH 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: FASH221.	
FASH 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.	
FASH 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: PSYC100 and SOC1201.	

FASH 320	FASHION AND APPAREL INTERNSHIP	3-6	Design conceptualization, fashion illustration, and photo documentation techniques emphasized. PREREQ: FASH424. RESTRICTIONS: Open to apparel design seniors only.
An off-campus supervised and coordinated field study program in fashion/apparel related areas. RESTRICTIONS: Requires permission of instructor. Students may register for 3 or 6 credits. May be repeated once for a maximum of 6 credits total.			
FASH 321	TRAVEL STUDY PROGRAM	1-6	FASH 424 APPAREL COLLECTION DEVELOPMENT 3 Conceptualization, design and execution of a coordinated apparel collection. Advances and expands knowledge and skills from previous courses. PREREQ: FASH324.
Study of the domestic and/or international textiles, apparel, interior and allied fashion industries through visits and research projects. RESTRICTIONS: Requires FASH faculty approval through an application process. Offered at regular intervals.			
FASH 322	RETAIL DESIGN AND CONSUMER BEHAVIOR	3	FASH 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.
Exploration of the effects of retail design on consumer behavior. Logos, packaging, point-of-purchase display, signage, personnel and store layout are examined. May be crosslisted with HRIM322.			
FASH 324	APPAREL DESIGN BY DRAPING	3	FASH 430 TOPICS IN FASHION MARKETING AND PROMOTION 3 Topics related to aspects of marketing and promotional activities in the fashion industry. Current practices and trends within the industry are explored. Topics vary. PREREQ: FASH218, BUAD301.
Exploration of three dimensional methods of apparel design. Design and execution of draped garment structures required. PREREQ: FASH314.			
FASH 325	PRESENTATION TECHNIQUES	3	FASH 433 PRODUCT DEVELOPMENT AND MANAGEMENT STUDIO 3 Focuses on all phases of apparel product development for a targeted market from conceptualization through execution of sample garments for mass production. Further develops skills in computer-aided pattern designing, grading, marker making and data management (e.g., sizing, specifications, operations and costing). Includes field trip. PREREQ: FASH314, FASH333.
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.			
FASH 328	FASHION ADVERTISING AND PROMOTION	3	FASH 455 TEXTILES AND APPAREL IN THE GLOBAL ECONOMY 3 Overview of the global textile and apparel industries. Examines the United States textile complex and the United States market within an international context. PREREQ: FASH218, ECON151 or ECON152.
An introduction to advertising and promotion in the fashion industry. Emphasis is on the role of advertising and other promotional mix elements that support an integrated marketing communications (IMC) program in the textiles and apparel industry. PREREQ: FASH218, FASH318, BUAD301.			
FASH 333	FASHION FORECASTING AND DESIGN	3	FASH 465 SEMINAR 1-3 PF RESTRICTIONS: May be repeated to a maximum of three credits.
Introduction to trend research, presentation, and collection design for targeted markets. Utilizes advanced techniques in computer graphics and web development for fashion design, emphasizing concept development, visualization, storyboard layout, and design presentation. PREREQ: FASH233.			
FASH 365	FASHION MERCHANDISING AND APPAREL DESIGN SEMINAR	1 PF	FASH 466 INDEPENDENT STUDY 1-6
Creates awareness of career opportunities and develops techniques for success in apparel design and textile clothing career options. RESTRICTIONS: APD and FM majors only.			
FASH 366	INDEPENDENT STUDY	1-6	FASH 619 SOCIAL PSYCHOLOGICAL ASPECTS OF CLOTHING 3 Study of clothing and appearance as contributors to human interactions; consideration of the importance of clothing in individual and collective behavior. Analysis of how dress reflects self-feelings, establishes social identities and affects interpersonal encounters.
FASH 380	PRODUCT DEVELOPMENT	3	FASH 626 HISTORIC TEXTILES & CLOTHING COLLECTION MANAGEMENT 1-3 Practicum at the University of Delaware Historic Costume and Textiles Collection. Learn proper care, storage and display techniques for flat textiles, apparel and accessories. Experiences may include museum education, object accession, and database management.
Introduces concepts and methods used by buyers/merchandisers to create store-branded merchandise for targeted customer segments. The process of developing products, from trend research to production to distribution, is studied. PREREQ: FASH218, FASH222.			
FASH 415	TOPICS IN TEXTILES	3	FASH 630 TOPICS IN FASHION MARKETING & PROMOTION: CONSUMER BEHAVIOR 3 Research topics in marketing and promotional activities in the fashion industry. Current practices and trends within the industry are explored from theoretical perspectives. Topics vary.
One topic is covered each semester; either fiber science, textile analysis, or textile dyeing and finishing.			
FASH 416	MULTI-CHANNEL MERCHANDISING	3	FASH 633 PRODUCT DEVELOPMENT AND MANAGEMENT STUDIO 3 Apparel product development for a targeted market from conceptualization through execution of sample garments for mass production. Develop skills in computer-aided pattern designing, grading, marker making and data management (e.g., sizing, specifications, operations and costing). Includes field trip. PREREQ: Requires permission of instructor.
Examines the scope and application of retail delivery systems including direct marketing technologies. Target market segmentation and product fulfillment are examined as they apply to the fashion industry. PREREQ: FASH218, FASH318.			
FASH 418	MERCHANDISE PLANNING	4	FASH 655 TEXTILES AND APPAREL IN THE GLOBAL ECONOMY 3 Global interdependencies that influence production, distribution, and consumption of goods and services. Diverse roles of government, industry, and consumers in the global economy. Overview of global textile and apparel industries. Examines U.S. textile complex and U.S. market within international context.
Focuses on computer applications related to mathematical concepts and calculations used in developing merchandise budgets. Spreadsheets are used to develop merchandise plans for sales, inventories, markdowns, shrinkage, receipts, open-to-buy and gross margin. Other industry-related planning systems are examined. PREREQ: FASH218, BUAD301, ACCT207 or FASH217, and ACCT160.			
FASH 419	SOCIAL PSYCHOLOGICAL ASPECTS OF CLOTHING	3	FASH 665 FASHION STUDIES SEMINAR 0 Exploration of current research and industry needs in the field. RESTRICTIONS: Must be taken each time course is offered. Presentation of thesis research required.
Study of clothing and appearance as contributors to human interactions; consideration of the importance of clothing in individual and collective behavior. Analysis of how dress reflects self-feelings, establishes social identities and affects interpersonal encounters. PREREQ: FASH114, PSYC100 and SOCI201.			
FASH 420	ASSORTMENT PLANNING AND BUYING STUDIO	2	FASH 666 SPECIAL PROBLEM 1-6 Individual study, individual service learning project, group experiential learning (e.g., travel, internship, service learning), research that allows students to synthesize learnings across courses.
Explores how merchandise budgets translate into buying decisions. Emphasis on assortment planning and purchasing. Computer applications are involved. PREREQ: FASH418.			
FASH 421	PROFESSIONAL PORTFOLIO DEVELOPMENT	1	FASH 689 APPAREL SUPPLY CHAINS AND SOCIAL RESPONSIBILITY 1 Challenges for social responsibility in context of structure, relationships and long-standing practices and methods in apparel business. Analyzes structural and competitive issues of supply chains such as ownership, globalization, and outsourcing.
Conceptualization and development of a professional portfolio of design work.			

FASH 691	SOCIALLY RESPONSIBLE APPAREL: GLOBAL POLICY	1
Political and profit interests that influence socially responsible decisions and policy for the global textile and apparel industry are considered. Factors analyzed include ethics, economics, government policies, international labor standards, environmental regulations, and company priorities.		
FASH 692	SUSTAINING GLOBAL APPAREL SUPPLY CHAINS	1
Examines responsibility of businesses for sustaining economic/social development in global apparel industry. An historical perspective of the role of the industry in economic development provides a context for evaluating current issues concerning sustainable development.		
FASH 693	CULTURE AND WORK IN THE APPAREL INDUSTRY	1
Examines interrelationships between cultural characteristics, employment/work practices and social responsibility. Examples of industry practices that reflect effects of culture on business practices are addressed.		
FASH 694	APPAREL CONSUMERS AND SOCIAL RESPONSIBILITY	1
Examines role of consumers in improving working conditions, labor standards, and environmental stewardship in apparel factories worldwide. Factors and groups motivating consumer action are explored, including influence of personal characteristics, market opportunities, and activist and other pressure groups.		
FASH 695	BRINGING SOCIAL RESPONSIBILITY TO APPAREL CORPORATE CULTURE	1
Importance of leadership, the role of inspirational leadership, and the opportunities for making a difference are explored, analyzed and applied. Emphasis on social change - how individuals can help build a socially responsible workplace.		
FASH 696	CURRENT INITIATIVES FOR APPAREL INDUSTRY LABOR COMPLIANCE	1
Evaluates effectiveness of current initiatives for improving working conditions and labor standards in factories around the world. Explores codes of conduct and new trends for achieving long-term improvements in compliance to internationally recognized labor standards.		
FASH 697	WORKER-CENTRIC SOCIAL RESPONSIBILITY FOR APPAREL INDUSTRY	1
Examines the rights of workers. Explores obstacles in meeting and methods for assuring worker rights, including freedom of association. Consideration is given to how to effectively engage with workers.		
FASH 698	REDESIGNING GREEN APPAREL: DESIGN, SOURCING AND PACKAGING	1
Examines challenges to environmental stewardship in the design, sourcing, and packaging of apparel, textiles, and footwear products. Explores innovative practices, visionary leadership, and social change strategies for redesigning 'green' in the context of the design and sourcing roles of apparel business.		
FASH 699	PRODUCING ENVIRONMENTALLY RESPONSIBLE APPAREL	1
Examines environmentally responsible apparel production and practices as philosophy, process, and competitive business strategy. Analyzes sustainable production in the context of a business' physical plant, materials, and resource use.		
FASH 800	RESEARCH ANALYSIS IN FASHION STUDIES	3
Analysis and interpretation of research in fashion and apparel studies. Examination of qualitative and quantitative research methodologies. Emphasis is placed on theory development and research design.		
FASH 810	THEORIES OF DESIGN AND AESTHETICS	3
Theories and methods used in design and aesthetics; examines those used in multiple disciplines and their application in the field of apparel design.		
FASH 814	HISTORY OF THE FASHION INDUSTRY	3
Study on the evolution of the fashion industry, from its conception to present. Emphasis on manufacturing/production, design, retail and marketing. Each segment examined through the political, economic, aesthetic, technological, social and cultural factors that influenced the industry.		
FASH 819	FASHION THEORY	3
Overview of theoretical perspectives used to explain and predict fashion and fashion change; examines economic, historical, psychological, marketing, and sociological concepts and theories to understand the fashion process.		
FASH 822	GLOBAL FASHION CONSUMERS	3
Study of consumer behavior toward fashion products in a global context. Theories will be investigated from the context of the required readings.		
FASH 824	CREATIVE DESIGN FOR EXHIBITION	3
Use of advanced apparel design techniques in the development and execution of a collection of garments for juried design exhibition.		
FASH 825	INTERDISCIPLINARY APPROACHES TO CREATIVE PROBLEM SOLVING	3
Interdisciplinary approaches to collaborative thinking and problem solving, implementing variety of methods (e.g., environmental scanning,		

concept/knowledge mapping, scenario building, futuring/forecasting, visioning, scenario building, strategic planning) to the sustainable resolution of global contemporary issues challenging the textile/apparel/retail complex.

FASH 868 **SUPERVISED RESEARCH IN FASHION STUDIES** **1-3**
Exploration of the academic research process, encompassing its conceptualization, design, execution, and dissemination phases.

FASH 869 **THESIS** **1-6**
Engage in all phases of original scholarship under the guidance of their graduate committee and document the results in written form, including the process.

FINANCE

FINC 200	FUNDAMENTALS OF FINANCE	3
Provides non-business majors with an overview of the role of finance within a business organization. Topics include financial statement analysis, time value of money, capital budgeting, valuation and the cost of capital. RESTRICTIONS: Not open to business administration, finance or accounting degree candidates.		
FINC 201	INTRODUCTION TO INVESTMENTS	3
Provides non-business majors with an overview of the principles and theory of investments and financial markets. Topics include the analysis of investment opportunities and the management of investment portfolios. RESTRICTIONS: Not open to business administration, finance or accounting degree candidates.		
FINC 311	PRINCIPLES OF FINANCE	3
Introduces fundamental techniques and concepts related to the financial management of business firms. Topics include the time value of money, valuation, capital budgeting, working capital management, cost of capital, capital structure analysis, short and long term financing. PREREQ: ACCT207.		
FINC 312	INTERMEDIATE FINANCIAL MANAGEMENT	3
Focuses on the role of the corporate financial manager in shareholder wealth maximization. Enhances the understanding of material covered in FINC311 through the application of analytical methods, cases and the effective use of information technology in a contemporary financial environment. PREREQ: FINC311. RESTRICTIONS: Requires a grade of C- or better in FINC311.		
FINC 313	FINANCIAL MARKETS	3
Analyses domestic and international financial markets and examines the characteristics of market makers such as investment bankers, brokers, and dealers. The focus is on the fixed income financial instruments used in money and capital markets with emphasis on relevant risk, liquidity, and risk-return trade-offs. PREREQ: FINC311. RESTRICTIONS: Requires a grade of C- or better in FINC311.		
FINC 314	INVESTMENTS	3
Examines the valuation of securities, the functioning of securities markets and the theory and practice of modern portfolio management. Topics include advanced techniques in security valuation, standards and practices in investment management, portfolio evaluation standards and applications using real-time data. PREREQ: FINC311.		
FINC 364	FINANCE IN PRACTICE	3
Requires completion of at least 120 hours of finance-related internship with verification by the hiring company. Term paper relating the real-world duties and experiences of the internship to principles learned in the classroom also required. PREREQ: FINC311. RESTRICTIONS: Registration by permission of the instructor only.		
FINC 392	SEMINAR ON INTERNATIONAL FINANCIAL MANAGEMENT	3
Seminar at an overseas location on selected topics in international financial management. Combines lectures and visits to local organizations. Research paper. PREREQ: FINC311. RESTRICTIONS: Used only as a professional elective for finance majors.		
FINC 412	FINANCIAL INSTITUTIONS	3
Examines various types of financial institutions. Topics include structure, performance, asset/liability management, regulation and current issues that impact operational structures. PREREQ: FINC313 and ECON302.		
FINC 413	ADVANCED CORPORATE FINANCE	3
Examines such areas as financial theory and practice, financial analysis, financial benchmarking, and small business finance. Topics vary by semester. PREREQ: FINC312.		

FINC 414	BANK MANAGEMENT	3
Examines the management of commercial banks and similar institutions. Topics include funds and capital management, liquidity and credit standards, and lending and trust operations. PREREQ: FINC412.		
FINC 415	INTERNATIONAL FINANCE	3
Examines the international monetary environment and its impact on financial planning for the firm. Topics include exchange rates, currency restrictions, tax regulations, direct investment theory, capital budgeting, financing, risk management, and working capital management. PREREQ: ECON302.		
FINC 416	DERIVATIVE SECURITIES AND RISK MANAGEMENT	3
Examines the trading, valuation and theory of pricing futures and forward contracts, options, swaps and other derivative securities. Emphasis is placed on the use of derivatives for hedging and risk management. PREREQ: FINC314.		
FINC 417	REAL ESTATE FINANCE	3
Introduces real estate theory and management. Topics include financing, evaluation and property management, housing policy, and governmental regulation and participation. PREREQ: FINC313.		
FINC 418	SEMINAR IN CORPORATE GOVERNANCE	3
Examines current issues in corporate governance. Topics include executive compensation, shareholder resolutions and board of director ownership and accountability. PREREQ: FINC311.		
FINC 419	FINANCIAL MODELING AND VALUATION	3
Applies economic principles and financial modeling techniques to value seasoned equity, initial public offerings, mergers, private equity transactions, and leveraged buyouts. PREREQ: FINC312 and FINC314.		
FINC 850	FINANCIAL MANAGEMENT	3
Provides an introduction to the fundamental concepts of the finance function with an emphasis on the decision-making techniques relevant to financial and nonfinancial managers. Topics include valuation, risk and return, capital budgeting, cost of capital, financial analysis and planning, and working capital management. PREREQ: ACCT800.		
FINC 851	CORPORATE FINANCIAL ANALYSIS	3
Examines major policy-making areas in corporate finance and the impact of alternative policies on the value of the firm. Emphasis is placed on strengthening financial decision-making skills. Advanced topics include capital investment policy, financing and capital structure policies, dividend policy, and corporate control. PREREQ: FINC850.		
FINC 852	INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT	3
Examines the role and functioning of securities markets, valuation techniques, and the theory and practice of portfolio management. Topics include portfolio construction and evaluation metrics, relative valuation techniques and an introduction to derivative security pricing. PREREQ: FINC850.		
FINC 853	INTERNATIONAL FINANCIAL MANAGEMENT	3
Examines the financial management of multinational firms and the interrelationships between financial planning and the international economic environment. Topics include direct investment theory, capital budgeting, financing trade and investments, risk management and working capital management. PREREQ: FINC850.		
FINC 854	SPECIAL TOPICS IN FINANCE	1-3
Examines selected topics of current interest in various areas of finance, including corporate financial management, investment analysis and portfolio management, or financial institutions and markets. PREREQ: FINC850.		
FINC 855	FINANCIAL INSTITUTIONS AND MARKETS	3
Examines the nature, purpose, and management of financial institutions and markets. PREREQ: FINC850.		
FINC 856	FINANCIAL ENGINEERING AND RISK MANAGEMENT	3
Introduces the pricing, trading and use of derivative securities (forwards, futures, swaps and options contracts), emphasizing the management of risk arising from the volatility of exchange rates, interest rates and commodity and equity prices. PREREQ: FINC850.		
FINC 858	CORPORATE GOVERNANCE	3
Introduces issues pertaining to corporate governance and oversight, and examines topics of current interest concerning the relationships between corporate		

boards, company management, and shareholders.
PREREQ: FINC850.

FINC 859	SEMINAR IN FINANCE	3
Emphasis is on financial research and the application of alternative research methods to a project or current interest. Involves individual inquiry, written communication of results, and presentation of findings by each student. PREREQ: Six credit hours of graduate work in finance. RESTRICTIONS: Requires 24 M.B.A. credit hours.		

FINC 871	WORKSHOP IN FINANCIAL ECONOMICS	3
Introduces core theoretical topics, empirical methods, and data that are domain of financial economics, mostly by studying journal articles. Focus on research regarding market efficiency, asset pricing, and corporate finance. Topics include financial intermediation, market microstructure, corporate governance, international finance. PREREQ: ECON822. FINC850 or pre-course reading of MBA-level textbook recommended.		

FOREIGN LANGUAGES AND LITERATURES

FLLT 100	ESSENTIAL FOREIGN LANGUAGE	1 PF
Basic, practical vocabulary and idiomatic expressions for beginners in the Foreign Language (e.g. French, Spanish, Chinese, Bulgarian, 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 normal 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 and writing). PREREQ: FLT105.		
FLLT 107	MODERN LANGUAGE III - INTERMEDIATE	4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: FLT106. RESTRICTIONS: Satisfies Arts and Sciences foreign language requirement.		
FLLT 202	BIBLICAL AND CLASSICAL LITERATURE	3
Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts. Crosslisted with ENGL202. PREREQ: ENGL110.		
FLLT 203	LANGUAGES OF THE WORLD	3
Survey of the world's languages, examining a number of important phenomena from a wide range of languages. Phenomena are both structural (e.g., word order and agreement) and societal or psychological (how multicultural societies choose a common language, the relation between language and thought). Crosslisted with LING203.		
FLLT 309	POLITICAL CULTURE BY COUNTRY	3
Introduction to the political and civic cultures underpinning and supporting different political systems. Topics may vary depending on host country. Crosslisted with POSC309. RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.		
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 crosslisted with CMLT316. RESTRICTIONS: Open to first-year students.		
FLLT 319	TOPICS: FRENCH LITERATURE IN TRANSLATION	3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced prior to the registration period. May be crosslisted with WOMS319.		

- FLLT 320 VARYING AUTHORS AND GENRES 3**
Cultural, especially cross-cultural and/or interdisciplinary studies with primary emphasis on the aesthetic context of the announced topic, e.g., Nordic Saga and Myth; Courtly Love; and the European Postwar Novel.
May be crosslisted with CMLT320, WOMS320.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 321 TOPICS: CHINESE LITERATURE IN TRANSLATION 3**
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet.
May be crosslisted with WOMS321.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 322 TOPICS: CLASSICAL LITERATURE IN TRANSLATION 3**
Special topics in Greek and Roman culture and civilization. Particular areas and writers to be announced, e.g., ancient epic, ancient drama, Greek literature in translation.
May be crosslisted with CMLT322, WOMS322.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 323 FIRST YEAR SEMINAR 3**
Introduction to the study of language, literature, and the cultures that produce them. Specific subject matter varies.
- FLLT 325 TOPICS: GERMAN LITERATURE IN TRANSLATION 3**
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics may vary and are announced in registration booklet.
May be crosslisted with WOMS325.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 326 TOPICS: HISPANIC LITERATURE IN TRANSLATION 3-12**
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet.
May be crosslisted with WOMS326.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 327 TOPICS: RUSSIAN LITERATURE IN TRANSLATION 3**
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 328 TOPICS: JAPANESE LITERATURE IN TRANSLATION 3-6**
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet.
May be crosslisted with WOMS328.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 329 TOPICS: ITALIAN LITERATURE IN TRANSLATION 3**
Study of the works of one or more outstanding authors or of a special theme. Taught in English.
May be crosslisted with WOMS329.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 330 VARYING AUTHORS, THEMES AND MOVEMENTS 3**
Cultural, especially cross-cultural, study with primary emphasis on the historical development of the announced area, e.g., The Faust Theme in Western Literature, Dante Through the Ages, Don Juan, and the Transformation of a Myth. Topics vary and are announced in registration booklet.
May be crosslisted with WOMS330.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 331 INTRODUCTION TO CHINESE FILMS 3**
Inquiry into Chinese films from the prewar period to the present. Both aesthetic and technical elements of film production and reception featured. Discussion intensive.
- FLLT 337 BRAZIL THROUGH FILM 3**
Examines Brazilian culture and history through film. Film techniques and movements. Other disciplines will help provide an understanding of Brazilian film, including history, literature, gender studies, sociology, cultural studies, politics, and ethnic studies. Topics include religion, gender issues, ethnicity, migration, identity, music, and popular culture. Taught in English. Portuguese films have English subtitles.
- FLLT 338 LIGHT AND SHADOW—JAPANESE FILMS 3**
Inquiry into Japanese films from the immediate postwar period to present. Both aesthetic and technical elements of film production and reception featured. Discussion intensive.
- FLLT 345 MODERN ISRAEL: CULTURE AND IDENTITY 3**
Many factors contribute to a diverse and intriguing Israeli society. Topics include the roots of Zionism, the concept of the Israeli Sabra, the effects of the Holocaust, ethnic groups and the Arab-Israeli conflict, through history, film, literature and music.
May be crosslisted with JWST345.
- FLLT 360 HUMANITIES COLLOQUIUM 3**
Papers and discussion by faculty members and students participating in Humanities Semester offerings. Interdisciplinary approach.
- FLLT 366 INDEPENDENT STUDY 1-6**
- FLLT 375 TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION 3**
Special topics in Russian and Soviet culture. Taught in English. Topics vary and are announced in registration booklet.
May be crosslisted with WOMS375.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 380 TOPICS: JAPANESE CULTURE IN TRANSLATION 3**
Special topics in Japanese culture. Taught in English. Topics vary and are announced in registration booklet.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 383 CHINESE CULTURE IN TRANSLATION 3**
Special topics in Chinese culture. Taught in English. Topics vary and are announced in registration booklet.
May be crosslisted with WOMS383.
RESTRICTIONS: May be repeated for credit when topics vary.
- FLLT 390 HONORS COLLOQUIUM 3**
First year interdisciplinary Honors seminar. May be team taught. Specific topics vary.
RESTRICTIONS: Open to first year Honors students only.
- FLLT 401 HISTORICAL LINGUISTICS 3**
Languages of the world, Indo-European languages, the comparative method and linguistic evolution.
Crosslisted with LING401.
PREREQ: Completion of two years of a college language.
- 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.
May be crosslisted with LING421.
- FLLT 422 LANGUAGE SYLLABUS DESIGN 3**
Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, notional-functional and task-based approaches. Topics: materials development, textbook evaluation and adaptation, design and implementation of learning units for second-language special purpose and bilingual learners. Includes one and a half hour weekly practicum and 25 hours of observation in high school classrooms.
May be crosslisted with LING422.
- FLLT 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. Bilingual measures. Practice in item construction and analysis.
May be crosslisted with LING424.
- FLLT 425 TECHNOLOGY-ENHANCED LANGUAGE LEARNING 3**
Study of the practical and theoretical aspects of using technology in second language learning. It is open to teachers of all foreign languages and will be taught in English.
PREREQ: FLLT421.
RESTRICTIONS: Open to teachers of foreign languages.
- FLLT 429 METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS 3**
Familiarizes students with appropriate teaching methods and techniques for the elementary foreign language classroom. Includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials and course design.
May be crosslisted with EDUC429.
- FLLT 436 POLITICS AND LITERATURE 3**
Class, civil rights, feminism, revolution and other political issues examined through novels, film and other literary works.
Crosslisted with POSC436.
- FLLT 466 INDEPENDENT STUDY 1-6**
- FLLT 475 VARYING TOPICS: LITERARY CRITICISM IN A FOREIGN LANGUAGE CONTEXT 3**
Overview of literary criticism with special emphasis on criticism important to French, Spanish, Italian, Russian and German literatures. May be organized as an historical survey or as a survey of a particular period, including the contemporary period.
PREREQ: A 300-level survey of literature course in French, Spanish, Italian, Russian, or German.

FLLT 601	HISTORICAL LINGUISTICS	3
The languages of the world, the Indo-European languages, the comparative method and linguistic evolution. Crosslisted with LING601. PREREQ: Completion of two years of a college language.		
FLLT 621	METHODS OF TEACHING FOREIGN LANGUAGES	3
Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science. Includes demonstrations and practical exercises. May be crosslisted with LING621.		
FLLT 622	LANGUAGE SYLLABUS DESIGN	3
Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, notional-functional, and task-based approaches. Topics: materials development, textbook evaluation and adaptation, design and implementation of learning units for second-language special purpose and bilingual learners. May be crosslisted with LING622.		
FLLT 623	PRINCIPLES OF FOREIGN LANGUAGE	3
Current perspectives on foreign language instruction and extensive hands-on experience with the implementation of effective language teaching strategies. Emphasis 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
Study of the principles and techniques of second-language testing, including measurement of the four skills and of communicative competence. Bilingual measures. Practice in item construction and analysis. May be crosslisted with LING624.		
FLLT 625	TECHNOLOGY-ENHANCED LANGUAGE LEARNING	3
Study of the practical and theoretical aspects of using technology in second language learning. It is open to teachers of all foreign languages and will be taught in English. PREREQ: FLLT621 or FLLT623. RESTRICTIONS: Open to teachers of foreign languages.		
FLLT 629	METHODS OF TEACHING FOREIGN/SECOND LANGUAGES IN ELEMENTARY SCHOOLS	3
Appropriate teaching methods and techniques for the elementary foreign language classroom. Includes demonstrations by experienced FLES teachers, peer-analysis of video-taped model lessons prepared by participants, and an introduction to testing, materials and course design. May be crosslisted with EDUC606.		
FLLT 675	VARYING TOPICS: LITERARY CRITICISM IN A FOREIGN LANGUAGE CONTEXT	3
Overview of literary criticism with special emphasis on criticism important to French, Spanish, Italian, Russian and German literatures. May be organized as an historical survey or as a survey of a particular period, including the contemporary period.		
FLLT 801	PROFESSIONAL ORIENTATION	3
Provides students in foreign languages and literatures 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.		
FLLT 868	RESEARCH	1-12

FOOD AND RESOURCE ECONOMICS

FREC 100	SUSTAINABLE DEVELOPMENT	3
Surveys pressing issues in the management of natural resources, environmental protection, and international development. Requires critical evaluation of these issues by applying basic policy analysis, considering the ethical dimensions of policy, and drawing on economic indicators of environmental quality and human health. RESTRICTIONS: Students with majors in the College of Agricultural and Natural Resources cannot use this course to satisfy the Agricultural and Biological Sciences requirement in their major.		
FREC 110	INTRODUCTION TO FOOD AND AGRIBUSINESS INDUSTRY	1
Introduction to the food and agribusiness industry. The economic structure and importance of the industry is discussed.		
FREC 135	INTRODUCTION TO DATA ANALYSIS	3
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.

FREC 150	ECONOMICS OF AGRICULTURE AND NATURAL RESOURCES	3
Introduction to economic and management principles and their applications to agriculture, including agribusiness, natural resources and the environment.		
FREC 201	RECORDS AND ACCOUNTS	3
Introductory course. Emphasis on concepts and principles and the uses of accounting for control and decision-making purposes. RESTRICTIONS: Designed for non-business and non-accounting majors.		
FREC 212	FOOD RETAILING AND CONSUMER BEHAVIOR	3
Topics include consumer market environment, demographic characteristics of the population, food retail marketing and financial strategies, product merchandising planning, new product development strategies and site location analysis.		
FREC 240	QUANTITATIVE METHODS IN AGRICULTURAL ECONOMICS	3
Basic quantitative applications of agricultural economics principles and theory. Determination of market equilibria and optimization of static models. PREREQ: MATH115; and FREC150 or ECON151.		
FREC 270	BIOTECHNOLOGY: SCIENCE AND SOCIOECONOMIC ISSUES	3
Introduction to agricultural biotechnology and socio-economic issues. Introduces genetic engineering and the basic scientific theory and the applications of biotechnology in agriculture production and research. Presents issues surrounding biotechnology-risk and technology assessment, animal rights, public and private research interface, media and environmental perspectives, consumer acceptance, regulation and economic development. Crosslisted with ANFS270.		
FREC 302	MANAGEMENT OF AGRIBUSINESS FIRMS	3
Principles and practical problems of firm management (decision-making) and planning. PREREQ: FREC150 or ECON151. RESTRICTIONS: Not open to freshmen or sophomores except by permission of instructor.		
FREC 305	MANAGEMENT AND LEADERSHIP DEVELOPMENT	3
Exposes students to food and agribusiness human resource management and employee development. Emphasis on the functions of management, leadership principles, effective supervision, training programs, employee and management appraisal systems, role of minorities in management and ethics in management.		
FREC 316	ECONOMICS OF BIOTECHNOLOGY AND NEW TECHNOLOGIES	3
Introduction to the economic explanations for new technologies, innovation and adoption. Biotechnology issues include consumer acceptance, labeling, risk assessment, market structure, trade, patents and the environment. Other current technologies and the future are examined.		
FREC 335	ADVANCED DATA MANAGEMENT	3
Advanced use of microcomputer systems and application software used in agricultural sciences. PREREQ: FREC135.		
FREC 343	ENVIRONMENTAL ECONOMICS	3
Analyzes benefits and costs of environmental policy; reviews valuation techniques; assesses efficiency of decentralized, regulatory, tax and marketable permit policies to protect the environment. Uses graphical (non-calculus) economic analysis. May be crosslisted with ECON343. PREREQ: ECON151 or FREC150.		
FREC 345	STRATEGIC SELLING AND BUYER COMMUNICATION	3
Application of strategic selling techniques to actual selling situations. Focus on technical and personal sales. Involves extensive use of videos, case problems, sales presentations and traveling with sales professionals.		
FREC 350	FARM MANAGEMENT	3
Basis and conditions for agricultural production, farm planning and analysis, management of crop and production, investments and financial problems and management of labor. PREREQ: FREC150, and FREC201 or ACCT207. RESTRICTIONS: Designed for students without farm background.		
FREC 366	INDEPENDENT STUDY	1-6
FREC 404	FOOD AND FIBER MARKETING	3
System approach to food and fiber marketing analysis: consumer, retail, processor, wholesale and farm level. Domestic and foreign demand and supply and analysis, pricing, marketing costs, food safety, market power and its sources. Physical distribution, and structure of the food and fiber marketing system.		
FREC 406	AGRICULTURAL AND NATURAL RESOURCE POLICY	3
Agricultural and natural resource policy formation, effects of policy on resource		

allocation and economics of alternative programs. Analysis of effects of various programs on producers, consumers and taxpayers, especially contemporary issues and market failures.
PREREQ: FREC150 or ECON151.

- FREC 408 STATISTICAL RESEARCH METHODS I** 3
Descriptive and inferential statistics in agribusiness and biological applications focusing on hypothesis testing, multiple regression, and analysis of variance techniques.
May be crosslisted with STAT408.
- FREC 409 RESEARCH METHODS II** 3
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.
- FREC 410 INTERNATIONAL AGRICULTURAL TRADE AND MARKETING** 3
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 emphasized. Case studies to reinforce concepts and integrate major topics presented.
PREREQ: FREC150 or ECON151.
- FREC 412 STRATEGIC MARKETING COMPETITION** 1-3
Strategic marketing of a new food or fiber product/service. Development of a marketing plan and communicating the plan effectively in local and national competition.
RESTRICTIONS: Requires permission of instructor.
- FREC 420 AGRICULTURE IN ECONOMIC DEVELOPMENT** 3
Process of increasing agricultural productivity and food supply in developing nations. Rural resource adjustment problems at various stages of industrialization. Role of foreign trade in development process.
PREREQ: FREC150 or ECON 151.
- FREC 424 RESOURCE ECONOMICS** 3
Theoretical allocation of exhaustible and renewable resources over time, concepts of social welfare and depletion, and review of market failures and contemporary resource management issues.
PREREQ: FREC150 or ECON151.
- FREC 427 AGRIBUSINESS FINANCIAL MANAGEMENT** 3
Study of the principles and tools of finance to identify and solve agribusiness financial management problems through the application of quantitative analytical methods and problem solving techniques.
PREREQ: FREC201 or ACCT207, and a statistics course.
- FREC 429 COMMUNITY ECONOMIC DEVELOPMENT** 3
Community economic development in the United States; application of economic principles regarding industrial location, land use, environmental protection, and economic growth and public service provision; and economic development policies.
PREREQ: FREC150 or ECON151.
- FREC 430 ESTABLISHING AND MANAGING A FOOD AND AGRIBUSINESS ENTERPRISE** 3
Analysis of the necessary factors to consider in initiating a Food and Agribusiness enterprise. Including strategic marketing concepts, competitive, communication, site, and financial strategies, management structure and legal forms of small businesses, etc. Involves case studies and writing a business plan.
- FREC 444 ECONOMICS OF ENVIRONMENTAL MANAGEMENT** 3
Review of benefit-cost analysis and welfare theory; techniques for evaluating environmental amenities; the evolution of environmental legislation; and review of case studies of environmental conflicts.
May be crosslisted with ECON442.
PREREQ: ECON300 or 301.
- FREC 450 TOPICS IN ENVIRONMENTAL LAW** 3
Overview of the legal process and environmental laws in order to understand policy issues and learn action processes in the environmental field.
May be crosslisted with LEST450.
- FREC 464 INTERNSHIP** 1-3
Practical experience acquired by working with corporate and government institutions. Internship sponsor, performance evaluation, and written reports are required.
RESTRICTIONS: A maximum of three credits may be applied to the B.S. in Agriculture with a major in Food and Agribusiness Management.
- FREC 465 SEMINAR** 1
Oral and written reports in the subdisciplines of food and resource economics.

- FREC 466 INDEPENDENT STUDY** 1-6
- FREC 471 FUTURES AND OPTIONS MARKETS** 3
Analysis of futures and options markets of agricultural and nonagricultural commodities. Trading and hedging theory and techniques, cash and futures price relationships. Students trade commodities via a satellite information system.
May be crosslisted with ECON471.
PREREQ: FREC404 or ECON300 or ECON301.
- FREC 480 GEOGRAPHIC INFORMATION SYSTEMS IN NATURAL RESOURCE MANAGEMENT** 4
Introductory hands-on training in geographic information systems for environmental and natural resource management.
- FREC 608 STATISTICAL RESEARCH METHODS** 3
Experimental design and plot plans, collection, analysis and presentation of data in agricultural and biological research.
May be crosslisted with STAT608.
- FREC 611 REGIONAL WATERSHED MANAGEMENT** 3
Reviews the practical applications of watershed planning as a tool to manage land, water and ecosystem resources. Explores public policies and practices of watershed planning by examining case studies. Uses a multidisciplinary approach involving the fields of geography, environmental science, geology, public policy, land planning, geographic information systems (GIS) and engineering.
Crosslisted with UAPP611.
- FREC 615 ADVANCED PRICES AND STATISTICS** 3
Statistical tools used in agricultural economics research and operations research. Introduction to econometric specifications, estimation and interpretation.
May be crosslisted with ORES615.
- FREC 674 APPLIED DATA BASE MANAGEMENT** 3
Provides an in-depth understanding of using computers to manage data using programs such as SAS and Microsoft/Access.
May be crosslisted with STAT674.
RESTRICTIONS: Requires permission of instructor.
- FREC 682 SPATIAL ANALYSIS OF NATURAL RESOURCES** 3
Advanced hands-on training in geographic information systems and spatial statistics for environmental and natural resource management.
PREREQ: FREC480.
- FREC 801 APPLIED DEMAND AND MARKETING ANALYSIS** 3
Deals with research techniques and procedures in applied economics with focus on empirical applications of economic theory and econometric tools in consumer demand and marketing analysis.
- FREC 806 RESEARCH TECHNIQUES AND PROCEDURES** 3
Planning research projects with emphasis on methods of collecting and analyzing data, and the presentation of results. A problems course.
May be crosslisted with ORES806.
PREREQ: FREC608.
- FREC 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 crosslisted with ORES810.
- FREC 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.
- FREC 827 ADVANCED PRODUCTION ECONOMICS** 3
Specification, identification and estimation of dual models for use in the evaluation, hypothesis testing and control of firm-level technological and production problems.
May be crosslisted with ECON827, ORES827.
PREREQ: ECON801 and an econometrics/statistics course.
RESTRICTIONS: Requires permission of instructor.
- FREC 834 SEMINAR IN RESOURCE ECONOMICS** 3
Quantitative analyses of natural resource markets, resource depletion and the design of optimal management strategies.
May be crosslisted with ORES834.
- FREC 868 RESEARCH** 1-9
- FREC 869 MASTER'S THESIS** 1-6

FRENCH

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.		
FREN 102	ELEMENTARY FRENCH II	3
Completion of basic French. PREREQ: FREN101 or FREN105.		
FREN 105	FRENCH I - ELEMENTARY	4
Introduction to the French language and development of speaking, listening, reading and writing skills through the use of basic texts.		
FREN 106	FRENCH II - ELEMENTARY/INTERMEDIATE	4
Completion of basic French. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: FREN105. RESTRICTIONS: Two to three years of high school French acceptable in lieu of prerequisite.		
FREN 107	FRENCH III - INTERMEDIATE	4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: FREN106. RESTRICTIONS: Four years of high school French acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.		
FREN 111	INTERMEDIATE FRENCH I	3
Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: FREN102 or FREN106. RESTRICTIONS: Three years of high school French acceptable in lieu of prerequisite.		
FREN 112	INTERMEDIATE FRENCH II	3
Continued practice in speaking and writing, reading texts of average difficulty. Grammar review as needed. PREREQ: FREN111. RESTRICTIONS: Four years of high school French acceptable in lieu of prerequisite. Satisfies Arts and Sciences foreign language requirement.		
FREN 200	GRAMMAR AND COMPOSITION	3
Intensive grammar review of all major verb tenses and grammatical concepts (such as object pronouns). Emphasis is on grammar improvement through reading and writing. PREREQ: FREN107 or FREN112.		
FREN 205	FRENCH CONVERSATION	3
Practical use of French by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work. PREREQ: FREN107 or FREN112 or one 200-level course. RESTRICTIONS: Minimum grade of B required for prerequisites. Not intended for native speakers of French.		
FREN 206	CULTURE THROUGH CONVERSATION	3
Discussion of topics drawn from contemporary French life. Designed for students who wish to broaden their knowledge of French culture while improving their oral and aural language skills. PREREQ: FREN107 or FREN112. RESTRICTIONS: Taught in French.		
FREN 207	FRENCH CARIBBEAN PAST AND PRESENT	3
Introduction to contemporary French Caribbean, its history, its culture, its people, their way of life and the issues confronting them. Focuses on Martinique. RESTRICTIONS: Taught in English during Winter Session abroad. Not for minor credit.		
FREN 208	CONTEMPORARY FRANCE I	3
An introduction to contemporary France, its culture, its people, their way of life and the issues confronting them. RESTRICTIONS: Not for major credit. Taught abroad only, in both English and French. Does not satisfy the foreign language requirement.		
FREN 209	FRENCH CONVERSATION THROUGH FILM	3
Development of oral proficiency in French through discussion and analysis of major French films. Some written work and grammar review where appropriate. PREREQ: FREN107 or FREN112 or one 200-level French course. RESTRICTIONS: Minimum grade of B required for prerequisites.		
FREN 211	FRENCH READING AND COMPOSITION	3
Reading and discussion of French literature. Frequent compositions. Grammar review where appropriate.		

PREREQ: FREN200 with a minimum grade of C or FREN107 with a minimum grade of A- or FREN112 with a minimum grade of A-.

FREN 250	INTRODUCTION TO BUSINESS FRENCH	3
Familiarizes students with characteristics of business French (terminology, syntactical patterns, etc.) and policies and practices of the French business community. PREREQ: Any 200-level course taught in the French language.		
FREN 301	INTRODUCTION TO FRENCH LITERATURE: PROSE	3
Selected readings, with discussion and analysis, of the various genres of prose fiction (contes, nouvelles, romans) and nonfiction (essais) from the middle ages to the present. PREREQ: FREN211 and any 200-level course taught in the French language.		
FREN 302	INTRODUCTION TO FRENCH LITERATURE: POETRY AND THEATRE	3
Selected readings, with discussion and analysis, of the various genres of poetry (lyrical, epic, narrative) and theatre (comedy, tragedy, drama) from the middle ages to the present. PREREQ: FREN211 and any 200-level course taught in the French language.		
FREN 305	FRENCH CONVERSATION AND COMPOSITION	3
Discussion of cultural, social and political topics in French-speaking countries. Vocabulary building, grammar exercises and compositions. PREREQ: 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 exposes, discussion of articles and videos, textual analysis and compositions. PREREQ: Any two 200-level French courses conducted in French. RESTRICTIONS: Taught abroad only.		
FREN 308	CONTEMPORARY FRANCE	3
Discussion and study of issues related to contemporary cultural, political and social developments in France, including its people in today's European community. PREREQ: Any two 200-level French courses taught in the French language. RESTRICTIONS: Taught abroad only and in French.		
FREN 314	FRENCH PHONETICS	3
Studies the sounds of the French language (both individual phonemes and items of connected speech, such as liaison, linking, intonation, etc.). Helps improve pronunciation of the language. PREREQ: Any two 200-level French courses. RESTRICTIONS: Not intended for native speakers of French.		
FREN 325	FRENCH CIVILIZATION I	3
A study of French cultural history from Gaul to the French Revolution. PREREQ: Any two 200-level French courses.		
FREN 326	FRENCH CIVILIZATION II	3
A study of French cultural history from the French Revolution to 1945. PREREQ: Any two 200-level French courses.		
FREN 350	ADVANCED BUSINESS FRENCH	3
Development of strategies to initiate and maintain oral and written communication in the world of business. Acquisition of commercial vocabulary, practice in speaking French in business situations, letter writing and article reading. Functional and cultural approach. PREREQ: Any two 200-level French courses, one preferably being FREN250.		
FREN 355	SPECIAL TOPICS	3
Explores an area of special interest in French literature or culture studies. RESTRICTIONS: Taught abroad.		
FREN 366	INDEPENDENT STUDY	1-3
FREN 403	STRUCTURE OF FRENCH	3
Study of the sounds, morphology and syntax of the French language, as well as of discursive phenomena. Introduces students to the science of linguistics as applied to French. Taught in French. PREREQ: Two 300-level French courses, one of which should be FREN314.		
FREN 404	ADVANCED COMPOSITION AND GRAMMAR	3
Intensive writing practice in French (seven compositions, all to be revised), with systematic grammar review: past tenses, articles, adjectives, participles, passive voice, the conditional, the subjunctive, concordance of verb tenses, demonstrative pronouns. PREREQ: Two 300-level French courses.		
FREN 405	TRANSLATION AND STYLISTICS	3
Focuses on vocabulary and translation skills (from French into English and vice-versa). PREREQ: Two 300-level French courses with a minimum grade of B+.		

- FREN 406 ADVANCED FRENCH LANGUAGE** 3
Grammatical structure and stylistics with special attention given to technical vocabulary and discourse.
PREREQ: Any 300-level French course.
RESTRICTIONS: Course taught abroad only.
- FREN 411 GREAT AUTHORS I: 1100-1750** 3
Selected readings of master authors and works from the Middle Ages to the Age of Enlightenment. Authors may include Villon, Rabelais, Montaigne, Moliere, Corneille, Mme. de Lafayette, Montesquieu, Voltaire and others.
PREREQ: Any two 300-level French literature courses.
- FREN 412 GREAT AUTHORS II: 1750-PRESENT** 3
Selected readings of master authors and works from the dawn of Romanticism to the present. Authors may include Prevost, Rousseau, Hugo, Flaubert, Baudelaire, Gide, Proust, Camus, Sartre, Ionesco, Beckett, Duras and others.
PREREQ: Any two 300-level French literature courses.
- FREN 423 FRENCH MEDIEVAL LITERATURE** 3
Survey of French literature to 1500.
PREREQ: Any two 300-level French literature courses.
- FREN 424 FRENCH RENAISSANCE LITERATURE** 3
Selected works by Rabelais, the poets of the Pleiade, Montaigne and others.
PREREQ: Any two 300-level French literature courses.
- FREN 437 SEVENTEENTH CENTURY FRENCH THEATRE** 3
Growth of French dramatic literature before 1715 and analysis of the principal plays of Corneille, Racine and Moliere.
PREREQ: Any two 300-level French literature courses.
- FREN 438 SEVENTEENTH CENTURY FRENCH POETRY AND PROSE** 3
Representative novelists, poets, critics and moralists from Descartes and Pascal to La Fontaine, Boileau, Mme. de La Fayette and others.
PREREQ: Any two 300-level French literature courses.
- FREN 441 THE EIGHTEENTH CENTURY: THE AGE OF VOLTAIRE** 3
Novels, plays, essays and poetry of such authors as Montesquieu, Marivaux, Prevost and Voltaire.
PREREQ: Any two 300-level French literature courses.
- FREN 442 THE EIGHTEENTH CENTURY: THE AGE OF ROUSSEAU** 3
Novels, plays, essays and poetry of such authors as Diderot, Rousseau, Beaumarchais and Chénier.
PREREQ: Any two 300-level French literature courses.
- FREN 445 NINETEENTH CENTURY FRENCH NOVEL** 3
The novel from Romanticism to Naturalism. Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.
PREREQ: Any two 300-level French literature courses.
- FREN 446 NINETEENTH CENTURY FRENCH POETRY AND THEATRE** 3
Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.
PREREQ: Any two 300-level French literature courses.
- FREN 451 TWENTIETH CENTURY FRENCH LITERATURE: THE AGE OF ANXIETY AND THE ABSURD** 3
Main trends from Gide, Celine and Malraux to Camus, Sartre and Beckett, including Surrealism, Existentialism and the Theatre of the Absurd.
PREREQ: Any two 300-level French literature courses.
- FREN 452 ASPECTS OF CONTEMPORARY FRENCH LITERATURE** 3
A study of contemporary French literature, including novels, plays, essays and poetry of such authors as Robbe-Grillet, Sarraute, Perec, Tournier, Duras, Ponge, Bonnefoy, Jaccottet and Barthes.
PREREQ: Any two 300-level French literature courses.
- FREN 453 CONTEMPORARY FRENCH CIVILIZATION: 1958-PRESENT** 3
Culture, customs and political and economic life in France since 1958.
PREREQ: Any two 300-level French courses.
- FREN 454 FRENCH CINEMA** 3
Study of modern French cultural history through the films of such masters as Vigo, Gance, Pagnol, Renoir, Bresson, Resnais, Malle and others.
PREREQ: Any two 300-level French literature courses.
- FREN 455 SELECTED AUTHORS, WORKS AND THEMES** 3-12
Works of one or more outstanding authors or on a special theme.
PREREQ: Any two 300-level French literature courses.
RESTRICTIONS: May be repeated for credit when topics vary.
- FREN 456 FRENCH THEATER WORKSHOP** 3
Study of French theater of different periods and genres, with an emphasis on staging and performance. Class activities include dramatic readings, improvisation, and exercises to improve diction. May culminate in a public presentation of students' work.
PREREQ: Any two 300-level French literature courses.
- FREN 457 THE FRANCOPHONE WORLD** 3
Examines the social, cultural, political and historical aspects of various regions of the Francophone world (the Maghreb, Sub-Saharan Africa, the Caribbean, South East Asia (Vietnam) and Lebanon) as well as the Beur (descendants of the first generation of Maghrebi immigrants) phenomenon in the French banlieue (suburbs). Texts and films serve as points of entry into these multicultural communities.
PREREQ: Any two 300-level French courses.
- FREN 458 TOPICS IN FRANCOPHONE LITERATURE** 3
Varying aspects of Francophone studies, such as women's writing, literature of Quebec, colonial literature, African literature and cinema, literature of immigration.
PREREQ: Any two 300-level French literature courses.
- FREN 459 NEGRITUDE, ANTILLANITE, CREOLITE** 3
Focuses on the literary movements of Negritude, Antillanite, and Creolite, and their relation to Caribbean identity, culture and history, as well as to the field of Francophone postcolonial studies.
PREREQ: Any two 300-level French literature courses.
- FREN 466 INDEPENDENT STUDY** 1-3
- FREN 533 FRENCH READINGS FOR PH.D. CANDIDATES** 3 PF
A basic course with emphasis on developing reading comprehension.
RESTRICTIONS: Designed for graduate students in other disciplines who have had little or no previous experience with French.
- FREN 605 TRANSLATION AND STYLISTICS** 3
Focuses on vocabulary and translation skills (from French into English and vice versa). Literary, commercial and journalistic texts serve as stylistic models.
- FREN 611 GREAT FRENCH AUTHORS I: 1100-1750** 3
Selected readings of master authors and works from the Middle Ages to the Age of Enlightenment. Authors may include Villon, Rabelais, Montaigne, Moliere, Corneille, Mme. de Lafayette, Montesquieu, Voltaire and others.
- FREN 612 GREAT FRENCH AUTHORS II: 1750-PRESENT** 3
Selected readings of master authors and works from the dawn of Romanticism to the present. Authors may include Prevost, Rousseau, Hugo, Flaubert, Baudelaire, Gide, Proust, Camus, Sartre, Ionesco, Beckett, Duras and others.
- FREN 623 FRENCH MEDIEVAL LITERATURE** 3
Survey of French literature to 1500.
- FREN 624 FRENCH RENAISSANCE LITERATURE** 3
Selected works by Rabelais, the poets of the Pleiade, Montaigne and others.
- FREN 637 SEVENTEENTH CENTURY FRENCH THEATRE** 3
Growth of French dramatic literature before 1715 and analysis of the principal plays of Corneille, Racine and Moliere.
- FREN 638 SEVENTEENTH CENTURY FRENCH POETRY AND PROSE** 3
Representative novelists, poets, critics and moralists from Descartes and Pascal to La Fontaine, Boileau, Mme. de La Fayette and others.
- FREN 641 THE EIGHTEENTH CENTURY: THE AGE OF VOLTAIRE** 3
Novels, plays, essays and poetry of such authors as Montesquieu, Marivaux, Prevost and Voltaire.
- FREN 642 THE EIGHTEENTH CENTURY: THE AGE OF ROUSSEAU** 3
Novels, plays, essays and poetry of such authors as Diderot, Rousseau, Beaumarchais and Chénier.
- FREN 645 NINETEENTH CENTURY FRENCH NOVEL** 3
The novel from Romanticism to Naturalism. Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.
- FREN 646 NINETEENTH CENTURY FRENCH POETRY AND THEATRE** 3
Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.
- FREN 651 TWENTIETH CENTURY FRENCH LITERATURE: THE AGE OF ANXIETY AND THE ABSURD** 3
Main trends from Gide, Celine and Malraux to Camus and Beckett, including Surrealism, Existentialism and the Theater of the Absurd.
- FREN 652 ASPECTS OF CONTEMPORARY FRENCH LITERATURE** 3
A study of contemporary French literature, including novels, plays, essays and poetry of such authors as Robbe-Grillet, Sarraute, Perec, Tournier, Duras, Ponge, Bonnefoy, Jaccottet and Barthes.

FREN 655	SELECTED AUTHORS, WORKS AND THEMES	3-12
Works of one or more outstanding authors or on a special theme. RESTRICTIONS: May be repeated for credit when topics vary.		
FREN 658	TOPICS IN FRANCOPHONE LITERATURE	3
Varying aspects of Francophone studies, such as women's writing, literature of Quebec, colonial literature, African literature and cinema, literature of immigration.		
FREN 659	NEGITUDE, ANTILLANITE, CREOLITE	3
Focuses on the literary movements of Negritude, Antillanite, and Creolite, and their relation to Caribbean identity, culture and history, as well as to the field of Francophone postcolonial studies.		
FREN 869	MASTER'S THESIS	1-6
FREN 875	TOPICS: FRENCH LITERATURE	3
Study of selected topics, authors and works in the various fields of French literature. Emphasizes preparation of seminar presentations and term paper. RESTRICTIONS: May be repeated for credit when topics vary.		

GEOGRAPHY

GEOG 101	PHYSICAL GEOGRAPHY: CLIMATIC PROCESSES	3
Introduction to processes responsible for weather, climate and climatic change. Implications of climate for ecosystems and human activities. Earth-sun relations, geographic coordinate systems and map interpretation. Together GEOG101 and 106 form a comprehensive introduction to physical geography and its tools.		
GEOG 102	HUMAN GEOGRAPHY	3
Examination of the spatial distribution of human activities worldwide. Particular attention is given to those factors and processes that have led to spatial inequality and locational conflict from the international scale to the neighborhood scale.		
GEOG 106	PHYSICAL GEOGRAPHY: LAND SURFACE PROCESSES	3
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.		
GEOG 111	CLIMATIC PROCESSES LABORATORY	1
Laboratory investigation of processes responsible for weather, climate and climatic change. Implications of climate for ecosystems and human activities. Earth-sun relations, geographic coordinate systems and map interpretation. COREQ: GEOG101.		
GEOG 120	WORLD REGIONAL GEOGRAPHY	3
Introduction to the geographic regions of the world and the changing relations between regions. Emphasis is on environmental, economic, and political geographic relationships between industrial and developing nations.		
GEOG 152	CLIMATE AND LIFE	4
Introduction to those physical and biological processes that shape our climatic environment. Important themes include the exchanges of energy and mass between the atmosphere and both vegetation and built environments; and the influence of climate on humans and humans on climate.		
GEOG 166	SPECIAL PROBLEM	1-3
GEOG 203	INTRODUCTION TO CULTURAL GEOGRAPHY	3
Introductory study of people, landscapes and cultures through time. Emphasis is on culture, ethics and aesthetics as contexts for human perceptions and the creation of varied human habitats.		
GEOG 210	ECONOMIC GEOGRAPHY	3
Areal variation on the earth's surface of human activities related to producing, exchanging and consuming wealth. World distributional patterns of the major economic activities.		
GEOG 220	METEOROLOGY	3
Analysis of the atmosphere, weather elements, air masses, fronts and storms. Principles of weather forecasting, especially as it relates to severe weather.		
GEOG 225	HISTORICAL GEOGRAPHY OF THE UNITED STATES	3
Persistence and change of settlements, economic activities and social/cultural behavior in development of different geographical regions of the United States.		
GEOG 226	GEOGRAPHY OF LATIN AMERICA	3
Physical, historical and cultural geography of Latin America.		
GEOG 230	HUMANS AND THE EARTH ECOSYSTEM	3
An examination of the historical and contemporary role of humans as major agents of biological change in the earth's ecosystem.		
GEOG 235	CONSERVATION OF NATURAL RESOURCES	3
Physical, social and economic problems involved in integrating resource management and maintaining environmental quality.		
GEOG 236	CONSERVATION: GLOBAL ISSUES	3
Introduces the global nature of resources management and discusses the relationships between population growth, the market economy, agricultural production and mineral and energy exploitation, worldwide.		
GEOG 240	ENVIRONMENT AND BEHAVIOR	3
Interdisciplinary introduction to individual and group behavior in relation to developed and natural environments. The implications of such human environment interactions for planning.		
GEOG 250	COMPUTER METHODS FOR GEOGRAPHIC AND ENVIRONMENTAL SCIENCES	4
Modern Fortran programming for application to data analysis and modeling, with examples and applications from the geographical and environmental sciences. Topics include the basics of data reduction, numerical modeling, and design and use of scientific graphics. PREREQ: MATH115 or MATH 117.		
GEOG 255	APPLIED CLIMATOLOGY	3
Application of climatic information to practical problems of agriculture, irrigation and crop scheduling, health, clothing, water resources, architecture and industry.		
GEOG 271	INTRODUCTION TO GEOGRAPHIC DATA ANALYSIS	4
A survey of computational, statistical, and graphical techniques used in scientific data analysis with particular emphasis on the special nature of geographic and spatial data. Includes spreadsheet and scripting language programming.		
GEOG 310	SOCIAL GEOGRAPHY	3
The environment is defined, arranged and experienced differently by different social groups. Examines the geographical settings of minorities - ethnic groups, women, children, elderly and the homeless - and the ways institutions, media and political processes affect the spatial location and place experiences of these groups.		
GEOG 315	NEWARK, DELAWARE: PEOPLE, POLITICS AND PLACE	3
Compares college towns across the country to see how they look, feel and respond to town/gown challenges and takes a critical look at Newark, Delaware. Examines the social diversity of Newark's population; the history and politics behind local zoning, housing policies and city ordinances; and the geography of UD students. Off-campus research and/or service-learning projects required. RESTRICTIONS: Not intended for freshmen.		
GEOG 320	WATER AND SOCIETY	3
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.		
GEOG 325	URBAN GEOGRAPHY	3
Spatial relationships of urban areas, focusing on the structure of towns, the organization of urban space and the external relationships of cities.		
GEOG 328	TRANSPORTATION GEOGRAPHY	3
Geographical factors in the development of transportation and influences of transportation innovations on spatial patterns of settlement and regional growth.		
GEOG 329	INTERNATIONAL MIGRATION	3
Interdisciplinary introduction to alternative/complementary disciplinary approaches to the study of human movement between states. Offered on a rotational basis by faculty involved in the University of Delaware migration group. Crosslisted with POSC329.		
GEOG 342	BIOCLIMATOLOGY	3
Influences of weather and climate on animals, plants and humans, and their distributions; adaptation to normal and extreme environments; and environmental measurement and interpretation. PREREQ: GEOG330 and GEOG250.		
GEOG 343	CLIMATIC GEOMORPHOLOGY	3
Influence of climate and vegetation elements on rock weathering and soil erosion rates. Landform assemblages and surface materials produced under present and past climatic regimes. PREREQ: GEOG106 or GEOL105/115 or GEOL107.		
GEOG 345	CULTURAL GEOGRAPHY	3
Broad principles of the field. Human mobility and stasis. Material and symbolic landscapes. Individual and group values in landscape formation and change.		
GEOG 346	URBAN CULTURAL GEOGRAPHY	3
City landscapes as expressions of attitudes and ideals. Oriental and Western; classical, modern and future. Humanizing the urban landscape.		

- GEOG 357 PALEOCLIMATOLOGY 3**
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.
PREREQ: GEOG101 or GEOG152 or GEOG220.
- GEOG 366 INDEPENDENT STUDY 1-6**
- GEOG 372 GEOGRAPHIC INFORMATION SYSTEMS 3**
Geographic Information Systems (GIS) are a rapidly growing computer-based technology for storage and analysis of spatial information. GIS technology has been used in a variety of municipal, utility and natural resource applications. Course considers the history, uses, technology and implementation issues associated with GIS. Introduces the principles, concepts, and technical issues of geographic information systems and science. Basic cartographic principles of map design and construction are covered. Provides hands-on training in the use of a professional grade GIS package for the mapping and spatial analysis of geographic phenomena and processes.
COREQ: GEOG 250 or GEOG 271.
- GEOG 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.
Crosslisted with GEOL385.
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113, or GEOG106.
- GEOG 390 HONORS COLLOQUIUM 3**
Crosslisted with POSC390.
- GEOG 411 FLUVIAL GEOMORPHOLOGY 3**
Hydrologic and sediment transport processes in rivers and watersheds. Morphology and evolution of rivers and watersheds. Depositional processes and evolution of floodplains. Structure and interpretation of fluvial deposits in the geologic record.
Crosslisted with GEOL411.
PREREQ: Completion of any of the one-year undergraduate core course sequences (GEOL 300-302, 303-304, 305-306, or 307-308).
- GEOG 412 PHYSICAL CLIMATOLOGY 4**
Energy and moisture exchange between the atmosphere and land surface for characteristic 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 assesses the current state of scientific understanding of and ability to forecast climate change.
PREREQ: GEOG101 or GEOG152 or GEOG220 or equivalent.
- GEOG 420 ATMOSPHERIC PHYSICS 3**
Introduction to energy and moisture flows in the atmosphere at small scales. Includes atmospheric 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 discussion and debate on sustainable development policies.
- GEOG 423 ATMOSPHERIC DYNAMICS 3**
Investigates atmospheric motion in a quantitative manner. Expands basic conservation laws to derive the equations of atmospheric motion and to develop the concepts of vorticity and circulation. Discusses atmospheric wave motion and general circulation.
PREREQ: MATH242 and GEOG220.
COREQ: MATH243.
- GEOG 428 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.
- GEOG 438 WORLD CITIES IN COMPARATIVE PERSPECTIVE 3**
World city as a new and distinctive geographic urban form in the world economy. Case studies explore common features of internal structure and external relationships of world cities, their growing environmental problems and extent to which they have decoupled from national cultures and economies.
- GEOG 445 METHOD AND THEORY IN GEOGRAPHY 3**
The nature of geography, its history, methodology and applications in research and societal problems. A pre-professional course.
- GEOG 449 ENVIRONMENT AND SOCIETY 3**
Considers the relationships between environmental and social processes from the theoretical, philosophical and methodological perspectives of geography. Explores the ethical and contextual implications of framing environmental questions and posing solutions. Examines approaches to the geographical analysis of environmental problems.
- GEOG 451 MICROCLIMATOLOGY 4**
Introduction to instrumentation and techniques involved in microclimatic monitoring and sampling. Students have the unique opportunity to collect field data through a semester long research project. Research results are written to the specifications of a peer-reviewed scientific journal.
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 456 HYDROCLIMATOLOGY 3**
Study of the hydrologic cycle as it relates to water in the atmosphere and in and on the earth's surface. Hydrologic processes including precipitation, soil moisture, evapotranspiration, runoff and streamflow are examined.
PREREQ: MATH241 and GEOG250 or equivalent.
- 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 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**
Expands upon the principles and concepts covered in GEOG372 to examine advanced data structures and spatial analysis techniques, uncertainty, and visualization methods of geographic data and analysis results. Extensive experience using a professional grade GIS package. Experience is also gained in customizing the software and automating the processing through a scripting language.
PREREQ: GEOG250 or GEOG271, GEOG372, MATH115 or MATH117.
- GEOG 474 INTRODUCTION TO ENVIRONMENTAL REMOTE SENSING 3**
Introduces the fundamental characteristics of electromagnetic radiation, energy interactions, instruments, and ways to extract meaningful geophysical information from remote sensing data to solve geographical and environmental problems. Airphoto interpretation, photogrammetry, and digital image processing techniques are described through in-class demonstrations and hands on exercises using a professional grade image processing system.
PREREQ: GEOG250 or GEOG271, MATH115 or MATH117.
- GEOG 477 SPATIAL DATA ANALYSIS 3**
Special approaches to analysis of data associated with points, lines and areas on the Earth's surface commonly encountered in environmental sciences. Introduces mapping, graphical and quantitative approaches to analyzing spatial data. Fortran programs developed and used.
PREREQ: GEOG250.
- GEOG 482 PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS 3**
Survey and analysis of land surface processes in polar and mountain environments. Emphasis on the ground thermal regime, permafrost, periglacial (cold climate, nonglacial) landforms and environmental problems in cold regions. May be crosslisted with GEOL482.
PREREQ: GEOG106 or GEOL105/115 or GEOL107.
- GEOG 600 PRELUDE TO GEOGRAPHY 1**
Introduction to contemporary American geography, especially its research and educational frontiers. Also emphasizes theoretical and practical considerations in formulating, carrying out and evaluating geographic research. Students additionally are required to attend (and then discuss) the Department's Friday afternoon guest lectures.
RESTRICTIONS: Open to graduate students in geography and climatology only.
- GEOG 601 PROSEMINAR IN GEOGRAPHY I 2**
Examines the contemporary structure of geography, as its theories and approaches to inquiry. Surveys the discipline's historical development, and

introduces bibliographic and electronic literature searches, how to formulate a research question and organize research into that question.
 RESTRICTIONS: Open to graduate students in geography and climatology.

GEOG 602 PROSEMINAR IN GEOGRAPHY II 2
 Deepens ability to conduct research into a thesis or dissertation problem. By the end of the course, students are expected to have a complete draft of the literature review chapter of their thesis or dissertation.
 PREREQ: GEOG601.
 RESTRICTIONS: Open to graduate students in geography and climatology.

GEOG 605 COMPUTER PROGRAMMING FOR ENVIRONMENTAL RESEARCH 1
 Using a mixture of guided self-study and lecture, students learn modern Fortran programming for application to environmental data analysis and atmospheric and geological modeling. Older language features and use of legacy codes are also covered lightly.
 COREQ: GEOG250.

GEOG 606 OCEAN AND ATMOSPHERE REMOTE SENSING 3
 Fundamentals of ocean and atmosphere remote sensing including space platforms, their orbits, instruments, data retrieval and image processing methods. Oceanographic and atmospheric applications of remote sensing and new developments in sensors and data analyses.
 Crosslisted with MAST606.

GEOG 611 FLUVIAL GEOMORPHOLOGY 3
 Hydrologic and sediment transport processes in rivers and watersheds. Morphology and evolution of rivers and watersheds. Depositional processes and evolution of floodplains. Structure and interpretation of fluvial deposits in the geologic record.
 Crosslisted with GEOL611.

GEOG 612 PHYSICAL CLIMATOLOGY 4
 Energy and moisture exchange between the atmosphere and land surface for characteristic natural and human-modified environments.
 PREREQ: MATH241 and GEOG250.

GEOG 614 THE AMERICAN SUBURB 3
 An examination of historical and geographical origins of the American suburb and its role in metropolitan development and larger society. Includes evolution of streetcar and automobile suburbs with special emphasis on post World War II suburban boom and contemporary post-suburban trends.
 Crosslisted with UAPP614.

GEOG 617 SEMINAR IN CLIMATE CHANGE 3
 Examines facts and fallacies regarding global warming and climate science and assesses the current state of scientific understanding of and ability to forecast climate change.
 PREREQ: GEOG101 or GEOG152 or GEOG220 or equivalent.

GEOG 620 ATMOSPHERIC PHYSICS 3
 Introduction to energy and moisture flows in the atmosphere at small scales. Includes atmospheric thermodynamics, cloud physics and radiation.
 PREREQ: MATH242 and GEOG220.
 COREQ: GEOG250.

GEOG 622 RESOURCES, DEVELOPMENT AND THE ENVIRONMENT 3
 Focuses on food, resources, energy and population issues in relationship to economic development and the global environment. Engages students in discussion and debate on sustainable development policies.
 May be crosslisted with UAPP622.

GEOG 623 ATMOSPHERIC DYNAMICS 3
 Investigates atmospheric motion in a quantitative manner. Expands basic conservation laws to derive the equations of atmospheric motion and to develop the concepts of vorticity and circulation. Discusses atmospheric wave motion and general circulation.
 PREREQ: MATH242 and GEOG220.
 COREQ: MATH243.

GEOG 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
 Reading and research seminar on evolution of American urban landscape from approximately 1850 to present. Examination of historical, cultural and geographical issues and processes related to industrialism and capitalism, technology, gender and ethnicity, housing, poverty and wealth as means of understanding formation of historic American urban landscape. Includes field trips to cities in region.
 Crosslisted with UAPP635.

GEOG 636 RESEARCH TOPICS IN HISTORIC PRESERVATION 3
 Seminar addresses a specific research issue within historic preservation including hypothesis construction, design of research methodology and evaluation of results. Emphasis on use of primary sources and application of data-base techniques.
 Crosslisted with UAPP636.

GEOG 638 WORLD CITIES IN COMPARATIVE PERSPECTIVE 3
 World city as a new and distinctive geographic urban form in the world economy. Case studies explore common features of internal structure and external relationships of world cities, their growing environmental problems and extent to which they have decoupled from national cultures and economies.
 May be crosslisted with UAPP638.

GEOG 641 SUMMER INSTITUTE FOR GEOGRAPHY TEACHERS I 3
 Explores the content, perspectives, and methods of geography, focusing on maps and spatial analysis (Delaware Geography Standard 1) and how humans interact with the physical environment (Delaware Standard 2). Content presented relates directly to the requirements of the K-12 Delaware Content Standards in Geography.

GEOG 642 SUMMER INSTITUTE FOR GEOGRAPHY TEACHERS II 3
 Explores the content, perspectives, and methods of geography, focusing on the geographic concept of Place (Geography Standard 3) and Region (Geography Standard 4). Content presented relates directly to the requirements of the K-12 Delaware Content Standards in Geography.

GEOG 645 METHOD AND THEORY IN GEOGRAPHY 3
 The nature of geography, its history, methodology and applications in research and societal problems. A preprofessional course.

GEOG 649 ENVIRONMENT AND SOCIETY 3
 Considers the relationships between environmental and social processes from theoretical, philosophical, and methodological perspectives of geography. Explores the ethical and contextual implications implied in framing environmental questions and posing solutions. Examines approaches to the geographical analysis of environmental problems.

GEOG 651 MICROCLIMATOLOGY 4
 Introduction to instrumentation and techniques involved in microclimatic monitoring and sampling. Field observation carried out in varying environmental situations.
 PREREQ: GEOG412 or GEOG612.

GEOG 652 SEMINAR IN CLIMATOLOGY 3-12
 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 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 GEOGRAPHIC INFORMATION SYSTEMS AND SCIENCE 3
 Introduces the principles and concepts of geographic information science to effectively use a professional level geographic information system. Practical hands-on exposure to "real" data and GIS software and hardware is provided through exercises and a final project.

GEOG 671 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS 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 672 SEMINAR IN GEOGRAPHIC INFORMATION SYSTEMS 3
 Principles underlying geographic information systems (GIS) are examined, and sample geographic problems are analyzed. Design and programming of modules for data acquisition and storage, map projection, map overlay, spatial data analyses, and graphic output are considered. Geographic themes and data vary

each time the seminar is offered.

PREREQ: GEOG470, GEOG670 or GEOG471.

GEOG 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 677 SPATIAL DATA ANALYSIS 3
Special approaches to analysis of data associated with points, lines and areas on the Earth's surface commonly encountered in environmental sciences. Introduces mapping, graphical and quantitative approaches to analyzing spatial data. Fortran programs developed and used.
PREREQ: GEOG250.

GEOG 681 REMOTE SENSING OF ENVIRONMENT 3
Detection and mapping of land and ocean resources with optical, infrared and microwave sensors. Digital analysis of satellite images using multispectral and spatial analysis techniques and correlation with ground/ship data. Application to oceanography, coastal processes, geology, land use, geography, agriculture, climate and pollution studies. Includes hands-on image analysis in GIS laboratory. Crosslisted with MAST681.
RESTRICTIONS: Requires permission of instructor.

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, non-glacial) landforms and environmental problems in cold regions. May be crosslisted with GEOL682.

GEOG 803 TOPICS IN GEOMORPHOLOGY 1-3
Selected topics in geomorphology. Topics vary according to instructor preference. Crosslisted with GEOL803.
RESTRICTIONS: May be taken more than once for graduate credit.

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 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.

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, GEOL115.

GEOL 107 GENERAL GEOLOGY 4
Principles of physical geology and its application in interpreting earth processes. Laboratory covers identification of earth materials and the interpretation of topographic and geologic maps.

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. Also explores 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 Sciences.

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
Uplift, weathering, sediment transport, depositional processes and selected depositional environments. Quaternary history and geochronology. Subsurface fluid flow in surficial environments. Environmental and applied aspects of surficial processes.
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/ancient analogs 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 structures, geologic stress and the responses of rocks to stress. Examines plate tectonics and the major structural and tectonic relations generated at plate boundaries.
PREREQ: GEOL105 and GEOL115, or GEOL107 or GEOL113.

GEOL 306 THE EARTH'S LITHOSPHERE II: FIELD GEOLOGY 4
Training and experience in geological mapping and field methods. Geologic map construction and interpretation. Includes rock descriptions, stratigraphic analysis and correlation, and structural methods. Emphasis on regional Piedmont and coastal plain geologic settings.
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL305.

GEOL 307 THE EARTH'S HISTORY I: PALEOBIOLOGY 4
Recognition, biology and paleobiology of major groups of invertebrates. Use of the fossil record in solving environmental and paleoenvironmental problems. Principles of stratigraphy and correlation and origin and development of the geologic time scale.
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113.

GEOL 308 THE EARTH'S HISTORY II: EARTH SYSTEM SCIENCE 4
Interaction and evolution of the lithosphere, biosphere, hydrosphere and atmosphere. Examination of the geologic record as a test for hypotheses about earth system processes including climate change, paleoceanography and tectonics. Integrative study of the history of the earth and its inhabitants.
PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113; GEOL307.

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 crosslisted with GEOG385.

PREREQ: GEOL105 and GEOL115, or GEOL107, or GEOL113, or GEOG106.

GEOL 401 SENIOR SEMINAR: TOPICS IN GEOSCIENCE 3

Integrated examination of topics and concepts of current interest and importance in geoscience. Topics may vary.

PREREQ: Senior geology majors only, within 30 credits of graduation.

GEOL 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 411 FLUVIAL GEOMORPHOLOGY 3

Hydrologic and sediment transport processes in rivers and watersheds. Morphology and evolution of rivers and watersheds. Depositional processes and evolution of floodplains. Structure and interpretation of fluvial deposits in the geologic record.

May be crosslisted with GEOG411.

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; paleogeographies 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 geology 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 GEOLOGY 3

The application of geologic principles to matters of environmental concern.

Discussion, examples, techniques and case histories in water supply, waste disposal, zoning and land use, mining, legislation, regulation and professionalism emphasizing the role of geologist and the educated citizen.

PREREQ: 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 and control, health and safety plans, decontamination and spill response recovery.

RESTRICTIONS: GEOL422 cannot be applied toward the nine credits of 400-level geology electives required of BS geology majors.

GEOL 428 HYDROGEOLOGY 3

Principles of groundwater flow and water chemistry in varied geologic media. Evaluation of groundwater resources and assessment of environmental problems associated with groundwater use.

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 453 ELEMENTARY GEOPHYSICS I 3

Fundamentals of seismology, wave propagation, refraction and reflection of seismic waves. Seismic and ground-penetration radar (GPR) exploration methods and interpretations, with emphasis on near-surface problems.

PREREQ: GEOL107 or GEOL105/115 or GEOL113; MATH 242; PHYS201 and PHYS202.

GEOL 454 ELEMENTARY GEOPHYSICS II 3

Gravity and the shape of the earth and theories of isostasy. Geomagnetism, magnetization of rocks and paleomagnetism. Gravity, magnetic, electrical and electromagnetic methods and interpretations.

PREREQ: GEOL107 or GEOL105/115 or GEOL113; MATH242; PHYS201 and PHYS202.

GEOL 466 INDEPENDENT STUDY 1-3

GEOL 482 PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS 3

Survey and analysis of land surface processes in polar and mountain environments. Emphasis on the ground thermal regime, permafrost, periglacial (cold climate, nonglacial) landforms and environmental problems in cold regions. Crosslisted with GEOG482.

PREREQ: GEOG106 or GEOL105/115 or GEOL107.

GEOL 501 TOPICS IN MIDDLE SCHOOL GEOLOGY EDUCATION: WATERSHEDS 3

Application of geologic principles to topics related to watersheds, ground and surface waters, topographic maps, point and non-point sources of pollution, the water cycle, and drinking water.

PREREQ: GEOL107.

RESTRICTIONS: Restricted to in-service middle school teachers.

GEOL 502 TOPICS IN MIDDLE SCHOOL GEOLOGY EDUCATION: EARTH HISTORY 3

Application of geologic principles to topics related to Earth's history including: the rock record, relative and absolute dating of rocks, the fossil record, correlation of rocks and fossils, the geologic time scale, and the history of geologic events in Delaware.

RESTRICTIONS: Restricted to in-service middle school science teachers.

GEOL 601 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 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 611 FLUVIAL GEOMORPHOLOGY 3

Hydrologic and sediment transport processes in rivers and watersheds.

Morphology and evolution of rivers and watersheds. Depositional processes and evolution of floodplains. Structure and interpretation of fluvial deposits in the geologic record.

May be crosslisted with GEOG611.

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 uses 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 & analysis, 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 groundwater 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 uses in interpreting geologic history and paleoecology.		
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 GEOCHEMISTRY	3
Chemical principles applied to geologic processes and environments. Thermochemistry of mineral equilibria; and mineral stabilities at high temperature and pressure. Radioisotopes and methods of geochronology. The geochemical history of the earth.		
GEOL 653	ELEMENTARY GEOPHYSICS I	3
Fundamentals of seismology, wave propagation, refraction and reflection of seismic waves. Seismic and ground-penetration radar (GPR) exploration methods and interpretations, with emphasis on near-surface problems.		
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
Spatial distributions; directional data; statistical graphics, regression and time series analysis; model validation; sampling; principal components; cluster analysis; discriminant analysis; and statistical software routines. Crosslisted with STAT657. PREREQ: MATH201		
GEOL 682	PHYSICAL GEOGRAPHY OF COLD ENVIRONMENTS	3
Survey and analysis of land surface processes in polar and mountain environments. Emphasis on the ground thermal regime, permafrost, periglacial (cold climate, non-glacial) landforms and environmental problems in cold regions. Crosslisted with GEOG682.		
GEOL 801	TOPICS IN PLANETOLOGY	1-3
Selected topics in planetology. 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 preference. May be crosslisted with GEOG803. RESTRICTIONS: May be taken more than once for graduate credit.		
GEOL 804	TOPICS IN GEOCHEMISTRY	1-3
Selected topics in geochemistry. Topics vary according to instructor preference. RESTRICTIONS: May be taken more than once for graduate credit.		
GEOL 807	TOPICS IN MINERALOGY AND PETROLOGY	1-3
Selected topics in mineralogy and petrology. Topics vary according to instructor's 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 810	TOPICS IN COASTAL GEOSCIENCE	1-3
Selected topics in coastal geoscience. Topics vary according to instructor preference. RESTRICTIONS: May be taken more than once for graduate credit.		

GEOL 818	TOPICS IN PALEOBIOLOGY	1-3
Selected topics in paleobiology. Topics vary according to instructor's preference.		

GEOL 857	PALEOCEANOGRAPHY	3
Focuses on processes related to climate change from tectonic to millennial timescales based on the marine sedimentary record of the past 65 million years. Topics include light stable isotopes and biogeochemical cycling of elements. Includes lectures and student-lead discussion of current literature. Crosslisted with MAST857. RESTRICTIONS: Requires permission of instructor.		

GEOL 868	RESEARCH	1-9
Enables students to begin planning work and research before admission to dissertation candidacy and GEOL969.		

GEOL 869	MASTER'S THESIS	1-6
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GEOL 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.		

GEOL 969	DOCTORAL DISSERTATION	1-12 PF
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GREEK

GREK 101	ELEMENTARY ANCIENT GREEK I	3
Prepares students to read ancient Greek literary works in the original language. Emphasizes building a basic vocabulary and acquiring essential grammar. Includes discussion of ancient Greek culture and civilization.		

GREK 102	ELEMENTARY ANCIENT GREEK II	3
Completion of elementary Greek. PREREQ: GREK101 or equivalent.		

GREK 213	ANCIENT PROSE: INTERMEDIATE GREEK	3
Focuses on the works of one or more prose authors with particular attention to review of grammar and syntax. Readings will be drawn from the philosophical, historical, and oratorical works of authors such as Plato, Herodotus, Xenophon, Lysias, Demosthenes, and Isocrates in rotation or in combination. PREREQ: GREK102 or equivalent.		

GREK 214	ANCIENT POETRY: INTERMEDIATE GREEK	3
Focuses on the works of one or more poets. Readings will be drawn from the epic, lyric, and dramatic (tragic and comic) works of authors such as Homer, Sappho, Pindar, Aeschylus, Sophocles, Euripides, and Aristophanes in rotation or in combination. PREREQ: GREK213 or equivalent. RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.		

GREK 313	ANCIENT PROSE: ADVANCED INTERMEDIATE GREEK	3
Focuses on the works (in the original language) of one or more prose authors with particular attention to interpretative issues such as themes and contemporary intellectual and cultural milieu. Readings drawn from the philosophical, historical, and oratorical works of authors such as Plato, Herodotus, Xenophon, Lysias, Demosthenes, and Isocrates in rotation or in combination. PREREQ: GREK214 or equivalent.		

GREK 314	ANCIENT POETRY: ADVANCED INTERMEDIATE GREEK	3
Advanced intermediate level course in ancient Greek focusing on the works (in the original language) of one or more poets. Readings will be drawn from the epic, lyric, and dramatic (tragic and comic) works of authors such as Homer, Sappho, Pindar, Aeschylus, Sophocles, Euripides, and Aristophanes in rotation or in combination. PREREQ: GREK214 or equivalent.		

GREK 366	INDEPENDENT STUDY	1-3
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GREK 466	INDEPENDENT STUDY	1-3
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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 College of Arts and Sciences 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: GRMN111.
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 and written work where appropriate.
PREREQ: GRMN107 or one 200-level German course.
RESTRICTIONS: 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 to broaden knowledge of German culture while improving oral and aural language skills.
PREREQ: GRMN107.
RESTRICTIONS: Taught abroad only.
- 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 235 GERMAN POPULAR CULTURE** 3
Examines aspects of German popular culture, especially youth culture: customs, attitudes, pastimes, audio, print and visual media preferred by German young adults. Students exposed to colloquial German used within everyday contexts.
PREREQ: GRMN107.
RESTRICTIONS: Not intended for students who have already taken a 300- or 400-level course in German.
- GRMN 246 GERMAN YOUTH CULTURE** 3
Aspects of German youth culture, including customs, attitudes, and pastimes preferred by students in Germany. Focus on reading, writing, and audiovisual media. Topics include fashion, sports, socialization represented in variety of media, such as TV, film and print media. Taught in German.
PREREQ: GRMN107.
RESTRICTIONS: Not intended for students who have already taken a 300 or 400 level course in German.
- 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: GRMN107.

RESTRICTIONS: Not intended for students who have already taken a 300- or 400-level course in German.

- GRMN 305 GERMAN CONVERSATION AND PHONETICS** 3
Discussion of current cultural, social and political topics in German-speaking countries. Pronunciation exercises and vocabulary building.
PREREQ: Any two 200-level German courses.

- GRMN 306 PRACTICAL ORAL/WRITTEN EXPRESSION** 3
Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exposes, discussion of articles and videos, textual analysis and compositions.
PREREQ: Any two 200-level German courses.
RESTRICTIONS: Taught abroad only.

- GRMN 308 CONTEMPORARY GERMANY II** 3
Discussion and study of issues related to contemporary cultural, political and social developments in Germany, including its place in today's European community.
PREREQ: Any two 200-level German courses.
RESTRICTIONS: Taught abroad only. Taught in German.

- GRMN 311 INTRODUCTION TO MODERN GERMAN LITERATURE** 3
Masterpieces of poetry, narrative prose and drama from the 18th century to the present.
PREREQ: Any two 200-level German courses

- GRMN 325 GERMAN CIVILIZATION AND CULTURE** 3
A survey of the major cultural, social and political developments in Germany from the mid-18th century to the present.
PREREQ: Any two 200-level German courses

- GRMN 350 INTRODUCTION TO BUSINESS GERMAN** 3
Familiarizes students with characteristics of business German (vocabulary, terminology and syntactical patterns) and aspects of the German business community.
PREREQ: Any two 200-level German courses.

- GRMN 355 SPECIAL TOPICS** 3-12
Explores an area of special interest in German literature or culture studies. The subject matter varies and will be announced in the registration booklet.
PREREQ: Any two 200-level German courses.
RESTRICTIONS: May be repeated for credit when topics vary.

- GRMN 366 INDEPENDENT STUDY** 1-3

- GRMN 406 ADVANCED GERMAN LANGUAGE** 3
Grammatical structure and stylistics with special attention given to technical vocabulary and discourse, e.g., business, law, science and agriculture.
PREREQ: Two 300-level German courses, one of which may be taken concurrently with the 400-level course.
RESTRICTIONS: Taught abroad only.

- GRMN 412 EARLY GERMAN LITERATURE** 3
Representative authors and themes: 12th-17th centuries. "Courtly love" and "knighthood" (Minnesang, Das Nibelungenlied); "bourgeoisie" vs. "peasantry" during the Reformation (Sachs's Fastnachtspiele, Eulenspiegel); and the Baroque themes of "carpe diem" and "memento mori" (Grimmelshausen's Simplicissimus, Gryphius's plays, Baroque poetry).
PREREQ: Two 300-level German courses, one of which may be taken concurrently with the 400-level course.

- GRMN 422 AGE OF GOETHE** 3
Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The importance of the Enlightenment, the Storm and Stress movement, the Classical period and early Romanticism.
PREREQ: Two 300-level German courses, one of which may be taken concurrently with the 400-level course.

- GRMN 433 NINETEENTH-CENTURY GERMAN LITERATURE** 3
Studies major literary trends and figures from the end of Romanticism to Naturalism.
PREREQ: Two 300-level German courses, one of which may be taken concurrently with the 400-level course.

- GRMN 442 FROM NATURALISM TO EXPRESSIONISM** 3
Main literary currents from the 1880's to the 1920's.
PREREQ: Two 300-level German courses, one of which may be taken concurrently with the 400-level course.

- GRMN 453 GERMAN LITERATURE: 1945-1989** 3
Major authors and literary movements from the end of World War II until German unification.
PREREQ: Two 300-level German courses, one of which may be taken concurrently with the 400-level course.

GRMN 455	SELECTED AUTHORS, WORKS AND THEMES	3
Works of one or more outstanding authors or a special theme. PREREQ: Two 300-level German courses, one of which may be taken concurrently with the 400-level course. RESTRICTIONS: May be repeated for credit when topics vary.		
GRMN 465	POSTWALL GERMANY: LITERATURE AND CULTURE	3
Explores reunited Germany's cultural and literary landscape and examines how reunification has affected East and West Germans. Focuses on how reunification has (re) shaped German national identity, affected the way Germans remember the past and contribute to the formation of a multicultural society. PREREQ: Two 300-level German courses, one of which may be taken concurrently with the 400-level course.		
GRMN 466	INDEPENDENT STUDY	1-3
GRMN 533	GERMAN READINGS FOR PH.D. CANDIDATES	3 PF
A basic course in German for graduate students in other disciplines who have had little or no previous experience in the language. Emphasis on developing reading comprehension.		
GRMN 612	EARLY GERMAN LITERATURE	3
Representative authors and themes: 12th-17th centuries "courtly love" and "knighthood" (Minnesang, Das Nibelungenlied); "bourgeoisie verses peasantry" during the Reformation (Sachs's Fastnachtspiele, Eulenspiegel); Baroque themes of "carpe diem" and "memento mori" (Grimmelshausen's Simplicissimus, Gryphius's plays, Baroque poetry).		
GRMN 622	AGE OF GOETHE	3
Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The importance of the Enlightenment, the Storm and Stress movement, the Classical period and early Romanticism.		
GRMN 633	NINETEENTH CENTURY GERMAN LITERATURE	3
A study of major literary trends and figures from the end of Romanticism to Naturalism.		
GRMN 642	NATURALISM TO EXPRESSIONISM	3
Main literary currents from the 1880's to the 1920's.		
GRMN 653	GERMAN LITERATURE: 1945-1989	3
Major authors and literary movements from the end of World War II until German unification.		
GRMN 655	SELECTED AUTHORS, WORKS AND THEMES	3-12
Works of one or more outstanding authors or a special theme. RESTRICTIONS: May be repeated for credit when topics vary.		
GRMN 665	POSTWALL GERMANY: LITERATURE AND CULTURE	3
Explores reunited Germany's cultural and literary landscape and examines how reunification has affected East and West Germans. Focuses on how reunification has (re)shaped German national identity, affected the way Germans remember the past and contributed to the formation of a multicultural society.		
GRMN 869	MASTER'S THESIS	1-6
GRMN 875	SEMINAR: TOPICS IN GERMAN LITERATURE	3
Study of selected topics, authors and works in the various fields of German literature. Variable content. Emphasizes preparation of seminar presentations and term paper. RESTRICTIONS: May be repeated for credit when topics vary.		

HEBREW

HEBR 105	HEBREW I - ELEMENTARY	4
Introduction to the Hebrew alphabet and language, and development of basic speaking, listening, reading and writing skills. May be crosslisted with JWST105.		
HEBR 106	HEBREW II - ELEMENTARY/INTERMEDIATE	4
Continuation of Elementary Hebrew. Increasing mastery of the basic skills of speaking, listening, reading, and writing through texts, conversations and songs. May be crosslisted with JWST106. PREREQ: HEBR105. Those with background other than HEBR105 should see instructor for appropriate placement.		
HEBR 107	HEBREW III - INTERMEDIATE	4
Strengthening grammar skills, continued practice in speaking, listening, writing and reading through conversation, texts and songs. May be crosslisted with JWST107. PREREQ: HEBR106. Those with background other than HEBR106 should see instructor for appropriate placement. RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.		

HEBR 205	HEBREW CONVERSATION	3
Practical use of Hebrew by means of discussions and oral reports on a variety of topics including family, school and work life. Emphasis on improvement of conversational skills for social situations, as well as grammatical competence and reading comprehension through multicultural themes including the revival of the Hebrew language and various issues related to Hebrew culture. May be crosslisted with JWST205. PREREQ: HEBR107 or equivalent.		
HEBR 209	CONTEMPORARY ISRAEL THROUGH FILM	3
Development of oral and written proficiency in Hebrew through discussion and analysis of Israeli films pertaining to major issues in the development of the young state. Grammar review where needed. May be crosslisted with JWST209. PREREQ: HEBR107 or one 200-level Hebrew course or professor's permission. RESTRICTIONS: Minimum grade of A- required for HEBR107 and minimum grade of B required for a 200-level course.		
HEBR 366	INDEPENDENT STUDY	1-3
HEBR 466	INDEPENDENT STUDY	1-6

HUMAN SERVICES, EDUCATION AND PUBLIC POLICY

HEPP 100	INTRODUCTORY SEMINAR	1
Designed for freshmen and transfer students in the CHEP College, and provides students an opportunity to gain a greater understanding of the University and the CHEP College. Students learn practical skills helpful in mastering the freshman year or first year for transfer students. Attention given to time management and study skills, academic resources, and out-of-classroom opportunities. Other helpful tips to ease the transition into college area also be covered. Fulfills the First Year Experience (FYE) requirement for freshmen students.		
HEPP 400	SERVICE LEARNING PRACTICUM	3-6
Structured experience in a public or private, business, educational or non-profit setting as part of the Human Services, Education and Public Policy major. Requires written documentation of the experience by the student through various means such as a paper, portfolio, report, journal, etc.		
HEPP 433	INTERNET LITERACY	3
Provides the conceptual background and the online skills needed to become Internet literate. Includes a hands-on tutorial on creating Web pages and using search engines to conduct research. Reflects on the impact of emerging technologies on the future of schooling and communications.		
HEPP 465	SENIOR SEMINAR IN DISABILITIES STUDIES	3
Culminates the Disabilities Studies minor. Focuses on community access, independence, inclusion, and productivity of people with disabilities. Examines national disability policy frameworks and applications, person-centered perspectives on delivery of services and supports, and methods of facilitating change. Requires completion of an applied local advocacy project. PREREQ: IFST270 and EDUC230.		
HEPP 533	INTERNET LITERACY	3
Provides the conceptual background and the online skills needed to become Internet literate. Includes a hands-on tutorial on creating Web pages and using search engines to conduct research. Reflects on the impact of emerging technologies on the future of schooling and communications.		

HEALTH AND EXERCISE SCIENCES

HESC 120	PHYSICAL EDUCATION	1-12 PF
Introduces knowledge and skills in physical activity. The program is geared toward lifetime sports 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.		
HESC 122	LIFEGUARD TRAINING	2
Skills and knowledge for the professional lifeguard. Topics include the professional lifeguard; rescue skills; breathing and cardiac emergencies; firstaid; oxygen administration in the use of Automated External Defibrillation (AED); and spinal injuries.		
HESC 132	SCUBA	2
Prepares students with the skills and knowledge necessary to continue their training for open water scuba certification.		

HESC 135 FRESHMAN SEMINAR	2	Covers basic survival skills: effective coping strategies to meet personal, academic, career and social challenges. Enhances student success and develops positive lifelong learning skills. RESTRICTIONS: Open to first semester freshmen.
HESC 140 FUNDAMENTAL SKILLS ANALYSIS	3	Designed to develop cognitive understanding and practical experience for teaching and refinement of fundamental skills in grades K-12. Emphasis on processes of perceiving, extending, refining and applying fundamental skills through teaching progressions, lead-up games, and activities. RESTRICTIONS: Open to HPEI majors only.
HESC 141 ADVENTURE CHALLENGE AND OUTDOOR RECREATION	1	Provides opportunity to develop skills and techniques, learn methods and acquire knowledge of designated outdoor recreation skills and adventure challenge activities. Emphasis on developing readiness for presenting such activities in group settings. RESTRICTIONS: Open to HPEI majors only.
HESC 143 SKILLS, TECHNIQUES AND KNOWLEDGE OF STUNTS AND TUMBLING	1	Preparation for teaching elementary school gymnastics using developmentally appropriate experiences with minimal equipment, including concepts of weight transfer, rolling, balance skills, and muscle fitness. RESTRICTIONS: Open to HPEI majors only.
HESC 145 INTRODUCTION TO PHYSICAL EDUCATION	3	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 HPEI majors only.
HESC 155 PERSONAL HEALTH MANAGEMENT: AN APPROACH FOR A LIFETIME	3	Utilizing group problem solving techniques and on-line resources, students develop a comprehensive approach to managing their own health. RESTRICTIONS: Not open to students who have taken HESC214.
HESC 160 HEALTH BEHAVIOR SCIENCE FIRST YEAR SEMINAR	1	Exposure to career opportunities within health behavior science field. RESTRICTIONS: Open to HLB1 majors only.
HESC 166 SPECIAL PROBLEM	1-3 PF	
HESC 168 FRESHMAN SPECIAL TOPICS	1-3	Freshman level independent study.
HESC 202 FOUNDATIONS OF SPORT MANAGEMENT	3	Overview of sport management field and segments of sport industry, including types of employment opportunities, as well as skills, educational background, and experiences essential for successful career in sport industry. RESTRICTIONS: Open to SMI majors only.
HESC 205 FRESHMAN SEMINAR IN EXERCISE SCIENCE	1 PF	Introduction to biomechanics, exercise physiology, and motor control, including familiarization with types of laboratory research and career opportunities associated with each discipline.
HESC 207 FOUNDATIONS OF LEISURE AND SPORT MANAGEMENT	3	History, theory, and philosophy of leisure and sport and their influence on society, with emphasis on principles and objectives of program planning and execution. RESTRICTIONS: Open to SMI, SM, HLB1 and HLBH majors only.
HESC 210 EMERGENCY MANAGEMENT OF INJURIES AND ILLNESSES	3	Emergency management of life-threatening and non-life-threatening injuries and illnesses. Includes CPR skills and initial and secondary assessments; first aid for wounds, burns, heat illnesses, and cold illnesses; and injuries to the head, spine, chest, and extremities. RESTRICTIONS: Open to majors within the Department of Health, Nutrition and Exercise Sciences only.
HESC 214 WELLNESS: A WAY OF LIFE	3	Principles of personal and public health including present and future problems of environmental control. Includes health services, health education and healthy school environment. RESTRICTIONS: Not open to students who have taken HESC155.
HESC 220 ANATOMY AND PHYSIOLOGY	3	Structure and function of human body: skeletal, muscular, circulatory, respiratory, nervous, endocrine, digestive and urinary systems. Foundation course for all areas of physical education and athletics. RESTRICTIONS: Open to majors and HLEX concentration students only.
HESC 225 OFFICIATING RECREATIONAL SPORTS	1-2	Theory and practice of officiating recreational sports. Introduced as a lifetime activity, emphasis is placed on practical experience with the intramural program. Minimal classroom time. Offers excellent leadership training. RESTRICTIONS: Meets one half of a semester. Spring sports: basketball and softball.
HESC 230 GROUP FACILITATION SKILLS IN HEALTH AND PHYSICAL EDUCATION	3	Effective group facilitation, management and communication proficiency modeled and practiced. Participation in a variety of group models to enhance delivery of diverse classroom topics. Develops preliminary health education planning skills including communication of sensitive issues. RESTRICTIONS: Open to HPEI majors only.
HESC 231 TEACHING COMMUNITY AND MENTAL HEALTH	3	Development of teaching approaches for mental health issues such as death and dying, suicide, depression, stress reduction and self-esteem. Emphasis on developing partnerships with community-based health programs and accessing pertinent health information. PREREQ: HESC155. RESTRICTIONS: Open to HPE majors only.
HESC 240 INTRODUCTION TO ATHLETIC TRAINING	3	Orientation to athletic training as a career in the health care industry and introduction to the prevention and care of injuries in the physically active population. PREREQ: HESC220. RESTRICTIONS: Restricted to Athletic Training Interest (ATI) students only. Not open to students who have taken HESC305.
HESC 241 TEACHING INDIVIDUAL SPORTS	3	Designed to prepare physical education teacher candidates to teach a variety of individual sports that have been identified as relevant to national and state standards, and current K-12 physical education curricula. Emphasis on developing readiness for teaching these activities in public school setting. RESTRICTIONS: HPE students only.
HESC 245 TEACHING TEAM SPORTS	3	Designed to prepare physical education teacher candidates to teach a variety of team sports identified as relevant for K-12 physical education settings and both state and national standards. Emphasis placed on developing content and pedagogical knowledge necessary to teach these activities in public school settings. RESTRICTIONS: HPE students only.
HESC 251 SKILLS, TECHNIQUES AND KNOWLEDGE OF RHYTHMS AND DANCE	1	Preparation of physical education teachers. Provides opportunity to develop skills, learn methods and techniques and acquire knowledge of the above activities. Emphasis on developing readiness for presenting such activities in public school settings. RESTRICTIONS: Open to HPEI and HPE majors only.
HESC 252 LIFETIME LEISURE ACTIVITIES	1	Provides 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 HPEI and HPE majors only.
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. RESTRICTIONS: Open to HPEI and HPE majors only.
HESC 257 ATHLETIC TRAINING PRACTICUM I	3 PF	Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies. PREREQ: HESC240. RESTRICTIONS: Open to athletic training majors only.
HESC 258 ADVANCED TAPING AND BRACING TECHNIQUES	1	Laboratory experience in advanced taping, wrapping, bracing and splinting; variations for upper and lower extremity orthopedic injuries; emergency and non-emergency on-field transportation techniques; and equipment fitting and modification techniques. RESTRICTIONS: Open to athletic training majors only.
HESC 261 LEADERSHIP IN LEISURE AND SPORT MANAGEMENT	3	Dynamics of group interaction and theories, principles, and practices of leadership. Review of research in leadership and group dynamics. Practical experience in applying theories and techniques through group execution of major campus-wide special event. PREREQ: HESC207. RESTRICTIONS: Open to HLB1, HLBH, SMI and SM majors only.

HESC 263	LEADERSHIP PRACTICUM	1 PF	Students work under the auspices of an appointed professional to develop leadership skills in fitness activities.	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 or HESC310. COREQ: HESC317. RESTRICTIONS: Open to students whose major or minor requires this course.
HESC 266	SPECIAL PROBLEM	1-3 PF		
HESC 268	SOPHOMORE SPECIAL TOPICS	1-3	Sophomore level independent study.	
HESC 276	TECHNOLOGY IN HEALTH AND PHYSICAL EDUCATION	2	Focuses on future educators integrating technology into the classroom. Hands-on work involves designing educational experiences for professional and student use. RESTRICTIONS: Open to HPEI majors only.	
HESC 281	ADVENTURE CHALLENGE: ACTIVITIES & LEADERSHIP	3	Introduces outdoor adventure learning. Gain an understanding of the learning process and activities that are especially effective for behavior change in areas of cooperation and communication. Leadership skills are emphasized.	
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 HPE majors only.	
HESC 301	MOTOR DEVELOPMENT	3	Pattern of motor development from infancy through adolescence. Motor performance, perceptual-motor development in children, assessment for motor problems, remedial activities, principles of motor learning and conditions that improve motor learning. PREREQ: HESC140 OR HESC145. RESTRICTIONS: Open to HPE majors only.	
HESC 302	PRACTICUM IN SPORT MANAGEMENT	1 PF	A pre-internship professional experience in a sport management/recreation agency. Students work under the auspices of a faculty supervisor and professional mentor to gain practical experience. RESTRICTIONS: Open to sport management majors only.	
HESC 303	PRACTICUM IN SPORT MANAGEMENT	1 PF	A pre-internship professional experience in a sport management agency. Students work under the auspices of a faculty supervisor and professional mentor to gain practical experience. RESTRICTIONS: Open to sport management 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 or HESC310.	
HESC 310	PRE-CLINICAL ANATOMY AND PHYSIOLOGY	4	Structure and function of the human body for pre-professionals in clinical and allied health fields. Emphasis on skeletal, muscular and nervous systems, with additional coverage of circulatory, respiratory, endocrine and immune systems. RESTRICTIONS: Open to exercise science majors only.	
HESC 311	ISSUES IN HEALTH BEHAVIOR SCIENCE	3	Issues surrounding health behavior science, with emphasis on role of professional in promoting individual and community behavior change. RESTRICTIONS: Open to HLBH majors only.	
HESC 315	INSTRUCTIONAL STRATEGIES FOR DRUG EDUCATION	3	Presents methods and materials to be used in school drug education programs. Emphasis on basic information related to the drug problem. Outside resource people including former drug users will be involved in class presentations. PREREQ: HESC155 and HESC230.	
HESC 317	STRENGTH AND CONDITIONING LABORATORY	1	Practical applications of strength and conditioning theory presented in HESC320. Development of fundamental skills needed to be a professional trainer for people of all activity levels. PREREQ: HESC220 or HESC310. COREQ: HESC320 is a prerequisite or corequisite.	
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 on health-related fitness, lifetime physical activity and nutrition using a nationally approved program. PREREQ: NTD200. RESTRICTIONS: Open to HPE majors only.	
HESC 320	PRINCIPLES OF STRENGTH/CONDITIONING	3	Addresses scientific basis of strength and conditioning based upon principles	
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 HPE majors only.	
HESC 325	INSTRUCTIONAL STRATEGIES FOR HUMAN SEXUALITY	3	Develops content knowledge and presents teaching methodologies relative to all facets of human sexuality. Emphasis on the process of integrating information into effective age specific educational strategies. PREREQ: HESC315. RESTRICTIONS: HPE majors or permission of instructor.	
HESC 326	RESEARCH METHODS AND STATISTICS FOR BEHAVIORAL SCIENCE	3	Overview of types of research and statistical techniques commonly used in health behavior science, including research proposal development. RESTRICTIONS: Open to juniors and seniors in health behavior sciences majors only.	
HESC 329	DYNAMICS OF TEAM PROBLEM SOLVING	3	Development of teaming skills and their application in solving real life health-related issues. Topics include facilitation and leadership, dialogue and discussion, team maintenance and development and conflict resolution.	
HESC 332	HEALTH BEHAVIOR THEORY AND ASSESSMENT	3	Provides understanding and application of health behavior theory to program development and evaluation. Emphasis placed on skills and competencies necessary for programming and evaluation including needs assessments, research, communication and team process. PREREQ: HESC326 or STAT200. RESTRICTIONS: Open to students in health behavior science majors or weight management concentration only.	
HESC 333	HEALTH BEHAVIOR THEORY AND PROGRAM PLANNING	3	Health behavior theories as they relate to youth health behaviors and development of health education programs, including development and use of instruments for assessing health behaviors. RESTRICTIONS: Open only to HPE majors.	
HESC 335	HEALTH AND AGING	3	Aging process addressed from biopsychosocial perspective. Particular emphasis placed on developing understanding of complex interrelations among aging, health and social structure. RESTRICTIONS: Open to health behavior science or GRN concentration majors only.	
HESC 340	MANAGEMENT OF SPORT INFORMATION	3	An analysis of the information management process in the sport industry. The relationships between sport organizations, the public and the media are explored. RESTRICTIONS: Open to sport management majors only.	
HESC 341	PRINCIPLES OF OUTDOOR RECREATION	3	Presents an orientation to the field of outdoor recreation. Attention given to heritage, trends, resources, economics, management approaches, ecological and educational goals and ethics toward an outdoor natural environment. Laboratory section involves participation and skill development in a variety of outdoor recreation activities.	
HESC 342	INTRODUCTION TO ADAPTED PHYSICAL ACTIVITY	3	Current concepts and trends in adapted physical activity across the lifespan, including skills necessary to prepare meaningful individualized movement experiences for people with special needs. Field work required. RESTRICTIONS: Open to HNES majors with sophomore, junior, or senior standing or HLEX concentrations.	
HESC 343	ADAPTED PHYSICAL EDUCATION	3	Knowledge and skills required to meet the professional and legal mandates pertaining to individualized health and physical education for students with special needs. PREREQ: HESC220, HESC250. RESTRICTIONS: Restricted to HPE majors with junior or senior standing.	
HESC 344	FINANCIAL ASPECTS OF SPORT MANAGEMENT	3	Analysis of economic and societal variables impacting the financial viability of professional, intercollegiate and Olympic sport organizations. RESTRICTIONS: Open to junior/senior sport management majors only.	

- HESC 345 TACTICAL APPROACH TO TEACHING SPORTS 3**
Uses tactical problems to teach invasion, wall/net and fielding/run-scoring activities. Students analyze strategies for successful transfer across similar games. Appropriate practices and outcomes of quality physical education programs emphasized.
PREREQ: HESC140.
RESTRICTIONS: Open to HPE majors only.
- HESC 347 LEGAL ASPECTS OF SPORTS MANAGEMENT 3**
An introduction to the legal system and liability issues of tort law, agency law, antitrust labor law and constitutional law as they apply to professional and amateur sports.
RESTRICTIONS: Open to junior/senior sport management majors, health behavior science majors with a concentration in leisure service management, and legal studies minors.
- HESC 350 BASIC CONCEPTS IN KINESIOLOGY 3**
Review of musculoskeletal anatomy and lever systems provides foundation for analyzing human movement. Practical kinesiological evaluation focuses on common fitness and health related exercises. Movement analysis and proper techniques discussed for cardiovascular machines, abdominal work, stretching, etc.
PREREQ: HESC220 or HESC310.
RESTRICTIONS: Open to students whose major or minor requires this course.
- HESC 353 PRE-PROFESSIONAL SEMINAR 1 PF**
Prepares exercise science majors with 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: Restricted to exercise science majors. Requires junior status.
- HESC 354 SEMINAR 1 PF**
Explores internship opportunities in (1) recreation and leisure services field for the recreation major or (2) 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 I 3 PF**
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 coaching minors only.
- HESC 356 FIGURE SKATING PRACTICUM II 3 PF**
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 coaching minors only.
- HESC 357 ATHLETIC TRAINING PRACTICUM II 3 PF**
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies.
PREREQ: HESC257.
RESTRICTIONS: Open to athletic training majors only.
- HESC 358 ATHLETIC TRAINING PRACTICUM III 3 PF**
Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies.
PREREQ: HESC357.
RESTRICTIONS: Open to athletic training majors only.
- HESC 366 INDEPENDENT STUDY 1-6 PF**
- HESC 368 JUNIOR SPECIAL TOPICS 1-3**
Junior level independent study.
- HESC 371 OUTDOOR ADVENTURE LEADERSHIP 3**
Introduces recreation leadership in outdoor adventure activities. Attention directed toward conceptual and technical aspects of adventure programs.
- HESC 375 NEUROMECHANICAL BASIS OF HUMAN MOVEMENTS 3**
Functional aspects of the neuromuscular and sensory systems and elementary mechanics are employed to explain the mechanical characteristics and control mechanisms underlying basic groups of human motor activities.
PREREQ: PHYS201 or 207.
COREQ: HESC220 or 310 may be taken as either a corequisite or a prerequisite.
RESTRICTIONS: Restricted to exercise science majors.
- HESC 381 ADVENTURE CHALLENGE EDUCATION 3**
An introduction to adventure challenge education and its concepts. Counseling concepts in adventure challenge education introduced. Activities including low-level

group initiatives through participation on high level "ropes courses" are 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 communication skills, teaching skills, sport psychology and managing team related responsibilities and relationships, including risk management.
PREREQ: HESC317 and HESC320.
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 overdose, phonophoresis, iontophoresis, drugs affecting skeletal muscle, pain and inflammation.
PREREQ: HESC358.
RESTRICTIONS: Open to athletic training majors only.

- HESC 400 RESEARCH METHODS 3**
Introduction to research on health and physical activity, including types of research, research design, matching appropriate statistical tools with research designs, research writing style and format and ethical issues related to research.
PREREQ: Junior or senior standing. Completion of STAT200 with at least a C-.
RESTRICTIONS: Open to exercise science majors only.

- HESC 401 FOUNDATIONS OF HUMAN SEXUALITY 3**
A multidisciplinary study of human sexuality focusing on the implications for individuals and society of the biological, psychological and sociocultural determinants of human sexuality. Deals with sexually explicit material.
Crosslisted with IFST401.

- HESC 403 PRACTICUM IN ADAPTED PHYSICAL EDUCATION 1-6 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 or HESC343.
RESTRICTIONS: Open to majors only.

- HESC 405 REHABILITATION OF ATHLETIC INJURIES I 3**
Foundations of injury treatment and rehabilitation, including the healing process, neuromuscular control, flexibility and range of motion, strength/power/endurance, postural stability and balance, and cardio-respiratory considerations.
PREREQ: HESC357.
RESTRICTIONS: Open to athletic training majors only.

- HESC 406 REHABILITATION OF ATHLETIC INJURIES II 3**
Building upon the content of HESC405, students develop enhanced proficiency with rehabilitation techniques and skills for both the upper and lower extremities, as well as the trunk and low back regions.
PREREQ: HESC405.
RESTRICTIONS: Open to athletic training majors only.

- HESC 407 PREVENTION AND RECOGNITION OF ATHLETIC INJURIES 3**
Procedures for preventing, diagnosing, treating and rehabilitating athletic injuries. Emphasis on early detection of both nature and extent of injury.
PREREQ: HESC480 and HESC481.
RESTRICTIONS: Open to AT majors only.

- 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: Open to athletic training majors only.

- HESC 414 METHODS AND MATERIALS IN HEALTH EDUCATION 3**
Emphasis on health education in school curriculum: curriculum content and organization of materials for instructional purposes.
PREREQ: HESC155, HESC210, HESC231, HESC315 and HESC325.
Satisfactory completion of Praxis I.
RESTRICTIONS: Junior status, upper division clearance, minimum gpa of 2.50, major index of 2.75 and completion of all skills requirements. Open to HPE majors only.

- HESC 415 METHODS AND MATERIALS IN ELEMENTARY PHYSICAL EDUCATION 3**
Introduction to teaching physical education in elementary school settings with emphasis on designing and delivering developmentally appropriate units of instruction and pedagogical analysis of effective teaching behaviors. Includes classroom management, teaching strategies and performance-based assessment of pupil achievement.
PREREQ: HESC145, HESC140, HESC210, HESC301, HESC345 and HESC319.
Satisfactory completion of Praxis I.
RESTRICTIONS: Junior status, upper division clearance, minimum gpa of 2.50,

major index of 2.75 and completion of all skills requirements. Open to HPE majors only.

- HESC 417 METHODS AND MATERIALS IN SECONDARY PHYSICAL EDUCATION 3**
Introduction to teaching physical education in secondary school settings with emphasis on designing and delivering developmentally appropriate units of instruction and pedagogical analysis of effective teaching behaviors. Also includes classroom management, teaching strategies and performance-based assessment of pupil achievement.
PREREQ: HESC140, HESC145, HESC210, HESC220, HESC301, HESC319, and HESC345. 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 skill courses. Open to HPE majors only.
- HESC 420 FUNCTIONAL HUMAN ANATOMY 4**
Anatomical individuality, functional significance and human performance interpretations involved through consideration of muscular, skeletal and nervous systems. Laboratory experience emphasizes meaning and significance of musculoskeletal movements and utilizes prosected human specimens, models, x-rays, dry biological materials and other aids.
PREREQ: HESC220 or HESC310.
RESTRICTIONS: Open to AT, Honors and biomedical engineering majors only.
- HESC 422 ORGANIZATION AND ADMINISTRATION OF LEISURE SERVICES 3**
Study of operation and management of sport, recreation and fitness facilities. Emphasis placed on developing skills necessary to conduct day-to-day operations and manage these types of facilities.
RESTRICTIONS: Open to senior health behavior science majors.
- HESC 425 BIOMECHANICS OF HUMAN MOTION 4**
Study of the fundamental mechanical principles governing the human body in motion and at rest, including application of statics and dynamics in the quantitative analysis of sport and exercise.
PREREQ: HESC220 or HESC310.
RESTRICTIONS: Open only to students in the athletic training major, health and physical education major, figure skating coaching minor, and strength and conditioning minor.
- HESC 426 BIOMECHANICS I 4**
Application of mechanical principles in the study of the human musculoskeletal system, including analysis of joint forces, as well as the mechanical properties of bone, muscle, and connective tissues.
PREREQ: PHYS201 or 207, and HESC310.
COREQ: HESC375 must be either a corequisite or a prerequisite.
RESTRICTIONS: Open to exercise science majors only.
- HESC 427 BIOMECHANICS II 3**
Provides information on measurement of human motion in three dimensions and on calculation of inverse dynamics in two dimensions as applied to analysis of human motion.
PREREQ: HESC426 and MATH242.
RESTRICTIONS: Open to exercise science majors only.
- HESC 428 MOTOR CONTROL AND LEARNING 3**
Control and learning of human movement, with emphasis on historical and contemporary theories, psychomotor aspects of movement, learning and performance, and the fundamental systems related to perception and action.
PREREQ: HESC310 and HESC375.
COREQ: HESC429.
RESTRICTIONS: Exercise science majors only.
- HESC 429 MOTOR CONTROL AND LEARNING LABORATORY 1**
Laboratory experiences related to motor control and learning.
PREREQ: HESC310 and HESC375.
COREQ: HESC 428.
RESTRICTIONS: Majors in exercise science only.
- HESC 430 PHYSIOLOGY OF ACTIVITY 3**
Study of integration of body systems in performance of exercise, work and sports activities. Performance of exercise activities by the human body under environment, stress situations.
PREREQ: HESC220 or HESC310 or BISC276 or BISC306.
COREQ: HESC431.
RESTRICTIONS: Open to majors in exercise science or athletic training, minors in strength and conditioning, or students with a concentration in health and exercise or weight management.
- HESC 431 PHYSIOLOGY OF ACTIVITY LABORATORY 1**
Laboratory experiences include the measurement of physiological parameters under exercise conditions.
COREQ: HESC430 or HESC433.
- HESC 432 EXERCISE TESTING AND PRESCRIPTION 4**
Basic exercise prescription and fitness testing, including considerations for populations with special needs. Provides background content for American

College of Sports Medicine's Health Fitness Instructor exam.
PREREQ: HESC220 or HESC310 or BISC276, and HESC430 or HESC433.
RESTRICTIONS: Open only to majors in HNES, or those with health and exercise or weight management concentrations.

- HESC 433 APPLIED PHYSIOLOGY OF ACTIVITY 3**
Function of human body during exercise, including integration of body systems during exercise, work, and sport activities and ways in which environment impacts performance.
PREREQ: HESC220.COREQ: HESC431.
RESTRICTIONS: Restricted to majors in health behavior science and health and physical education.
- HESC 434 TWELVE-LEAD ELECTROCARDIOGRAM INTERPRETATION 3**
Study of all aspects of electrocardiography including arrhythmia identification, rate determination, axis deviation, heart blocks, hypertrophy and myocardial infarction patterns.
RESTRICTIONS: Open to exercise science majors only.
- HESC 437 SPORT MARKETING 3**
A study of basic marketing concepts with applications to sport organizations, both amateur and professional. Topics include promotions and public relations, sport consumer behavior, strategic market planning, marketing information management, marketing communications and sponsorship.
PREREQ: BUAD100.
RESTRICTIONS: Open to junior and senior sport management majors.
- HESC 438 SPORT EVENT AND FACILITY MANAGEMENT 3**
Management of sport events and facilities, including sponsorship acquisition, marketing and promotions, volunteer management, budgeting, participant registration, facility design, and event and facility operations.
RESTRICTIONS: Open only to junior/senior sport management majors.
- HESC 439 ETHICS AND ISSUES IN SPORT MANAGEMENT 3**
Examination of the importance of sport in society as a transmitter of values, including major ethical theories in sport and ethical perspectives on current issues in sport.
RESTRICTIONS: Open to senior sport management majors.
- 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 447 ADVANCED TOPICS IN STRENGTH AND CONDITIONING 3**
Theoretical principles for developing individualized strength and conditioning programs based on biomechanical, physiological and neural concerns, including calculations of volume, intensity and tonnage. Topics include teaching progressions and technique training for Olympic style exercises, weight room safety and weight room design.
PREREQ: Junior or senior standing. Completion of HESC320, HESC350 and HESC425 or HESC426 with at least a C-. HESC426 may be a corequisite.
RESTRICTIONS: Restricted to minors in strength and conditioning.
- 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.
RESTRICTIONS: Open to athletic training majors only.
- 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 451 CLINICAL EXERCISE PHYSIOLOGY 3**
Methods of evaluating cardiovascular function through graded exercise tests as well as principles of exercise prescription. Theoretical as well as practical covering of administrative aspects of testing, metabolic calculations, variety of testing protocols, basic exercise physiology and exercise prescription.
PREREQ: HESC430.
RESTRICTIONS: Open to exercise science majors only.
- HESC 455 FIGURE SKATING PRACTICUM III 3 PF**
Concentration on advanced teaching/coaching techniques related to the skill required in I.S.I.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.
RESTRICTIONS: Open to figure skating coaching minors only.
- HESC 456 FIGURE SKATING PRACTICUM IV 3 PF**
Direct involvement in the teaching/coaching of beginner elite national and world

competitors under the supervision of Ice Skating Development Center professional staff.
 RESTRICTIONS: Open to figure skating coaching minors only.

HESC 457 ATHLETIC TRAINING PRACTICUM IV 3 PF
 Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies.
 PREREQ: HESC358.
 RESTRICTIONS: Open to athletic training majors only.

HESC 458 ATHLETIC TRAINING PRACTICUM V 3 PF
 Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies.
 PREREQ: HESC457.
 RESTRICTIONS: Open to athletic training majors only.

HESC 459 ATHLETIC TRAINING PRACTICUM VI 3 PF
 Supervised clinical experience in athletic training. Development of competencies and proficiencies in content areas comprising the role of an athletic trainer, as specified in the NATA's Athletic Training Educational Competencies.
 PREREQ: HESC458.
 RESTRICTIONS: Open to athletic training majors only.

HESC 460 COACHING/PERFORMANCE PRACTICUM 1-3 PF
 Practical coaching/performance experience in a scholastic/clinical setting with the season chosen corresponding to each student's interest. The student must keep a daily log of methods and experiences and choose an appropriate project. Observations will be made by the minor coordinator and the cooperating supervisor.
 PREREQ: HESC210, HESC220, HESC320 and HESC390.
 RESTRICTIONS: Junior status or higher.

HESC 462 PRACTICUM IN STRENGTH AND CONDITIONING 3 PF
 Directed practical experience in a strength and conditioning environment.
 PREREQ: Admission to the strength and conditioning minor and completion of HESC320, HESC432 and HESC447 with at least a C-.

HESC 463 PRACTICUM IN EXERCISE SCIENCE 1-6 PF
 Directed practical experiences in clinical aspects of exercise science.
 PREREQ: Admission to the exercise physiology or biomechanics concentration.
 RESTRICTIONS: Junior status or higher.

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

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

HESC 466 INDEPENDENT STUDY 1-6 PF

HESC 468 SENIOR SPECIAL TOPICS 1-3
 Senior level independent study.

HESC 480 UPPER EXTREMITY AND SPINE EVALUATION 3
 Evaluation of the upper extremity, cervical spine and facial injuries. SOAP format evaluation, on-field evaluation, mechanics and pathomechanics of joint movement, detailed anatomy, etiology of specific injuries and special and stress tests will be discussed.
 PREREQ: HESC220 and HESC240.
 RESTRICTIONS: Open to athletic training majors only.

HESC 481 LOWER EXTREMITY AND SPINE EVALUATION 3
 Evaluation of the lower extremity, lumbar spine and sacroiliac joint. SOAP format evaluation, on-field evaluation, mechanics and pathomechanics of joint movement, detailed anatomy, etiology of specific injuries and special and stress tests will be discussed.
 PREREQ: HESC220 and HESC240.
 RESTRICTIONS: Open to athletic training majors only.

HESC 484 WOMEN IN SPORTS 3
 Historical and contemporary perspectives on the female athlete, encompassing biological, psychological, sociological, and legal issues that are gender dependent and culturally unique.
 May be crosslisted with WOMS484.

HESC 485 RESEARCH IN EXERCISE SCIENCE 1-3
 Undergraduate laboratory research experience in biomechanics, exercise physiology, or motor control.

RESTRICTIONS: Restricted to exercise science majors. Consent of instructor required. May be repeated for up to six credits.

HESC 490 DEVELOPMENT OF HEALTH PROMOTION PROGRAMS 3
 Prepares students to plan, create and implement health promotion programs in the workplace, focusing on program selection, promotion, evaluation and expansion.
 PREREQ: HESC332 and a statistics course.
 RESTRICTIONS: Open to HBM and HLBH majors, or GRN concentrations.

HESC 601 RESEARCH METHODS 3
 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.

HESC 602 ELEMENTARY COMPUTER STATISTICS 3
 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.

HESC 603 SEMINAR IN EXERCISE SCIENCE 0 PF
 Guest and student presentations on research or other topics related to exercise science.

HESC 604 SENSORIMOTOR CHARACTERISTICS OF INJURY 3
 Nervous system attributes related to acute injury and overuse syndromes, including mechanoreceptor function, muscle tone and stiffness regulation, dynamic restraint, neuromuscular dyskinesia, and neurocognitive traits. Implications for research and clinical outcomes will be discussed.
 PREREQ: HESC220 or equivalent.

HESC 605 PATHOETIOLOGY OF MUSCULOSKELETAL INJURIES 3
 Physiological, mechanical, and neuromuscular mechanisms of common musculoskeletal injuries with implications for both clinical and research environments.
 PREREQ: HESC220 or equivalent.
 RESTRICTIONS: Restricted to graduate students.

HESC 606 EVIDENCE-BASED SPORTS MEDICINE 3
 Theory and practice of evidence-based sports medicine for both clinical and research environments, with emphasis on understanding results of health care interventions and practices for patients and research subjects.

HESC 607 MOTOR LEARNING AND CONTROL 3
 Exploration of theoretical perspectives of motor learning and control, with a focus on contemporary approaches. Surveys neurological systems involved in perception and motor performance. Application of specific principles of learning and control of movement to the teaching of motor skills in daily living activities, physical education and sport.

HESC 609 SURVEY RESEARCH METHODS 3
 Emphasis on procedures for designing survey-based research studies, including choice of subjects, development of proper instrumentation, statistical design and analysis, and formulation of proposals appropriate for publication.
 RESTRICTIONS: Restricted to students in the M.S. programs in health promotion and human nutrition.

HESC 610 PEDAGOGICAL ANALYSIS 3
 Focuses on developing skills and knowledge related to the pedagogical analysis of teaching behaviors in order to improve instructional effectiveness and assist with understanding student teacher supervision from a behavioral change perspective. Self assessment and measurement of effective teaching behaviors will be emphasized.

HESC 615 USING ASSESSMENT IN PHYSICAL EDUCATION 3
 Authentic assessment strategies for K-12 programs using national and state content standards in physical education. Topics include current practices, educational reform, teacher and student accountability and technological resources.

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

HESC 620 INTERNATIONAL SPORT MANAGEMENT AND MARKETING 3
 Overview of the global sport industry, including the bid and host process for international sport competitions, the organization of the international sport community, the penetration strategies of American sport leagues and products into international markets, and the structure of sport in other countries.

HESC 634 SPORT BUSINESS AND FINANCE 3
 Principles of financial management and microeconomics as applied to the sport industry, with a focus on spectator sports at both professional and collegiate

levels. Topics include the financing of sport facility construction, budgeting in collegiate athletics, and the financial effects of collective bargaining agreements.

HESC 635 ADMINISTRATION OF INTERCOLLEGIATE ATHLETICS 3
In-depth analysis of governance, management, marketing and financing of intercollegiate athletics at institutional, conference and national governance levels, including major issues facing leadership of intercollegiate athletics.
RESTRICTIONS: Open to MBA and educational leadership majors.

HESC 644 OUTDOOR EXPERIENTIAL EDUCATION FOR TEACHERS AND RECREATORS 3
Focuses on development of a broad spectrum of curriculum materials and instructional aids to be utilized in outdoor education programs. Includes techniques in social studies, science, art, language arts, physical education, music and math. Examines the meaning, scope and value of outdoor education and the involvement of the outdoor education movement in schools in America. Investigates activities both in and around schools and in natural areas.

HESC 645 ADVENTURE BASED COUNSELING IN EDUCATION 3
Presents a model for teachers to challenge students and alter learning capabilities through cooperative behaviors. Participants will have an opportunity to develop new skills utilizing physically challenging activities to expand their curriculum in the area of adventure education.

HESC 647 LEGAL ASPECTS OF SPORT MANAGEMENT 3
Overview of the legal principles relevant to sport managers, including tort law, contract law, constitutional law, agency law, risk management, judicial review and administrative law related to the operations and administration of sport and athletic programs.

HESC 650 LIFE SPAN MOTOR DEVELOPMENT 3
Theoretical and empirical inquiry into developmental changes in movement patterns across the life span. Focus will be placed on changes in behavioral aspects of human motor behavior and the underlying mechanisms to which these changes relate. Students will design and complete research project.

HESC 651 NEUROPHYSIOLOGICAL BASIS OF HUMAN MOVEMENT 3
Neural control of human movement, including gradation of muscular force, motor unit control principles, neuromuscular aspects of strength, segmental motor control, the organization of ballistic movements, adaptations in the control of movement, and aging. Students will learn related research techniques through hands-on demonstrations.
PREREQ: HESC220 or equivalent.

HESC 655 ADVANCED PHYSIOLOGY OF EXERCISE 3
Consists 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 665 12 LEAD ECG INTERPRETATION 3
Designed to teach the fundamentals for administering the 12-lead and single-lead electrocardiograms and stress test protocols for individuals recovering from cardiovascular disease. Emphasis on determining rate, rhythm, axis, hypertrophy and infarction.

HESC 666 SPECIAL PROBLEM 1-12

HESC 675 EXERCISE TESTING AND PRESCRIPTION 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 680 EXERCISE, NUTRITION AND BONE HEALTH 3
Role of exercise and diet in development and maintenance of skeleton, including exercise protocols, nutrients, exercise nutrient interactions and assessment tools. Crosslisted with NTDT680.
PREREQ: BISC276 or equivalent and NTDT200 or equivalent.

HESC 686 MATHEMATICS FOR BIOMECHANICS 3
Mathematical techniques for research in biomechanics and related fields, with emphasis on methods useful for biomedical signal processing. Topics include Fourier analysis, matrix algebra, and signal processing
May be crosslisted with BMSC686.
PREREQ: MATH221 and MATH222 or equivalent.

HESC 687 SEMINAR IN BIOMECHANICS 3
Introduction to contemporary and classical research literature on the biomechanics of human movement with an emphasis on exercise, clinical and sport applications. Lecture/discussion format.

HESC 688 ELECTROMYOGRAPHIC KINESIOLOGY 3
Introduction to the theoretical basis and practical application of

electromyography. Topics include the electrophysiological basis of muscle actions, mechanical properties of muscle, EMG recording and processing methods and applications of EMG to the study of human motion.

HESC 689 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 690 BIOMECHANICAL METHODS 3
Introduces students to fundamental methods of two- and three- dimensional analysis in sports biomechanics. Topics will include creation of local coordinate systems, coordinate system transformations, joint center predictions, vector manipulation, linear and angular kinematics, joint forces and moments.
PREREQ: Calculus.
RESTRICTIONS: Requires permission of instructor.

HESC 802 HUMAN CARDIOVASCULAR CONTROL 3
Focuses on human cardiovascular control as it pertains to orthostasis, exercise and heat stress. The role of mechanical, neural and humoral factors is emphasized, as well as factors that control oxygen transfer from lungs to cells.
PREREQ: Undergraduate human or exercise physiology at the 200-level or higher.

HESC 804 CLINICAL MEASURES IN EXERCISE PHYSIOLOGY 3
Assessment techniques and research protocols used in exercise physiology. Resting energy expenditure, body composition, bone mineral density, cardiopulmonary evaluation and selected histochemical analyses .
PREREQ: Undergraduate background in exercise physiology.
RESTRICTIONS: Class size limited to 15.

HESC 808 SEMINAR IN MOTOR CONTROL 3
Introduction to research literature on contemporary theories and models of motor control. Topics include problems of controlled variables and reference systems, movement variability, motor redundancy, interactions of the locomotor apparatus and the central nervous system, and movement optimization criteria.
PREREQ: Undergraduate biomechanics and motor control/behavior at the 200-level or higher.

HESC 840 ADVANCED HUMAN ANATOMY 3
Laboratory requiring detailed gross dissection of the extremities and their girdles. Specific emphasis is placed upon neuromuscular, skeletal, cardiovascular and mechanical factors dictating functional capabilities of the human body. Understanding the relationship between structure and function must be demonstrated frequently.

HESC 866 SPECIAL PROBLEM 1-12

HESC 868 RESEARCH 1-12

HESC 869 MASTER'S THESIS 1-6

HESC 964 PRE-CANDIDACY STUDY 3-12 PF

HISTORY

HIST 101 WESTERN CIVILIZATION-1648 3
Principal political, social, economic and cultural developments in Western civilization from late antiquity (3rd century A.D.) to middle of 17th century.

HIST 102 WESTERN CIVILIZATION: 1648-PRESENT 3
The principal political, social, economic and cultural developments in Western civilization since the middle of the 17th century.

HIST 103 WORLD HISTORY I 3
Principal political, economic, cultural and social developments in world history through the sixteenth century, relating the past to the present. Equal weight given to the history of Asia, Africa, the Americas and Europe.

HIST 104 WORLD HISTORY II 3
Principal political, economic, cultural and social developments in world history from the sixteenth century to the present, relating the past to the present. Equal weight given to the history of Asia, Africa, the Americas and Europe.

HIST 130 ISLAMIC NEAR EAST: 600-1500 3
Introduces the origins of Islam, its development as a religion and a culture, and the broad trends in Middle Eastern history until 1500.

HIST 131 ISLAMIC NEAR EAST: 1500-PRESENT 3
Considers the traditional make-up of the Middle East and charts the emergence of the region in its present form through the nineteenth and twentieth centuries.

- HIST 134 HISTORY OF AFRICA 3**
Introduction to African history south of the Sahara, from the earliest times to 1914. Introduces major themes in African history: pre-colonial African political, social and economic institutions; diversity in African political organizations; slave trade and colonialism.
May be crosslisted with BAMS134.
- HIST 135 INTRODUCTION TO LATIN AMERICAN HISTORY 3**
Introduction to Latin American history from preconquest period to present.
- HIST 136 TOPICS IN EAST ASIA IN FILM 1-3**
Explores East Asian cinema and society via readings, discussion and viewing of films by and/or about East Asians. Topics vary.
Crosslisted with EAST136.
RESTRICTIONS: May be repeated for credit when topics vary.
- HIST 137 EAST ASIAN CIVILIZATION: CHINA 3**
A survey of major aspects of Chinese civilization, relating the past to the present.
- 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 201 INTRODUCTION TO GLOBAL ISLAM 3**
Introduction to theology, philosophy and history of Islam. Provides basic introduction to Quran, Traditions of Prophet Muhammad, and fundamentals of Islam law and jurisprudence. Explores different interpretations and manifestations of Islam, both historically and contemporaneously. Surveys rapid globalization of Islam and Muslim communities.
Crosslisted with POSC201.
- 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 INTRODUCTION TO MILITARY HISTORY 3**
Survey of the history of warfare from the ancient Greeks through World War II, with emphasis upon tactics, weapons, armor, strategy and the human factors that contributed to success or failure in war.
- HIST 216 INTRODUCTION TO MATERIAL CULTURE STUDIES 3**
Introduces students to material culture studies, broadly defined as study of all things people make and all the ways people have altered the physical world. Explores the approaches, concepts, and methods of numerous disciplines that investigate material culture.
Crosslisted with ANTH216.
- HIST 220 AMERICAN CIVIL RIGHTS MOVEMENT 3-4**
Team-taught, interdisciplinary, history of the American Civil Rights Movement. Deals with the crucial years from 1954 to 1970 and examines the larger history of American race relations.
May be crosslisted 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-1300 3**
A survey of the evolution of Christianity from its origins to 1300.
- HIST 243 ANCIENT RELIGION AND CIVILIZATION 3**
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 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 254 JEWISH HOLOCAUST: 1933-1945 3**
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 crosslisted with JWST254.
- HIST 268 SEMINAR 3**
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 3**
Comparative survey of the modern histories of several Asian countries, for example China, Japan and Vietnam, emphasizing their responses to the modern world. Topics include traditional societies, impact of imperialism, nationalist and communist movements, Pacific War, cultural revolution in China, Vietnam Conflict and emergence of the Japanese economic powerhouse.
- HIST 291 WOMEN'S HISTORY THROUGH FILM 1**
Explores women's historical experiences through the medium of film. Students will view and discuss a variety of documentary films on women and read materials related to topics covered in the films. Films will deal with historical and contemporary issues in the United States and internationally.
Crosslisted with WOMS291.
RESTRICTIONS: May be repeated for credit when topics vary.
- HIST 300 WOMEN IN AMERICAN HISTORY 3**
The position of women in American life viewed from a historical perspective including such topics as home and family life, women in the work force, women as agents of social change and feminism.
May be crosslisted with WOMS300.
- HIST 302 THE WORLD IN OUR TIME 3**
An examination of current events within the context of historical forces.
- HIST 306 HISTORY OF AMERICAN FOREIGN POLICY 3**
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 3**
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 3**
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 UNITED STATES BUSINESS AND POLITICAL ECONOMY 3**
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 310 POSTWAR AMERICA I: 1945 - 1963 3**
Social, political and diplomatic history of the United States from 1945 to 1963.
- HIST 311 POSTWAR AMERICA II: 1963 - PRESENT 3**
Social, political and diplomatic history of the United States from 1963 to the present.
- HIST 312 HISTORY OF CRIME AND CRIMINAL JUSTICE 3**
Examines changing perceptions of criminal and deviant behavior and development of laws, institutions, and social policies to counteract crime from seventeenth century to present.
Crosslisted with CRJU312.
- HIST 313 THE UNITED STATES, 1877 - 1914 3**
Examines the rise of big business after the Civil War and societal responses to industrialism. Describes and assesses topics including race relations, immigration, and politics.
- HIST 314 THE UNITED STATES, 1914 - 1945 3**
Examines United States history from 1914 - 1945 and focuses on three topics: 1) the causes and consequences of American intervention in the two world wars; 2) social and cultural change during the 1920s; and 3) the age of the Great Depression and New Deal.
- HIST 316 FIRST ENCOUNTERS: INDIANS AND EUROPEANS IN EARLY AMERICA 3**
Explores the initial contacts between Native Americans and Europeans during the sixteenth and seventeenth centuries. Focuses on encounters between the Indians and the Spanish in Mexico, the French in Canada and the British along the Atlantic seaboard.
- HIST 318 COLONIAL AMERICA 3**
The transit of culture from England to America and its modification there during the seventeenth century. The development of mature colonial societies to 1760.

- HIST 319 REVOLUTIONARY AMERICA 3**
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 3**
Sectional conflict and the struggle between rival nationalisms in mid-19th century United States.
- HIST 323 THE OLD SOUTH 3**
The history of the Southern United 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 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.
Crosslisted with CRJU324.
- HIST 325 HISTORY OF BLACK AMERICA TO THE CIVIL WAR 3**
Black historical impact on American life and culture to the Civil War.
Crosslisted with BAMS304.
PREREQ: BAMS110.
- HIST 326 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 ghetto and the struggle for civil rights.
Crosslisted with BAMS306.
- HIST 328 AMERICAN INDUSTRIAL SOCIETY FROM 1815-PRESENT 3**
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 in the south, reform movements, family life and population change, and social and political conflict.
- HIST 329 INTERNATIONAL MIGRATION 3**
Interdisciplinary introduction to alternative/complementary disciplinary approaches to the study of human movement between states. Offered on a rotational basis by faculty involved in the University of Delaware migration group.
Crosslisted with POSC329.
- HIST 330 PEASANTS AND REVOLUTION IN AFRICA 3**
The most remarkable nationalist struggles in modern Africa have been supported by peasants. Special attention paid to these struggles, especially in Guinea-Bissau, Angola, Zimbabwe, Mozambique, and to the Mau-Mau of Kenya. Why did the peasants support the revolution? Did they benefit from the victories?
- HIST 331 HISTORY OF CARIBBEAN I 3**
Examines major themes in Caribbean history from the pre-Columbian period to the end of slavery in 1838. Discussion of the demographic and ecological consequences of European contact, sugar and slavery, the evolution of creole cultures and slave resistance.
May be crosslisted with BAMS331.
- HIST 332 HISTORY OF CARIBBEAN II 3**
Examines the period from 1838 to the present. Includes a discussion of the social and economic adjustments to emancipation, the making of plural societies with the importation of Asian laborers, American imperialism and political and social movements of the twentieth century.
May be crosslisted with BAMS332.
- HIST 334 AFRICAN AMERICAN WOMEN'S HISTORY 3**
Explores the diversity of African American women's lives and development of women, work, and culture from the colonial era through the late 20th century. Examines the social, political, religious and economic factors affecting change and transformation in the lives of African American women. Provides a broad introduction to the interdisciplinary field of African American and Women's Studies.
May be crosslisted with BAMS334, WOMS334.
- HIST 336 TOPICS IN LATIN AMERICAN HISTORY 3**
History and culture of Latin American peoples.
RESTRICTIONS: Only taught abroad in Latin America.
- HIST 338 GREEK-ROMAN SPORT-RECREATION 3**
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 3**
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.
RESTRICTIONS: Taught abroad only. May be repeated for credit when taken on different study abroad programs.
- HIST 340 ANCIENT NEAR EAST AND GREECE 3**
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 REFORMATION EUROPE 3**
Religion in the realms of thought and action during the rise of early modern Western civilization: the witch-craze, the scientific revolution, the Reformation, the Counter-Reformation and their impact on the behavior and perceptions of people by 1650.
- 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 HISPANIC 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 350 WORLD WAR II IN EUROPE, 1939-1945 3**
Military history of World War II in Europe. Post-World War I revival of German military power, the origins of the war in European context, and military operations from the German attack on Poland to the collapse of Italy and Germany.
- 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.
RESTRICTIONS: When taught abroad, focuses on the host country.
- 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-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 considered are the nature of political order and justice, the character of the good life and moral obligation, the relation between faith and reason, and the development of historical reason and theories of the fine arts. Readings will be from Milton, Locke, Voltaire, Rousseau and others.

- 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 THE EUROPEAN CITY 3**
The evolution of cities in European history, emphasizing the development of urban society and culture. Topics vary and may include London and Paris in the Modern Age, London in the Modern Age, Paris in the Modern Age.
RESTRICTIONS: May be taught abroad. May be repeated for credit when taken on different city topics.
- HIST 359 SOVIET UNION: 1917-1990 3**
Political, socioeconomic and cultural developments in the Soviet Union from 1917 to 1990.
- HIST 361 TWENTIETH CENTURY FRANCE 3**
French political, social, and cultural history from the 1890s to the year 2000.
- HIST 362 EUROPEAN CULTURAL HISTORY, 1748-1889 3**
Surveys both popular culture and elite culture from the Enlightenment to the centenary of the French Revolution. Subjects include revolutionary culture, Romanticism, realism, railroads, industry, popular pastimes, folklore, moral reform, national identity. Sources include literature, painting, music.
- HIST 365 TOPICS IN EAST ASIAN HISTORY 3**
Topics vary and may include history of civilization (China, Japan, Korea, Southeast Asia, etc.), women in historical and modern times, European colonialism in Asia, and trade with United States.
RESTRICTIONS: Taught only in study abroad program. May be repeated for credit when topics vary.
- 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 imperialism, modernization, the rise of modern Chinese nationalism and revolution.
RESTRICTIONS: Not open to freshmen.
- 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 modern nationalism, Chiang Kai-shek and Mao Zedong, post-1949 China and the Deng Xiaoping era.
RESTRICTIONS: Not open to freshmen.
- HIST 370 HISTORY OF MODERN JAPAN 3**
History of Japan from 1600 to 1952 with special emphasis on domestic forces of change, impact of the West, Japanese imperialism and militarism, the dilemma of progress and Japan's place in the modern world.
- HIST 371 POSTWAR JAPAN 3**
Traces the emergence of contemporary Japan in its cultural and social spheres. Emphasis is on analysis of the historical significance of postwar Japanese culture. Investigations explore every day life as depicted in literature, film, journalism, memoirs and historical 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 crosslisted with WOMS372.
PREREQ: HIST370.
RESTRICTIONS: Not open to first year students.
- 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 BRITAIN SINCE 1714 3**
British politics, society, and culture in modern times. The rise of parliamentary democracy, industry, liberalism, empire, feminism, social democracy and mass culture.
- HIST 376 ENGLAND: THE FORMATIVE YEARS, 1648 - 1798 3**
Synthesizes the social, economic, political, and cultural developments during Britain's rise to world power. Topics include the rise of the novel, origins of political parties, voyages of Captain Cook, fascination with landscape, origins of empire, growth of industry, and changing nature of family, fashion, sex and marriage. Expected to write a number of short critical essays.
- HIST 377 RADICALISM AND REVOLUTION: ISLAMIC MOVEMENT/ MODERN MIDDLE EAST 3**
Addresses the background, historical development and present state of Islamic fundamentalist movements.
- HIST 378 NATIONALISM IN THE MODERN MIDDLE EAST 3**
Focuses on the ideology of nationalism in an attempt to explain the emergence of the modern countries in the Middle East.
- HIST 379 HISTORICAL ARCHAEOLOGY OF THE EASTERN UNITED STATES 3**
Surveys the substantive contributions of historical archaeology to the study of the cultural history of eastern North America beginning with the period of initial European contact.
Crosslisted with ANTH379.
- HIST 380 HISTORY OF THE ARAB-ISRAELI CONFLICT 3**
Explores the roots and the historical complexity of the Arab-Israeli conflict. Topics include: the origins of Zionism, the nature of traditional Arab/Ottoman society in the 19th century, the relationship between the early Zionists and indigenous Arab population of Palestine, the creation of a Jewish society, the rise of Palestinian nationalism, and the protracted search for coexistence between Jews and Arabs.
May be crosslisted with JWST381.
- HIST 381 ISLAM AND THE WEST: THE HISTORY OF MUTUAL PERCEPTIONS 3**
Surveys the history of mutual views of Islam and Christianity/Judaism/the West from the Middle Ages to the present. Topics include medieval polemics, Enlightenment attempts at respect and understanding, the question of Orientalism, and the current specter of a clash of civilizations.
- HIST 382 HISTORY OF WESTERN MEDICINE 3**
Social and cultural forces that have influenced the development of modern medicine.
- HIST 386 ASIAN AMERICA: CULTURE AND HISTORY 3**
Explore the literature, culture and history of Asian Americans and immigrants to the United States variously using fiction, drama, poetry, documentary, photography, narrative film, drama, court cases, primary and secondary historical materials. Patterns of Asian immigration, anti-Asian violence and internment, Asian American resistance in litigation, legislation, and cultural activities, from Gold Rush to globalization.
Crosslisted with ENGL386.
- HIST 387 HISTORY OF SEXUALITY IN THE U.S. 3**
A survey of American sexual ideals, practices, and identities, from the Colonial period to the present. How anxieties about interracial sex shaped life in the American South, how the advent of more reliable contraceptives provoked both social movements and political debate, and how the emergence of a scientific discourse of sexual difference simultaneously propelled the gay rights movement and enabled scientists to categorize same-sex love as pathology and perversion.
May be crosslisted with SGST387, WOMS387.
- HIST 389 THE AMERICAN WEST 3**
Surveys the American West through the eyes of its diverse population as well as those who are drawn to study and define it. Particular attention given to themes currently debated concerning the legacy, meaning and imagery of the American West.
- HIST 390 AMERICAN INDIANS: THE SOUTHWEST 3**
Addresses the history of Indians in the American Southwest from pre-European contact to the present. Approaches the subject from multiple disciplinary and cultural perspectives and focuses on the histories of the "Pueblo," Hopi, Apache and Navajo people.
- HIST 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 392 BUDDHISM AND POLITICS IN ASIA 3**
Addresses the modern phenomenon of politically engaged Buddhism by introducing the historical development of Buddhism and its relations to state and society. Focuses on case studies on Buddhist political movements in modern Asian history, such as the Buddhist Peace Movement during the Vietnam War, Tibetan resistance to Chinese rule, the movement of Untouchables in India.
RESTRICTIONS: Not open to freshmen.
- HIST 393 HISTORY OF MODERN VIETNAM 3**
Covers major social, cultural, political, economic and military developments in Vietnamese history from approximately 1500 to the present, including traditional civilization, colonization, nationalism and communism, the Indochina Wars

(among them the "Vietnam Conflict"), the Kampuchean Crisis, and life under the Socialist Republic of Vietnam since 1976.

RESTRICTIONS: Not open to freshmen.

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 crosslisted with BAMS395.

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, Afrikaners in power since 1948, and African struggles for freedom.

HIST 403 HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS 3
Introduction to philosophy, purposes, structure, historical development and future of museums, and botanical and zoological gardens. Examines functions of collection, conservation, research, exhibition/interpretation, and social/cultural services; museum field growth.
Crosslisted with MSST403.

HIST 408 PUBLIC HISTORY: RESOURCES, RESEARCH AND PRACTICE 3
Team-taught seminar that acquaints students with the function and resources of American historical organizations and how to use these resources in the non-academic setting for productive historical research. Addressed to those pursuing careers in public history and teaching and scholarship.
May be crosslisted with MSST408.

HIST 411 SEMINAR IN AMERICAN HISTORY 3
Topics vary. Recent topics include Jefferson and His Time, Women in 20th Century America, The Nightmare Years: The U.S. 1960-1980, American Religious History and Conservatism in Recent America.
May be crosslisted with WOMS411.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 430 SEMINAR IN TWENTIETH CENTURY LATIN AMERICAN REVOLUTIONS 3
Focuses on four twentieth century Latin American revolutions, concentrating on the historical background and events of the Mexican, Guatemalan, Cuban and Nicaraguan revolutions.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 431 CARIBBEAN PLANTATION SOCIETY AND ECONOMY 3
Examines the establishment and operation of the plantation economy and the evolution of creole society in the Caribbean during slavery. Emphasis will be placed on staple production but attention will also be given to the development of the informal slave economy. Topics include rural and urban slavery, the structure of slave society, creole culture, mechanisms of social control and slave resistance.
May be crosslisted with BAMS431.

HIST 432 POST EMANCIPATION CARIBBEAN SOCIETIES 3
Examines the process of adjustment to emancipation primarily in the British Caribbean. It involves a discussion of the transition to free labor, systems of domination, the development of multi-ethnic societies and syncretic cultural forms.

HIST 439 WOMEN AND REVOLUTION IN AFRICA 3
Discusses the critical roles played by women in African revolutionary movements. Why did women join these revolutionary movements? What is the relationship between feminism and revolution?
May be crosslisted with WOMS439.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 440 SEMINAR IN AFRICA UNDER COLONIAL RULE 3
Introduces various Colonial policies of the European powers in Africa, emphasizing the comparisons and contrasts among these policies. Attention paid to the effect of Colonialism on Africa's economic, social and political development.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 444 SEMINAR: WOMEN IN THE ISLAMIC MIDDLE EAST 3
Examines the major developments, themes and problems in women's history in the Middle East from the advent of Islam to the present. By tracing women's legal status, sexual morality, family and social life, and female economic and political

participation, it seeks to shed light on the process of women's roles in society and to challenge the notion that gender divisions and roles have been static over time. May be crosslisted with WOMS444.
PREREQ: HIST268.

RESTRICTIONS: Majors only, or permission of instructor.

HIST 449 SEMINAR: SCIENCE, TECHNOLOGY AND MEDICINE 3
Topics vary and may include The American System, History of Chemistry, or History of Engineering.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

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.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

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 crosslisted with ARTH454.

HIST 463 HISTORICAL ARCHAEOLOGY AND THE PUBLIC 3
Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation.
Crosslisted with ANTH463.

HIST 464 INTERNSHIP IN HISTORY 1-6
Internship with a substantially historical content at a museum, historical society, historic site, government agency, or other venue, under joint supervision of Department of History and the sponsoring organization. Includes completion of journal of activities and/or a final project.
PREREQ: Sophomore standing or higher.
RESTRICTIONS: Requires pre-approval from Department of History's Undergraduate Studies Committee, which also determines the number of credits.

HIST 466 INDEPENDENT STUDY 1-6

HIST 470 SEMINAR IN ANCIENT HISTORY 3
Topics vary and may include Slavery in Antiquity, The Archaeology of the Ancient World or The Greek City State.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 471 SEMINAR IN MEDIEVAL HISTORY 3
Topics may include Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.
May be crosslisted with WOMS472.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 473 SEMINAR IN EARLY MODERN EUROPEAN HISTORY 3
Topics vary and may include Renaissance Humanism, or Women in Europe from 1100-1600.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 474 SEMINAR IN BRITISH HISTORY 3
Topics vary and may include Britain Since 1945; British Political Ideas, Hobbes to Burke; and Britain, 1714-1870.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 475 SEMINAR IN MODERN EUROPEAN HISTORY 3
Topics vary and may include The Holocaust, The Cold War, Hitler's Germany, or The Age of Revolution.
May be crosslisted with WOMS475.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 477 SEMINAR IN LATIN AMERICAN HISTORY 3
Topics vary and may include History of Mexico, History of the Caribbean or Slavery in the New World.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

HIST 479 SEMINAR IN ASIAN HISTORY 3
Topics vary and may include History of Southeast Asia, 20th Century China or

Japan in the 20th Century.

PREREQ: HIST268.

RESTRICTIONS: Majors only, or permission of instructor.

HIST 480 SEMINAR IN WORLD HISTORY 3

Topics vary and may include Decolonization.

PREREQ: HIST268.

RESTRICTIONS: Majors only, or permission of instructor.

HIST 483 SEMINAR IN COMPARATIVE HISTORY 3

Topics vary, but all compare some aspect of American with European history or Western with non-Western history.

PREREQ: HIST268.

RESTRICTIONS: Majors only, or permission of instructor.

HIST 491 PLANNING A COURSE OF INSTRUCTION 3

Aims, course planning, instructional strategies, evaluation and selection of materials for teaching history and the social sciences in secondary schools.

RESTRICTIONS: The Student Learning Portfolio must be completed by the end of this course in order to student teach in the spring semester.

HIST 492 INTEGRATING INSTRUCTIONAL TECHNOLOGY INTO SOCIAL STUDIES TEA 1

Provides future history teachers with the technology skills that they need in order to become more effective teachers. Meld sound instructional technology skills with the academic content and instructional methods acquired during the course of their academic career. Topics include creating websites and webquests, copyright and fair use laws, plagiarism and internet professionalism, accessing knowledge and instructional materials on the internet, using software and hardware to enhance classroom instruction, and assessment tools.

HIST 493 PROBLEMS IN TEACHING HISTORY AND SOCIAL SCIENCES 3

Helps beginning teachers carry out planned instructional strategies, analyze their teaching behavior, evaluate the effectiveness of their instruction and modify their instructional plans based on their teaching experience.

HIST 601 UNITED STATES HISTORIOGRAPHY 3

Introduces changing interpretations of United States history and examines the development of the American historical profession.

HIST 602 EUROPEAN HISTORIOGRAPHY 3

Introduces changing interpretations of various aspects of European history.

HIST 603 HISTORIOGRAPHY OF TECHNOLOGY 3

Introduces major historiographic issues and examines the development of this subfield of history.

HIST 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

Landmark works and recent theoretical approaches to the understanding and interpretation of the man-made environment. Readings draw from a variety of disciplinary frameworks including art history, anthropology, historical archeology, cultural geography, sociology and history.

Crosslisted with EAMC605.

RESTRICTIONS: Requires permission of instructor.

HIST 606 ISSUES IN AMERICAN MATERIAL CULTURE 3

Studies major themes in American material culture of the 17th, 18th or 19th centuries. Topics vary.

Crosslisted with EAMC606.

RESTRICTIONS: Requires permission of instructor.

HIST 607 READINGS IN AMERICAN MATERIAL LIFE 3

Readings of recent monograph and serial publications pertaining to American Material Life. Topics include Landscape, Architecture, Work, Deportment, 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 crosslisted with MSST608.

HIST 611 SEMINAR IN AMERICAN HISTORY 3-6

Topics vary. Recent topics include Jefferson and His Time, Women in 20th Century America, The Nightmare Years: The U.S. 1960-1980, American Religious History, and Conservatism in Recent America.

HIST 614 THE AMERICAN SUBURB 3

An examination of historical and geographical origins of the American suburb

and its role in metropolitan development and larger society. Includes evolution of streetcar and automobile suburbs with special emphasis on post World War II suburban boom and contemporary post-suburban trends.

Crosslisted with UAPP614.

HIST 617 SEMINAR IN GENDER AND WOMEN'S HISTORY 3-6

Reading seminar. Topics vary and may include U.S. Women's History, U.S.

Women's History in Comparative Perspective, Gender in History, or European Women's History.

HIST 620 THE INVASION OF AMERICA 3

Reading seminar devoted to exploring the experiences of Native Americans in the present-day United States and Canada from the sixteenth century to the Indian Removal of the 1830s.

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

A readings seminar on the Revolutionary era from 1750 to 1812 which addresses the issues of economy, identity, political culture, slavery, frontiers, and America in the Atlantic world.

HIST 625 UNITED STATES 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 UNITED STATES SOCIAL AND CULTURAL HISTORY: 1850-1929 3

Reading seminar covering interpretive issues in social and cultural history. Topics 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 process 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 UNITED STATES 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 633 THE UNITED STATES IN THE TWENTIETH CENTURY 3

Reading seminar on 20th century U.S. history.

HIST 635 THE EVOLUTION OF THE AMERICAN URBAN LANDSCAPE 3

Reading and research seminar on evolution of American urban landscape from approximately 1850 to present. Examination of historical, cultural and geographical issues and processes related to industrialism and capitalism, technology, gender and ethnicity, housing, poverty and wealth as means of understanding formation of historic American urban landscape. Includes field trips to cities in region.

Crosslisted with UAPP635.

HIST 636 RESEARCH TOPICS IN HISTORIC PRESERVATION 3

Seminar addresses a specific research issue within historic preservation including hypothesis construction, design of research methodology and evaluation of results. Emphasis on use of primary sources and application of data-base techniques.

Crosslisted with UAPP636.

HIST 637 LAW AND SOCIETY IN HISTORICAL PERSPECTIVE 3

Examination of the social history of law, crime and legal institutions in the United States from colonial times to present. Focus is on the role that law has historically played in allocating resources, structuring social relationships, and distributing political power.

Crosslisted with SOCI637.

HIST 638 DOCUMENTATION OF HISTORIC STRUCTURES 1

Focuses on learning to create scaled, annotated field notes of historic resources in preparation for making measured drawings of buildings. Students spend all of their time in the field, working as part of a team to record a variety of buildings through plans, sections, elevations and details.

Crosslisted with UAPP631.

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 CREATING EUROPEAN MODERNITY 3**
The origins and spread of rapid, sustained economic growth since 1750.
- HIST 652 THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING 3**
Examines the historic preservation planning process, the theory supporting this process and contemporary practices. Case studies used to demonstrate the integration of theory and practice.
Crosslisted with UAPP629.
- HIST 654 VERNACULAR ARCHITECTURE 3**
Study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship.
May be crosslisted with ARTH654, MSST654, UAPP654.
- 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 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.
Crosslisted with ANTH663.
- HIST 671 STUDIES IN MEDIEVAL HISTORY 3-6**
Topics vary and 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 and include Renaissance Humanism; Women in Europe, 1100-1600; or Rome and Religion.
- HIST 674 STUDIES IN BRITISH HISTORY 3**
Topics vary and may include British Political Culture, 1760-1820; Victorian Britain; or Britain Since 1945.
- HIST 675 SEMINAR IN MODERN EUROPEAN HISTORY 3**
Topics vary and include The Holocaust, The Cold War or Hitler's Germany.
- HIST 677 STUDIES IN LATIN AMERICAN HISTORY 3**
Topics vary and may include history of Mexico, history of the Caribbean or slavery in the New World.
- HIST 679 STUDIES IN ASIAN HISTORY 3**
Topics vary and may include History of Southeast Asia, 20th Century China or Japan in the 20th Century.
- HIST 683 STUDIES IN COMPARATIVE HISTORY 3**
Topics vary, but all 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-1860 3**
Original research and writing on subjects in American history before 1860. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.
- HIST 804 MUSEUM INTERNSHIP 3**
Internship practice in administration, collections management, exhibition and interpretation at museums and related institutions. Students spend ten full weeks, or the equivalent, at the University museum, Winterthur Museum, Hagley Museum, Longwood Gardens or other acceptable institution.
Crosslisted with MSST804.
RESTRICTIONS: Open to graduate students only. Requires at least one semester course in museum studies and permission of instructor.

- HIST 805 RESEARCH AND WRITING SEMINAR: AMERICA 1860-PRESENT 3**
Original research and writing on subjects in American history after 1860. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.
- HIST 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 868 RESEARCH 1-9 PF**
- HIST 869 MASTER'S THESIS 1-6**
- HIST 964 PRE-CANDIDACY STUDY 1-12 PF**
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.
- HIST 969 DOCTORAL DISSERTATION 1-12 PF**

HEALTH PROMOTION

- HLPR 610 HEALTH AND THE MEDIA 3**
Explores the relationships between health behavior and cognition, and media communications and messages. Specific attention placed on culturally influenced health outcomes, channels of communication, and personal and demographic influences. Health promotion programmatic considerations and interventions related to media factors will be emphasized.
- HLPR 803 ADVANCED HEALTH PROMOTION PROGRAMMING AND EVALUATION 3**
Prepares the student with the skills for planning, developing, implementing and evaluating health promotion programs in a variety of settings and populations. Emphasis on the behavioral, epidemiological and socio-ecological issues that impact programming and the skills required to evaluate a program.
PREREQ: HESC490.
RESTRICTIONS: Open to graduate students only.
- HLPR 807 TOPICS AND ISSUES IN HEALTH PROMOTION 3**
Seminar format and multidisciplinary approach to study current issues. Different faculty review issues from the viewpoint of their disciplines. Students participate in the selection of topics and are required to prepare and present in-depth reports on multiple issues.
RESTRICTIONS: Open to graduate students only.
- HLPR 809 HEALTH BEHAVIOR 3**
Health and behavioral science theory and research provide a framework for the analysis of health-related behaviors across the lifespan. Emphasis on the psychological and social determinants of health-related behaviors of individuals. Examines the roles of health professionals in facilitating behavior change.
RESTRICTIONS: Open to graduate students only.
- HLPR 813 HEALTH PSYCHOLOGY AND BEHAVIORAL MEDICINE 3**
Relationships among social, psychological, and cultural factors and health, including prevention and treatment of disease and other health behaviors.
RESTRICTIONS: Graduate students only.
- HLPR 815 HEALTH AND OLDER ADULTS 3**
Seminar class emphasizing the biological, sociological, and psychological aspects of the aging process as related to health.
- HLPR 819 SOCIAL MARKETING 3**
Application of marketing principles to health behavior change. Includes the development, implementation and evaluation of social marketing campaigns; theories of behavior change applied to marketing; message development, targeting and segmentation; analysis of current social marketing initiatives.
RESTRICTIONS: Graduate students only.
- HLPR 823 HUMAN RESPONSE TO STRESS 3**
Provides an overview of current models and theories of stress, a review of multidisciplinary approaches to the study of stress in applied settings, and a reading knowledge of selected research findings in the field of stress.
RESTRICTIONS: Open to graduate students only.
- HLPR 864 INTERNSHIP 3 PF**
Up to a maximum of 450 hours of fieldwork experience in a health promotion setting, completed along with a performance evaluation and term paper.
RESTRICTIONS: Open to graduate students only and successful completion of the qualifying examination.

HLPR 866 SPECIAL PROBLEM 1-12**HLPR 868 RESEARCH 3 PF**

Affords an opportunity to apply information derived from the graduate program of study to a health promotion setting or specific population. Involves selecting, organizing, conducting and evaluating a project related to the field of health promotion.

RESTRICTIONS: Open to graduate students only and successful completion of the qualifying examination.

HEALTH STUDIES

HLTH 495 HEALTH STUDIES PRACTICUM 6 PF

Directed service learning experience in a health services setting.

RESTRICTIONS: Restricted to senior health studies majors.

HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT

HRIM 140 INFORMATION TECHNOLOGY AND SERVICES MANAGEMENT 3

Overview of the service industry, its history, current status and future trends. Uses an integrated approach to the study of services, stressing the importance of understanding the underlining processes of service delivery and the way new technologies are affecting them.

HRIM 144 HOSPITALITY INFORMATION MANAGEMENT, NETWORKS AND SYSTEMS 3

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 operations, 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 187 INTRODUCTION TO HOSPITALITY INFORMATION MANAGEMENT 3

Provides an overview of the information systems and technology applications used in the hospitality industry to support operations and management decision-making. Also covers hospitality specific software applications.

HRIM 201 FOOD PRINCIPLES 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: HRIM211.

HRIM 211 FOOD PRINCIPLES LABORATORY 1

Principles of food selection and preparation as related to the chemical and physical properties of food. Includes the composition and structure of food, functional properties of ingredients, and methods to obtain desired sensory and nutritional qualities. COREQ: HRIM201.

HRIM 212 CLUB MANAGEMENT 3

Provides an overview of elements unique to club management such as the nature of private membership, investment, governance, club house operations, food and beverage operations, elements of quality service, financial structures of clubs, accounting and private club marketing.

HRIM 214 ISSUES IN TOURISM MANAGEMENT 3

Examines the scope and organization of the tourism industry, motivations for travel, and the management of micro and macro tourism resources. Economic, social, political and environmental impact of tourism are considered along with the issue of sustainable development within the industry.

HRIM 215 MEETING AND CONFERENCE MANAGEMENT 3

Development of management strategies applicable to meeting and conference management including the methodologies unique to each property and group served by any one operation.

HRIM 217 CATERING MANAGEMENT 3

Application of management principles to the catering function. Topics include: developing catering management systems; catering menu planning and design; on-premise versus off-premise catering management; and food production. Students plan and implement actual catered events.

HRIM 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, 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 EXECUTIVE PRESENTATIONS AND PROBLEM SOLVING 3

Examines various problem solving methods relating to specific issues of the hospitality industry. Explores oral, written and multi-media executive presentation techniques of problem solving results including personal presentations.

HRIM 238 ASSESSMENT AND EVALUATION IN SERVICE DELIVERY SYSTEMS 3

Introduction to research process applied to evaluation of service delivery systems, including design, data collection, analysis, interpretation and reporting of findings. Special emphasis placed on development and use of service delivery evaluation instruments.

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 313 PRINCIPLES OF GAMING MANAGEMENT 3

An overview of gaming management and how it relates to hospitality management. Topics include a history of gaming in the U.S., social and legal aspects, licensing, organization, credit issues, marketing and Title 31 of the Bank Security Act.

HRIM 314 HOSPITALITY ENTREPRENEURSHIP AND VENTURE CREATION 3

Provides an overview of venture creation in hospitality enterprises from concept development to capital creation. Examines various business structures used in hospitality businesses including franchising and management contracts.

HRIM 316 CROSS CULTURAL ETIQUETTE AND PROTOCOL 3

Introduces students to a range of mores and decorum required to effectively work with and offer services to international visitors and associates. Various levels of treatment accorded domestic and international dignitaries within specific types of events and accommodations in the hospitality industry are also discussed.

HRIM 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.

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: HRIM201.

COREQ: HRIM325.

HRIM 322 RETAIL DESIGN AND CONSUMER BEHAVIOR 3

Exploration of the effects of retail design on consumer behavior. Logos, packaging, point-of-purchase display, signage, personnel and store layout are examined. Crosslisted with FASH322.

HRIM 325 LABORATORY IN QUANTITY FOOD SERVICE MANAGEMENT 2

Laboratory experience in quantity food production, service and management. Applications in safety, sanitation, technical operations and quality and cost controls in a quantity food service environment.

PREREQ: HRIM201 and HRIM211.

COREQ: HRIM321.

HRIM 327 PROPERTY ENGINEERING 3

Introduction to problems of cost and operational control of security, safety, parking, preventive maintenance, laundry, HVAC, electrical, refrigeration, plumbing, fire prevention, care of guest rooms and public space.

HRIM 330 INTERNATIONAL HOSPITALITY OPERATIONS 3-5

How hotels, food service operations and tourism attractions function outside of the United States, with particular emphasis on Europe. Focuses on cultural, political, environmental, geographic and economic factors critical to successful international hospitality operations.

HRIM 335 HOSPITALITY FACILITY DESIGN 3

Explores architectural design processes, including both aesthetic and functional design, as they relate to hospitality venues such as restaurants, hotels, commercial kitchens and resorts. Examines the impact of codes, construction costs and environmental parameters that affect hospitality construction.

HRIM 346	HOSPITALITY INDUSTRY WEB-BASED MARKETING	3
Provides information necessary to understand 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 366	INDEPENDENT STUDY	1-6
HRIM 380	MANAGEMENT OF LODGING OPERATIONS	3
Management of front desk, housekeeping, maintenance, security and conference operations.		
HRIM 381	MANAGEMENT OF FOOD AND BEVERAGE OPERATIONS	3
Management tools available to control sales and expenses in food and beverage operations. Analysis of centers of responsibility. Cost management approach to development of control systems. PREREQ: HRIM321.		
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: ACCT200 or both ACCT207 and ACCT208.		
HRIM 425	HISTORIC ROADSIDE ARCHITECTURE	3
Examines various historic hospitality and retail venues with emphasis on their development throughout this automobile based century. Hotels, motels, diners, fast food and full service restaurants, roadside attractions and retail outlets will be discussed as they relate to travel and tourism.		
HRIM 442	HOSPITALITY 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 HOSPITALITY 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-unit 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 450	MANAGING HOSPITALITY INFORMATION SYSTEMS	3
Life cycle approach to understanding hospitality industry information systems. Includes study of issues considered in the analysis, design and implementation of information systems in hospitality operations. PREREQ: HRIM187 or MISY160.		
HRIM 466	INDEPENDENT STUDY	1-6
HRIM 480	HUMAN RESOURCES MANAGEMENT IN THE HOSPITALITY INDUSTRY	3
Techniques and philosophies of personnel management as applied to hospitality operations. Motivation, attitude formation and job satisfaction. Case studies related to theories of organizational behavior and industrial psychology.		
HRIM 481	MARKETING IN THE HOSPITALITY 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 HOSPITALITY 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 hospitality property.		
HRIM 489	HOTEL, RESTAURANT AND INSTITUTIONAL MANAGEMENT PRACTICUM II	6
Structured experience in a hospitality industry environment. At least 40 hours per credit hour in planned activities associated with the management and operation of a hospitality property. PREREQ: HRIM321, HRIM325 and HRIM488.		
HRIM 601	ADVANCED HOSPITALITY AND TOURISM PRODUCT MANAGEMENT	3
Reviews different types, styles and quality of hospitality and tourism products.		

Examines product management including branding, product lifecycles, positioning and packaging. Includes the latest trends in product development and theoretical and practical issues related to multi-unit operations.

HRIM 602 **INTERNATIONAL HOSPITALITY AND SERVICE MANAGEMENT** **3**
Provides an understanding of the service delivery system, its concepts, principles and theories. The mechanics of identifying and setting organizational vision and service standards and the impact of technology on service delivery are covered.
PREREQ: HRIM601.

HRIM 603 **STRATEGIC HOSPITALITY MANAGEMENT** **3**
Provides a comprehensive understanding of strategic management concepts and competitive strategy as applied to the hospitality industries. Examines co-ordination of environmental scanning, strategy and structure of the hospitality service firm.

HRIM 604 **HOSPITALITY FINANCIAL MANAGEMENT ISSUES** **3**
Examines both managerial accounting and financial management as they are practiced in the hospitality industry. Applies principles of finance and accounting to decision-making in the industry, emphasizing industry features and characteristics.
PREREQ: HRIM382, its equivalent, or permission of instructor.

HRIM 605 **ISSUES IN HOSPITALITY INFORMATION TECHNOLOGY** **3**
Examines issues related to information technology in the hospitality industry, including systems, networking, databases, telecommunications, the internet and e-commerce.
PREREQ: HRIM601.

HRIM 642 **HOSPITALITY COMPUTER BASED TRAINING** **3**
A project management approach to the development and implementation of computer-based training in the hospitality industry. Focuses on understanding project management concepts and techniques and applying them to the creation of interactive technology-based training.
PREREQ: HRIM601.

HRIM 643 **HISTORIC ROADSIDE ARCHITECTURE** **3**
Examines various historic hospitality and retail venues with emphasis on their development throughout this automobile based century. Hotels, motels, diners, fast food and full service restaurants, roadside attractions and retail outlets are discussed as they relate to travel and tourism.
Crosslisted with UAPP643.

HRIM 648 **DATA-MINING ANALYSIS IN THE HOSPITALITY INDUSTRY** **3**
Considers the collection of data in hospitality systems environments and ways to mine (or organize) the data into a management information system. Focuses on creating and organizing a data warehouse based on understanding customer relationship management.
PREREQ: HRIM602.

HRIM 664 **HOSPITALITY TECHNOLOGY INTERNSHIP** **3**
Supervised technology-related work experience with a hospitality business or related organization.

HRIM 668 **INDUSTRY PROJECT** **3**
Provides the opportunity to research, design and/or develop the solution to a real-world hospitality technology-related problem or issue.

HRIM 687 **MANAGEMENT SYSTEMS IN THE HOSPITALITY INDUSTRY** **3**
Examines issues surrounding the implementation of information technology in supporting hospitality operations from a guest service perspective and decision making from the viewpoint of management. Case studies and review of various software utilized to understand the various subsystems in a hospitality property.
PREREQ: HRIM601.

HRIM 869 **MASTER'S THESIS** **1-6**

HEALTH SERVICES ADMINISTRATION

HSAD 604 **ADVANCED PRACTICE ROLES FOR HEALTHCARE PROVIDERS** **3**
Focuses on roles and issues affecting healthcare providers engaged in advanced practice. Roles are analyzed in relation to current issues and concepts of advanced practice.
May be crosslisted with NURS604.
RESTRICTIONS: Permission required from department.

HSAD 619 **FINANCIAL MANAGEMENT IN HEALTH SERVICES ORGANIZATIONS** **3**
Provides the basic principles and concepts of effective management of budgets for healthcare units. Includes analysis of the environment and departmental organization and their impact on healthcare.
May be crosslisted with NURS619.
RESTRICTIONS: Permission of department required.

HSAD 635 HEALTH ADMINISTRATION THEORIES 3
Theories of administration, organization and management, their interaction with other health discipline theories and their influence on management of healthcare agencies. Includes the interaction of theories with attainment of institutional goals. May be crosslisted with NURS635.
RESTRICTIONS: NURS604 required as prerequisite or corequisite.

HSAD 637 HEALTH PLANNING STRATEGIES 3
Analyzes organizational systems and roles of managers and administrators. Students identify organizational needs, formulate goals and objectives appropriate to healthcare agencies and identify strategies appropriate to accomplishing goal attainment with ethical constraints of healthcare. May be crosslisted with NURS637.
RESTRICTIONS: NURS604 required as prerequisite or corequisite.

HSAD 638 HEALTH SERVICES EVALUATION 3
Emphasizes the role of managers and administrators in personnel development, promotion of research in clinical settings and development and implementation of quality improvement initiatives and their implications for healthcare. May be crosslisted with NURS638.
RESTRICTIONS: NURS604 required as prerequisite or corequisite.

HSAD 664 HEALTH SERVICES ADMINISTRATION PRACTICUM 1-3
In conjunction with his/her faculty advisor and based on student's individualized long range goals, student selects a preceptor and healthcare setting in which to apply didactic contact in real life settings. Requires 126 hours of on-site experience, which can be taken in one semester or divided over three semesters.
COREQ: HSAD635, HSAD637, or HSAD638.

HSAD 868 RESEARCH: SCHOLARLY PROJECT 1-3
Investigation of a problem in clinical settings related to finance, administration, personnel management, public policy or education, resulting in completion of a scholarly project.
PREREQ: Research and statistics and any two of the following: HSAD635, HSAD637, HSAD638.

HSAD 890 COLLOQUIUM 0 PF
See NURS890 for course description.

INDIVIDUAL AND FAMILY STUDIES

IFST 101 HUMAN SERVICES AND CULTURAL COMPETENCE 1
Provides an overview of human services and approaches to culturally competent practices; critical perspectives regarding diversity, society, race, class, gender and social policy are discussed.

IFST 165 SEMINAR 1 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
Examination of diverse families in the United States with an emphasis on issues of race, ethnicity, class, and gender. Emphasis on the effects of multiculturalism and social change.

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; developmental curriculum; family issues; health, safety, and nutrition; and professional issues.

IFST 220 CHILD DEVELOPMENT I: PRENATAL - AGE 3 3
Study of prenatal development and the physical, perceptual, social-emotional, and cognitive-language developmental domains of children birth to three. Emphasis on nurturing relationships and understanding child development within cultural contexts of children's families. Directed observation in infant/toddler settings.

IFST 221 CHILD DEVELOPMENT II: 3-10 3
Study of cognitive, social, emotional, and physical development of children three to ten years old. Variables that influence child development including family and school investigated. Directed observation of children.
PREREQ: IFST 220 or IFST 201.

IFST 222 INCLUSIVE CURRICULUM: BIRTH - GRADE 2 3
Curriculum/programming for optimal development of children birth to second grade in inclusive settings. Focus on curriculum approaches and examination of the role of play, constructivist theories, developmentally appropriate/culturally responsive practice.
PREREQ: IFST220 and IFST221.
COREQ: IFST224.

IFST 224 PRACTICUM IN INCLUSIVE CURRICULUM: BIRTH - GRADE 2 3
Discussion and weekly practicum experience with children in early childhood settings. Focus on application of theory and reflective thinking. Experience in curriculum planning and guidance.
PREREQ: IFST220 and IFST221.
COREQ: IFST222.

IFST 230 FAMILIES AND THEIR COMMUNITIES 3
Discusses the community context of family life, and the interface of family with school, community and work settings. Community development, social capital, collaboration, family and community asset building, and opportunity structure analysis approaches are presented.

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 disabilities in the context of their family and culture from a multidisciplinary perspective. Covers disabilities and their causes; changing needs across the lifespan, gender, cross-cultural and legal issues; and information about prevention/intervention, employment, inclusion, and empowerment.
May be crosslisted with PSYC270, SOC1270.

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 306 READING AND WRITING FROM BIRTH - GRADE 2 3
Covers development of language and literacy from birth to second grade. Explores instructional and assessment strategies for promoting growth in speaking, listening, reading, and writing.
PREREQ: LING101, IFST222 and IFST224. Students must pass Praxis I prior to taking this course.
COREQ: IFST350, IFST412 and IFST432.

IFST 310 PARENTING THROUGH THE LIFESPAN 3
Applied focus on parenting styles, roles, issues and goals through the lifespan. Parent diversity, interfaces with schools and community, resources, theoretical perspectives and developmental needs of children and parents are examined.
PREREQ: IFST201 or PSYC350.

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 social-emotional development of adolescents and youth in the context of the family, peer groups and the community. Emphasis on theories, current research and the transition from adolescence to young adulthood.
PREREQ: EDUC205 or IFST201.

IFST 330 HELPING RELATIONSHIPS 1 PF
Introduction to the core dimensions of counseling and helping relationships: empathy, respect, genuineness and concreteness. Practice in communicating those levels of the core dimensions that are facilitative to interpersonal functioning.

IFST 331 YOUTH-AT-RISK 3
Explores diverse theories regarding the characteristics of youth-at-risk including an examination of individual, family, school, and societal factors. Risk behaviors identified as well as early identification and applying effective, research-based intervention programs.

IFST 332 COUNSELING THEORIES 3
Examination of selected counseling theories from theoretical, personal, functional and philosophical points of view.

IFST 333 DEVELOPMENT OF HUMAN RELATIONSHIPS 3
Developmental theory and research related to intrapersonal and interpersonal conditions, characteristics, attitudes and behaviors necessary for effective human relationships. Basic focus on the psychology of the individual, relationship skills, conflict management and intimacy.

- IFST 334 EXPERIENTIAL EDUCATION 3**
Field experience combined with a seminar emphasizing professional issues in human services, including portfolio development and career planning. Students should arrange for a 50 hour field placement prior to first week of class (see instructor).
PREREQ: IFST101.
RESTRICTIONS: HMSV majors only.
- 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, lifespan changes, transitions and stage-related issues of early, middle and late adult life. Explores concepts, theories, historical trends and empirical studies during these life periods; integrates theories with practical applications.
PREREQ: 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: IFST235 and IFST334 or permission of instructor.
- IFST 347 PROGRAM DEVELOPMENT AND EVALUATION 3**
Focuses on program development, administrative procedures, and program evaluation. Basic skills required for the development, delivery and evaluation of a wide range of human service programs including preventive interventions for families and individuals.
PREREQ: IFST235 and IFST334 or permission of instructor.
- IFST 350 TECHNOLOGY AND ASSISTIVE TECHNOLOGY IN EARLY CHILDHOOD EDUCATION 3**
The study of the impact technology and assistive technology have on teaching and learning in early childhood settings. Focus on the effective use of technology to develop curriculum, gather assessment data, and interact with children and families. Basic operation and evaluation of technical tools.
PREREQ: IFST222 and IFST224.
COREQ: IFST306, IFST412 and IFST432.
- IFST 355 PROFESSIONAL ISSUES IN EARLY CHILDHOOD DEVELOPMENT AND EDUCATION 3**
Overview and analysis of issues for professionals serving children birth to grade two 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: IFST222/224.
- IFST 360 LEARNING IN COMMUNITY CONTEXTS 3**
Study of the educational process in institutions and organizations with a focus on non-profit groups oriented toward community service. Emphasis upon the relation of these groups' educational practices to their overall public service mission. Crosslisted with EDUC360.
- IFST 364 FIELD EXPERIENCES IN ADMINISTRATION & FAMILY POLICY 1-9**
Provides opportunities to work/participate in human service agencies, business and industry, as well as formal and non-formal educational settings. May be repeated for up to nine credit hours.
Prereq: IFST235 and IFST334.
RESTRICTIONS: Requires permission of instructor.
- IFST 365 SEMINAR 1-3**
- IFST 366 INDEPENDENT STUDY 1-12**
- IFST 401 FOUNDATIONS OF HUMAN SEXUALITY 3**
A multidisciplinary study of human sexuality focusing on the implications for individuals and society of the biological, psychological and sociocultural determinants of human sexuality. Deals with sexually explicit material. May be crosslisted with HESC401, WOMS401.
- IFST 402 CHILD AND FAMILY POLICY 3**
Provides an historical overview of family and child policy in the United States, including policies toward children and families in poverty. The role of the economy, politics, race, class, gender, legal and advocacy issues are discussed.
PREREQ: IFST235 and IFST202.
- 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 405 AGING AND THE FAMILY 3**
Explores developmental changes of older adults and impact on their family members. A major focus is on kinship and caregiving by family and decision making in selecting respite and institutional care when elders develop cognitive and physical disabilities.
- IFST 409 DOMESTIC VIOLENCE SERVICES 3**
Examines issues in providing services to families in which domestic violence is occurring. Multiple service systems are explored, with emphasis on service coordination, service gaps, and public policy.
May be crosslisted with CRJU409, WOMS409.
PREREQ: IFST235 or SOCI201 or WOMS201.
RESTRICTIONS: Open to juniors and seniors only.
- IFST 410 THE HOSPITALIZED CHILD 3**
The psychosocial needs of pediatric patients and their caregivers are examined. Emphasis on coping, preparation, medical terminology, play, assessment and family-centered care. Implications for nursing care, child life specialists, pre-medical students and others working with the pediatric population are studied.
PREREQ: IFST221 or PSYC325.
- IFST 411 INCLUSIVE CURRICULUM: BIRTH - PRESCHOOL 3**
Curriculum/programming for optimal development of children birth-36 months in inclusive settings. Focus on primary caregiving and continuity of care, routines as a basis for curriculum, environmental designs, building relationships with children and families, and the IFSP process.
PREREQ: IFST222/224.
COREQ: IFST431 and IFST452.
- IFST 412 INCLUSIVE CURRICULUM: PRESCHOOL - KINDERGARTEN 3**
Curriculum/programming and assessment for optimal development of children in inclusive preschool and kindergarten settings. Focus on how children learn and methods for teaching math, literacy, arts, science, and social studies in an integrated curriculum; developmentally appropriate and culturally responsive instructional practices; continuum of teaching strategies.
PREREQ: IFST222 and IFST224.
COREQ: IFST306, IFST350 and IFST432.
- IFST 413 INCLUSIVE CURRICULUM: KINDERGARTEN - GRADE 2 3**
Curriculum and assessment for optimal development of children kindergarten through grade 2 in inclusive settings. Focus on how children learn; methods for teaching math, literacy, arts, science, and social studies in an integrated curriculum; developmentally appropriate and culturally responsive instructional practices; continuum of teaching strategies.
PREREQ: IFST222, IFST224, IFST306.
COREQ: IFST414, IFST433 and IFST435.
- IFST 414 CLASSROOM MANAGEMENT/GUIDANCE AND BEHAVIOR SUPPORT 3**
Comparison of theoretical viewpoints underlying behavior. Provides an overview of positive behavior support (individual/schoolwide), including functional behavioral assessment. Emphasized is the importance of teaching socially acceptable responses to reduce and prevent problem behavior. Hands-on experiences address techniques and strategies including visual supports and increasing motivation.
PREREQ: IFST222/224.
COREQ: IFST413, IFST433 and IFST435.
- IFST 422 CAPSTONE IN FAMILY RELATIONSHIPS 3**
An integrative analysis of interpersonal relationships and problems in courtship, marriage and the family in contemporary 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 FAMILY LIFE EDUCATION 3**
Investigates curriculum and instructional strategies for use in support, prevention and empowerment-based programs across the lifespan.
May be crosslisted with WOMS430.
PREREQ: IFST201 or IFST202.
- IFST 431 FIELD EXPERIENCE: BIRTH - PRESCHOOL 1 PF**
Field-based experiences in a school, agency, or family setting with children.

Collaboration with school, community and families in order to support ongoing work in the setting.

PREREQ: IFST222/224.

COREQ: IFST411 and IFST452.

IFST 432 FIELD EXPERIENCE: PRESCHOOL - KINDERGARTEN 2 PF

Field-based experiences in a school, agency, or family setting with children ages three to six. Observation, instruction, and assessment of children. Collaboration with school, community and families in order to support ongoing work in the setting.

PREREQ: IFST222/224.

COREQ: IFST306, IFST350 and IFST412.

IFST 433 FIELD EXPERIENCE: KINDERGARTEN - GRADE 2 1 PF

Field-based experiences in a school, agency or family setting with children, kindergarten through second grade. Observation, instruction, and assessment of children. Collaboration with school, community, and families in order to support ongoing work in the setting.

PREREQ: IFST222/224.

COREQ: IFST413, IFST414 and IFST435.

IFST 435 PROGRAMS FOR CHILDREN WITH EXCEPTIONALITIES 3

Philosophy, organization, and operation of programs for children with exceptionalities. Focus on teaching in inclusive settings, and implementing developmentally appropriate practices. Addresses parent-professional partnerships, characteristics of specific disabilities and related interventions, IEP process, adaptation strategies, and positioning and handling techniques.

PREREQ: IFST222, IFST224 and EDUC230.

COREQ: IFST413, IFST414 and IFST433.

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: IFST401.

RESTRICTIONS: Requires permission of instructor. For undergraduate teaching assistants only.

IFST 440 EARLY CHILDHOOD ADMINISTRATION, LEADERSHIP AND ADVOCACY 3

Organization and administration of programs for young children. Development of effective strategies for leadership and advocacy. Consideration of personnel, facilities, regulations, quality programming and business management.

PREREQ: IFST340.

IFST 445 FAMILY, COMMUNITY AND SCHOOL PARTNERSHIPS 3

Parent-child relationships with a focus on parenting styles, roles, issues and goals geared toward successful utilization of family, school, and community-based resources. Family interfaces with schools and community resources, family diversity and theoretical perspectives, along with developmental needs of parents and children are examined.

PREREQ: IFST101.

COREQ: IFST334 or IFST432.

IFST 449 INTERNSHIP IN FAMILY AND COMMUNITY SERVICES 3-10 PF

On-the-job experience in a community and family service agency.

RESTRICTIONS: Requires permission of instructor.

IFST 452 ASSESSMENT OF CHILDREN 3

Study of multiple roles of formal and informal assessment. Primary focus on integration of curriculum, assessment and programing. Strategies for family involvement will be identified.

May be crosslisted with PSYC460.

PREREQ: IFST220, IFST221, IFST222, and IFST224.

COREQ: IFST411 and IFST431.

IFST 459 CHILD DEVELOPMENT PRACTICUM 1-9 PF

Supervised student teaching experience.

PREREQ: IFST435, IFST452 and IFST470.

RESTRICTIONS: Requires permission of instructor.

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

Discusses professional issues in the delivery of human services.

COREQ: IFST449.

IFST 466 INDEPENDENT STUDY 1-12

IFST 470 FAMILIES AND CHILDREN AT RISK 3

Study of multiple roles of formal and informal assessment. Primary focus on integration of curriculum, assessment and programing. Strategies for family involvement will be identified.

PREREQ: IFST201 or IFST220 or IFST221 or PSYC325.

IFST 472 SUBSTANCE ABUSE AND THE FAMILY 3

Provide an overview of substance abuse, with an emphasis on how it affects the family. Topics include definitions and trends, the physiological effects of substances, the psychological effects of substances, children of substance abusing parents, prevention, and intervention.

IFST 475 TOPICS IN INDIVIDUAL AND FAMILY STUDIES 1-3

Selected topics focusing on current issues affecting families from an interdisciplinary and global perspective.

RESTRICTIONS: Prerequisites vary by topic and instructor.

IFST 480 STUDENT TEACHING SEMINAR 2 PF

Discussion-oriented and problem-centered seminar with emphasis on the role and contributions of the early childhood education professional.

COREQ: EDUC400.

IFST 481 HONORS CAPSTONE STUDENT TEACHING SEMINAR 3

Discussion-oriented and problem-solving seminar with emphasis on role and contributions of the early childhood education professional. Includes introduction to teachers as researchers and completion of public presentation.

COREQ: EDUC400.

RESTRICTIONS: Permission of instructor. Honors students only.

IFST 490 INSTRUCTIONAL METHODS IN FAMILY AND CONSUMER SCIENCES 3

Identification, selection and evaluation of developmentally appropriate strategies and resources for instruction in Family and Consumer Sciences secondary classrooms and community settings. School practicum required.

IFST 491 CURRICULUM AND ASSESSMENT IN FAMILY AND CONSUMER SCIENCES 3

Foundations of curriculum development and evaluation as applied to Family and Consumer Sciences secondary classrooms and community settings. School practicum required.

PREREQ: IFST490.

IFST 601 THEORIES OF HUMAN DEVELOPMENT 3

Overview and analysis of classic and contemporary theoretical approaches in human development. Special emphasis on research and theory concerning families as contexts of development.

IFST 604 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 studied.

IFST 605 IMPACT OF AGING ON THE FAMILY 3

Psychological, physical and financial impact of aging persons on younger family members; increased dependence; family adjustment, both positive and conflicting.

IFST 606 SKILLS DEVELOPMENT IN INDIVIDUAL AND FAMILY STUDIES 3

Application of theories and concepts necessary to specific skills and techniques central to working within the student's field of specialization.

IFST 607 SEMINAR IN COMMUNITY DEVELOPMENT AND NONPROFIT LEADERSHIP 1

Examines complex ways in which concepts of community analysis and development are used and understood.

Crosslisted with UAPP607.

IFST 608 POVERTY, NEIGHBORHOODS AND COMMUNITY DEVELOPMENT 3

Examines social science literature through which multidisciplinary analysts have described and explained poverty, analyzed neighborhoods, and categorized community development efforts. Focusing on the United States, particular attention is paid to analyses from 1960 to the present.

Crosslisted with UAPP608.

IFST 609 DOMESTIC VIOLENCE SERVICES 3

Examines issues in providing services to families in which domestic violence is occurring. Multiple service systems are explored, with emphasis on service coordination, service gaps, and public policy.

IFST 610 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 procedures, directed observation and participation in a hospital setting.

IFST 614	EVALUATION PRACTICES	3	Techniques and methods for assessing professional growth of adults as well as performances and learning of adolescents and special clientele; differentiates evaluation and measurement; explores current issues in evaluation.
IFST 615	RESEARCH METHODS	3	Evaluation of existing research reports, articles and monographs, development of data collection techniques, analysis and presentation of data pertaining to child, family and community populations, elements of statistical analysis, evaluation and selection of research designs, preparation of a research project proposal.
IFST 621	FAMILY STUDIES I: EMPIRICAL AND THEORETICAL PERSPECTIVES	3	Examines basic theories in family studies and trends affecting families at the macro level. Includes a survey of the empirical base of the field and covers issues relating to the interface of the family and society and trends in prevention, intervention, education and therapy.
IFST 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. Crosslisted with EDUC623. PREREQ: EDUC202 or EDUC413.
IFST 630	FAMILY LIFE EDUCATION	3	Teaching methods to address family life education and issues in formal educational and community settings and designing quality curricula and pedagogy for support, prevention and empowerment-based experiences.
IFST 637	PROGRAM PLANNING, ASSESSMENT AND EVALUATION	3	Methods of program planning, summative and formative evaluation and assessment including models, rationales and evaluation techniques as they relate to individual classrooms, educational programs and community settings.
IFST 638	ADOLESCENCE AND YOUTH: THEORIES	3	A critical review of the theories pertaining to personal, physical and socio-emotional development of the periods from early adolescence through youth by an examination of significant research.
IFST 639	CURRICULUM METHODS AND ASSESSMENT	3	Curriculum, instruction and methods of accountability as they relate to educational programs in community and family service agencies. Includes curriculum development, assessment and developmentally appropriate practices with emphasis on integrating language and literacy, social science, mathematics, science and the arts.
IFST 640	EARLY CHILDHOOD ADMINISTRATION, LEADERSHIP AND ADVOCACY	3	Organization, administration and evaluation of early childhood education programs including personnel, facilities, regulations, educational programming, curriculum, management and development. Includes strategies for leadership, professional development and advocacy.
IFST 641	INFANTS, TODDLERS AND FAMILIES: DEVELOPMENT AND PROGRAMMING	3	Cognitive, social, emotional and motor development for children from conception to 36 months, with implications for family support and early care and educational programming. Field placement required. PREREQ: IFST601 and IFST621.
IFST 642	LEADERSHIP IN HUMAN SERVICES	3	Examination of how leaders influence and control the direction and effectiveness of human service agencies and institutions. Focuses on trends, issues, theories and research on leadership with emphasis on the unique concerns of women.
IFST 645	PROGRAMMING FOR YOUNG CHILDREN WITH SPECIAL NEEDS	3	Theories, philosophies, organization and evaluation of programs, both mainstreamed and self-contained for young exceptional children. Emphasis on the multidimensional role of teachers. Focuses on working with parents individually and in groups and on child advocacy.
IFST 650	COMPUTERS IN EARLY CHILDHOOD	3	Integration of microcomputers into the early childhood, developmental curriculum. Considers theoretical rationale, operation of computers, selection of software and curriculum development. Includes a practicum with young children using microcomputers. PREREQ: Early childhood course work. RESTRICTIONS: Early childhood experience acceptable in lieu of prerequisites.
IFST 651	ADVANCED CHILD DEVELOPMENT	3	Theoretical approaches in psychosocial development in children; and influences on development of self-concept, sex-role behavior, moral development and prejudice.
IFST 655	MEASUREMENT TECHNIQUES FOR CHILDREN AND FAMILIES	3	Construction and analysis of developmental ratings, behavioral coding procedures, interviews, questionnaires, tests and sociometric measures appropriate for studying the behavioral development of children and families through the life cycle.
IFST 656	SUPERVISION: FUNCTIONS AND TECHNIQUES	3	Foundations and principles of effective supervision, methods of mentoring, team participation and use of a consultation model in educational settings and family agencies. Focuses on commonalities of skills, techniques and training needed to develop competent, reflective practitioners. May include field supervision.
IFST 658	READINGS IN INDIVIDUAL AND FAMILY STUDIES	3	Emphasis on either infancy, early and/or middle childhood, adolescence, adulthood, gerontology and/or specialized topics in family studies. Emphasis may vary by semester.
IFST 660	TEACHING OF LIFE SPAN DEVELOPMENT	3	Strategies and techniques for effective teaching of life span development at the post-secondary level, including observation, teaching opportunities and mentorships with faculty.
IFST 662	CURRICULUM ANALYSIS IN EARLY CHILDHOOD	3	Examination and evaluation of curriculum in early childhood including theoretical analysis of pedagogy, curriculum content and child outcomes.
IFST 663	ATYPICAL INFANT AND TODDLER DEVELOPMENT	3	Detailed overview of atypical development of infants and toddlers including their sensory, motor, cognitive, communication, and psychosocial development. Family interactions, supports, and early intervention service systems are also addressed.
IFST 665	SEMINAR	1-6	
IFST 668	RESEARCH	1-6	
IFST 669	SUPERVISED FIELD EXPERIENCE AND STUDY	1-12	Supervised work with children, adults and/or families in educational and/or community settings. RESTRICTIONS: Credit may be distributed over more than one semester.
IFST 670	FAMILY RISK AND RESILIENCY	3	Applied focus on situations which place families at risk across the life span such as poverty, disability, stressors and family dissolution. An examination of family strengths, cultural diversity and techniques for working with families across the life course in community based settings including classrooms, programs, and agencies.
IFST 679	DEVELOPMENT OF COUNSELING SKILLS	3	Focuses on development of needed skills and practices for establishing effective counseling relationships. Includes basic assumptions about helping relationships and emphasizes application of various counseling techniques. RESTRICTIONS: Open to students whose major requires course.
IFST 680	COUNSELING IN HIGHER EDUCATION	3	Introduction to the history, philosophy, roles, organizational structure, professional ethics, professional standards in research, and counseling and student affairs practice in higher education. RESTRICTIONS: Open only to majors in counseling in higher education.
IFST 681	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.
IFST 682	STUDENT DEVELOPMENT IN HIGHER EDUCATION	3	Studies of development in motivation and personality trends in late adolescence and 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.
IFST 683	SEMINAR IN HIGHER EDUCATION ADMINISTRATION	3	Overview of administrative and management issues faced by leaders in higher education.
IFST 684	THEORIES OF COUNSELING	3	Theories and techniques used in counseling individuals with personal, social, vocational and educational problems. RESTRICTIONS: Open only to majors in counselor education.
IFST 685	MULTICULTURAL ISSUES IN COUNSELING	3	Examines the influence of cultural background, including ethnicity, gender, sexual orientation, socio-economic factors, religious preference and age in the counseling relationship. Introduction to nontraditional theories and techniques useful with special populations. Emphasis on increased sensitivity toward cultural influences. RESTRICTIONS: Open only to majors in counselor education.

IFST 686	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.		
IFST 687	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.		
IFST 688	THE LAW AND STUDENT AFFAIRS	3
Legal issues which affect the student affairs practitioner in higher education. Review of federal statutes, court rulings and contract law as applied to administrative rules, legal rights of students and institutional liabilities.		
IFST 689	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.		
IFST 690	GENDER ISSUES IN COUNSELING	3
Examines how gender dynamics affect the counseling process. Emphasis on traditional, non-sexist and relational approaches to counseling and the gender-specific problems of clients.		
IFST 691	GROUP COUNSELING	3
Examination of group work and group counseling in higher education as well as primary and secondary school settings. Emphasis on theoretical foundation of group work and group skills training. RESTRICTIONS: Open only to majors in counselor education.		
IFST 692	STUDENT PERSONNEL MANAGEMENT	3
Study of the theories and principles of management in student affairs practice in higher education. Managerial, leadership, program development, supervising and organizational issues involved in professional practice.		
IFST 693	GROUP DYNAMICS	3
Theory, strategies and skills needed to work effectively with groups. Emphasis on understanding and managing the factors that affect group facilitation and leadership.		
IFST 694	INTERNSHIP IN COUNSELING	3
Supervised experiences in counseling in higher education. Minimum of 120 clock hours of direct service time per semester. RESTRICTIONS: Open only to majors CHED-MA in Counseling in Higher Education.		
IFST 695	INTERNSHIP IN STUDENT AFFAIRS	3
Supervised experiences in student affairs practice. Minimum of 120 hours of direct service time per semester RESTRICTIONS: CHED-MA students only.		
IFST 803	HUMAN DEVELOPMENT IN LIFE SPAN PERSPECTIVE	3
Systematic survey of developmental domains across the life span. Topical emphasis on multidisciplinary research findings chronicling continuities and discontinuities in individuals' status and functioning in physical growth, perception, cognition, language, attachment, personality development, gender and sexuality. PREREQ: IFST601 or permission of instructor.		
IFST 815	RESEARCH ISSUES AND DESIGNS	3
Examination of issues in design, sampling, measurement and analysis techniques applicable to research in family studies. PREREQ: IFST615.		
IFST 823	PROSEMINAR: SOCIAL AND URBAN POLICY	3
Social policy attempts to promote the well-being of individuals, families and communities through public action. Explores efforts to address social and economic problems in urban society. Considers differential policy impacts by social class, race/ethnicity, gender and age. Topics: welfare, housing, social security, health, education, criminal justice and employment. Crosslisted with UAPP823.		
IFST 828	TRENDS AND ISSUES IN INDIVIDUAL AND FAMILY STUDIES	3
Historical and theoretical frameworks for understanding current issues in research, policy development and practice in individual and family studies. Selected issues identified and analyzed for past and future contribution to the field of study.		
IFST 850	THEORIES: FAMILY STUDIES AND HUMAN DEVELOPMENT	3
Advanced analysis of theories of family studies and individual development, behavior and family life and applications to research models. Strong emphasis on historical and philosophical influences on theory building. The function of theory, the process of theory construction and critical components of specific theoretical perspectives examined. PREREQ: IFST621 or permission of instructor.		

IFST 855	FAMILY STUDIES II: ANALYSIS AND CRITICAL ISSUES	3
A critical analysis of topics central to understanding the field of family studies. Emphasis on issues facing contemporary families. Topics include the work-family balance, marriage, divorce, remarriage, parenting, domestic violence, pregnancy, sibling relationships across the lifespan. PREREQ: IFST621 or permission of instructor.		
IFST 860	DIVERSITY IN FAMILIES AND HUMAN DEVELOPMENT	3
Examines the effects of factors such as class, cohort, culture, gender and other components that influence diversity in families and variations in the context of human development. Surveys the impact of socioeconomic influences and demographic changes as they relate to varied family structures and relationships over the life course. PREREQ: IFST601, or IFST621, or permission of instructor.		
IFST 865	ADVANCED SEMINAR IN FAMILY STUDIES	1-3
Varying special interest topics in family studies. Topics usually are presented from an interdisciplinary perspective. RESTRICTIONS: Requires permission of instructor. May be repeated for credit as topic varies.		
IFST 868	RESEARCH	1-6
IFST 869	MASTER'S THESIS	1-6
IFST 870	FAMILY CRISIS AND COPING	3
Examines the research that focuses on families and individuals in crisis situations. Focuses on theories of understanding the differential impact of crisis as well as techniques to cope with the situations. Uses a developmental life span perspective.		
IFST 875	INTERGENERATIONAL RELATIONSHIPS AND DEVELOPMENT	3
Focused consideration of the role of intergenerational relationships in the development of individuals and families. Intensive study of theories and empirical data illustrating the contextually embedded interactions of individual and family development. Particular emphasis on developmental reciprocity in child-parent-grandparent and extended family relationships. PREREQ: permission of instructor.		
IFST 880	FAMILIES, DISABILITIES AND INSTITUTIONS	3
Focuses on how families and individuals with disabilities interface with a range of institutions such as the legal system, social services, educational and health care systems. Discusses effects of institutions on families and influence of families on institutional policies and processes.		
IFST 885	CHILDREN AND COMPUTERS	3
Students participate in building a sound theoretical and pedagogical foundation for use of computers in young children's education. Developmental perspectives such as Piaget, Vygotsky, and NAEYC's guidelines for Developmentally Appropriate Practice form the core of theoretical foundation building.		
IFST 964	PRE-CANDIDACY STUDY	3-12 PF
Research and readings in preparation of dissertation topics and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.		
IFST 969	DOCTORAL DISSERTATION	1-12 PF

ITALIAN

ITAL 105	ITALIAN I - ELEMENTARY	4
Introduction to the Italian language and development of speaking, listening, reading and writing skills through the use of basic texts.		
ITAL 106	ITALIAN II - ELEMENTARY/INTERMEDIATE	4
Completion of basic Italian. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: ITAL105. RESTRICTIONS: Two to three years of high school Italian acceptable in lieu of prerequisite.		
ITAL 107	ITALIAN III - INTERMEDIATE	4
Review of grammar, continued practice in speaking and writing, reading texts of average difficulty. PREREQ: ITAL106. RESTRICTIONS: Four years of high school Italian acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.		
ITAL 200	ITALIAN GRAMMAR REVIEW	3
Systematic review of fundamental aspects of Italian grammar. Study of special problem areas. Some conversational practice. PREREQ: ITAL107.		

ITAL 205	ITALIAN CONVERSATION	3	Practical use of Italian by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review and written work when appropriate. PREREQ: ITAL107. RESTRICTIONS: Prerequisite requires a minimum grade of B. One 200-level Italian course may be substituted for Prerequisite.
ITAL 206	CULTURE THROUGH CONVERSATION	3	Discussion of topics drawn from contemporary Italian life. Designed for students who wish to broaden their knowledge of Italian culture while improving their oral and aural language skills. PREREQ: ITAL107. RESTRICTIONS: Taught abroad only.
ITAL 208	ITALY: PAST AND PRESENT	3	An introduction to Italy, its history, its culture, its people, their way of life and the issues confronting them. RESTRICTIONS: Taught abroad only, in both English and Italian. Not for major credit. Does not satisfy the language requirement.
ITAL 211	ITALIAN READING AND COMPOSITION: SHORT FICTION	3	Reading and discussion of Italian short stories. Several short compositions. Grammar review where appropriate. PREREQ: ITAL200, ITAL205 or ITAL206.
ITAL 212	ITALIAN READING AND COMPOSITION: DRAMA AND PROSE	3	Reading and discussion of some major 20th-century plays and prose texts. Several short compositions. Grammar review where appropriate. PREREQ: ITAL200, ITAL205 or ITAL206.
ITAL 250	INTRODUCTION TO BUSINESS ITALIAN	3	Familiarizes students with characteristics of business Italian (vocabulary, technology, terminology and syntactical patterns) and aspects of the Italian business community. PREREQ: ITAL107.
ITAL 305	ADVANCED ITALIAN CONVERSATION AND COMPOSITION	3	Discussion of current cultural, social and political topics in Italy. Vocabulary building, grammar exercises and frequent compositions. PREREQ: ITAL211 or ITAL212.
ITAL 306	PRACTICAL ORAL/WRITTEN EXPRESSION	3	Offered abroad only, is designed to strengthen skills in grammar and vocabulary in preparation for advanced courses offered in second part of the semester. Class exercises include oral exposes, 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 mid-17th 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-17th century to the present. Study and discussion of representative works. PREREQ: ITAL211 or ITAL212.
ITAL 325	ITALIAN CIVILIZATION AND CULTURE I	3	A survey of the major cultural, social and political developments in Italy from the Etruscans to the 15th century. PREREQ: ITAL211 or ITAL212.
ITAL 326	ITALIAN CIVILIZATION AND CULTURE II	3	A survey of the major cultural, social and political developments in Italy from its Unification 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 STYLISTICS	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. Exposition of the questione della lingua; linguistic analysis of old Italian texts; and the effects of social, political and cultural factors on usage. Influences from and on other languages. PREREQ: Any two 300-level Italian courses. RESTRICTIONS: May be offered jointly with ITAL603.
ITAL 406	ADVANCED ITALIAN 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 Italian course. RESTRICTIONS: Taught abroad only.
ITAL 455	SELECTED AUTHORS, WORKS AND THEMES	3-12	Works of one or more outstanding authors or on a special theme. PREREQ: Any two Ital 300-level literature courses. RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL655.
ITAL 466	INDEPENDENT STUDY	1-3	
ITAL 601	ADVANCED ITALIAN GRAMMAR AND STYLISTICS	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 questione 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	3-12	Seminar on works of one or more outstanding authors or on a special theme. RESTRICTIONS: Can be repeated for credit when topics vary. May be offered jointly with ITAL455.

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 Kanji 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 Kanji characters. Introduction to formality levels and critical verb forms needed for more advanced communication. Media Center resources utilized. PREREQ: JAPN105. RESTRICTIONS: Two to three years of high school Japanese acceptable in lieu of prerequisite.
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 Kanji characters, handling a greater variety of formality levels, and verb forms. Media Center resources utilized. PREREQ: JAPN106. RESTRICTIONS: Four years of high school Japanese acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.
JAPN 200	JAPANESE GRAMMAR AND COMPOSITION	3	Further study of Japanese grammar, kanji characters and reading and writing skills for communication. Emphasis on grammar, Kanji and essay writing. PREREQ: JAPN107. Students are encouraged to take JAPN205 concurrently with JAPN200.
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 kanji 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. Students are encouraged to take JAPN200 concurrently with JAPN205. 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 develop all four language skills in such contexts as job interviews, telephone etiquette, correspondence and relations with supervisors. Skits and role-playing featured. PREREQ: JAPN205 or 206. Students are encouraged to take JAPN200 before or concurrently with JAPN209.		
JAPN 305	JAPANESE CONVERSATION AND COMPOSITION	3
Discussion of current cultural, social and political topics in Japanese. Vocabulary building, grammar exercises and frequent compositions. PREREQ: Three of the following: JAPN200, JAPN205, JAPN206, JAPN209, or instructor's permission.		
JAPN 306	PRACTICAL ORAL AND WRITTEN EXPRESSION	3
Designed to increase fluency and vocabulary. Grammar review focuses on special problems. PREREQ: Any two Japanese courses taught in Japanese. RESTRICTIONS: Taught abroad only.		
JAPN 355	SPECIAL TOPICS	3
Explores an area of special interest in Japanese literature or culture studies. The subject matter varies and will be announced in the registration booklet. PREREQ: Three of the following: JAPN200, JAPN205, JAPN206, JAPN209, or instructor's permission. RESTRICTIONS: May be repeated for credit when topics vary.		
JAPN 366	INDEPENDENT STUDY	1-3
PREREQ: Two of the following: JAPN200, JAPN205, JAPN206.		
JAPN 455	SELECTED AUTHORS, WORKS, AND THEMES	3
Works of one or more outstanding authors or on a special theme. PREREQ: Two 300-level Japanese courses. RESTRICTIONS: May be repeated for credit when topics vary.		
JAPN 466	INDEPENDENT STUDY	1-3
PREREQ: One 300-level Japanese course.		

JOURNALISM

JOUR 301	INTRODUCTION TO JOURNALISM	3
Introduction to history, practice and issues of journalism in variety of formats. Gateway to journalism, exposing students to challenges and opportunities of discipline, as well as work ethic and career responsibilities faced in the field. As an overview, helps students determine if journalism is right for them. PREREQ: Grade of B or better in ENGL110.		
JOUR 425	ETHICS AND ISSUES IN JOURNALISM	3
Examination of issues faced by journalism and journalists today, including different standards of truth, competing responsibilities (to readers, sources, corporate shareholders), blending of news and entertainment, and changing nature of journalism in digital age. PREREQ: JOUR401.		

JEWISH STUDIES

JWST 105	HEBREW I - ELEMENTARY	4
Introduction to the Hebrew alphabet and language, and development of basic speaking, listening, reading and writing skills. Crosslisted with HEBR105.		

JWST 106	HEBREW II - ELEMENTARY/INTERMEDIATE	4
Continuation of Elementary Hebrew. Increasing mastery of the basic skills of speaking, listening, reading, and writing through texts, conversations and songs. Crosslisted with HEBR106. PREREQ: HEBR105. Those with background other than HEBR105 should see instructor for appropriate placement.		
JWST 107	HEBREW III - INTERMEDIATE	4
Strengthening grammar skills, continued practice in speaking, listening, writing and reading through conversation, texts and songs. Crosslisted with HEBR107. PREREQ: HEBR106. Those with background other than HEBR106 should see instructor for appropriate placement. RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.		
JWST 166	SPECIAL PROBLEM	1-4
JWST 201	ISSUES AND IDEAS IN JEWISH STUDIES	1
A forum for scholars to share their thoughts and research on the culture, literature and history of the Jewish people. Topics range from historical reviews to contemporary issues.		
JWST 202	BIBLICAL AND CLASSICAL LITERATURE	3
Study of Greek, Roman, and Biblical literatures, set in their mythical, historical and cultural contexts, introducing appropriate critical concepts. Crosslisted with ENGL202. PREREQ: ENGL110.		
JWST 205	HEBREW CONVERSATION	3
Practical use of Hebrew by means of discussions and oral reports on a variety of topics including family, school and work life. Emphasis on improvement of conversational skills for social situations, as well as grammatical competence and reading comprehension through multicultural themes including the revival of the Hebrew language and various issues related to Hebrew culture. Crosslisted with HEBR205. PREREQ: HEBR107 or equivalent.		
JWST 208	INTRODUCTION TO JEWISH PHILOSOPHY	3
Fundamental issues in philosophy of religion reflecting both general theological approaches to resolving the tension between philosophy and religion and the uniquely Jewish attempt to do so. Topics include: God, miracles, good and evil, divine commandments and free will. Crosslisted with PHIL208.		
JWST 209	CONTEMPORARY ISRAEL THROUGH FILM	3
Development of oral and written proficiency in Hebrew through discussion and analysis of Israeli films pertaining to major issues in the development of the young state. Grammar review where needed. Crosslisted with HEBR209. PREREQ: HEBR107 or one 200-level Hebrew course or professor's permission. RESTRICTIONS: Minimum grade of A- required for HEBR107 and minimum grade of B required for a 200-level course.		
JWST 254	JEWISH HOLOCAUST: 1933-1945	3
Focuses on the infamous "Final Solution," with particular emphasis on the roots of Anti-Semitism, National socialist policies and plans, ghetto and camp life, the Einsatzgruppen, resistance, the politics of rescue and the art and literature of the Holocaust. Crosslisted with HIST254.		
JWST 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. Crosslisted with ANTH261.		
JWST 266	SPECIAL PROBLEM	1-3
JWST 308	TOPICS IN JEWISH THEOLOGY	3
Critical evaluation of the theological views of major branches of Judaism on such topics as: the significance of Israel, the status of Jewish law, the meaning of Jewish ritual and the mission of the Jewish people. Crosslisted with PHIL308. PREREQ: PHIL208 recommended.		
JWST 318	STUDIES IN FILM	3-6
Special topics such as film genres, major directors and Soviet cinema. Crosslisted with ENGL318. PREREQ: ENGL110. RESTRICTIONS: May be repeated for credit when topics vary.		
JWST 345	MODERN ISRAEL: CULTURE AND IDENTITY	3
Many factors contribute to a diverse and intriguing Israeli society. Topics include the roots of Zionism, the concept of the Israeli Sabra, the effects of the Holocaust, ethnic groups and the Arab-Israeli conflict, through history, film, literature and music. Crosslisted with FLT345.		

JWST 348	CONTEMPORARY JEWISH-AMERICAN LITERATURE	3
Lectures and discussions of outstanding contemporary Jewish American novelists, short story writers, and others. Crosslisted with ENGL348. PREREQ: ENGL110.		
JWST 349	INTRODUCTION TO JEWISH SOURCES: TEXT AND INTERPRETATION	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. Crosslisted with ENGL349.		
JWST 360	SOCIOLOGY OF RELIGION	3
Sociological analysis of major religions and the societies with which they have been associated; social settings of particular systems of belief; the relation of status; religious affiliation and personal behavior in modern societies. Crosslisted with SOCI360.		
JWST 365	STUDIES IN LITERARY GENRES, TYPES AND MOVEMENTS	3
Particular areas or writers to be announced. Crosslisted with ENGL365. PREREQ: ENGL110.		
JWST 366	INDEPENDENT STUDY	1-3
JWST 377	ARAB-ISRAELI POLITICS	3
Development of the Arab-Israeli conflict analyzed from the Dreyfus Affair and the Balfour Declaration to current events. Crosslisted with POSC377.		
JWST 381	HISTORY OF THE ARAB-ISRAELI CONFLICT	3
Explores the roots and the historical complexity of the Arab-Israeli conflict. Topics include: the origins of Zionism, the nature of traditional Arab/Ottoman society in the 19th century, the relationship between the early Zionists and indigenous Arab population of Palestine, the creation of a Jewish society, the rise of Palestinian nationalism, and the protracted search for coexistence between Jews and Arabs. Crosslisted with HIST380.		
JWST 382	STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH	3
Consideration of multiculturalism as it pertains to American culture or literature in English from Africa and other non-European societies. Variable in historical range, geography, and genre. Crosslisted with ENGL382. PREREQ: ENGL110. RESTRICTIONS: May be repeated once for credit when topics vary.		
JWST 390	HONORS COLLOQUIUM	3
Crosslisted with ENGL391.		
JWST 409	CONTEMPORARY PROBLEMS OF WORLD POLITICS	3
Critical areas of international politics. Topics vary by instructor. Crosslisted with POSC409. RESTRICTIONS: May be repeated once when topics vary.		
JWST 430	COMPARATIVE SOCIOLOGY	3-6
Exposes sociological similarities and differences between the United States and a selected country on a number of critical sociological topics. Topics include ethnic and religious diversity, culture, demographic structure, social institutions, social stratification and urbanization. Crosslisted with SOCI430. RESTRICTIONS: Requires permission of instructor. Only three credits may apply toward departmental requirement of six 400-level credits. Offered only in the study abroad program and subject to acceptance by the Office of International Programs.		
JWST 466	INDEPENDENT STUDY	1-3
JWST 480	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., autobiography). Stresses critical writing and literary research. Crosslisted with ENGL480.		

LATIN

LATN 101	ELEMENTARY LATIN I	3
Prepares students to read ancient Roman literary works in the original language. Emphasizes building a basic vocabulary and acquiring essential grammar. Discussion of Roman culture and civilization.		

LATN 102	ELEMENTARY LATIN II	3
Completion of elementary Latin. PREREQ: LATN101 or equivalent. RESTRICTIONS: One year of high school Latin acceptable in lieu of prerequisite.		
LATN 213	CICERO	3
Introduction to reading Latin literature in the original language, focusing on the philosophical and forensic works of Cicero, the historical writings of Livy and the poetry of Ovid. PREREQ: LATN101 and LATN102 or equivalent.		
LATN 214	VERGIL	3
Vergil's Aeneid or Ovid select works. Review of grammar and readings in the poetry of Vergil. PREREQ: LATN213. RESTRICTIONS: Satisfies College of Arts and Sciences language requirement.		
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: LATN214.		
LATN 222	HISTORIANS OF THE REPUBLIC	3
Selected readings from the works of Livy, Sallust and Cornelius Nepos. PREREQ: LATN214.		
LATN 313	ADVANCED INTERMEDIATE LATIN PROSE	3
Focuses on the works (in the original language) of one or more prose authors with particular attention to interpretative issues such as themes and contemporary intellectual and cultural milieu. Readings drawn from the philosophical, historical, and oratorical works of authors such as Tacitus, Pliny the Elder, Pliny the Younger, Caesar, Cicero, Sallust, and Seneca in rotation or in combination.		
LATN 314	ADVANCED INTERMEDIATE LATIN POETRY	3
Focus on the works (in the original Latin) of one or more poets with particular attention to interpretative issues such as themes and contemporary intellectual and cultural milieu. Readings will be drawn from authors such as Lucretius, Tibullus, Propertius, Ovid, Virgil, Ennius, Catullus, Plautus, Terence, and Seneca in rotation and/or in combination.		
LATN 366	INDEPENDENT STUDY	1-3
LATN 403	ROMAN LYRIC POETRY	3
Readings in the lyric poetry of Catullus and Horace. PREREQ: LATN214.		
LATN 413	ADVANCED LATIN PROSE	3
Focuses on the works (in the original language) of one or more prose authors with particular attention to interpretative issues such as themes and contemporary intellectual and cultural milieu. Readings drawn from the philosophical, historical, and oratorical works of authors such as Tacitus, Pliny the Elder, Pliny the Younger, Caesar, Cicero, Sallust, and Seneca in rotation or in combination. Meets with LATN313.		
LATN 414	ADVANCED LATIN POETRY	3
Focus on the works (in the original Latin) of one or more poets with particular attention to interpretative issues such as themes and contemporary intellectual and cultural milieu. Readings will be drawn from work of poets such as Lucretius, Virgil, Terence, Plautus, Catullus, Ennius, Propertius, Seneca, and Tibullus in rotation and/or in combination.		
LATN 466	INDEPENDENT STUDY	1-3

LEADERSHIP

LEAD 100	LEADERSHIP, INTEGRITY AND CHANGE	3
Introduces students to concepts and theories of leadership to help them develop the skills essential to becoming leaders in the workplace, community and society.		
LEAD 101	UNDERSTANDING CONSUMERS	3
Consumer diversity, consumer needs, and how consumer wants are shaped. Questions of social responsibilities are explored.		
LEAD 110	PERSPECTIVES ON LEADERSHIP	1
Overview of leadership as an academic discipline and a field of practice. Topics include exploring the nexus of leadership and consumer policy, career paths, resources for academic success, and opportunities for leadership development. Emphasis on individual and team skills for problem solving. RESTRICTIONS: Priority given to freshmen.		
LEAD 201	INTRODUCTION TO CONSUMER POLICY	3
Explores general models of how consumer policies come into being and examines		

how the relationships among consumers, government and business impact the formulation of these consumer policies.

LEAD 205 LEADERSHIP IN CONSUMER VOICE AND CUSTOMER SERVICE 3
Explores how consumers can use voice to obtain more satisfactory service and how organizations can encourage and use consumer voice for mutual benefit.

LEAD 209 PRESENTATION STRATEGIES 3
Methods for delivering leadership messages and for developing strategic presentations, with an emphasis on purpose, vision, audience and formats.

LEAD 304 LEADERSHIP, POWER AND SOCIAL RESPONSIBILITY 3
Examines power as a set of internal and external resources that leaders can use to promote social responsibility to and by consumers.
PREREQ: LEAD100.

LEAD 311 TOPICS IN CONSUMER RESOURCE MANAGEMENT 3
Topics relating to the development of human and economic resources and productive capacity to meet consumer needs over the life span. Topics will vary.

LEAD 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.

LEAD 341 DECISION-MAKING AND LEADERSHIP 3
Explores basic decision-making theories and models. Examines decision-making as an integral part of leadership in addressing consumer issues.
PREREQ: LEAD100.

LEAD 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 and the regulatory agencies responsible for implementing and enforcing these policies are examined.
PREREQ: LEAD201.

LEAD 366 INDEPENDENT STUDY 1-6

LEAD 401 TOPICS IN CONSUMER POLICY ANALYSIS 3
Topics examine the effects of consumer-oriented policies upon consumer well-being. Topics will vary.
PREREQ: LEAD201.

LEAD 404 LEADERSHIP IN ORGANIZATIONS 3
Understanding the process of change and positively affecting change in organizations through the exercise of leadership knowledge.
PREREQ: LEAD100.

LEAD 411 TOPICS IN LEADERSHIP DYNAMICS 3
Topics relating to aspects of leadership. Themes in leadership dynamics will be explored.
PREREQ: LEAD100.

LEAD 466 INDEPENDENT STUDY 1-6

LEAD 490 SENIOR CAPSTONE 3
Engage in a project addressing "real world" leadership challenges. Successful project completion requires integration, synthesis and reflection upon knowledge and skills acquired in previous courses. Specific projects vary by semester.
PREREQ: LEAD100, LEAD304, LEAD341.
RESTRICTIONS: Open to senior LEAD majors only.

LEGAL STUDIES

LEST 210 THE LAW AND YOU 1 PF
Provides an opportunity for students to learn more about how the law affects them directly. Prominent guest speakers cover current issues relating to the law, how it operates and how it may affect students and other members of the university community.

LEST 301 INTRODUCTION TO LEGAL STUDIES 3
Introduces legal studies as a multidisciplinary field.
May be crosslisted with CRJU301.

LEST 345 LEGAL ISSUES OF THE MASS MEDIA 3
Survey of legal issues affecting the development and performance of the mass media. The foundation of American communications law outlined through the study of First Amendment theory, its origin and development. Legal issues concerning libel, obscenity, copyright and broadcast regulation discussed.
Crosslisted with COMM345.

LEST 380 INTRODUCTION TO LAW 3
Broad overview of the nature, functions and limits of law. Emphasis on law as the

political instrument used to regulate, control and promote behavior and deal with social problems.

Crosslisted with POSC380.

LEST 383 LANGUAGE, POWER AND THE LAW 3
Focus on the power of language in the legal arena. Topics include: the language of mediation; gender and power; the Plain English movement; attorneys' questioning styles; fraud and deception in consumer contracts and advertising; the rebirth of shaming as punishment; leniency pleas; the legal job interview; and expert witness testimony, among others.
Crosslisted with LING383.

LEST 385 LANGUAGE AND LAW: COURT INTERPRETATION 3
Examines court interpretation from various perspectives and includes an historical overview of policy development, linguistic challenges (for both spoken and signed languages), ethics and responsibilities, testing and certification of court interpreters (at state and federal levels), and comparative data about other countries. Numerous guest speakers supplement coursework.
Crosslisted with LING385.

LEST 401 SENIOR SEMINAR 3
Culminates the legal studies minor by requiring an independent research project resulting in a term paper. Seminar focuses on a specific substantive issue, provides guidance from professor and chance to share ideas and problems with fellow students.
May be crosslisted with CRJU401, SOCI401.

LEST 408 ECONOMICS OF LAW 3
Effect of legal rules on resource allocation both in and between the public and private sectors. Considers common law, regulation and constitutional rules.
Crosslisted with ECON408.
PREREQ: ECON300 or ECON301.

LEST 450 TOPICS IN ENVIRONMENTAL LAW 3
Overview of the legal process and environmental laws in order to understand policy issues and learn action processes in the environmental field.
Crosslisted with FREC450.

LEST 466 INDEPENDENT STUDY 1-6

LEST 475 SOCIAL SCIENCE AND THE LAW 3
Examines the relationship of social science to law and the legal process, how social science has contributed to our understanding of law, and how social science has been employed in litigation.
Crosslisted with CRJU475.

LEST 646 ADMINISTRATIVE LAW AND POLICY 3
Introduces the basic concepts and rules of administrative law and of the legal issues affecting public and nonprofit organizations in dealing with governmental agencies. Special attention placed on the impact politics has on efforts by administrators to comply with administrative law rules and regulations. No prior legal training or command of legal language necessary.
Crosslisted with UAPP646.

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

LEST 673 INTERNATIONAL LAW 3
Origins, sources and applications of law to international relations, including the nature of treaties, the legal powers of states and international organizations, jurisdiction and immunities, and the role of international courts. Special attention given to the law of the sea for navigation, fisheries conservation, mineral exploitation and environmental protection.
Crosslisted with MAST673.
RESTRICTIONS: Requires permission of instructor.

LINGUISTICS

LING 101 INTRODUCTION TO LINGUISTICS I 3
Nature of language: structure of sounds, words, sentences, and meaning; relationships of language and society, culture, and thought. Emphasis is on language universals and variation both within and between languages, including non-Western and non-white varieties.

LING 102 LANGUAGE, MIND AND SOCIETY 3
Explores the structural aspects of language variation and the mental representation of language. Topics include; regional and social variation in language, sociolinguistics

of multilingual/multiethnic communities, language change, role of universal grammar in language learning, lexical access and parsing.
PREREQ: LING101.

LING 203 LANGUAGES OF THE WORLD 3
Survey of the world's languages, examining a number of important phenomena from a wide range of languages. Phenomena are both structural (e.g., word order and agreement) and societal or psychological (how multicultural societies choose a common language, the relation between language and thought).
May be crosslisted with FLIT203.

LING 222 LANGUAGE AND GENDER 3
Explores various ways in which gender is reflected in language. Topics include sexism in language, sexist language and differences in the structural aspects of men's and women's language and conversational style. Emphasis on the social implications of these differences.
May be crosslisted with WOMS222.

LING 253 LABORATORY PHONETICS 3
Study of speech sounds, emphasizing the measurement of the acoustic signal. Introduction to acoustic phonetics, concentrating on the source-filter model of speech production. Computer laboratory projects in speech recording, digitization, analysis, variation, synthesis and perception.

LING 265 STUDIES IN LANGUAGE 3-9
Topics vary and will be announced in registration booklet.
RESTRICTIONS: May be repeated for credit when topics vary.

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: LING101.

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 to learn names and functions of various structures involved in speech production and to gain understanding of how they serve to support speaking in normally functioning humans.

LING 379 INTRODUCTION TO AUDIOLOGY 3
Provides an overview to the field of audiology. Content includes a study of the anatomy and physiology of the hearing mechanism, hearing assessment, classification of hearing disorders, auditory pathologies, and management of hearing loss.
PREREQ: LING376.

LING 383 LANGUAGE, POWER AND THE LAW 3
Focus on the power of language in the legal arena. Topics include: the language of mediation; gender and power; the Plain English movement; attorneys' questioning styles; fraud and deception in consumer contracts and advertising; the rebirth of shaming as punishment; leniency pleas; the legal job interview; and expert witness testimony, among others.
May be crosslisted with LEST383.

LING 385 LANGUAGE AND LAW: COURT INTERPRETATION 3
Examines court interpretation from various perspectives and includes an historical overview of policy development, linguistic challenges (for both spoken and signed languages), ethics and responsibilities, testing and certification of court interpreters (at state and federal levels), and comparative data about other countries. Numerous guest speakers supplement coursework.
May be crosslisted with LEST385.

LING 390 ENGLISH LINGUISTICS 3
General introduction to the study of the English language, with emphasis on modern linguistic approaches.
Crosslisted with ENGL390.
PREREQ: ENGL110.

LING 401 HISTORICAL LINGUISTICS 3
Languages of the world, Indo-European languages, the comparative method and linguistic evolution.
May be crosslisted with FLIT401.
PREREQ: Completion of two years of a college language.

LING 403 INTRODUCTION TO PHONOLOGY 3
Basic introduction to phonology, concentrating on principles of articulatory phonetics, the IPA transcription system, distinctive feature theory, phonological analysis, and phonological rules.
PREREQ: LING101.

LING 404 STRUCTURE OF LANGUAGE 3
Introduction to the Structure of Language, concentrating on morphology and syntax. Analysis and theories of how morphemes and words are put together to create larger and larger units.
PREREQ: LING101.

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 418 MEANING AND LANGUAGE USE 3
Introduction to theories of meaning based on the notion of truth and their application to language use.
May be crosslisted with CGSC418, PHIL418.
PREREQ: LING101.

LING 421 METHODS OF TEACHING FOREIGN LANGUAGES 3
Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science.
Crosslisted with FLIT421.

LING 422 LANGUAGE SYLLABUS DESIGN 3
Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, notional-functional and task-based approaches. Topics: materials development, textbook evaluation and adaptation, design and implementation of learning units for second-language special purpose and bilingual learners. Includes one and a half hour weekly practicum and 25 hours of observation in high school classrooms.
Crosslisted with FLIT422.

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. Bilingual measures. Practice in item construction and analysis.
Crosslisted with FLIT424.

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 lecture format with assigned text, a few laboratory sessions provide an introduction to computer-based methods used in instrumental studies of speech.
PREREQ: LING253.

LING 462 LANGUAGE ACQUISITION 4
The factors which distinguish human language from animal communication, as well as the development of many facets of language (semantics, syntax and phonology). To supplement reading and discussion, students gain research experience by working approximately eight hours per week on the on-going language acquisition projects.
Crosslisted with EDUC462.

LING 466 INDEPENDENT STUDY 1-3

LING 470 DISCOVERING HUMAN LANGUAGE: INTRODUCTION TO FIELD LINGUISTICS 3
Examines how languages are put together through a face-to-face encounter with an unknown language. Determine how this language - and human language in general - is constructed. Also learn about culture, people and even the food where the language is spoken.
COREQ: LING101 or equivalent experience.

LING 476 SECOND LANGUAGE ACQUISITION AND BILINGUALISM 3
Psycholinguistic, sociolinguistic and neurolinguistic approaches to Second Language Acquisition (SLA). General models of first and second language learning. SLA within bilingual education programs. The linguistic, psychological and social experiences of the bilingual. Bilingual instruction and models of bilingual education.
May be crosslisted with EDUC476.
PREREQ: LING101.

LING 477 THE STRUCTURE OF ENGLISH 3
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish).
May be crosslisted with EDUC477, ENGL477.
PREREQ: LING101.

LING 480 INTRODUCTION TO SOCIOLINGUISTICS 3
Interface between language and contemporary society: theories, research and analytical methods. Topics include: language and culture; language planning and policy development in education and the Official English movement; technology

and communication; language attitudes; self-identity and naming; linguistic strategies in advertising and the language of compliments, among others.

PREREQ: LING101.

RESTRICTIONS: Restricted to Junior and Senior CGSC Majors/Minors and LING Minors.

LING 485 CLINICAL PRINCIPLES AND PROCEDURES IN SPEECH PATHOLOGY 3

Focuses on clinical principles and procedures in assessment, planning and intervention in speech pathology. Assessment issues related to measurement concepts and descriptive statistics including the use of norm-referenced tests, defining target behaviors and developing observation skills are covered. Treatment planning and intervention include developing a treatment program, getting target behavior baselines and documenting treatment effectiveness.

PREREQ: LING376.

LING 498 TEACHING ENGLISH AS A SECOND LANGUAGE 3

Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English; and devising and presenting lesson plans.

May be crosslisted with EDUC498.

LING 499 ISSUES IN TEACHING ENGLISH LANGUAGE LEARNERS 3

Addresses theoretical and instructional issues related to teaching English Language Learners (ELLs). Topics include issues in bilingual education, theories of L2 acquisition, ELL educational models, integrating language and content instruction, documentation and assessment of ELL skills, and understanding cultural diversity.

LING 601 HISTORICAL LINGUISTICS 3

The languages of the world, the Indo-European languages, the comparative method and linguistic evolution.

May be crosslisted with FLT601.

PREREQ: Completion of two years of a college language.

LING 603 INTRODUCTION TO PHONOLOGY 3

Basic introduction to phonology, concentrating on principles of articulatory phonetics, the IPA transcription system, distinctive feature theory, phonological analysis, and phonological rules.

LING 604 STRUCTURE OF LANGUAGE 3

Introduction to the Structure of Language, concentrating on morphology and syntax. Analysis and theories of how morphemes and words are put together to create larger and larger units.

LING 607 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.

LING 608 PHONOLOGY II 3

Continuation of LING607. More advanced phonological analysis and rule writing. Introduction to recent developments in nonsegmental phonology: autosegmental, metrical and prosodic theories.

PREREQ: LING607.

LING 609 SYNTAX I 3

Introduction to syntactic theory and analysis. Emphasis on argumentation and analysis rather than on the fine points of syntactic theory.

LING 610 SYNTAX II 3

Continuation of LING609. More advanced analysis of syntactic structures. Attention given to the theory of Principles and Parameters and to principles of universal grammar.

PREREQ: LING609.

LING 612 INTRODUCTION TO MORPHOLOGY 3

Introduces major types of morphological phenomena, their analysis and current theoretical approaches to handling them.

PREREQ: LING607.

LING 617 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 618 MEANING AND LANGUAGE USE 3

A graduate introduction to theories of meaning based on the notion of truth and their application to language use.

May be crosslisted with CGSC618.

LING 621 METHODS OF TEACHING FOREIGN LANGUAGES 3

Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science. Includes demonstrations and practical exercises.

Crosslisted with FLT621.

LING 622 LANGUAGE SYLLABUS DESIGN 3

Study of approaches to language syllabus design and materials development, including grammatically sequenced, situational, notional-functional, and task-based approaches. Topics: materials development, textbook evaluation and adaptation, design and implementation of learning units for second-language special purpose and bilingual learners.

Crosslisted with FLT622.

LING 624 SECOND LANGUAGE TESTING 3

Study of the principles and techniques of second-language testing, including measurement of the four skills and of communicative competence. Bilingual measures. Practice in item construction and analysis.

Crosslisted with FLT624.

LING 633 INTRODUCTION TO ACOUSTIC PHONETICS 3

Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily lecture format with assigned text, a few laboratory sessions provide an introduction to computer-based methods used in instrumental studies of speech.

LING 670 DISCOVERING HUMAN LANGUAGE: INTRODUCTION TO FIELD LINGUISTICS 3

Examines how languages are put together through a face-to-face encounter with an unknown language. Determine how this language - and human language in general - is constructed. Also learn about culture, people and even the food where the language is spoken.

May be crosslisted with CGSC671.

PREREQ: LING101, LING609, LING610, LING677 or equivalent experience.

LING 675 LANGUAGE ACQUISITION 4

Examines the factors which distinguish human language from animal communication as well as the development of many facets of language (semantics, syntax and phonology). Main emphasis on how children in the first three years acquire language.

Crosslisted with EDUC675.

LING 676 SECOND LANGUAGE ACQUISITION AND BILINGUALISM 3

Psycholinguistic, sociolinguistic and neurolinguistic approaches to Second Language Acquisition (SLA). General models of first and second language learning. SLA within bilingual education programs. The linguistic, psychological and social experiences of the bilingual. Bilingual instruction and models of bilingual education.

May be crosslisted with EDUC676.

LING 677 THE STRUCTURE OF ENGLISH 3

Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish).

May be crosslisted with EDUC677, ENGL677.

LING 680 INTRODUCTION TO SOCIOLINGUISTICS 3

Interface between language and contemporary society: theories, research and analytical methods. Topics include: language and culture; language planning and policy development in education and the Official English movement; technology and communication; language attitudes; self-identity and naming; linguistic strategies in advertising and the language of compliments, among others.

LING 691 SEMANTICS I 3

Introduction to linguistic theories of meaning. Survey of the semantic issues in reference, ambiguity, presupposition and implicature. Selected linguistic phenomena (e.g., tense, aspect, predication and thematic roles). Some elements of formal semantics.

LING 698 TEACHING ENGLISH AS A SECOND LANGUAGE 3

Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English. Devising and presenting lesson plans.

PREREQ: Three credits of English at the 200-level.

LING 699 ISSUES IN TEACHING ENGLISH LANGUAGE LEARNERS 3

Addresses theoretical and instructional issues related to teaching English Language Learner (ELL) students. Topics include issues in bilingual education, theories of L2 acquisition, methods of teaching ELLs, L2 testing, educational models, integrating language and content instruction, documentation and assessment of ELL skills, and role of cultural diversity in classrooms.

LING 801 LINGUISTIC TYPOLOGY 3-6

Introduction to the concerns of linguistic typology and the study of language universals and language documentation.

COREQ: LING607, LING609.

LING 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.
Crosslisted with ENGL802.
RESTRICTIONS: May be repeated once for credit when topics vary.

LING 830 SYNTAX III 3
In-depth investigation of syntactic universals and recent developments in the theory of syntax.
PREREQ: LING610.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 831 TOPICS IN SYNTAX 3
Current topics in syntactic theory, problems in the syntactic analysis of specific languages.
PREREQ: LING830.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 832 THE ACQUISITION OF SYNTAX 3
Current issues in the acquisition of syntax, such as: relationship between UG and specific language grammars, parameter setting model in L1 acquisition, effect of input frequency, methods for assessing children's syntax.
PREREQ: Syntax I and II, or concurrent enrollment in Syntax II

LING 848 SEMINAR IN LANGUAGE DEVELOPMENT 3
Covers aspects of semantic, syntactic and phonological development through examination of current research and theory in the field. Treats educational implications of language development.
Crosslisted with EDUC848.

LING 851 LINGUISTIC FIELD METHODS 3
Development of skills and techniques in various kinds of field analysis. Use of native informants. Discussion of the relationship between data collecting and grammatical statement.

LING 858 TOPICS IN THE STRUCTURE OF FEATURED LANGUAGES 3
Formal analysis of selected aspects of the grammar of one or more languages. Topics include phonology, morphology, syntax, and/or 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: LING608.
RESTRICTIONS: May be repeated for credit when topics vary.

LING 862 ACQUISITION OF PHONOLOGY 3
Development of phonology in normal children from babbling stage through acquisition of phonemes and basic phonological rules of a language. Examination of data from a variety of languages, focusing on language: specific and universal phenomena.
PREREQ: LING608.

LING 863 PROJECTS IN ACOUSTIC PHONETICS 3
Brief review of the articulatory, acoustic, and perceptual characteristics of speech and computer-based laboratory instrumentation. Students conduct research projects in acoustic phonetics, speech analysis, or speech synthesis. Projects will be suggested by the instructor, however, students may (with instructor's approval) choose a project of their own design.

LING 890 STUDIES IN LINGUISTICS 3-9
Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing.
May be crosslisted with CGSC890, ENGL890.

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

LING 969 DOCTORAL DISSERTATION 1-12 PF

LIBERAL STUDIES

MALS 600 NATURE AND HUMAN NATURE 3
Concentrates on salient views of nature and human nature, and the ways in which they have been shaped by the historical circumstances and disciplinary perspectives from which they were developed.
RESTRICTIONS: Open to majors only.

MALS 601 GRADUATE RESEARCH AND WRITING 1
Part of a three-credit gateway experience for incoming students. Students will

learn the conventions and expectations of graduate-level writing and research, including the formulation and development of independent research projects and the use of online databases.

MALS 602 TOPICS IN LIBERAL STUDIES I 1
Part of a three-credit gateway experience. Students will explore a liberal-studies topic typical of those taught in other MALS courses. The content will be interdisciplinary and/or intercultural, and the course methodology will include discussion, independent research, and varied forms of academic writing.

MALS 603 TOPICS IN LIBERAL STUDIES II 1
Part of a three-credit gateway experience. Students will explore a liberal-studies topic typical of those taught in other MALS courses. The content will be interdisciplinary and/or intercultural, and the course methodology will include discussion, independent research, and varied forms of academic writing.

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

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 are taught to narrow the focus of a topic, create an arguable thesis, gather source information from both library and on-line resources, evaluate the source of information, organize a logical argument, incorporate source information into the argument and revise into a finished paper.
RESTRICTIONS: Open to majors only.

MALS 625 FILM AND AMERICAN SOCIETY 3
Using major motion pictures, explores how Hollywood dealt with critical historical events: the Cold War, McCarthyism, the Civil Rights Movement, Vietnam, Watergate, and the modern Presidency.
RESTRICTIONS: Open to graduate majors only.

MALS 626 STUDIES IN TWENTIETH CENTURY AMERICAN LITERATURE 3
Examines narrative and thematic concerns in American fiction written before and after World War II. The fiction is explored against a background of cultural, philosophical, and literary trends.
RESTRICTIONS: For MALS students only.

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 only to majors only.

MALS 869 MASTER'S THESIS 1-6

MALS 879 SYNTHESIS PROJECT 1-6

MARINE STUDIES

MAST 200 THE OCEANS 3
Integrates physical, chemical, geological and biological principles into an overview that addresses why and how the oceans work. Draws heavily on current ocean issues to illustrate processes and problems.
RESTRICTIONS: Open only to non-science majors or with permission from instructor.

MAST 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.
Crosslisted with ENWC314.
PREREQ: BISC208.

MAST 366 INDEPENDENT STUDY 1-6

MAST 402 PHYSICAL OCEANOGRAPHY 3
Geographic and hydrodynamic aspects of oceanography. Geography of ocean basins; physical properties of seawater; radiation; and observed distributions of temperature, salinity, oxygen, and currents. Scalar and vector fields; hydrostatics; kinematics, momentum dynamics, vorticity dynamics, viscous flow and eddy flux.
RESTRICTIONS: Requires permission of instructor.

MAST 421 COASTAL FIELD BIOLOGY 3
Hands-on study of estuarine and coastal communities with emphasis on patchiness in time and space. Instruction in field techniques as well as analysis and presentation of data. Experience in scientific writing.
PREREQ: General Biology, Ecology, Genetics, and Physiology.

MAST 427 MARINE BIOLOGY 3
Ecologically oriented study of elementary oceanography, adaptive physiology, aspects of population and community ecology, reproductive and larval biology and marine production systems.
PREREQ: General Biology, Ecology, Genetics, and Physiology.

MAST 437 GEOLOGICAL OCEANOGRAPHY 3
Focuses on processes that create oceanic and continental margin sedimentary record. Topics include marine particle production and composition, transport, seafloor morphology, stratigraphy and paleoceanography. Students gain broad understanding of concepts in geological oceanography and marine geology.

MAST 451 MARINE INVERTEBRATE BIODIVERSITY 3
Overview of marine invertebrate structure and function physiology, development and life history, and ecology within the context of their evolutionary origins and phylogeny. Appreciation of their biodiversity and significance in marine ecosystems. Special attention to systematics and taxonomy of important groups and local fauna.

MAST 464 MARINE SCIENCE SUMMER INTERNSHIP 1-3
Students design a research project with an advisor and present it to peers, advisors and course instructor.

MAST 466 INDEPENDENT STUDY 1-3

MAST 468 UNDERGRADUATE RESEARCH 1-6

MAST 482 INTRODUCTION TO OCEAN SCIENCES 3
A quantitative introduction to the ocean world including geography, geophysics, chemistry of water and sediments, physics of ocean circulation and waves and tides, description of oceanic and nearshore environments, and biology of the seas.
PREREQ: MATH241 or MATH221; CHEM103 or CHEM111; PHYS201 or PHYS207.

MAST 492 MARINE ENVIRONMENTAL STUDIES 3
Examines the science behind contemporary issues in coastal and marine systems, with emphasis placed on environmental problem solving. Explore how science is practiced to address regional and global topics of concern, including marine pollution, managing shorelines, sustaining ecosystems, and living with climate change. Practical skills in synthesizing scientific literature, data analysis, and public speaking.
PREREQ: MAST482.

MAST 601 INTRODUCTION TO OCEANOGRAPHY 3
Topics include the geology and history of the ocean floor, oceanic sediments, the physics of the marine environment and the oceanic circulation, chemical processes in the ocean, and biological processes and production in the oceans.
RESTRICTIONS: For non-oceanographers. Requires graduate status.

MAST 602 PHYSICAL OCEANOGRAPHY 3
Geographic and hydrodynamic aspects of oceanography. The geography of ocean basins; physical properties of seawater; radiation; and observed distributions of temperature, salinity, oxygen and currents. Scalar and vector fields; hydrostatics; kinematics, momentum dynamics, vorticity dynamics, viscous flow and eddy flux.
RESTRICTIONS: Requires permission of instructor.

MAST 603 INTRODUCTION TO MARINE AND AQUATIC EDUCATION 3
Water environments and associated marine and aquatic curricula are highlighted through inquiry learning, lecture and field trips. Emphasized is the integration of science, math, language arts, history and exploratories in development of thematic curricula.
RESTRICTIONS: Inservice educators only.

MAST 604 ENVIRONMENTAL DATA MANAGEMENT 1
Emphasizes the use of remotely sensed data for research and management of coastal resources. Environmental issues and data requirements are discussed. Case studies illustrate the use of Geographic Information Systems for integrating remotely sensed imagery with ancillary data to address coastal environmental problems.
RESTRICTIONS: Requires approval of instructor.

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

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

MAST 607 WRITING PAPERS IN THE MARINE SCIENCES 3
The process and mechanics of publishing scientific papers in marine journals. Covers organizing data in tables and figures; mechanics of drawing up effective figures; marshalling of tables, figures and scientific ideas into a coherent story; and strategies and techniques used in effective writing.

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

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

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

MAST 620 ENERGY POLICY AND ADMINISTRATION 3
World and U.S. energy policies with emphasis on nuclear power, solar energy and fossil fuels. Analyzes progress and design of U.S. science and technology policy in energy domain.
Crosslisted with POSC624.

MAST 621 COASTAL FIELD BIOLOGY 3
Hands-on study of estuarine and coastal communities with emphasis on patchiness in time and space. Instruction in field techniques as well as analysis and presentation of data. Experience in scientific writing.
PREREQ: General Biology, Ecology, Genetics, Physiology

MAST 622 CONSERVATION AND RENEWABLE ENERGY POLICY 3
Covers current policy issues for energy conservation, energy efficiency, and renewable energy sources. Some prior background in energy policy is assumed. Topics include environmental impacts, utility programs, and international comparisons.
Crosslisted with UAPP626.
PREREQ: POSC624.

MAST 623 PHYSIOLOGY OF MARINE ORGANISMS 3
Processes and mechanisms of adaptation of organisms to marine environments.

Examines how environmental factors affect physiological processes in marine organisms. Lectures address physiological processes at cellular, whole organism and habitat levels.

PREREQ: MAST634 or equivalent. Requires permission of instructor.

MAST 625 MICROBIAL PHYSIOLOGY AND DIVERSITY 3

Emphasis on diversity of physiological strategies developed by prokaryotic microbes and some simple eukaryotes. Approach is to examine and dissect specific metabolic pathways both in isolation and in how they integrate with central metabolism.

PREREQ: BISC207/208, CHEM321 or CHEM331, or permission of instructor.

RESTRICTIONS: Juniors, Seniors, and Graduate Students.

MAST 626 TOPICS IN HALOPHYTE BIOLOGY 1-12

Analysis of current research in the biology of halophytic plants. Emphasis on student seminars and group discussions of the current literature.

RESTRICTIONS: May be repeated for credit when topics vary.

MAST 627 MARINE BIOLOGY 3

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

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

RESTRICTIONS: Requires permission of instructor.

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

Covers multiple disciplines required to develop offshore wind resources for large-scale power production. As a case study, it integrates science, engineering, and policy.

RESTRICTIONS: Open to graduate students only.

MAST 629 TOPICS IN MARINE ECOLOGY 1-6

Selected topics in marine ecology and physiology. Topics may vary and will be announced in the registration booklets.

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

MAST 634 MARINE MOLECULAR SCIENCES 3

This course surveys the dominant molecular processes in marine organisms that are essential for survival. Students are introduced to metabolic pathways, protein structure and function, DNA replication and repair, gene transcription and translation, and mitochondrial and chloroplast organelle function.

MAST 635 TURBULENCE IN THE ENVIRONMENT 3

Fundamentals of turbulence including the dynamics of vorticity, the cascade of energy and the theory of Kolmogorov, turbulent diffusion and turbulence in density stratified flows. Applications to many engineering disciplines as well as to meteorology and oceanography.

MAST 637 GEOLOGICAL OCEANOGRAPHY 3

Focuses on processes that create the oceanic and continental margin sedimentary record. Topics include marine particle production and composition, transport, seafloor morphology, stratigraphy and paleoceanography. Students gain a broad understanding of concepts in geological oceanography and marine geology.

MAST 646 CHEMICAL OCEANOGRAPHY 3

Composition of seawater; physiochemical properties of seawater distributions of gases, nutrients and trace metals; and effect of biological processes on seawater composition.

PREREQ: CHEM103 and CHEM104.

MAST 648 WATER WAVE MECHANICS 3

Primary emphasis on linear water wave theory and its applications. Shallowing, refraction and diffraction of waves. Basic aspects of wave-structure and wave-bottom interaction. Introduction to basic wave propagation models.

Crosslisted with CIEG672.

PREREQ: CIEG305.

MAST 651 MARINE INVERTEBRATE BIODIVERSITY 3

Overview of marine invertebrate structure and function, physiology, development and life history, and ecology within the context of their evolutionary origins and phylogeny. Appreciation of their biodiversity and significance in marine ecosystems. Special attention to systematics and taxonomy of important groups and local fauna.

MAST 663 DECISION TOOLS FOR POLICY ANALYSIS 3

Develops quantitative decision-making skills for science and technology policy decisions. Covers decision-making under uncertainty, axioms of decision analysis, decision trees, influence diagrams, sensitivity analysis, confidence intervals, value of information, probabilistic risk assessment, and multi-attribute decision theory. May be crosslisted with POSC663, UAPP663.

MAST 664 MARINE TRANSPORTATION POLICY 3

Overview of marine transportation policy and analysis under local, national, and

international contexts. Topics include: maritime transportation technology and fleet development; policy frameworks affecting trade, safety, and environment; quantitative analysis of shipping business economics and logistics under policy constraints.

MAST 670 UNITED STATES OCEAN AND COASTAL POLICY 3

Provides an overview and assessment of the evolution of U.S. ocean and coastal policies, including such policy areas as coastal management, fisheries management, marine mammal protection, offshore oil development, and marine pollution control.

MAST 671 COASTAL PROCESSES AND MANAGEMENT 3

Introduction to key processes operating in the coastal zone and to management techniques appropriate to these processes and environments. Emphasis on policy, regulatory and intergovernmental complexities that characterize coastal zone management in the United States and in other coastal nations.

MAST 672 APPLIED POLICY ANALYSIS 3

Empirical analysis of environmental and natural resource policy issues. Topics include valuation of natural resources, decision making under uncertainty, dynamic control and intertemporal issues in resource use and institutional aspects of policy analysis.

May be crosslisted with ECON670.

PREREQ: ECON300 or ECON 301.

MAST 673 INTERNATIONAL LAW 3

Origins, sources and applications of law to international relations, including the nature of treaties, the legal powers of states and international organizations, jurisdiction and immunities, and the role of international courts. Special attention given to the law of the sea for navigation, fisheries conservation, mineral exploitation and environmental protection.

May be crosslisted with LEST673, POSC604.

RESTRICTIONS: Requires permission of instructor.

MAST 674 LEGAL ASPECTS OF THE COASTAL ZONE 3

Examines basic legal doctrines and public policy implications relevant to the development and protection of the coastal zone of the United States. Use, ownership and control of water and land beneath and bordering upon water; relationships between the states and the federal government in areas of marine affairs; environmental protection and legal controls of water pollution.

RESTRICTIONS: Requires permission of instructor.

MAST 675 ECONOMICS OF NATURAL RESOURCES 3

Study of the allocation of natural resources, especially marine and coastal zone resources, in modern economics. Application of economic theory to the problems of misallocations and the means of correction, under both free and planned markets. May be crosslisted with ECON675.

RESTRICTIONS: Requires permission of instructor.

MAST 676 ENVIRONMENTAL ECONOMICS 3

Study of the choice of policies to protect the environment, including land, air and water resources. Theory of market failure and externalities, use of economic incentives in policy design, valuation of environmental resources and examination of inefficiencies in existing U.S. environmental policies.

May be crosslisted with ECON676.

PREREQ: ECON300.

MAST 677 INTERNATIONAL OCEAN AND ENVIRONMENTAL POLICY 3

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

MAST 678 ADMIRALTY AND MARITIME LAW 3

Introduction to U.S. admiralty and maritime law including jurisdiction carriage of goods by sea, personal injuries, collisions, salvage, insurance and marine pollution. May be crosslisted with POSC678, UAPP678.

RESTRICTIONS: Open to juniors, seniors and graduate students.

MAST 679 SHIPPING AND PORT MANAGEMENT 3

A seminar to study the structure and management of the shipping industry and ports, policies for ocean commerce, international trade, and merchant marine. May be crosslisted with POSC679.

MAST 681 REMOTE SENSING OF ENVIRONMENT 3

Detection and mapping of land and ocean resources with optical, infrared and microwave sensors. Digital analysis of satellite images using multispectral and spatial analysis techniques and correlation with ground/ship data. Application to oceanography, coastal processes, geology, land use, geography, agriculture, climate and pollution studies. Includes hands-on image analysis in GIS laboratory. May be crosslisted with ELEG681, GEOG681.

RESTRICTIONS: Requires permission of instructor.

MAST 685 FUNDAMENTALS OF ACOUSTICS 3

Fundamentals of sound and vibration, including equations governing vibrating string, vibration of bars, two-dimensional wave equation in plates, acoustic wave

equation, transmission phenomena and acoustic radiation and reception. Other topics include absorption and attenuation of sound, resonators and ducts and filters, in the context of environmental and underwater acoustics.
PREREQ: Calculus and introduction to differential equations.

MAST 686 REMOTE SENSING SEMINAR 1-12

Basic and applied research topics in remote sensing of earth resources, coastal processes, estuarine productivity, ocean dynamics and climatic effects presented by University students, faculty and guest speakers. Stresses advanced data acquisition and spectral and spatial image analysis techniques.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 691 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.
Crosslisted with CIEG639.
PREREQ: CIEG305.

MAST 692 ENVIRONMENTAL VALUES, MOVEMENTS AND POLICY 3

Examines citizens' beliefs and values, voluntary environmental groups and the ways in which individuals and groups affect environmental policy. Shows how research in areas such as environmental sociology and ecological anthropology can inform policy. May be crosslisted with UAPP692.

MAST 693 WAVES IN THE MARINE ENVIRONMENT 3

General principles of wave mechanics, kinematics and dynamics. Applications to surface gravity waves, acoustic waves, electromagnetic waves and large scale geophysical waves.
May be crosslisted with CIEG693.
PREREQ: MEEG690.

MAST 800 DYNAMICAL PHYSICAL OCEANOGRAPHY 3

Topics include basic definitions, conservation of mass, conservation of momentum, conservation of vorticity, horizontal frictionless flow, wind-driven circulation, stability and double diffusion, thermohaline circulation and tides.
RESTRICTIONS: Requires permission of instructor.

MAST 801 ENVIRONMENTAL MEASUREMENT TOOLS 1-5

Provides exposure to limitations of techniques used in sampling and analyses that develop information used in resource management decision making. The 5-credit team-taught course has separate components. Students in the Marine Management degree program would take all 5 credits.
RESTRICTIONS: Winter Session offering for MA program in the College of Marine Studies. Students outside the program may take portions of the full course as 1 or 2 credit components.

MAST 802 CASE STUDY IN COASTAL AND OCEAN MANAGEMENT 3

Analyzes issues in coastal and ocean management. Develops interdisciplinary problem-solving strategies. Engages students in real-world marine science/policy problems. Applies disciplinary knowledge, develops synthesis skills. Topics change, but case designs contain multi-disciplinary elements, e.g., physical ocean science, marine biology, oceanography, and marine policy.
PREREQ: MAST801 or instructor approval.

MAST 806 GEOPHYSICAL FLUID DYNAMICS I 3

Development of the fundamental fluid dynamics used in analyzing flows in physical oceanography and meteorology. Fundamentals of vorticity dynamics and geostrophy, inviscid theory of Rossby waves, and Ekman boundary layers.
PREREQ: MEEG863 and MEEG864.

MAST 808 COASTAL/ESTUARINE PHYSICAL DYNAMICS 4

Coastal and estuarine dynamics covering continental shelf wind-forced circulation; continental shelf waves; modes of estuarine circulation; shelf-estuary interaction; shelf break front dynamics; and estuarine and river plume fronts.
PREREQ: MAST602.

MAST 809 THE OCEAN AND CLIMATE VARIATION 3

Study of the ocean-atmosphere system; the fluxes of heat, water and energy in the ocean and interchanges with the atmosphere; budgets and mechanisms of exchange; and interannual and long-term climate variations as related to the ocean.
PREREQ: MAST602.

MAST 811 OCEANOGRAPHIC TIME SERIES ANALYSIS 3

Quantitative techniques for data processing and time series analysis. Topics include basic definitions, linear systems, digital filters, statistical techniques, auto-spectrum estimation, cross-spectrum estimation, Monte Carlo technique, empirical orthogonal function analysis and rotary spectrum estimation.
RESTRICTIONS: Requires permission of instructor.

MAST 814 POLITICAL ECONOMY OF THE ENVIRONMENT 3

Reviews major theories developed over the last half century to explain nature-society

relations. Policy case studies on environmental justice, trade and environment, global climate change, and sustainable development used to evaluate current range of political-economic explanations of nature-society relations. International, national and local responses to these problems are analyzed.
Crosslisted with UAPP810.

MAST 816 BIOLOGICAL OCEANOGRAPHIC PROCESS 1-4

Multidisciplinary approach to the abundance and distribution of organisms in the oceans, the physiological and behavioral responses of organisms to the abiotic and biotic environment and the role of organisms in modifying the environment. Taught as six modules: algae, bacteria, protozoa, zooplankton, benthos, fish and fisheries.
PREREQ: General biology, ecology, microbiology, and invertebrate biology.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 817 RESEARCH DESIGN AND METHODS 3

Covers the logic, design and practice of public policy research, and should be helpful for planning thesis or dissertation research, regardless of topic or methods used. Methods covered draw from social and political sciences, and process evaluation of policy.

MAST 820 EXPERIMENTAL DESIGN SEMINAR 1

Forum for presentation of research plans or results with emphasis on experimental design and data analysis. Ensuing discussion aids preparation of research proposals and sharpens critical assessment of own and colleagues' work.

MAST 821 MARINE BIOLOGY/BIOCHEMISTRY SEMINAR 1

With each offering, addresses a different specific topic, e.g., tropical marine biology, larval dispersal, estuarine productivity, etc.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 827 CURRENT TOPICS IN MARINE BIOLOGY 1-4

Subject areas change each term and will be announced in the registration booklet. Topics include aspects of plant biology, fish and invertebrate ecology and other aspects of marine ecology. May include lectures, tutorials and demonstration of techniques.
RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.

MAST 828 CURRENT TOPICS IN MARINE BIOCHEMISTRY 1-4

Subject areas change each term and will be announced in the registration booklet. Topics include marine chemical ecology, marine natural products chemistry, marine biochemistry of marine plants and animals. May include lectures, tutorials and demonstration of technique.
PREREQ: Graduate course in biochemistry.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 831 COASTAL AND ESTUARINE SEDIMENT DYNAMICS 3

Fundamentals of fluid flow and sedimentation in estuarine and coastal environments. Emphasis on oceanic and estuarine transport phenomena, basin morphology, sediment transport, facies distributions, and formations of the most recent sedimentary record.
PREREQ: MAST637 or permission of instructor.

MAST 838 PUBLIC POLICY ANALYSIS 3

Seminar covers an overview of the policy process and considers all topics central to an understanding of policy making in the United States.
Crosslisted with POSC838.

MAST 843 GLOBAL GOVERNANCE: THEORY AND CASES 3

Exploration of international organization, regime and global governance theory. Analysis of global governance arrangements in various issue areas such as the environment, ocean issues, human rights, development, world health, telecommunications, trade and finance.
Crosslisted with POSC843.

MAST 847 CURRENT TOPICS IN CHEMICAL METHODS IN OCEANOGRAPHY 1-3

Principles, capabilities and limitations of analytical methods to the chemistry of marine waters and sediments. Analytical methods include electrochemical, spectroscopic, chromatographic, electron microscopy and surface techniques. Emphasis on the analysis of trace components (biochemical, inorganic and organic) in the marine environment. Laboratory experiments. Topics vary and will be announced in the registration booklet.
PREREQ: MAST646 or analytical chemistry.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 850 MARINE INORGANIC CHEMISTRY 3

Principles of inorganic chemistry are used to explain and to understand the speciation and reactivity of the elements in the marine environment. Emphasis on the mechanistic aspects of important marine processes including mineral dissolution and formation, electron transfer reactions and the role of metals in biogeochemical reactions.
May be crosslisted with CHEM855.
PREREQ: MAST646, aquatic chemistry or physical chemistry.

MAST 852 ISOTOPE GEOCHEMISTRY 3
Introduction to the field of isotope geochemistry and the application of isotope systematics to the study of geological, geochemical, hydrological, atmospheric and marine cycles. Light stable isotopes, uranium thorium decay series nuclides, and long-lived heavy isotopes are considered.
PREREQ: MAST646.

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

MAST 855 COASTAL AND ESTUARINE CHEMISTRY 3
Distributions, behavior, and chemical processes in estuarine and coastal waters are examined in this advanced general chemical oceanography course. Greater heterogeneity of physical controls and anthropogenic influences give a unique nature to this coastal corridor in the global flux from land to sea.
PREREQ: MAST646.

MAST 857 PALEOCEANOGRAPHY 3
Focuses on processes related to climate change from tectonic to millennial timescales based on the marine sedimentary record of the past 65 million years. Topics include light stable isotopes and biogeochemical cycling of elements. Includes lectures and student-lead discussion of current literature.
May be crosslisted with GEO1857.
RESTRICTIONS: Requires permission of instructor.

MAST 868 RESEARCH 1-9

MAST 869 MASTER'S THESIS 1-6

MAST 870 INTEGRATED COASTAL MANAGEMENT 3
Provides a practical guide to the development, implementation, operation, and evaluation of integrated coastal management (ICM) programs. Examines the evolution of international prescriptions on ICM, and compares and contrasts experiences with integrated coastal management in both developed and developing countries.
PREREQ: MAST670.

MAST 871 ENVIRONMENTAL POLICY AND ADMINISTRATION 3
U.S. and international environmental politics, policies, laws, and agreements regarding air, water, and natural resource protection. Examines environmental governance regimes, politics and science, theories of environmental policy, public and private interaction, and epistemic communities in global warming, ozone layer protection, environmental public health, etc.
Crosslisted with POSC818.

MAST 873 SEMINAR: MARINE POLICY 1
Current topics in marine policy based on recent journal articles and active research and policy relevant activities of students, faculty and visitors from other universities and government agencies. Emphasis on research design and formats for oral and written presentation of results.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 875 ADVANCED FISHERY ECONOMICS 3
Theoretical and applied study of the optimal utilization and management of commercial and recreational fisheries with emphasis on equity issues and the difficulty of deriving regulations which are biologically effective and which provide incentives for economic efficiency at reasonable costs.
May be crosslisted with ECON875.
PREREQ: MAST675 or ECON675.

MAST 882 PHYSICAL OCEAN SCIENCE AND ENGINEERING SEMINAR 1
A review of the current literature in physical ocean science and engineering through student presentations.

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

MAST 969 DOCTORAL DISSERTATION 1-12 PF

MATHEMATICS

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

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

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

MATH 115 PRE-CALCULUS 3
The various classes of functions and their graphs are explored. Function classes include linear, quadratic, polynomial, rational, exponential, logarithmic and trigonometric. Skills and concepts needed for calculus (MATH221) are emphasized.
PREREQ: MATH010 or MATH012.
RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.

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

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

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

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

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

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

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

MATH 221 CALCULUS I 3
Topics include functions, graphing functions, limits, derivatives, sequences, series,

exponential and logarithmic functions, and integration.

RESTRICTIONS: Requires two years of high school algebra and one year of geometry. Credit cannot be received for both MATH221 and MATH241.

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

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

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

MATH 241 ANALYTIC GEOMETRY AND CALCULUS A 4
Functions, limits, continuity, derivatives and definite integrals. Exponential and log functions; simple differential equations modeling exponential growth and decay (linear and separable ODEs).
RESTRICTIONS: Requires two years of high school algebra, one year of geometry and trigonometry. Credit cannot be received for both MATH241 and MATH221.

MATH 242 ANALYTIC GEOMETRY AND CALCULUS B 4
Review of exponential and logarithmic functions; inverse trigonometric functions; integration techniques; parametric curves; polar coordinates; infinite series. Includes use of the computer package, Maple, to perform symbolic, numerical and graphical analysis.
PREREQ: MATH241.
RESTRICTIONS: Credit cannot be received for both MATH242 and MATH222.

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

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

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

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

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

MATH 260 INTEGRATIVE SEMINAR 1
Problem-based learning instruction aimed at integrating material in mathematics and biology.
RESTRICTIONS: Primarily for students in biological sciences and mathematics. Requires permission of instructor.

MATH 268 PERSPECTIVES ON MATHEMATICS 1
Designed for mathematics and other majors to expand students' understanding of contemporary mathematical thought, practice, culture and tools. Features

presentations from faculty and invitees on mathematical endeavors and professional activities in an informal atmosphere.
PREREQ: MATH241 or equivalent.

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

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

MATH 305 APPLIED MATHEMATICS FOR CHEMICAL ENGINEERING 3
A special applied mathematics course designed for chemical engineering majors. Emphasis is given on the interaction between mathematical theory and its engineering applications.
May be crosslisted with CHEG305.
PREREQ: A minimum grade of C- in MATH243 and CHEG112.
RESTRICTIONS: For chemical engineering majors only.

MATH 308 HISTORICAL DEVELOPMENT OF MATHEMATICAL CONCEPTS AND IDEAS 3
Illustrates the origins of ideas, processes and topics in the history of mathematics. Biographical sketches of the creators, descriptions of their diverse cultures and a writing project are included.
PREREQ: MATH241.
RESTRICTIONS: Credits cannot be used to satisfy major or minor requirements in mathematics other than the secondary mathematics education program.

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

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

MATH 342 DIFFERENTIAL EQUATIONS WITH LINEAR ALGEBRA II 3
A continuation of MATH341. Topics include series solutions, Laplace transform methods, boundary value problems, orthogonality, higher order equations, difference equations and numerical techniques. Continued emphasis on the interaction between these topics and physical systems.
PREREQ: MATH341.
RESTRICTIONS: Credit not given for both MATH342 and either MATH302, MATH349 or MATH352. Open to majors outside mathematics.

MATH 349 ELEMENTARY LINEAR ALGEBRA 3
Systems of linear equations, matrix algebra and determinants. Vector spaces, linear dependence and independence, basis and dimension. Linear transformations, similarity transformations and diagonalization problems. Inner product spaces and least squares approximation. Emphasizes theory and application to other mathematics areas. Includes computer use for analysis and solution of linear algebra problems.
PREREQ: MATH230 or MATH242.
RESTRICTIONS: Credit not given for both MATH349 and either MATH341, MATH342 or MATH351.

MATH 350 PROBABILITY THEORY AND SIMULATION METHODS 3
Introduces the basic theory in both discrete and continuous aspects of probability theory.
PREREQ: MATH210 or MATH230.
COREQ: MATH243.

MATH 351 ENGINEERING MATHEMATICS I 3
Solutions of linear algebraic equations, Gauss elimination, vector spaces, subspaces, linear dependence, linear ordinary differential equations of 2nd order and higher, initial value and boundary value problems, eigenvalues, coupled linear ordinary differential equations, nonlinear differential equations, with engineering applications.

COREQ: MATH243.

RESTRICTIONS: Credit not given for both MATH351 and either MATH302, MATH341 or MATH349. Open to MEEG and CIEG students only.

MATH 352 ENGINEERING MATHEMATICS II 3
Laplace transform, application to constant coefficient ordinary differential equations, scalar and vector fields, Laplacian, line integrals, divergence theorem, Stokes' theorem, Fourier series, orthogonality, diffusion equation, Laplace's equation, wave equation, separation of variables, with engineering applications. PREREQ: MATH351.
RESTRICTIONS: Open to MEEG and CIEG majors only.

MATH 353 ENGINEERING MATHEMATICS III 3
Numerical Methods in engineering, linear and non-linear algebraic equations, numerical solution of ordinary differential equations, Runge-Kutta methods, boundary value problems, finite differences, diffusion, Laplace equation, applications to engineering problems with programming. PREREQ: MATH351.
RESTRICTIONS: Open to MEEG and CIEG majors.

MATH 366 INDEPENDENT STUDY 1-6

MATH 379 PROBLEM SOLVING STRATEGIES 1
Studies a multitude of problem solving strategies such as looking for a pattern, making a model, working backwards, etc. COREQ: MATH380.
RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. Not for major (B.A. or B.S.) or minor credit in mathematical sciences.

MATH 380 APPROACHES TO TEACHING MATH 3
Aims, course planning, instructional strategies, evaluation and selection of materials for teaching mathematics in secondary schools. COREQ: MATH379.
RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. Not for major (B.A. or B.S.) or minor credit in mathematical sciences.

MATH 382 STUDENT TEACHING SEMINAR IN SECONDARY MATH 2 PF
Provides student teachers opportunities to reflect upon and discuss classroom teaching experience. Focuses on classroom management and other professional issues. PREREQ: MATH380.
COREQ: EDUC400.

MATH 401 INTRODUCTION TO REAL ANALYSIS 3
A rigorous treatment of one variable calculus. Topics will include sequences of real numbers, limit theorems, monotone sequences, Cauchy sequences, Bolzano-Weierstrass Theorem, continuity, uniform continuity, differentiability and Riemann integral. A historical perspective on the development of these topics will be provided. PREREQ: MATH245.

MATH 426 INTRODUCTION TO NUMERICAL ANALYSIS AND ALGORITHMIC COMPUTATION 3
Direct and iterative methods for solution of algebraic equations and systems of linear equations, matrix inversion, pseudo-inverses, algebraic eigenvalue problems, linear least-square problems and nonlinear equations. Stresses both numerical analysis and algorithmic aspects. May be crosslisted with CISC410. PREREQ: MATH349 or MATH341 or MATH351; and CISC105 or CISC181.
RESTRICTIONS: Requires familiarity with computing (e.g., programming language).

MATH 428 ALGORITHMIC AND NUMERICAL SOLUTION OF DIFFERENTIAL EQUATIONS 3
Algorithms for numerical integration and differentiation. Initial value problems; boundary value problems in ordinary differential equations; finite difference (explicit and implicit) methods; polynomial and spline approximation; finite elements and collocation; and introduction to numerical methods for partial differential equations. May be crosslisted with CISC411.
PREREQ: MATH426 or CISC410.

MATH 450 MATHEMATICAL STATISTICS 3
Introduction to mathematical aspects of statistics. Topics include exploratory data analysis, parameter estimation, maximum likelihood method, testing of hypothesis, confidence intervals and others. Includes application of a computer software package to perform data analysis. PREREQ: MATH350 or an equivalent course in probability

MATH 451 ABSTRACT ALGEBRA I 3
Basic properties of the integers and the rationals, fields of quotients, polynomial rings, root-finding, introduction to groups, rings and fields. A historical perspective on the development of the notion of number and algebraic structure. PREREQ: MATH349 and MATH245

MATH 460 INTRODUCTION TO SYSTEMS BIOLOGY 3
Systems biology approach, mathematical modeling of biological systems; examples from biomedical and agricultural research areas, biotechnology, industrial processes, and others. Differential equations, stochastic, feedback and control, or network models are discussed. Hands-on work via PBL modules. May be crosslisted with CHEG460. PREREQ: CHEM527, MATH535 and one of BISC302, 305, 306, 401 or 403.

MATH 466 INDEPENDENT STUDY 1-6

MATH 503 ADVANCED CALCULUS FOR APPLICATIONS 3
Change of variables, surface integrals, Stokes' Theorem, Divergence Theorem, Calculus of Variations, Euler's Equation, Brachistochrone and isoperimetric problems. Introduction to the qualitative theory of ordinary differential equations, including linear systems, phase space analysis, Lyapunov's Methods, and elements of the analysis of nonlinear systems. PREREQ: 300 level or above courses in ordinary differential equations and linear algebra.

MATH 508 INTRODUCTION TO COMPLEX VARIABLES AND APPLICATIONS 3
Introduction to analytic functions, contour integration, power series, residues and conformal mapping. PREREQ: MATH243.

MATH 512 CONTEMPORARY APPLICATIONS OF MATHEMATICS 3
Provides hands-on learning experience in contemporary applications of mathematics. Involves work with investigators from industry, national laboratories and other departments. Mathematical topics may include ordinary and partial differential equations, systems of differential equations, transform, asymptotic and numerical methods. PREREQ: A 300 or higher level course on differential equations.

MATH 518 MATHEMATICAL MODELS AND APPLICATIONS 3
Illustration and analysis of mathematical models for problems in the biological, physical and social sciences. PREREQ: Math 243 and Math 350. Does not satisfy the requirements for a minor.

MATH 529 FUNDAMENTALS OF OPTIMIZATION 3
Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and non-smooth programming. Optimality conditions. Saddle points and dual problems. Penalties and decomposition. Overview of computational approaches. PREREQ: Linear algebra (MATH349 or equivalent) and vector calculus (Math 243 or equivalent).

MATH 530 APPLICATION OF MATHEMATICS IN ECONOMICS 3
Provides students with experience in the application of mathematics in economics. Applications may vary from semester to semester. Mathematical topics may include applications of ordinary and partial differential equations, game theory, linear programming, dynamic programming, stochastic programming and calculus of variations. May be crosslisted with ECON530. PREREQ: MATH 302, MATH 349, ECON301 and ECON303

MATH 535 INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS 3
Theory and applications of parabolic, elliptic and hyperbolic partial differential equations originating from various mathematical physics problems. PREREQ: MATH302 or MATH342 or MATH352.

MATH 540 COLLEGE GEOMETRY: A HISTORICAL APPROACH 3
Historical development of the axiomatic systems in geometry, inauguration of deductive reasoning introduced by the Greeks (Euclid) along with the axiomatic developments, extensions, algebraic methods and geometric properties which followed. Plane, analytic, transformational and projective geometries are included. PREREQ: MATH245.
RESTRICTIONS: Graduate credit only for teachers.

MATH 549 CODING THEORY AND CRYPTOGRAPHY 3
Basic coding theory including correcting and detecting error patterns. Cryptography, including symmetric key encryption, DES, RSA and cryptographic protocols. PREREQ: MATH349.

MATH 579 GEOMETRY AND PROOF 3
In-depth study of high school geometry from an advanced perspective. Logic and proof provide a foundation for studying axiomatic systems, transformational geometry, and finite geometries. PREREQ: An undergrad. degree in mathematics or in secondary mathematics education. RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing secondary mathematics teachers, or by permission of instructor.

MATH 580 ANALYSIS FOR ADVANCED PLACEMENT CALCULUS TEACHERS 3

Prepares high school mathematics teachers to teach Advanced Placement Calculus. AP content, primarily from the AB course, is studied in depth. Participants analyze recent AP Examinations, scoring rubrics and student responses.
PREREQ: An undergrad. degree in mathematics or in secondary mathematics education.
RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing secondary mathematics teachers, or by permission of instructor.

MATH 581 ON THE NATURE OF PROOF 3

Designed for secondary teachers to show how to investigate a problem, develop ideas, test conjectures, and, if appropriate, prove that resulting statements are correct. Problems, including proofs, are chosen from the areas of algebra, pre-calculus, geometry and number theory.
PREREQ: BA/BS Math or Math Ed.
RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.

MATH 582 STUDIES IN DISCRETE MATHEMATICS 3

Designed to show secondary teachers how discrete mathematics underlies the science and technology specific to the computer age. Using the NCTM Standards as a guide, topics include relations, combinatorics, graph theory, sequences, and linear programming, as well as associated algorithms.
PREREQ: MATH581.
RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.

MATH 583 PROBABILITY AND STATISTICS FOR EDUCATION 3

Designed specifically for middle and secondary teachers. Topics include graphical methods, probability models, statistical inference and study design. Orientation to popular software packages. Applications selected from current literature.
PREREQ: Undergraduate statistics course.
RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.

MATH 584 ADVANCED SECONDARY MATHEMATICS METHODS 3

Designed to develop perspectives, knowledge, and frameworks which an inservice teacher can use to organize, interpret and critique their own teaching experience and that of others.
RESTRICTIONS: Requires permission of instructor. Credit to be used only in graduate programs in mathematics education.

MATH 585 TECHNOLOGY IN SECONDARY MATHEMATICS 3

Major emphasis on learning how to use computer software to enhance both the teaching and learning of algebra, geometry, statistics, probability and precalculus. Participants get hands-on experience with a function plotter, spreadsheet, geometry package and a statistic/probability package.
RESTRICTIONS: Working knowledge of graphing calculators. Credit to be used only in graduate programs in mathematics education.

MATH 586 MATHEMATICAL PROBLEM SOLVING: THEORIES AND PRACTICES 3

Designed to offer secondary teachers an opportunity to face and solve nonroutine problems. Teachers become familiar with problem solving strategies used not only with nonroutine problems but also with standard problems in an existing mathematics curriculum.
RESTRICTIONS: Requires permission of instructor. Credit to be used only in graduate programs in mathematics education.

MATH 587 PROPORTIONAL REASONING 3

Introduces and reinforces the underlying concepts of proportional reasoning and their applications in science.
RESTRICTIONS: Restricted to middle school mathematics and science teachers.

MATH 588 GEOMETRY AND MEASUREMENT FOR MIDDLE SCHOOL TEACHERS 3

Properties of 2-D and 3-D figures; measurement of length, area and volume; spatial relationships; transformations; connections with coordinate geometry; fundamentals of deductive system; van Hiele model of development of geometric reasoning, and use of Geometer's Sketchpad software to enhance package to enhance both teaching and learning of geometry and measurement.
May be crosslisted with EDUC588.

MATH 589 QUANTITATIVE LITERACY AND SCIENTIFIC INQUIRY 3

Connects mathematics and science in fundamental ways. Statistical methods used to construct scientific knowledge through evaluation of evidence and support for explanations. Scientific contexts used to investigate major statistical questions such as "Are two populations demonstrably the same or different on a given variable?"
RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing secondary mathematics teachers, or by permission of instructor.

MATH 590 PATTERNS AND ALGEBRA FOR MIDDLE SCHOOL TEACHERS 3

Mathematical modeling and multiple representations used as overarching themes

in development of algebraic concepts across grades 6-11. Topics introduced in problem-based settings, with graphing calculators used throughout.
PREREQ: MATH587 or permission of instructor.
RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing teachers, or by permission of instructor.

MATH 591 IMPLEMENTING EXEMPLARY CURRICULA: MIDDLE SCHOOL MATHEMATICS 3

Explores how exemplary middle school mathematics curricula promote the development of students' mathematical understandings and provides a context for best classroom practices. Examines in-depth topics in number and operations, algebra, geometry, measurement, and/or data analysis.
RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing teachers, or by permission of instructor.

MATH 600 FUNDAMENTALS OF REAL ANALYSIS I 3

Rigorous introduction to classical real analysis. Brief review of real numbers and a thorough discussion of the basic topology of metric spaces. Covers in detail the following topics: the analysis of sequences and series; continuity; differentiation and Taylor's theorem; and the analysis of sequences and series of functions.
PREREQ: MATH401.

MATH 602 FUNDAMENTALS OF REAL ANALYSIS II 3

Riemann integration, an introduction to Lebesgue integration, multivariable calculus.
PREREQ: MATH600.

MATH 611 INTRODUCTION TO NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING 3

Introduction to numerical computing, analysis and solution of systems of linear equations, linear least-squares, eigenvalue problems, methods for unconstrained optimization, solution of systems of nonlinear equations. Experience with standard computer packages, code development and simulations of applied problems.
PREREQ: MATH503 or MEEG863 or PHYS207.

MATH 612 INTRODUCTION TO NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS 3

Basic finite difference schemes for standard model problems. Schemes for integrating time dependent problems (including ordinary differential equations). Curved boundaries. Dispersion and Von Neumann analysis. Lax equivalence theorem and the CFL condition.
PREREQ: MATH503 or MEEG863 or PHYS207.

MATH 616 INTRODUCTION TO APPLIED MATHEMATICS I 3

Introduction to ideas and techniques used in solving problems arising in a variety of physical settings. Stability of nonlinear systems of ODE's. Sturm-Liouville problems and Green's functions. The wave, heat and Laplace equations. Elementary analysis of some nonlinear PDE's. Special functions, asymptotic expansions and perturbation theory.
PREREQ: One semester of advanced calculus.

MATH 617 INTRODUCTION TO APPLIED MATHEMATICS II 3

Continuation of MATH616.
PREREQ: MATH616.

MATH 630 PROBABILITY THEORY AND APPLICATIONS 3

Introduction to probability theory as background for further work in statistics or stochastic processes. Sample spaces and axioms of probability; discrete sample spaces having equally likely events; conditional probability and independence; random variables and describing their distributions; classical discrete and continuous random variables; mathematical expectation and moments of a distribution; the distribution of a function of a random variable; Chebyshev's inequality; the law of large numbers; central limit theorem.

MATH 631 INTRODUCTION TO STOCHASTIC PROCESSES 3

Classical stochastic processes with emphasis on their properties which do not involve measure theory. Markov chains in discrete and in continuous time with examples from random walk, birth and death processes, branching processes and queueing theory. Renewal and Markov renewal processes. Basic notions of Brownian motion and second-order processes.
PREREQ: MATH630.

MATH 650 ABSTRACT ALGEBRA 3

Elementary number theory, polynomial and abstract rings, ideals and quotient rings, PID's and Euclidean rings, groups, cyclic and Abelian groups, direct products, algebraic field extensions, splitting fields, field automorphisms, finite fields.
PREREQ: Undergraduate abstract algebra.

MATH 668 SEMINARS-COLLOQUIA 1

Requires attendance at 8 departmental seminars/colloquia each semester. A short written summary on one of the talks must be submitted to the graduate chair.
RESTRICTIONS: Required of all MS and Ph.D. students in their first and second years. For meeting the requirement each semester students receive one credit.

MATH 672 VECTOR SPACES	3
Vector spaces, linear transformations, decomposition theorems and bilinear forms. PREREQ: MATH349.	
MATH 688 COMBINATORICS AND GRAPH THEORY I	3
Combinatorial enumeration, designs and geometries, graphs, set systems, partially ordered sets, existence and construction of various combinatorial objects, Ramsey theory. PREREQ: MATH650 or permission of instructor.	
MATH 689 COMBINATORICS AND GRAPH THEORY II	3
Methods of linear algebra in combinatorics and graph theory, basics of coding theory and associated designs, number theory and cryptography, communication complexity. PREREQ: Knowledge of linear algebra.	
MATH 694 METHODS OF OPTIMIZATION	3
Methods of solving optimization problems in finitely many variables, with or without constraints. Steepest descent, quasi-Newton methods (e.g. BFGS and conjugate gradient). Quadratic programming and complementarity. Interior point methods. Sequential quadratic programming. Cutting planes and non-smooth optimization. Max-flow/min-cut for network optimization. PREREQ: Multivariate calculus and linear algebra.	
MATH 805 REAL ANALYSIS	3
Lebesgue measure and integration, differentiation and absolute continuity, L_p spaces, distributions and Sobolev spaces. PREREQ: MATH602.	
MATH 806 FUNCTIONAL ANALYSIS	3
Fundamental results for normed linear spaces with special emphasis on the theory of Hilbert space, spectral theorems and application to integral and differential equations. PREREQ: MATH602.	
MATH 807 COMPLEX ANALYSIS	3
Complex numbers; analytic functions; geometry of elementary functions; integrals; power series; residues and poles. PREREQ: MATH602.	
MATH 810 ASYMPTOTIC AND PERTURBATION METHODS	3
Asymptotic expansions of real and complex integrals; singular perturbation theory for ODEs and PDEs, WKB and multiple-scale expansion techniques. Selected applications. PREREQ: MATH617 and knowledge of analytic function theory or permission of instructor.	
MATH 812 INVERSE PROBLEMS	3
Ill-posed problems, regularization methods, Tikhonov regularization, the discrepancy principle, regularization by discretization. Selected topics from nonlinear inverse problems. PREREQ: MATH617 and MATH806.	
MATH 824 TOPICS IN APPLIED MATHEMATICS	3
Topics chosen from numerical analysis, elasticity, electromagnetic theory, fluid dynamics and other areas. RESTRICTIONS: Requires permission of instructor.	
MATH 826 TOPICS IN PURE MATHEMATICS	3
Topics vary and are chosen from a variety of areas in pure mathematics. RESTRICTIONS: Requires permission of instructor.	
MATH 827 TOPOLOGY	3
Generation and properties of topological spaces including connectedness and compactness. Continuity, separation and countability properties; convergence of nets and filters.	
MATH 835 PARTIAL DIFFERENTIAL EQUATIONS I	3
Methods of analysis and solution for partial differential equations, both initial and boundary value problems. Brings mathematical techniques to vital and current systems of equations arising in many fields. Topics include elliptic, hyperbolic and parabolic systems from a classical and variational perspective. PREREQ: MATH617.	
MATH 836 PARTIAL DIFFERENTIAL EQUATIONS II	3
Cauchy's problem and initial boundary value problems for hyperbolic and parabolic equations and systems. Boundary value problems for elliptic equations and systems. Sobolev space and semigroup methods will be emphasized. PREREQ: MATH806 and a course on partial differential equations.	
MATH 838 NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS	3
Introduces concepts of consistency, stability and convergence of numerical schemes. Finite element and finite difference schemes and their applications to fundamental partial differential equations are emphasized. PREREQ: MATH612 or equivalent.	

MATH 845 GROUPS AND THEIR APPLICATIONS	3
Review of elementary group theory, permutation groups, group actions, Sylow theorems, semi-direct and wreath products, classical matrix groups, automorphism groups of combinatorial structures, Polya enumeration. May also include representation theory, free groups, finite groups of isometries of Euclidean spaces. PREREQ: MATH650 or permission of instructor.	
MATH 850 THEORY OF PROBABILITY	3
Mathematically rigorous treatment of probability theory with emphasis on methods and tools for applications. Axioms of probability and independence. An introduction to large deviation theory and Martingale theory. Probabilistic methods in combinatorics and analysis. PREREQ: MATH602 or permission of instructor.	
MATH 868 RESEARCH	1-6
MATH 869 MASTER'S THESIS	1-6
MATH 870 READING IN MATHEMATICS	1-6
MATH 884 FINITE GEOMETRIES AND DESIGNS	3
Classical projective and affine spaces, nondegenerate planes, coordinate systems, spreads and packings, conics and unitals, collineation groups and Singer cycles. Further topics chosen from related geometrical designs, associated codes and algebraic surfaces/varieties. PREREQ: MATH688 and MATH845.	
MATH 964 PRE-CANDIDACY STUDY	3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.	
MATH 969 DOCTORAL DISSERTATION	1-12 PF

MATERIAL CULTURE STUDIES

MCST 216 INTRODUCTION TO MATERIAL CULTURE STUDIES	3
Introduces students to material culture studies, broadly defined as study of all things people make and all the ways people have altered the physical world. Explores the approaches, concepts, and methods of numerous disciplines that investigate material culture. Crosslisted with ANTH216.	
MCST 243 AMERICAN DECORATIVE ARTS, 1700 - 1900	3
An introduction to interior decoration and household arts during the 18th and 19th centuries, with an emphasis on furniture, metalwork, glass, ceramics, textiles, prints, and wallpaper. Field trips to Winterthur and the Delaware Art Museum are required. Crosslisted with ARTH243.	
MCST 402 AMERICAN MATERIAL CULTURE RESEARCH SEMINAR	3
Balanced emphasis on writing 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. PREREQ: ANTH216. RESTRICTIONS: Open to majors only.	
MCST 435 SEMINAR IN AMERICAN ART	3-12
American art from the Colonies to the present. Recent topics include Art and Revolution in Early America; Early American Modernism, and American Painting and Sculpture after World War II. Crosslisted with ARTH435. RESTRICTIONS: May be repeated for credit when topics vary.	
MCST 464 AMERICAN MATERIAL CULTURE STUDIES INTERNSHIP	3
Internship practicum supplementing theoretical and methodological background in administration, collections management, exhibition, research, interpretation, and public programming and services of museums. Students intern at the University Gallery or other acceptable museum, related institution or organization in the United States. PREREQ: ANTH216. RESTRICTIONS: Open to majors only.	
MCST 466 INDEPENDENT STUDY	1-6

MEDICAL TECHNOLOGY

MEDT 100 INTRODUCTION TO MEDICAL TECHNOLOGY	1
Orientation to the profession of medical technology with overview of clinical	

laboratory science areas. Discussion of the laboratory's critical role in healthcare delivery and the diversity of employment and career opportunities.

- MEDT 210 INFORMATION TECHNOLOGIES AND COMMUNICATION SKILLS 2**
Focuses on the use of computer and education technology such as Powerpoint, Word, Excel, WWW browsers and e-mail as tools to achieve effective communication necessary for success in the biomedical sciences.
RESTRICTIONS: Open to sophomores, juniors and seniors. Requires permission of instructor.
- MEDT 366 INDEPENDENT STUDY 1-6**
- MEDT 370 PHLEBOTOMY PRACTICUM 1**
Introduction to the theory and performance of phlebotomy. Supervised clinical experience in the application of laboratory theory and techniques in phlebotomy.
RESTRICTIONS: Open to medical technology majors only.
- MEDT 375 CLINICAL LABORATORY PRINCIPLES AND STATISTICS 2**
Basic laboratory principles including solution preparation, mathematics, safety, quality assurance and spectrophotometry. Introductory statistics including applications to laboratory information systems and research.
RESTRICTIONS: Requires permission of instructor.
- MEDT 380 CLINICAL IMMUNOLOGY AND MEDICAL VIROLOGY 4**
Introductory immunology concepts and the use of immunological assays, such as complement fixation, enzyme immunoassays, and fluorescent antibody assays, for the diagnosis of infectious diseases and immunological disorders. Study of viruses, diseases they cause, and the methods used to diagnose viral infections.
PREREQ: BISC208, BISC300, and CHEM213 or CHEM321.
RESTRICTIONS: Requires permission of instructor.
- MEDT 390 INTRODUCTION TO GENETICS AND MOLECULAR DIAGNOSTICS 3**
Study of genetics, molecular biology principles and techniques as it applies to the clinical laboratory for use in diagnosis, prognosis and treatment of disease. Topics include mendelian genetics, principles of DNA, RNA, and proteins, and the use of molecular techniques in diagnosis.
PREREQ: BISC208, and CHEM213 or CHEM321.
RESTRICTIONS: Requires permission of instructor.
- MEDT 391 INTRODUCTION TO MOLECULAR DIAGNOSTICS LABORATORY 1**
Laboratory exercises that correlate with MEDT390. Techniques include isolation of nucleic acids from biological fluids, electrophoresis, PCR, viral load testing and DNA sequencing.
PREREQ: MEDT390.
- MEDT 400 URINALYSIS AND BODY FLUIDS 2**
The study of routine urinalysis examination, renal function and body fluid testing procedures.
RESTRICTIONS: Open to medical technology majors only.
- MEDT 401 CLINICAL PHYSIOLOGICAL CHEMISTRY I 3**
Application and theory of manual and automated techniques used in diagnostic and therapeutic medicine. Emphasis on clinical procedures for carbohydrates, proteins, lipids, nonprotein nitrogenous compounds, blood gases and pH, and electrolytes.
RESTRICTIONS: Open to medical technology majors only.
- MEDT 403 CLINICAL PHYSIOLOGICAL CHEMISTRY II 4**
Application and theory of methodologies in enzymology, endocrinology and toxicology. Relationship of normal and abnormal laboratory findings in organ functional tests.
PREREQ: MEDT401.
- MEDT 404 HEMATOLOGY I 2**
Quantitative and qualitative study of the formed elements of the blood with emphasis on the normal state, as well as the study of normal and abnormal coagulation and hemostasis.
RESTRICTIONS: Open to medical technology majors only.
- MEDT 405 HEMATOLOGY II 2**
Study of the pathophysiology of erythrocytic and leukocytic disorders and the laboratory findings of these disorders.
PREREQ: MEDT404.
- MEDT 406 MEDICAL MICROBIOLOGY 3**
Study of the occurrence and pathogenesis of human infections and microorganisms associated with humans in health and disease.
RESTRICTIONS: Open to medical technology majors only.
- MEDT 409 IMMUNOHEMATOLOGY I 1**
Study of antigen and antibody systems of human red cells and compatibility testing of blood for transfusion.
RESTRICTIONS: Open to medical technology majors only.

- MEDT 411 CLINICAL PHYSIOLOGICAL CHEMISTRY LABORATORY I 2**
Laboratory exercises that complement the topics covered in MEDT401.
COREQ: MEDT401.
- MEDT 413 CLINICAL PHYSIOLOGICAL CHEMISTRY LABORATORY II 2**
Laboratory exercises that complement the topics covered in MEDT403.
COREQ: MEDT403.
- MEDT 414 HEMATOLOGY I LABORATORY 1**
Study and implementation of laboratory procedures that correlate with the material taught in MEDT404.
COREQ: MEDT404.
- MEDT 415 HEMATOLOGY II LABORATORY 2**
Study and implementation of laboratory procedures in hematology consistent with the material taught in MEDT405.
COREQ: MEDT405.
- MEDT 416 MEDICAL MICROBIOLOGY LABORATORY 2**
Laboratory study of microorganisms important in the normal flora and infectious diseases of humans.
COREQ: MEDT406.
- MEDT 418 MEDICAL TECHNOLOGY SENIOR SEMINAR 0 PF**
Readings, case studies, career planning and orientation for clinical education.
RESTRICTIONS: Requires senior and major status.
- MEDT 419 IMMUNOHEMATOLOGY I LABORATORY 1**
Laboratory procedures consistent with MEDT409.
COREQ: MEDT409.
- MEDT 420 IMMUNOHEMATOLOGY II 1**
Study of blood and component transfusions, their risks, complications and quality assurance. Also blood component therapy and testing of the neonate and adult.
PREREQ: MEDT409.
- MEDT 421 IMMUNOHEMATOLOGY II LABORATORY 1**
Laboratory procedures consistent with MEDT420.
COREQ: MEDT420.
- MEDT 430 DIAGNOSTIC BACTERIOLOGY AND MEDICAL MYCOLOGY 2**
Diagnostic bacteriology, emphasizing the correlation of in vitro and in vivo findings in the diagnosis and treatment of infectious disease, including human mycoses. Identification of pathogenic and nonpathogenic bacteria and fungi in clinical specimens.
PREREQ: MEDT406 and MEDT416.
COREQ: MEDT431.
- MEDT 431 DIAGNOSTIC BACTERIOLOGY AND MEDICAL MYCOLOGY LABORATORY 2**
Study and implementation of laboratory procedures that correlate with the material taught in MEDT430.
COREQ: MEDT430.
- MEDT 450 ANATOMY OF PROFESSIONALISM 1-3**
Introduces medical technology majors and those already in the clinical laboratory field to aspects of professional development essential for success in the modern healthcare arena and for life-long learning. Includes a first-hand experience at a national clinical laboratory science annual meeting, accompanied by on-site discussions and student presentations on campus.
RESTRICTIONS: Restricted to MT/MTI majors and MT graduates.
- MEDT 461 LABORATORY PRACTICE AND LEADERSHIP I 1**
Introduction to clinical laboratory practice and leadership with emphasis on management styles, motivational techniques, communication skills, organizational leadership and administration of personnel.
RESTRICTIONS: Requires permission of instructor.
- MEDT 466 INDEPENDENT STUDY 1-6**
- MEDT 471 LABORATORY PRACTICE AND LEADERSHIP II 1**
Discussion of clinical laboratory practice and leadership. Emphasis on responsibilities relating to daily operation of the laboratory, including human resource management, financial planning, cost analysis, laboratory design, laboratory information systems, marketing, government regulations and accreditation.
PREREQ: MEDT461.
RESTRICTIONS: Requires permission of instructor.
- MEDT 472 CLINICAL URINALYSIS PRACTICUM 1 PF**
Clinical experience in the application of laboratory theory and techniques in urinalysis.
PREREQ: MEDT400.
- MEDT 473 CLINICAL CHEMISTRY PRACTICUM 3 PF**
Supervised experience in the application of laboratory theory and techniques in

clinical chemistry.

PREREQ: MEDT403 and MEDT413.

MEDT 475 CLINICAL HEMATOLOGY PRACTICUM 3 PF
Supervised experience in the application of laboratory procedures in hematology.
PREREQ: MEDT405 and MEDT415.

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

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

MECHANICAL ENGINEERING

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

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

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

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

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

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

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

MEEG 321 MATERIALS ENGINEERING 3
Mechanical properties and materials behavior under static and dynamic loading; fatigue, creep, wear and corrosion; properties and applications of metals, ceramics, polymers and composites; forming and joining of materials; practical examples of materials selection in design and use of materials data bases.
PREREQ: MEEG215 and MEEG302.
RESTRICTIONS: Open to majors only.

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

MEEG 332 FLUID MECHANICS II 3
Compressible flows, isentropic flow, shock waves; lift and drag; inviscid flows,

potential and stream functions, elementary wing theory; boundary layers; computational fluid dynamics.
PREREQ: MEEG331 and MATH352.
RESTRICTIONS: Open to majors only.

MEEG 341 THERMODYNAMICS 3
Basic concepts of thermodynamics including properties of substances and gas mixtures, energy, entropy, and exergy. First and second law analysis of systems and control volumes. Applications to steady-flow devices and systems in power production, propulsion, and air conditioning.
PREREQ: MATH351 or equivalent.
RESTRICTIONS: Open to Majors only.

MEEG 342 HEAT TRANSFER 3
Conductive, convective and radiative heat transfer. Finite difference methods for solving transient, multi-dimensional problems numerically. Analysis of fins and heat exchanges.
PREREQ: MEEG341 and MATH352 and MATH353.
RESTRICTIONS: Open to majors only.

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

MEEG 346 THERMAL LABORATORY 1
Introduction to experimental and measurement techniques related to thermodynamics and heat transfer.
PREREQ: MEEG341.
COREQ: MEEG342.
RESTRICTIONS: Open to majors only.

MEEG 366 INDEPENDENT STUDY 1-6

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

MEEG 414 ANALYSIS OF AIRCRAFT STRUCTURE 3
Deals with analysis and design of flight structures and other light-weight structures. Loads, supports and reactions, constitute equations, and stress and deformation of components for flight vehicles are investigated. Overview of fatigue, vibration (flutter) and instability of structures are given.
PREREQ: MEEG215 or equivalent.

MEEG 419 MECHANICAL BEHAVIOR OF MATERIALS AND STRUCTURES 3
This course will discuss how material properties influence structural response and failure mechanisms under the influence of external loads. Includes plasticity; thermal stresses; fracture and damage mechanics; and buckling. Problem solving based on both analytical methods and computational mechanics.
PREREQ: MEEG215.

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

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

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

MEEG 432 AERODYNAMICS 3
Theoretical and computational aerodynamics. Review of fluid mechanics. Airfoils and finite wings in incompressible flow. Panel and vortex-lattice methods. Complex variable techniques. Boundary-layer theory.
PREREQ: MEEG331.

MEEG 435 WIND POWER ENGINEERING 3
Includes an historical overview, the energetics of wind power, wind turbine aerodynamics, and the basics of related dynamical, structural and electrical aspects of wind power. There is also a class visit to a nearby wind farm.

PREREQ: MEEG331 or CIEG305, MATH351.

RESTRICTIONS: May be counted towards the MEEG Aerospace Engineering Concentration.

MEEG 442 INTRODUCTION TO FUEL CELLS 3
Basic principles of fuel cells, fuel cell types and their applications, fuel processing and hydrogen storage.
PREREQ: MEEG331, MEEG342, MEEG344, or equivalent.

MEEG 445 SENIOR RESEARCH I 3
Investigation of an experimental nature to be carried out and reported upon by each student.
RESTRICTIONS: Open to seniors only.

MEEG 446 SENIOR RESEARCH II 3
Investigation of an experimental nature to be carried out and reported upon by each student.
RESTRICTIONS: Open to seniors only.

MEEG 453 MANUFACTURING PROCESSES AND SYSTEMS 3
Explains key concepts and elements of basic processes (metal cutting, forming, plastic molding), technologies (robotics, ergonomics, material handling, quality management, machine vision), industries/systems (pharmaceutical, automotive, packaging, food, and current advances (lean mfg., just-in-time).
PREREQ: MEEG321 or permission of instructor.

MEEG 466 INDEPENDENT STUDY 1-6

MEEG 481 COMPUTER SOLUTION OF ENGINEERING PROBLEMS 3
Overview of numerical modelings in continuum mechanics. Case studies in fluid and solid mechanics using commercially available software packages. Overview of common features, capabilities and limitations of commercial codes.

MEEG 482 CLINICAL BIOMECHANICS 3
The biomechanics and patho-mechanics of various human musculoskeletal joint systems. Normal joint anatomy and biomechanics; the mechanical effects of pathology and the goals of surgical repairs to counteract them will be explored through in vitro, in vivo and mathematical modeling studies of joint system mechanics.

MEEG 483 ORTHOPAEDIC BIOMECHANICS 3
Anatomy and physiology including microanatomy and mechanics of bone, cartilage, tendon and muscle. Mechanical modeling of body including joint loads, motion analysis, muscle forces and interaction with orthopaedic devices.
PREREQ: PHYS201 or PHYS207.

MEEG 484 BIOMATERIALS AND TISSUE ENGINEERING 3
Biomaterials for mechanical replacement of Orthopaedic tissues: bone, cartilage, ligament, tendon and whole joint systems. Topics include normal tissue mechanics and biocompatibility, mechanical behavior, degradation and host response to biomaterials. Experimental methods to assess biomaterials along with design and manufacturing considerations for joint and tissue replacements.

MEEG 485 CONTROL OF HUMAN MOVEMENT 3
Examines current topics in biomechanics research relevant to control of human movement including anatomy of the neuro-musculo-skeletal system, experimental techniques for study of CNS organization, and coordination principles of simple and complex tasks.
PREREQ: PHYS201 or 207, or permission of instructor.

MEEG 486 CELL AND TISSUE TRANSPORT 3
Analysis of water, solute, gas, and heat exchange in microcirculation and relationship between structure and function. Transport in biological porous media examined and applied to arterial wall, bone, and cartilage. Active transport across membranes considered and applied to kidney and secretory organs. Introduction to transport across cell membrane and role of receptors in transport, cell adhesion, and intracellular signaling presented.
PREREQ: MEEG331.

MEEG 610 INTERMEDIATE SOLID MECHANICS 3
Indicial notation, tensors; displacement, strain, compatibility; traction and stress, equations of motion; constitutive description of an elastic material; solutions to boundary value problems including torsion, bending, plane problems in elasticity (Airy stress function) and elements of linear elastic fracture mechanics.

MEEG 611 SANDWICH STRUCTURES 3
Composite and isotropic sandwich structures are studied for stresses, deformations, buckling loads, natural frequencies and dynamic response under mechanical and environmental loads, involving honeycomb, solid, foam, web and trusscore sandwich comprising beam, plate, ring and shell structures. Design and minimum weight optimization are treated.

MEEG 612 BIOMECHANICS OF HUMAN MOVEMENT 3
Mechanics of the musculoskeletal system with an emphasis on the control of

human movement. Topics include how the nervous system activates muscles, the mechanical properties of skeletal muscle and mechanisms for controlling limb movement. Applications include gait analysis, sports biomechanics and hand trajectory formation. Involves computer modeling of musculoskeletal systems.
PREREQ: PHYS201 or PHYS207.

MEEG 614 ANALYSIS OF AIRCRAFT STRUCTURES 3
Deals with analysis and design of flight structures and other light-weight structures. Loads, supports and reactions, constitute equations, and stress and deformation of components for flight vehicles are investigated. Overview of fatigue, vibration (flutter) and instability of structures are given.

MEEG 615 MECHANICAL PROPERTIES OF MATERIALS 3
Stress, strain, tensor notation and elementary elasticity. Plasticity and ductility based upon continuum mechanics. Ideal strength of crystalline, polymer and amorphous materials. Real materials: amorphous, polymers, ceramics, metals and composites. Dislocations, strengthening of solids. Mechanisms of fracture, fracture mechanics, fatigue, creep and stress rupture.
Crosslisted with MSE615.
RESTRICTIONS: Requires graduate status.

MEEG 616 COMPOSITE MATERIALS STRUCTURES 3
Introduction to composite materials; anisotropic elasticity and laminate theory; plates and panels of composite materials; beams, columns and rods; composite material shell structures; energy methods; strength and failure theories; adhesive bonding and mechanical fastening; hygrothermal effects; stress analysis, buckling, vibrations and impact.

MEEG 617 COMPOSITE MATERIALS 3
Fiber and matrix materials, fiber-matrix interface, polymer, metal, ceramic and carbon matrix composites, geometric aspects, elastic properties, lamination theory, strength of unidirectional composites, strength of laminates, durability, hybrid composites, flexible composites and textile structural composites.

MEEG 619 MECHANICAL BEHAVIOR OF MATERIALS AND STRUCTURES 3
Examines how material properties influence structural response and failure mechanisms under the influence of external loads. Includes plasticity; thermal stresses; fracture and damage mechanics; and buckling. Problem solving based on both analytical methods and computational mechanics.
May be crosslisted with CIEG619.
PREREQ: MEEG610 or similar.

MEEG 620 INTERMEDIATE DYNAMICS 3
Reference frames, angular velocity, linear velocity, angular acceleration, linear acceleration, multibody systems, inertia properties, kinetic energy, equations of motion, generalized d'Alembert's principles, numerical integration, computer simulation.

MEEG 621 OPTIMIZATION OF DYNAMIC SYSTEMS 3
Static optimization, numerical methods for static optimization, calculus of variations. Dynamic optimization: basic results, direct solution, indirect solution. Linear systems: finite time optimal control, steady state optimal control, multi-degree-of-freedom mechanical systems.
RESTRICTIONS: Undergraduates require permission of instructor.

MEEG 623 NONLINEAR DYNAMICS AND CHAOS 3
Nonlinear dynamics and chaotic phenomenon as applied to natural and engineering systems. Geometric and computational techniques, analytical methods for the qualitative analysis of dynamical systems modeled by differential equations and iterated maps. Planar and non-planar phase space analysis, local and global bifurcation analysis, catastrophes, resonances.
PREREQ: MATH351 or equivalent.

MEEG 624 CONTROL OF DYNAMIC SYSTEMS 3
Review of modeling and analysis of dynamic systems. Transient and steady-state responses. Introduction to the theory of feedback controls and stability for continuous time systems. Control system design studies via root locus, frequency domain and state space methods. Brief introduction to digital controls.
PREREQ: MEEG211, MEEG311 and MATH352.

MEEG 630 INTERMEDIATE FLUID MECHANICS 3
Algebra and analysis of Cartesian Tensors. Descriptions of motion, kinematics. Conservation equations. Constitutive theory, Newton-Stokes fluids. Irrotational flow of an inviscid fluid. Dimensional analysis. Some exact solutions of the Navier-Stokes equations. Asymptotic flows: creeping flow, flow in the boundary layer. Introduction to turbulent flow. One dimensional compressible flow.

MEEG 635 WIND POWER ENGINEERING 3
Lecture course on engineering aspects of modern large wind turbines.
PREREQ: MEEG331 or equivalent, MEEG211 or equivalent, MEEG351 or equivalent.

MEEG 637 MULTIPHASE FLOW AND TRANSPORT 3
Principles of multiphase flows with particles, droplets, and bubbles. Local and averaging formulations of interfacial mass, momentum, energy transfers and

related transport processes. Applications to industrial and environmental processes.

PREREQ: MEEG630 or permission of instructor.

- MEEG 640 INTERMEDIATE HEAT TRANSFER 3**
Theory and equations of heat conduction, boundary conditions, steady and transient heat conduction, theory of convection, forced convection in laminar flows, derivation of conservation equations, numerical methods.
- MEEG 642 INTRODUCTION TO FUEL CELLS 3**
Basic principles of fuel cells, fuel cell types and their applications, fuel processing and hydrogen storage.
PREREQ: MEEG331, MEEG342, MEEG344.
- MEEG 653 MANUFACTURING PROCESSES AND SYSTEMS 3**
Explains key concepts and elements of basic processes (metal cutting, forming, plastic molding), technologies (robotics, ergonomics, material handling, quality management, machine vision), industries/systems (pharmaceutical, automotive, packaging, food, and current advances (lean mfg., just-in-time).
PREREQ: MEEG321 or permission of instructor.
- MEEG 655 PRINCIPLES OF COMPOSITES MANUFACTURING 3**
Fundamental principles involved in composites manufacturing are introduced. Modeling of such processes emphasized with applications of injection molding, compression molding, filament winding, pultrusion and resin transfer molding.
PREREQ: MEEG332 and MEEG342.
- MEEG 658 METALS AND ALLOYS 3**
Introductory alloy theory: free electron theory, metallic bonding. Alloy structure: solid solutions, ordered and intermetallic phases. Physical metallurgy: Mechanical properties and annealing. Production, applications and structure/property relationships of major engineering alloys, intermetallics, superalloys, metallic glasses.
PREREQ: MSEG302, MEEG321 or equivalent.
- MEEG 671 INTRODUCTION TO ROBOTICS 3**
Topics include: rigid motions and transformations, forward kinematics, Denavit-Hartenberg representations, inverse kinematics, velocity kinematics, dynamics, independent joint control, multivariable control, force control.
PREREQ: Requires familiarity with kinematics and basic dynamics.
RESTRICTIONS: Recommended for seniors and graduate students.
- MEEG 681 COMPUTER SOLUTIONS OF ENGINEERING PROBLEMS 3**
Overview of numerical modelings in continuum mechanics. Case studies in fluid and solid mechanics using commercially available software packages. Overview of common features, capabilities and limitations of consumer codes.
- MEEG 682 CLINICAL BIOMECHANICS 3**
The biomechanics and patho-mechanics of various human musculoskeletal joint systems. Normal joint anatomy and biomechanics; the mechanical effects of pathology and the goals of surgical repairs to counteract them are explored through in vitro, in vivo and mathematical modeling studies of joint system mechanics.
- MEEG 683 ORTHOPEDIC BIOMECHANICS 3**
Anatomy and physiology including microanatomy and mechanics of bone, cartilage, tendon and muscle. Mechanical modeling of body including joint loads, motion analysis, muscle forces and interaction with orthopedic devices.
PREREQ: MEEG211 and MEEG215.
- MEEG 684 BIOMATERIALS AND TISSUE ENGINEERING 3**
Biomaterials for mechanical replacement of Orthopaedic tissues: bone, cartilage, ligament, tendon and whole joint systems. Topics include normal tissue mechanics and biocompatibility, mechanical behavior, degradation and host response to biomaterials. Experimental methods to assess biomaterials along with design and manufacturing considerations for joint and tissue replacements.
- MEEG 685 CONTROL OF HUMAN MOVEMENT 3**
Examines current topics in biomechanics research relevant to control of human movement including anatomy of the neuro-musculo-skeletal system, experimental techniques for study of CNS organization, and coordination principles of simple and complex tasks.
PREREQ: PHYS201 or 207, or permission of instructor.
- MEEG 686 CELL AND TISSUE TRANSPORT 3**
Analysis of water, solute, gas, and heat exchange in microcirculation and relationship between structure and function. Transport in biological porous media examined and applied to arterial wall, bone, and cartilage. Active transport across membranes considered and applied to kidney and secretory organs. Introduction to transport across cell membrane and role of receptors in transport, cell adhesion, and intracellular signaling presented.
PREREQ: MEEG331.
- MEEG 690 INTERMEDIATE ENGINEERING MATHEMATICS 3**
Linear algebra: generalized vector space, eigenvalue problem, diagonalization, quadratic forms. Field theory: divergence theorem, Stokes' theorem, irrotational

fields. Sturm-Liouville theory, Bessel functions, Legendre polynomials. Partial differential equations: diffusion and Laplace equations by separation of variables and Sturm-Liouville theory, wave equation. Engineering applications.

- MEEG 811 SANDWICH STRUCTURES 3**
Composite and isotropic sandwich structures are studied for stresses, deformations, buckling loads, natural frequencies and dynamic response under mechanical and environmental loads, involving honeycomb, solid, foam, web and truss core sandwich comprising beam, plate, ring and shell structures. Design and minimum weight optimization are treated.
- MEEG 816 ADVANCED CONTINUUM MECHANICS 3**
A rigorous study of kinematics of finite deformation and the field equations of mechanics and thermodynamics of continua. Tensor analysis employed throughout.
- MEEG 817 COMPOSITE MATERIALS 3**
Introduction, thermoelastic behavior of laminated composites, statistical strength theories of continuous-fiber composites, short-fiber composites, hybrid composites, two-dimensional textile structural composites, three-dimensional textile structural composites, flexible composites, and nonlinear elastic finite deformation of flexible composites.
May be crosslisted with MSEG817.
PREREQ: MEEG610 or MEEG616 or MEEG617.
- MEEG 818 PLATES AND SHELLS IN AEROSPACE STRUCTURES I 3**
Theory of plates from three-dimensional equations of elasticity. Small deflection analysis of rectangular and circular plates. Thermoelastic effects. Analysis of orthotropic plates, multilayered plates and sandwich panels. Green's functions. Energy methods. Reissner variational theorem for plates of moderate thickness. Large deflections of plates.
- MEEG 819 PLATES AND SHELLS IN AEROSPACE STRUCTURES II 3**
General theory of thin shells from three-dimensional equations of elasticity; shells of revolution under axially symmetric loads; asymmetric loads; thermoelastic effects; general bending theory, membrane theory, inextensional theory; Donnell equations; edge load solutions; orthotropic shells; laminated shells.
- MEEG 821 ADVANCED DYNAMICS 3**
General principles of spatial dynamics. Lagrangian and Hamiltonian methods. Application to engineering problems.
- MEEG 824 STRUCTURAL DYNAMICS AND CONTROL 3**
Reviews vibration analysis of uniform/composite beams, plates and shells. Introduces analysis of structural sound radiation into enclosures and open field. Structural vibration controls and feedback strategies including modal, natural and optimal controls and uniform damping. Reduction of structural sound radiation by adaptive feedforward structural controls.
PREREQ: MEEG211, MEEG311, and MATH352.
- MEEG 831 FLUID DYNAMICS 3**
Bodies, configurations and motions. Kinematics and basic laws. Constitutive theory, simple fluids, viscometric motion. Differential, rate type and integral models. Navier-Stokes fluids, stability theorems, uniqueness.
PREREQ: MATH630, MEEG690, or permission of instructor.
- MEEG 837 MULTIPHASE FLOW AND TRANSPORT 3**
Principles of multiphase flows with particles, droplets, and bubbles. Local and averaging formulations of interfacial mass, momentum, energy transfers and related transport processes. Applications to industrial and environmental processes.
PREREQ: MEEG630 or permission of instructor.
- MEEG 840 SPECIAL TOPICS IN CONTINUUM MECHANICS 3**
Study of advanced principles of continuum mechanics in one or more special fields. Topics selected by instructor. Special subjects may include the general theory of constitutive equations, hyperelasticity, electroelasticity, hypoelasticity, simple and nonsimple fluids, and solutions of special problems in these areas.
- MEEG 855 PRINCIPLES OF COMPOSITES MANUFACTURING 3**
Fundamental principles and an application involving composites manufacturing are introduced. Modeling of such processes is emphasized and a specific project is required. Assignments include open-ended problems. Areas of manufacturing include: injection molding, compression molding, filament winding, pultrusion and resin transfer molding.
- MEEG 868 RESEARCH 1-9**
- MEEG 869 MASTER'S THESIS 1-6**
Experimental investigation conducted for the purpose of contributing new useful data and theory in some field of mechanical engineering. Although supervised, investigation is independent in character to encourage development of initiative.
- MEEG 871 RANDOM VIBRATIONS 3**
Review of theory of statistics and probability. Introduction to random processes of spectral analysis. Characterization of random excitations and random responses

of degree of freedom linear systems with application to engineering structures. Level crossing probability and fatigue damage estimate. Random vibration of nonlinear dynamic systems. Methods for analyzing nonlinear stochastic systems. PREREQ: CIEG311 (for CIEG students), MEEG311 (for MEEG students). Knowledge of MEEG824 is desirable but not required.

MEEG 872 PLANNING AND OPTIMIZATION OF DYNAMIC SYSTEMS 3
Overview of cutting edge research methods in planning, control and optimization of dynamic systems that integrate tools from nonlinear systems theory, motion planning and functional optimization.
RESTRICTIONS: Permission of instructor required.

MEEG 873 APPLIED NONLINEAR CONTROL 3
Review of analysis of nonlinear dynamic systems. Lyapunov stability theory. Optimal control of nonlinear systems. Feedback linearization. Robust and adaptive sliding mode controls and the backstepping design of sliding mode control. Feedforward control of nonlinear systems. Discussion of current research topics of nonlinear controls and their engineering applications.
PREREQ: MEEG824 or equivalent, MEEG690, and permission of instructor

MEEG 881 ADVANCED MUSCULOSKELETAL BIOMECHANICS 3
Examines current topics in biomechanics research including musculoskeletal modeling, muscle physiology, anthropometric analysis, biomedical imaging techniques, neural control of movement and/or clinical biomechanics.
PREREQ: MEEG612 and MEEG683.

MEEG 891 ADVANCED ENGINEERING MATHEMATICS 3
Integral transform and Green's Function Solution of Partial Differential Equations, complex variables, variational calculus and introduction to perturbation methods.
PREREQ: MEEG690.

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

MEEG 969 DOCTORAL DISSERTATION 1-12 PF

MANAGEMENT INFORMATION SYSTEMS

MISY 160 BUSINESS COMPUTING: TOOLS AND CONCEPTS 3
Introduction to computers: components and operations. Introduction to management information/decision support systems and the system development process. Emphasis on microcomputers and software packages used in business.

MISY 225 INTRODUCTION TO PROGRAMMING BUSINESS APPLICATIONS 3
Use of higher level contemporary computing languages to structure Prototyping applications of systems.
PREREQ: MISY160 or CISC101.
RESTRICTIONS: MIS minors only. Not open to CS majors in the MIS minor.

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

MISY 330 DATABASE DESIGN AND IMPLEMENTATION 3
Covers the design and implementation of enterprise databases in the business environment. A networked setting and its effect on database management will be emphasized.
PREREQ: MISY225 or CISC181.
RESTRICTIONS: MIS majors and minors only. Not open to computer science majors in the MIS minor.

MISY 340 EMERGING TECHNOLOGIES 3
Businesses need to learn how to leverage new technologies to be effective. Explores emerging technologies, both from a technical and a managerial perspective. Focus will be on using technology to improve business processes and solve business problems.
PREREQ: MISY225 or CISC181.

MISY 350 BUSINESS APPLICATION DEVELOPMENT 3
Programming techniques for modern business applications, including object-oriented programming, XML, Web services, and Web applications.
PREREQ: MISY225.

MISY 364 MANAGEMENT INFORMATION SYSTEMS IN PRACTICE 3
Requires at least 120 hours of MIS-related assignments in an internship, verified by the hiring company. A term paper relating the real world duties and responsibilities of the internship to principles learned in traditional MIS classes is required.

MISY 366 INDEPENDENT STUDY 1-6

MISY 395 GLOBAL ISSUES IN INFORMATION TECHNOLOGY 3
Selected information technology topics facing global organizations are explored. Emphasis placed on enterprise systems and challenges of managing global systems. Company visits abroad deliver this perspective.
RESTRICTIONS: Taught abroad.

MISY 427 MANAGEMENT OF INFORMATION SYSTEMS 3
Explores practical applications of information technology in all aspects of management including organizational behavior, human resource management, international management and strategic decision making. Issues of managing emerging technologies, integrating technologies with people, organizational culture and structure and strategic decision making will be discussed.
PREREQ: BUAD309.
RESTRICTIONS: Open to management and MIS majors only.

MISY 430 SYSTEMS ANALYSIS AND IMPLEMENTATION 3
Covers the challenges of developing and managing systems analysis and design projects. Students learn to determine systems requirements, analyze systems problems, model potential solutions and design and implement these solutions. Other current topics will be included to reflect the changing information systems environment.
PREREQ: MISY330 or CISC437.
RESTRICTIONS: Open to MIS majors and minors and INSY majors only.

MISY 431 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: MISY430.
COREQ: MISY432.
RESTRICTIONS: Open to MIS majors and minors only.

MISY 432 PROBLEM SOLVING PROJECT MANAGEMENT 3
Capstone in Business and Economics MIS minor. Emphasis on applying concepts of project management to real management information problems.
PREREQ: MISY430.
COREQ: MISY431.
RESTRICTIONS: Open to MIS majors and minors only.

MISY 810 TELECOMMUNICATIONS AND NETWORKS I 3
Leadership skills in information technology, telecommunications and internet technology for technology management. Introduces concepts in data and image compression, digital audio and digital cellular telephony. Provides fundamental knowledge of transmission and storage technology and a system-level understanding of computer networks and the internet.
Crosslisted with CPEG810.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

MISY 811 TELECOMMUNICATIONS AND NETWORKS II 3
Considers technology trends and their impact on industry and the global economy. Topics include the convergence of computation and communications; emerging standards in high-capacity cellular telephony; the impact of global positioning systems on business applications; and the future capabilities of the internet.
Crosslisted with CPEG811.
COREQ: CPEG810. May also be taken as prerequisite.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management Program.

MISY 830 DECISION SUPPORT AND ANALYSIS 3
Considers how to structure and define complex business decision problems; the analytical framework and techniques required to understand the problem; where the data needed for the analysis resides in the organization and the tools and techniques needed to obtain it.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

MISY 840 PROJECT MANAGEMENT AND COSTING 3
Provides the technical knowledge and skills needed to successfully plan, execute and evaluate IT projects. Strong emphasis on the costing of IT projects.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

MISY 850 SECURITY AND CONTROL 3
Considers state-of-the-art technological and organizational approaches to enhancing the security and integrity of corporate information resources in a cost-effective manner.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

MISY 865 SEMINAR 1-12
Taught from an IT perspective and provides a background for understanding the

information needs of an organization's business processes. Topics include accounting for an IT environment; business processes and operations management; finance; marketing; management; and programming.
RESTRICTIONS: Open only to students in the M.S. in Information Systems and Technology Management program.

MISY 870 STRATEGIC INFORMATION TECHNOLOGY MANAGEMENT 2
Explores how information technologies to enhance the strategic goals of the organization. Examines the relationship between broad strategic goals and organizational mission, and specific tactical IT responses. Considers the strategic importance of ERP, CRM, corporate intelligence, knowledge sharing, etc.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

MISY 871 HIGH TECHNOLOGY SEMINAR 1
Series of guest speakers on various IT topics.
RESTRICTIONS: Preference given to students in the M.S. in Information Systems and Technology Management program.

MISY 873 INFORMATION TECHNOLOGY AND ORGANIZATIONAL EFFECTIVENESS 3
Examines how information and communication technologies combine with work processes and organizational structures to enhance organizational performance. Develops skills in recognizing opportunities for technology interventions and in effectively implementing technologically enhanced change.
PREREQ: BUAD870.

MILITARY SCIENCE

MLSC 105 INTRODUCTION TO LEADERSHIP I 1
Introduction to leadership principles using case studies, historical perspectives and hands-on leadership opportunities. Learn to rappell, use a map and compass, understand the basics of physical fitness and familiarize with Army traditions and ceremonies. No military obligation associated with this course.

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

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

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

MLSC 215 LEADER DEVELOPMENT 4
An introductory six week off-campus, hands-on leadership education and assessment course. Real life individual and collective leadership challenges and opportunities. All expenses paid. Multiple scholarship opportunities.
RESTRICTIONS: Permission of instructor required.

MLSC 305 APPLIED LEADERSHIP I 2
Advanced training in military leadership. One of two courses designed to prepare cadets for the ROTC Advanced Camp/Nurse Summer Training Program. Focuses on leadership development through multiple, small unit leadership opportunities and counseling. Fine tunes skills learned in the previous two years of Military Science, ROTC Basic Camp or prior military service, especially marksmanship, land navigation, drill and ceremonies and physical fitness. Commitment to military service required.
RESTRICTIONS: Requires permission of instructor.

MLSC 306 APPLIED LEADERSHIP II 2
Continues to build on the basics of MLSC305. Completes preparation for Advanced Camp/Nurse Summer Training Program and focuses on leadership at the platoon and company level. Small unit tactics and training are emphasized. Information is provided to help the student make wise decisions about military service options. Commitment to military service required.
PREREQ: MLSC305.

MLSC 315 LEADER EVALUATION 4
An advanced six week off-campus, hands-on leadership education and assessment course. Real life individual and collective leadership challenges and opportunities. All expenses paid.

PREREQ: MLSC305 and MLSC306.
RESTRICTIONS: Requires permission of instructor.

MLSC 365 MILITARY HISTORY STUDIES 3
Selected topics in American military history, current military trends and future military requirements.

MLSC 366 INDEPENDENT STUDY 1-3

MLSC 405 ADVANCED LEADERSHIP I 2
Prepares cadets for commissioning by refining professional skills and leadership ability. Students assigned leadership positions and function as commanders and staff officers in planning and executing cadet battalion activities. Focuses on technical skills needed to accomplish assigned missions and other topics which expand cadet knowledge of Army systems and procedures. Commitment to military service required.
PREREQ: MLSC306.

MLSC 406 ADVANCED LEADERSHIP II 2
Builds on leadership skills from MLSC405 and helps complete the transition from cadet to Lieutenant. Cadets are assigned new leadership positions to broaden their leadership experience. Focuses on officer professional development subjects needed to manage a military career and personal affairs. Commitment to military service required.
PREREQ: MLSC306.

MLSC 466 INDEPENDENT STUDY 1-3

MATERIALS SCIENCE

MSEG 302 MATERIALS SCIENCE FOR ENGINEERS 3
Crystal binding and structure; energetics and structure of lattice defects; elasticity, plasticity, and fracture; phase equilibria and transformations; relations of structure and treatment to properties; structures of inorganic and organic polymers; and electronic and magnetic properties.
PREREQ: CHEM103 or equivalent and PHYS207 or equivalent.

MSEG 366 INDEPENDENT STUDY 1-6

MSEG 406 CORROSION AND PROTECTION 3
Degradation of structural materials through interaction with their environment. Electrochemical attack on alloys and its relation to metallurgical structure. Forms of corrosion including high temperature oxidation and biological effects. Corrosion monitoring and deterioration of polymers, concrete and advanced materials. Emphasis on materials selection and corrosion methods.
PREREQ: CHEM103/104 or equivalent, MSEG302 or consent of instructor. Physical chemistry helpful.

MSEG 410 EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS 3
Study of the micromechanical and thermomechanical response of composite materials. Execution and assessment of experiments conducted to investigate strength and stiffness characteristics of composite materials.
May be crosslisted with CIEG410.

MSEG 420 CAREER SURVIVAL OUTSIDE THE UNIVERSITY 1
Provides mechanisms to overcome cultural barriers existing between university and industrial cultures. Topics include leadership vs. management, professional and cultural ethics, individual responsibility vs. teamwork, and networking and mentorship in accomplishing career goals. Includes guest speakers from local industries, technical writing and oral communication exercises.

MSEG 425 ENTREPRENEURSHIP AND RISK: MEETING THE CHALLENGES 3
Deals with critical financial, legal, scientific and engineering issues confronted during initial planning stages of high technology start-up enterprise. Range of speakers from finance, marketing, engineering, law and early- and late-stage start-up companies provide perspective on challenges of launching new business venture. Work in cross-disciplinary teams to develop R&D strategic and business plan for new high tech product offering.

MSEG 441 NANOMATERIALS AND THIN-FILM PROCESSES 3
Includes physical and chemical vapor deposition processes. Topics selected from vacuum science and technology, thin-film evaporation processes, discharges, plasmas, ion-surface interactions, chemical vapor deposition, laser ablation, substrate surfaces and thin-film Nucleation, Epitaxy, film structure, characterization of thin-films and nanostructures, etc.

MSEG 442 SEMICONDUCTORS FOR MICRO- AND NANO- TECHNOLOGY 3
Introduction to some main themes of physics of semiconductors, emphasizing unique properties at micro- and nanometer scale. Reviews basic properties of bulk semiconductors and discusses how these properties modify at the micro- and nano-meter scale. Applications-oriented. Select range of applications in

electronics, photonics, biology, chemistry, and medicine discussed to illustrate range of utility of micro- and nano-structures.

RESTRICTIONS: Upper-class undergraduates (at 4xx level) and graduates (at 6xx level) in materials science and engineering, electrical engineering, and physics.

MSEG 446 SENIOR RESEARCH 1-6

Research general areas of materials science and/or engineering under the direction of a member of the materials science faculty or other faculty in science or engineering subject to the approval of the materials science chair.

RESTRICTIONS: Open to seniors only. Science background required.

MSEG 466 INDEPENDENT STUDY 1-6

MSEG 601 STRUCTURE AND PROPERTIES OF POLYMER MATERIALS 3

Measurement and control of the microstructure and properties of solid polymers. Structure generation, structure-property models and effects of processing on properties.

May be crosslisted with CHEG601.

PREREQ: MSEG302.

MSEG 602 STRUCTURE OF MATERIALS 3

Crystal structure analysis by X-ray and electron diffraction. Characterization of materials by optical microscopy, scanning and transmission electron microscopy, thermal analysis and spectroscopy.

PREREQ: MSEG302.

MSEG 606 CORROSION AND PROTECTION 3

Degradation of structural materials through interaction with their environment. Electrochemical attack on alloys and its relation to metallurgical structure. Forms of corrosion including high temperature oxidation and biological effects.

Corrosion monitoring and deterioration of polymers, concrete and advanced materials. Emphasis on materials selection and corrosion control methods.

PREREQ: CHEM103/104 or equivalent, MSEG302 or permission of instructor.

Physical chemistry helpful.

MSEG 607 PHYSICAL PROPERTIES OF MATERIALS I 3

Basic models of electrical, magnetic optical and thermal properties of solid materials. Introduction to quantum physics to describe electronic structure of atoms, atomic bonds and crystals. Electronic, magnetic and optical effects in metals, semiconductors, ceramics, polymers and amorphous materials. Operation of basic electronic devices and semiconductor.

PREREQ: MSEG302 and PHYS208.

MSEG 610 EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS 3

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

May be crosslisted with CIEG610.

MSEG 615 MECHANICAL PROPERTIES OF MATERIALS 3

Stress, strain, tensor notation and elementary elasticity. Plasticity and ductility based upon continuum mechanics. Ideal strength of crystalline, polymer and amorphous materials. Real materials: amorphous, polymers, ceramics, metals and composites. Dislocations, strengthening of solids. Mechanisms of fracture, fracture mechanics, fatigue, creep and stress rupture.

May be crosslisted with MEEG615.

RESTRICTIONS: Requires graduate status.

MSEG 616 CHEMISTRY AND PHYSICS OF SURFACES AND INTERFACES 3

Fundamental and engineering aspects of metal, semiconductor, and oxide surfaces; their structure and defects, characterization, electronic properties, adsorption and reaction kinetics and thermodynamics. Applications to catalysis, microelectronics, and environment sensitive behavior.

Crosslisted with CHEG616.

PREREQ: CHEG342 and CHEM444.

RESTRICTIONS: Open to seniors and graduate students only.

MSEG 620 CAREER SURVIVAL OUTSIDE THE UNIVERSITY 1

Provides mechanisms to overcome cultural barriers existing between university and industrial cultures. Topics include leadership vs. management, professional and cultural ethics, individual responsibility vs. teamwork, and networking and mentorship in accomplishing career goals. Includes guest speakers from local industries, technical writing and oral communication exercises.

MSEG 624 PRACTICAL ELECTRON MICROSCOPY 3

Basic theories and in-depth practical aspects of scanning electron microscopy, transmission electron microscopy, elemental analysis, and sample preparation techniques. Hands-on oriented. For some lab assignments, students can be accommodated to prepare and analyze real samples from their own research.

MSEG 625 ENTREPRENEURSHIP AND RISK: MEETING THE CHALLENGES 3

Deals with critical financial, legal, scientific and engineering issues confronted during initial planning stages of high technology start-up enterprise. Range of speakers from finance, marketing, engineering, law and early- and late-stage

start-up companies provide perspective on challenges of launching new business venture. Work in cross-disciplinary teams to develop R&D strategic and business plan for new high tech product offering.

MSEG 630 INTRODUCTION TO SCIENCE AND ENGINEERING OF POLYMER SYSTEMS 3

Provides an understanding of the science and engineering of macromolecules from a structure/property perspective. Topics include polymerization, chain structure and configuration, polymer size and shape, phase separation behavior, amorphous and crystalline state, glass-rubber transition, cross linking/rubber elasticity, viscoelasticity, rheology polymer processing and mechanical behavior.

MSEG 632 PRINCIPLES OF POLYMERIZATION 3

Provides background in the theoretical and synthetic considerations of polymer synthesis. Topics include theoretical descriptions of molecular weight distributions, step growth polymerizations, chain growth polymerizations, living polymerizations, as well as chemical strategies for the production of various polymers. Specialized topics in the current polymer chemistry literature may also be discussed.

PREREQ: MSEG630 to be taken as prerequisite or corequisite.

MSEG 633 POLYMER SYNTHESIS AND CHARACTERIZATION LAB 3

Provides direct laboratory experience with the synthesis of a variety of conventional polymers via step growth, radical, and ionic polymerization methods. Polymers synthesized are also characterized via common polymer characterization methods such as IR spectroscopy, gel permeation chromatography, differential scanning calorimetry, and NMR spectroscopy.

PREREQ: MSEG632 to be taken as prerequisite or corequisite.

MSEG 635 PRINCIPLES TO POLYMER PHYSICS 3

Chain statistics, thermodynamics, and kinetics are discussed in the context of modern polymer physics characterization techniques, such as dynamic and static light scattering and elastic/inelastic neutron scattering.

MSEG 641 NANOMATERIALS AND THIN FILM PROCESSES 3

Includes physical and chemical vapor deposition processes. Topics selected from Vacuum Science and Technology, Thin-Film Evaporation Processes, Discharges, Plasmas, Ion-Surface Interactions, Chemical Vapor Deposition, Laser Ablation, Substrate Surfaces and Thin-Film Nucleation, Epitaxy, Film Structure, Characterization of Thin Films and nanostructures, etc.

Crosslisted with PHYS641.

MSEG 642 SEMICONDUCTORS FOR MICRO- AND NANO-TECHNOLOGY 3

Introduction to some main themes of physics of semiconductors, emphasizing unique properties at micro- and nanometer scale. Review of basic properties of bulk semiconductors and discuss how these properties modify at micro- and nanometer scale. Applications-oriented. Select range of applications in electronics, photonics, biology, chemistry, and medicine discussed to illustrate range of utility of micro- and nano-structures.

RESTRICTIONS: Upper-class undergraduates (at 4xx level) and graduates (at 6xx level) in materials science and engineering, electrical engineering, and physics.

MSEG 666 SPECIAL PROBLEM 1-12

MSEG 803 EQUILIBRIA IN MATERIAL SYSTEMS 3

Classical thermodynamics of condensed systems (macroscopic description). Fundamental laws. Functions and equations of state. Equilibrium and stability criteria. Single component phase equilibrium, multi-component mixtures. Partial molar properties, non-ideal mixtures. Equilibrium in multi-phase, multi-component systems. Phase Rule.

PREREQ: MSEG302 or Graduate Standing.

MSEG 804 KINETICS IN MATERIAL SYSTEMS 3

Theory of reaction kinetics. Transport mechanisms in solids. Nucleation and spinodal decomposition. Interfacial attachment and migration. Transition state theory applied to diffusion and phase transformation. Elementary non-equilibrium thermodynamics and phenomenological equations in material transport and phase transformation.

PREREQ: MSEG302 or Graduate Standing.

MSEG 807 PHYSICAL PROPERTIES OF MATERIALS II 3

Continuation of MSEG607 with emphasis on the electrical transport properties of material. Topics include electronic structure and energy band diagrams of semiconductors, metals and insulators; Fermi surfaces; dynamics of electrons; Semiconductor materials and devices; band structure and transport properties of selected semiconductors; band-gap engineering; novel materials systems; electron emission; particularly field emission.

PREREQ: MSEG607.

MSEG 811 ADVANCED TOPICS IN MATERIALS 1-3

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

MSEG 817 COMPOSITE MATERIALS 3

Introduction, thermoelastic behavior of laminated composites, statistical strength theories of continuous-fiber composites, short-fiber composites, hybrid composites, two-dimensional textile structural composites, three-dimensional textile structural

composites, flexible composites, and nonlinear elastic finite deformation of flexible composites.

Crosslisted with MEEG817.

PREREQ: MEEG610 or MEEG616 or MEEG617.

MSEG 823 TRANSMISSION ELECTRON MICROSCOPY IN MATERIALS SCIENCE 3

Transmission electron microscope, lens defects and resolution. Diffraction and Kikuchi pattern formation and analysis. Image formation: kinematical and dynamical theories of electron diffraction. Burger's vector and other fault analysis. Convergent beam and microdiffraction techniques. High resolution electron microscopy.

May be crosslisted with CHEG823.

MSEG 860 EPITAXIAL GROWTH AND BAND ENGINEERING 3

Fundamentals and recent developments in the growth of epitaxial films of electronic/ optical materials and devices. Topics include vacuum technology, growth thermodynamics, heterojunction physics, materials characterization, and practical considerations. Focus on molecular beam epitaxy, but discuss complementary techniques.

Crosslisted with ELEG860.

MSEG 866 SPECIAL PROBLEM 1-12

MSEG 868 RESEARCH 1-9

MSEG 964 PRE-CANDIDACY STUDY 3-12 PF

Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

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

MSEG 969 DOCTORAL DISSERTATION 1-12 PF

MUSEUM STUDIES

MSST 165 INTERNATIONAL DECORATIVE ARTS 3

Introduction to history of decorative arts in world cultures, ancient times to present. Ornamental and functional arts in metalwork, glass, and ceramics in art historical, cultural, symbolic, and technological contexts. Case studies from Asia, Africa, the Islamic World, Europe, and the Americas.

May be crosslisted with ARTH165.

MSST 205 SCIENCE AND THE DETECTION OF ART FORGERIES 3

Concepts from many scientific disciplines are useful for interpreting works of art. Analytical techniques based on those concepts often reveal art forgeries. Case studies will use basic scientific principles to investigate a wide variety of known or alleged art forgeries.

May be crosslisted with ARTH205.

MSST 215 QUEER SEXUAL IMAGERY IN THE VISUAL ARTS 3

Introduction to the diversities of representation of the human body in western visual art with an emphasis on coded as well as explicit images of queer sexuality.

May be crosslisted with WOMS215.

MSST 403 HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS 3

Introduction to philosophy, purposes, structure, historical development and future of museums, and botanical and zoological gardens. Examines functions of collection, conservation, research, exhibition/interpretation, and social/cultural services; museum field growth.

May be crosslisted with ARTH403, HIST403.

MSST 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.

Crosslisted with HIST408.

MSST 444 TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS 3

Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions.

May be crosslisted with ANTH444, ARTC444.

MSST 445 TECHNOLOGY OF CULTURAL MATERIALS: METALS 3

Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics and functions. Case studies from a wide variety of cultural traditions.

May be crosslisted with ANTH445, ARTC445.

MSST 463 HISTORICAL ARCHAEOLOGY AND THE PUBLIC 3

Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation.

Crosslisted with ANTH463.

MSST 464 MUSEUM STUDIES INTERNSHIP 3

Internship practicum supplementing theoretical and methodological background in administration, collections management, exhibition, research, interpretation, and public programming and services of museums. Students intern at the University museum or other acceptable museum, related institution or organization in the United States.

PREREQ: MSST403.

MSST 480 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3

Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research.

May be crosslisted with ART424, ARTC480, ARTH480.

RESTRICTIONS: Requires permission of instructor.

MSST 485 COLOR MIXING AND MATCHING 3

Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and the manufacture of paint studied. Major topics include color interaction and the Munsell system of color description.

May be crosslisted with ART426, ARTC485.

RESTRICTIONS: Requires permission of instructor.

MSST 488 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3

Major masters and the materials, tools, supports and techniques of architectural painting and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.

May be crosslisted with ART427, ARTC488, ARTH488.

RESTRICTIONS: Requires permission of instructor.

MSST 489 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3

Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to present. Major topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.

May be crosslisted with ART428, ARTC489, ARTH489.

RESTRICTIONS: Requires permission of instructor.

MSST 490 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3

Major masters and materials, tools and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.

May be crosslisted with ART429, ARTC490, ARTH490.

RESTRICTIONS: Requires permission of instructor.

MSST 606 ISSUES IN AMERICAN MATERIAL CULTURE 3

Studies major themes in American material culture of the 17th, 18th or 19th centuries. Topics vary.

Crosslisted with EAMC606.

RESTRICTIONS: Requires permission of instructor.

MSST 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.

Crosslisted with HIST608.

MSST 629 THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING 3

Examines the historic preservation planning process, the theory supporting this process and contemporary practices. Case studies used to demonstrate the integration of theory and practice.

Crosslisted with UAPP629.

MSST 644 TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS 3

Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point

of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions.
May be crosslisted with ANTH644, ARTC644.

MSST 645 TECHNOLOGY OF CULTURAL MATERIALS: METALS 3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics, and functions. Case studies from a wide variety of cultural traditions.
May be crosslisted with ANTH645, ARTC645.

MSST 654 VERNACULAR ARCHITECTURE 3
Study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship.
Crosslisted with HIST654.

MSST 663 HISTORICAL ARCHEOLOGY AND THE PUBLIC 3
Provides practical experience through involvement in a project at an agency, research center or museum which researches, interprets, administers and preserves historical archaeological resources for the public. For students planning careers in historical archaeology, public history, university teaching, the museum field and historic preservation.
Crosslisted with ANTH663.

MSST 680 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3
Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include: the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research.
May be crosslisted with ART682, ARTC680, ARTH680.
RESTRICTIONS: Requires permission of instructor.

MSST 681 MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3
Twentieth-century artists' materials. Topics: acrylic emulsion and acrylic solution alkyd resin, PVA paints: collage-assemblage; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, felt-tip markers, colored inks and pencils: airbrush spray gun; and non-art materials. Potential health hazards. Conservation topics: pH, lightfastness, adhesion and storage environments.
May be crosslisted with ART681, ARTC681, ARTH681.

MSST 685 COLOR MIXING AND MATCHING 3
Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and manufacture of paint studied. Major topics include color interaction, and Munsell system of color description.
May be crosslisted with ART685, ARTC685.
RESTRICTIONS: Requires permission of instructor.

MSST 688 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3
Major masters and materials, tools, supports and techniques of architectural and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.
May be crosslisted with ART688, ARTC688, ARTH688.
RESTRICTIONS: Requires permission of instructor.

MSST 689 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3
Major masters and materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Topics include development of canvas, brushes, oil paint, mediums, varnishes, solvents and complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.
May be crosslisted with ART689, ARTC689, ARTH689.
RESTRICTIONS: Requires permission of instructor.

MSST 690 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3
Major masters and materials, tools, and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.
May be crosslisted with ART 690, ARTC690, ARTH690.
RESTRICTIONS: Requires permission of instructor.

MSST 801 MUSEUM CURATORSHIP: COLLECTIONS MANAGEMENT 3
Collections management theory and practices that focuses on the administration, handling, physical care, recording and study of museum collections. Combines classroom instruction, demonstrations and field trips with "hands on" projects in the University Gallery and other area museums.
RESTRICTIONS: Open to graduate students only.

MSST 803 MUSEUMS AND MODERN TECHNOLOGY 3
Examines the use of digital technology in museums. Topics include communication strategies, digital image processing, collections databases, geographic information systems, CAD, animation, exhibitions, and web design. Students will plan and prepare a web site that deals with a museum-related topic.

MSST 804 MUSEUM INTERNSHIP 3
Internship practice in administration, collections management, exhibition and interpretation at museums and related institutions. Students spend ten full weeks, or the equivalent, at the University museum, Winterthur Museum, Hagley Museum, Longwood Gardens or other acceptable institution.
May be crosslisted with HIST804.
RESTRICTIONS: Open to graduate students only. Requires at least one semester course in museum studies and permission of instructor.

MSST 805 HISTORICAL PROPERTIES 3
Administration and interpretation of historical properties, including historic site surveys, preservation research, building restoration, conservation techniques and the establishment and attainment of interpretive objectives. Field trips to area historic sites. Combines classroom instruction and work projects at area historic sites.
RESTRICTIONS: Open to graduate students only.

MSST 807 MUSEUM CURATORSHIP: TEMPORARY AND ECONOMICAL EXHIBITS 3
Focuses on the planning, designing and fabrication of economical museum exhibits for changing exhibition rooms and alternative spaces. Emphasizes time-, money- and labor-saving techniques. Students design and produce a temporary exhibit in the University Gallery or in a local museum.
RESTRICTIONS: Open to graduate students only.

MSST 808 MUSEUM EDUCATION AND INTERPRETATION 3
The theory, strategies, practices, evaluation and administration of learning in a museum environment with emphasis on interpretation of collections through a variety of instructional means. Lectures, discussions, field trips, program planning, curriculum development, proposal writing, audience studies, practice teaching and special project work with area museums.
RESTRICTIONS: Open to graduate students only.

MUSIC EDUCATION

MUED 166 SPECIAL PROBLEM 1-3

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

MUED 279 ELEMENTARY GENERAL MUSIC METHODS AND MATERIALS 3
Introduction to developing Elementary General Music Methods and Materials and implementing a comprehensive, standards-based elementary general music curriculum through clinical experiences.
PREREQ: MUED179 with a grade of C- or better.
RESTRICTIONS: Restricted to music education majors. Offered in fall semester only.

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

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

MUED 366 INDEPENDENT STUDY 1-3

MUED 378 SECONDARY GENERAL MUSIC METHODS AND MATERIALS 3
Introduction to developing and implementing a project-based curriculum for secondary general music through clinical experiences.
PREREQ: MUED279 and MUSC335 with a grade of C- or better.
COREQ: MUED336, MUSC351, or MUSC352.
RESTRICTIONS: Restricted to music education majors. Offered spring semester only. Students must successfully complete Praxis I Exam and Music Education Sophomore Review prior to enrollment.

MUED 379 MUSIC IN ELEMENTARY AND JUNIOR HIGH (OR MIDDLE) SCHOOL 3
Introduction to music materials and approaches through clinical experiences.
PREREQ: MUED279 and MUSC335 with a grade of C- or better.
COREQ: MUED337, MUSC351 or MUSC352.
RESTRICTIONS: Restricted to music education majors. Offered spring semester only. Students must successfully complete Praxis I Exam and Music Education Sophomore Review prior to enrollment.

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

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

MUED 478 SECONDARY MUSIC MATERIALS AND APPROACHES: CHORAL 3
Methods and materials for teaching choral/vocal music at the secondary level, including practicum placements in the choral music education classroom. Topics include group vocal technique, rehearsal strategy and planning, and organization of the comprehensive choral program.
PREREQ: MUED378 and MUED336 with a grade of C- or better. For Music Education Majors only.
RESTRICTIONS: Offered in Fall Semester only.

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

MUSIC

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

MUSC 101 APPRECIATION OF MUSIC 3
Introduction to Western music literature through a nontechnical presentation of various musical styles and forms.
RESTRICTIONS: Not open to music majors. Offered in fall and spring semesters.

MUSC 102 APPRECIATION OF MUSIC 3
Music literature through a nontechnical presentation of various musical styles and forms. Continuation of MUSC101 with emphasis on the larger forms - symphonies, operas, oratorios, concertos - and the 20th century.
PREREQ: MUSC101 or permission of instructor.

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

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

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

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

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

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

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

MUSC 111 CONCERT CHOIR 0-1
Select ensemble open to all students by permission of professor, as determined by audition. Rehearses and performs exemplary choral repertoire ranging from Renaissance to works by contemporary composers. Additional emphasis given to fostering healthy vocal production and development of sight singing skills.
PREREQ: Audition/permission of instructor.
RESTRICTIONS: May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

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

MUSC 114 SYMPHONIC BAND 0-1
Sixty-five to 70 member ensemble performs standard concert literature as well as new compositions.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 115 WIND ENSEMBLE 0-1
Select 45-member group of woodwind, brass and percussion players that performs original band music, chamber music and transcriptions.
RESTRICTIONS: Requires audition and may be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 116 JAZZ ENSEMBLE 0-1
Study and performance of the diverse styles characteristic of the medium.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 117 UNIVERSITY ORCHESTRA 0-1
Plays at least four public programs per year, drawn from music masterworks in all styles and periods from Baroque to Contemporary. Featured are faculty, professional soloists, conductors and collaborations with other University ensembles.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 118 PERCUSSION ENSEMBLE 0-1
Study and performance of works for percussion instruments.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 120 PEP BAND 0-1
Attends all home basketball games performing a variety of pop, rock and jazz selections. Performs at select games during Winter Session. Attendance at these games is mandatory.
RESTRICTIONS: Requires audition and may be repeated for credit. Offered in spring semester only. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 123 STEEL BAND 0-1
Teaches music and theory through rote learning, reading, and improvisation to

students with no musical training. Students perform in a traditional Caribbean Steel Drum Band.

RESTRICTIONS: Requires audition and may be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 124 STEEL BAND: ADVANCED ENSEMBLE 0-1

Traditional Caribbean Steel Drum ensemble. Students rehearse and perform music of the Caribbean tradition.

PREREQ: MUSC123 or permission of instructor.

RESTRICTIONS: Permission of instructor students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study. May be repeated for credit.

MUSC 125 COLLEGIUM MUSICUM 0-1

Ensemble for the performance of instrumental and vocal music of the Medieval, Renaissance and Early Baroque periods. Size, instrumentation and repertoire for the group varies from semester to semester dependent upon resources at hand, players' skills and other factors.

PREREQ: Audition.

RESTRICTIONS: May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 150 FRESHMAN HONORS PRIVATE STUDY 1

Private study for qualified freshman honors students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: Requires audition.

RESTRICTIONS: Restricted to freshman honors students only. May be repeated for credit. Offered in fall and spring semesters. Must be enrolled in a departmentally approved ensemble.

MUSC 151 PRIVATE STUDY FOR BACHELOR OF MUSIC I 2

Private study for freshmen bachelor of music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: Audition and acceptance into Bachelor of Music program.

COREQ: One of MUSC108, 110, 113, 114, 115, 116, 117, 118, 321.

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

MUSC 152 PRIVATE STUDY FOR BACHELOR OF MUSIC II 2

Continuing private study for freshman bachelor of music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC151 with a grade of C- or better.

COREQ: One of MUSC108, 110, 113, 114, 115, 116, 117, 118, 321.

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

MUSC 153 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS I 2

Private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: Audition and acceptance into bachelor of arts (Music) or music minor.

COREQ: One of MUSC108, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered in fall and spring semesters.

MUSC 154 PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS II 2

Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC153 with a grade of C- or better.

COREQ: One of MUSC108, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered in fall and spring semesters.

MUSC 155 PRIVATE STUDY FOR SECONDARY AND MERIT I 1

Private study for music majors pursuing a secondary area, and qualified students not enrolled in a music degree program. Student adds to course title the branch of study elected: piano, organ, voice, or orchestral instrument. Includes a one-hour studio class. May be repeated for credit.

COREQ: One of MUSC108, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: Requires audition and permission of instructor. Offered in fall and spring semesters.

MUSC 171 DICTION: ENGLISH AND ITALIAN 1

Study of pronunciation rules for singing in English and Italian. Includes practicum.

RESTRICTIONS: Restricted to applied music/voice majors. Offered in fall semester only.

MUSC 174 CLASS VOICE: BEGINNING 1

Fundamentals of singing for nonvocal music major. Study of basic technique, repertoire and function of vocal mechanism.

PREREQ: Requires one semester of University vocal experience.

RESTRICTIONS: Open to instrumental music education majors only. Offered in spring semester only.

MUSC 175 CLASS PIANO: ELEMENTARY I 1

Beginning piano primarily for the vocal or instrumental music major. Basic techniques, reading, transposition and playing by ear.

RESTRICTIONS: Preference for enrollment given to music majors and minors.

Nonmusic majors require permission of instructor. Offered in fall semester only.

MUSC 176 CLASS PIANO: ELEMENTARY II 1

A continuation of MUSC175. Scale and arpeggio playing, keyboard harmony, repertory of pieces appropriate to technical ability.

PREREQ: MUSC175 and MUSC195 with grades of C- or better.

RESTRICTIONS: Preference for enrollment given to music majors and minors.

Nonmusic majors require permission of instructor. Offered in spring semester only.

MUSC 177 CLASS GUITAR I 1

Introduction to the fundamentals of guitar technique and note reading for non-music majors. Topics include guitar history, repertoire, scales and exercises with an emphasis on classical as well as folk music. Music Education majors may also find this course particularly useful for classroom teaching.

RESTRICTIONS: Offered in fall and spring semesters.

MUSC 178 CLASS GUITAR II 1

A continuation of Class Guitar I with a stronger emphasis on ensemble playing and development of a repertoire.

PREREQ: MUSC177 with a grade of C- or better.

RESTRICTIONS: Offered in spring semester only.

MUSC 179 ORGAN CLASS 1

Students learn the basic techniques needed to play the organ. Students apply these skills in a class setting, focusing on introductory organ literature and hymn playing.

RESTRICTIONS: Requires permission of instructor.

MUSC 181 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES 2

Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.

RESTRICTIONS: Requires audition and permission of instructor. Offered in fall and spring semesters.

MUSC 182 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES 2

Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.

PREREQ: MUSC181 with a grade of C- or better.

RESTRICTIONS: Requires permission of instructor. Offered in spring and fall semesters.

MUSC 185 EAR TRAINING AND SIGHT SINGING I 2

Techniques of sight singing and music reading skills. Development of ability in aural recognition of melody, harmony and rhythm.

COREQ: MUSC195.

RESTRICTIONS: Must pass department musicality test. Offered in fall and winter semesters.

MUSC 186 EAR TRAINING AND SIGHT SINGING II 2

Techniques of sight singing and music reading skills. Development of ability in the aural recognition of melody, harmony and rhythm.

PREREQ: MUSC185 and MUSC195 with grades of C- or better.

COREQ: MUSC196.

RESTRICTIONS: Open to music majors and minors. Offered in spring semester only.

MUSC 193 SIGHT READING AT THE KEYBOARD I 1

Techniques for improving coordination and musical comprehension when playing from sight at the keyboard.

RESTRICTIONS: For keyboard majors. Offered in fall and spring semesters.

MUSC 194 SIGHT READING AT THE KEYBOARD II 1

Continuation of MUSC193.

PREREQ: MUSC193 with a grade of C- or better.

RESTRICTIONS: For keyboard majors. Offered in fall and spring semesters.

MUSC 195 HARMONY I 3

Review of music fundamentals. Diatonic harmony including part-writing with keyboard application. Chord structures and functional relationships. Basic melodic and contrapuntal compositional techniques. Writing, playing and analysis.

COREQ: MUSC185.

RESTRICTIONS: Must pass department Musicality Test. Offered in fall and winter semesters.

MUSC 196 HARMONY II 3

Continuation of harmony: diatonic through chromatic harmony with keyboard application. Chord structures and functional relationships. Basic melodic and

contrapuntal compositional techniques. Writing, playing and analysis.

PREREQ: MUSC185 and MUSC195 with grades of C- or better.

COREQ: MUSC186.

RESTRICTIONS: Open only to music majors and minors. Offered in spring semester.

MUSC 197 JAZZ HARMONY 3

Study of elementary aspects of melody, harmony, texture, dynamics, rhythm and form in selected jazz and American popular literature; development of elementary aural-perceptual and compositional skills related to jazz and American popular music.

PREREQ: MUSC105 with a grade of C- or better.

RESTRICTIONS: Offered in odd numbered years, fall semesters only.

MUSC 205 MUSIC OF THE WORLD 3

Survey of non-Western world musical cultures utilizing textbook, reprinted reserve articles, films and in-class performance/demonstrations. Goal is the understanding and appreciation of various world musics.

MUSC 206 MUSIC OF CHINA, KOREA AND JAPAN 3

Systematically examines the origin and historical development of the musical cultures of the Far East. Studies how the musical and cultural influence of Chinese musical culture has had an enormous impact on the development of such cultures in Korea and Japan.

MUSC 207 HISTORY OF JAZZ 3

Chronological study of the style changes in jazz from the late 19th century to the present. Emphasis on the sociological, economic and technological influences of the period and on the principal personalities who have been primarily responsible for change.

May be crosslisted with BAMS207.

RESTRICTIONS: Offered in spring semester only.

MUSC 209 HISTORY OF SPANISH MUSIC 3

Covers the most outstanding traditions of Spanish music, including Arab-influenced Andalusian music, 13th century music, schools of the "Renacimiento", 17th century court music, the "Zarzuela", 19th century Nationalism, and the most modern tendencies of the 20th century.

RESTRICTIONS: Taught abroad only.

MUSC 210 MUSIC OF BRITAIN 3

Chronological study of music of Britain with emphasis on English music from 1485 to present. Explores music for various media (including choral, instrumental, opera) and principal British composers, relating the development of musical styles to events in British history. When taught as part of UD London Semester, will include attendance at variety of London performances.

RESTRICTIONS: Requires permission of instructor.

MUSC 211 INTRODUCTION TO MUSIC HISTORY 3

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

PREREQ: MUSC195 with a grade of C- or better.

RESTRICTIONS: Offered in fall semester only.

MUSC 212 HISTORY OF LITURGY AND HYMNS 3

Study of the evolution, structure and content of historical liturgies and of the hymnody which developed within them. Includes examination of Jewish and Eastern elements while focusing on the texts and music of the services and hymns of various traditions within the Western Church.

MUSC 213 FRENCH MUSICAL CULTURE 3

Explores the contributions of French culture to the history of Western Music. Special focus on major trends in music written and performed in Paris from the Middle Ages through the 20th century, and on the musical institutions that made Paris a world capital of music.

RESTRICTIONS: Taught abroad only.

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

Development of performing and teaching skills.

RESTRICTIONS: Open only to music education and theory/composition majors. Offered in fall semester.

MUSC 215 HIGH BRASS INSTRUMENTS CLASS 1

Development of performing and teaching skills.

RESTRICTIONS: MUSC215 and MUSC216 to be taken consecutively in one academic year. Open only to sophomore music education and theory/composition majors. Offered fall semester only.

MUSC 216 LOW BRASS INSTRUMENTS CLASS 1

Development of performing and teaching skills.

PREREQ: MUSC215 with a grade of C- or better.

RESTRICTIONS: MUSC215 and MUSC216 to be taken consecutively in one academic year. Open only to sophomore music education and theory/composition majors. Offered in spring semester.

MUSC 217 WOODWIND INSTRUMENTS CLASS I 1

Development of performing and teaching skills.

RESTRICTIONS: MUSC217 and MUSC218 to be taken consecutively in one academic year. Open only to freshmen music education and theory/composition majors. Offered fall semester.

MUSC 218 WOODWIND INSTRUMENTS CLASS II 1

Development of performing and teaching skills.

PREREQ: MUSC217 with a grade of C- or better.

RESTRICTIONS: MUSC217 and MUSC218 to be taken consecutively in one academic year. Open only to freshmen music education and theory/composition majors. Offered in spring semester.

MUSC 219 PERCUSSION INSTRUMENTS 1

Development of performing and teaching skills.

RESTRICTIONS: Open only to music education and theory/composition majors. Offered spring semester.

MUSC 220 MARCHING BAND TECHNIQUES 1

Focuses on designing and charting a show of the complete contemporary marchingband. Overview of history and development of the marching band, as well as "hands-on" sessions in marching percussion and color guard.

PREREQ: MUSC113 with a grade of C- or better.

RESTRICTIONS: Offered spring semester only.

MUSC 221 MARCHING PERCUSSION TECHNIQUES 1

Focuses on advancing skills on the marching snare drum, multi-tenors, bass drum, cymbals or front ensemble. Emphasizes techniques through an opportunity to learn basic arranging skills. Open to students of all skill levels.

RESTRICTIONS: Offered spring semester only. May be repeated for credit.

MUSC 241 ACCOMPANYING CHAMBER MUSIC: PIANO 1

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

PREREQ: Sight-Reading Placement Test. RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters. May be taken 4 times for credit.

MUSC 251 PRIVATE STUDY FOR BACHELOR OF MUSIC III 2

Continuing private study for sophomore bachelor of music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC152 with a grade of C- or better.

COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

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

MUSC 252 PRIVATE STUDY FOR BACHELOR OF MUSIC IV 2

Continuing private study for sophomore bachelor of music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. In lieu of a jury, the student performs a Sophomore Review which must be passed in order to continue on to junior-level private study (see student handbook for details).

PREREQ: MUSC251 with a grade of C- or better.

COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

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

MUSC 253 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS III 2

Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC154 with a grade of C- or better.

COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered fall and spring semesters.

MUSC 254 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS IV 2

Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC253 with a grade of C- or better.

COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered fall and spring semesters only.

MUSC 271 DICTION: GERMAN 1

A study of pronunciation rules for singing in German. Includes practicum.

PREREQ: MUSC171 with a grade of C- or better.

COREQ: Enrollment in applied study.

RESTRICTIONS: Offered fall semester only.

MUSC 272 DICTION: FRENCH 1

A study of pronunciation rules for singing in French. Includes practicum.

PREREQ: MUSC171 with a grade of C- or better.

COREQ: Enrollment in applied study.

RESTRICTIONS: Offered spring semester only.

MUSC 275 CLASS PIANO: INTERMEDIATE I 1

Piano techniques applicable to the levels and needs of the students; a

continuation of reading and transposition; and improvisation and repertory of grade two pieces.

PREREQ: MUSC176 and MUSC196 with grades of C- or better.

RESTRICTIONS: Restricted to music majors and minors, or by permission of instructor. Offered fall semester only.

MUSC 276 CLASS PIANO: INTERMEDIATE II 1
A continuation of MUSC275.

PREREQ: MUSC275 with a grade of C- or better.

RESTRICTIONS: Restricted to music majors and minors, or by permission of instructor. Offered spring semester only.

MUSC 279 INTRODUCTION TO THE ORGAN 2
Designed to provide information about the organ: its history, use and literature as well as tonal and mechanical aspects of its design.

MUSC 281 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES I 2
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.

PREREQ: MUSC181 with a grade of C- or better.

RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters.

MUSC 282 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES II 2
Private studio instruction covering improvisational techniques and interpretations used in jazz performance. Examines a cross-section of styles and repertoire.

PREREQ: MUSC281 with a grade of C- or better.

RESTRICTIONS: Requires audition. Offered fall and spring semesters.

MUSC 283 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES III 2
Private studio instruction covering improvisational techniques and interpretations used in jazz performance. Examines a cross-section of styles and repertoire.

PREREQ: MUSC282 with a grade of C- or better.

RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters.

MUSC 285 ADVANCED EAR TRAINING AND SIGHT SINGING I 2
Continuation of MUSC185 and MUSC186.

PREREQ: MUSC186 and MUSC196 with grades of C- or better.

COREQ: MUSC295.

RESTRICTIONS: Open to music majors and minors, or by permission of instructor. Offered fall semester only.

MUSC 286 ADVANCED EAR TRAINING AND SIGHT SINGING II 2
Continuation of MUSC185, MUSC186 and MUSC285.

PREREQ: MUSC285 and MUSC295 with grades of C- or better.

COREQ: MUSC296.

RESTRICTIONS: Open to music majors and minors, or by permission of instructor. Offered spring semester only.

MUSC 287 MUSIC TECHNOLOGY I 3
Overview and experience with commercially-available music-related hardware and software. Hardware includes IBM and Macintosh microcomputers, electronic keyboards and tone generators incorporating Musical Instrument Digital Interface (MIDI), digital recording systems, CD-ROM and videodisc. Software includes sequencers, notation packages, interactive composers, educational programs and hypermedia applications.

PREREQ: MUSC105 or MUSC195 with a grade of C- or better.

RESTRICTIONS: Offered fall and spring semesters.

MUSC 291 PRACTICUM IN CHURCH MUSIC 1
Introduces a variety of skills, techniques and information needed in the practice of church music. Students will learn to apply these skills through in-class experience with various instruments and resources.

MUSC 292 ORGAN IMPROVISATION AND SERVICE PLAYING 2
Students learn and apply skills used in improvising at the organ and playing for church services. Basic conducting component included.

RESTRICTIONS: Offered spring semester only.

MUSC 295 ADVANCED HARMONY I 3
Review of chromatic harmony. Study, writing and analysis of 18th century counterpoint. Introduction to instrumentation. Introduction to form and analysis. Eighteenth and nineteenth century harmony, techniques and styles. Original compositions.

PREREQ: MUSC186 and MUSC196 with grades of C- or better.

COREQ: MUSC286.

RESTRICTIONS: Open to music majors and minors, or by permission of instructor. Offered fall semester only.

MUSC 296 ADVANCED HARMONY II 3
Continuation of MUSC295. Study of late 19th and 20th century harmony, techniques and styles. Continuation of instrumentation. Original compositions.

PREREQ: MUSC285 and MUSC295 with grades of C- or better.

COREQ: MUSC286.

RESTRICTIONS: Open to music majors and minors, or by permission of instructor. Offered spring semester only.

MUSC 298 BEGINNING MUSIC COMPOSITION 1
Private study in beginning composition. Creative writing in vocal and instrumental media.

RESTRICTIONS: Restricted to theory/composition majors. May be repeated for up to 4 credits. Offered fall and spring semesters.

MUSC 301 JUNIOR RECITAL 0 PF
A 30-minute public recital.

COREQ: MUSC351, 352, 357, 358, 451.

RESTRICTIONS: Offered fall and spring semesters.

MUSC 302 WOMEN IN MUSIC: AN ALTERNATE SURVEY 3
Survey of women's contributions to Western art music traditions from 12th century to present day through the study of women as composers, performers, patrons, and as the subject of musical expression. Explores cultural systems that have alternately encouraged and suppressed women's creativity.

May be crosslisted with WOMS302.

MUSC 309 PATTERNS OF PATRONAGE 3
Examines the creation, performance and transmission of music within broader context of the economic, political, social and technological environment.

Emphasizes interdependency of musical activity and its patrons, including traditional functions of state, church, civic, mercantile, private; also contemporary interaction with public, private, and third sectors.

RESTRICTIONS: Open to juniors and seniors. Offered spring semester only.

MUSC 310 CHURCHES AND CATHEDRALS OF LONDON 3
A study of ecclesiastical architecture of the 12th-20th centuries, noting structure, architectural style & historical role, as well as the way in which music, liturgy and the visual arts unfold within each building.

RESTRICTIONS: Taught in London only.

MUSC 311 MUSIC HISTORY: 400 - 1600 3
The history of musical style and theory in the Middle Ages (5th through 14th centuries) and the Renaissance (15th and 16th centuries).

PREREQ: MUSC211 with a grade of C- or better or permission of instructor.

RESTRICTIONS: Offered spring semester only.

MUSC 312 MUSIC HISTORY: 1600 - 1827 3
The history of musical style and theory during the Baroque period (1600-1750), and the Classic period through the death of Beethoven (1827).

PREREQ: MUSC211 with a grade of C- or better or permission of instructor.

RESTRICTIONS: Offered fall semester only.

MUSC 313 MUSIC HISTORY: 1827 - PRESENT 3
The Romantic era, Impressionism and the 20th century. Musical thought and style from 1827 to the present.

PREREQ: MUSC211 with a grade of C- or better or permission of instructor.

RESTRICTIONS: Offered spring semester only.

MUSC 321 ENSEMBLE: INSTRUMENTAL, PIANO, OR VOCAL 0-1
Performance of chamber literature for instrument, piano or voice.

RESTRICTIONS: May be repeated for credit. Offered fall and spring semesters.

Students may sign up for 0-credit only if they have reached the 17-credit limit.

Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 328 CHORAL LITERATURE 2
Study of style, structure and interpretations of representative choral works, including large and small forms composed since 1500.

PREREQ: MUSC211 with a grade of C- or better.

RESTRICTIONS: Offered fall semester only.

MUSC 335 BASIC CONDUCTING 2
The principles of conducting and score reading.

PREREQ: MUSC286 and MUSC296 with grades of C- or better.

RESTRICTIONS: Offered fall semester only.

MUSC 339 VIENNESE COMPOSERS 3
Selected Viennese composers including Mozart, Beethoven, Schubert and the Strausses. Emphasis on Viennese music. A combination of music history and music appreciation.

RESTRICTIONS: Taught in Semester in Vienna program only.

MUSC 345 HISTORY OF THEATRE: AMERICAN MUSICAL THEATRE 3
Musical-dramatic forms of the 18th, 19th and 20th centuries in the United States and their impact on the modern musical theatre. Complete works read and compared to a series of criteria that are found in successful modern shows.

Comparison of older and current works.

May be crosslisted with THEA345.

RESTRICTIONS: Offered fall semester only.

MUSC 351 PRIVATE STUDY FOR MUSIC EDUCATION V 2
Continuing private study for junior music education majors. The student adds to

the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC252 with a grade of C- or better.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For music education majors only. Offered fall and spring semesters.

MUSC 352 PRIVATE STUDY FOR MUSIC EDUCATION VI 2

Continuing private study for junior music education majors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC351 with a grade of C- or better.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For music education majors only. Offered fall and spring semesters.

MUSC 353 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS V 2

Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC254 with a grade of C- or better or permission of instructor.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For bachelor of arts (music) students and music minors only. Does not count for bachelor of arts degree credit. Offered fall and spring semesters.

MUSC 354 PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS VI 2

Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC353 with a grade of C- or better or permission of instructor.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For bachelor of arts (music) students and music minors only. Does not count for bachelor of arts credit. Offered in fall and spring semesters.

MUSC 357 PRIVATE STUDY FOR APPLIED MUSIC V 3

Continuing private study for junior applied music majors, including preparation for Junior Recital. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC252 with a grade of C- or better.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 358 PRIVATE STUDY FOR APPLIED MUSIC VI 3

Continuing private study for junior applied music majors, including preparation for Junior Recital. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC357 with a grade of C- or better.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 363 KEYBOARD LITERATURE 3

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

PREREQ: MUSC252 or MUSC254 with a grade of C- or better.

MUSC 366 INDEPENDENT STUDY 1-3

MUSC 389 ELEMENTS OF MUSIC MANAGEMENT 3

Introduces principles involved in planning and management for performing arts organizations. Includes basic concepts of project development and implementation, production issues for public performances, communication skills and marketing techniques, utilization of new technologies, and aspects of resource planning and advocacy.

RESTRICTIONS: Open to juniors and seniors.

MUSC 390 HONORS COLLOQUIUM 3

MUSC 392 CONTRAPUNTAL WRITING 2

Contrapuntal techniques with emphasis on 16th- and 18th-century styles and forms.

PREREQ: MUSC295 with a grade of C- or better.

RESTRICTIONS: Offered in odd numbered years, spring semesters only.

MUSC 393 KEYBOARD HARMONY 2

Practical course for the development of facility in applying knowledge of harmony to the keyboard. Emphasis on figured basis, score reading and improvisation.

PREREQ: MUSC276 and MUSC296 with grades of C- or better.

RESTRICTIONS: Offered in even numbered years, spring semesters only.

MUSC 395 FORM ANALYSIS 3

Structure of homophonic and polyphonic music representing different periods of musical history.

PREREQ: MUSC296 with a grade of C- or better.

RESTRICTIONS: Offered in even numbered years, spring semesters only.

MUSC 400 INTERNSHIP IN CHURCH MUSIC 1-3

Capstone for Church Music minor providing students with opportunities to gain

skills and knowledge through practical application while working under the supervision of professional musicians.

PREREQ: MUSC179, MUSC212, MUSC291 and MUSC292 with grades of C- or better.

RESTRICTIONS: Requires permission of instructor.

MUSC 401 SENIOR RECITAL 0 PF

A 60-minute public recital.

COREQ: MUSC457 or MUSC458.

RESTRICTIONS: Requires senior status. Offered in fall and spring semesters.

MUSC 403 CHAMBER MUSIC LITERATURE 3

Survey of chamber music literature from the 17th century to the present.

PREREQ: MUSC312 with a grade of C- or better.

RESTRICTIONS: Requires permission of instructor. Offered in even numbered years, in spring semesters only.

MUSC 405 SYMPHONIC LITERATURE 3

Historical and structural analysis of major symphonic works from the 18th century to the present.

PREREQ: MUSC312 with a grade of C- or better.

RESTRICTIONS: Requires permission of instructor. Offered in odd numbered years, in spring semesters only.

MUSC 407 CONTEMPORARY MUSIC LITERATURE 3

Analysis of styles and techniques of contemporary composers beginning with compositions of the late 1950s.

PREREQ: MUSC313 with a grade of C- or better, or permission of instructor

RESTRICTIONS: Offered in fall semester only.

MUSC 419 MUSIC THEORY RESEARCH 3

Designed to prepare the music theory major for MUSC 421. The student learns how to do research in music theory, does a survey of the literature appropriate to his/her area of interest, and focuses on the thesis to be written while taking MUSC 421.

RESTRICTIONS: Permission of instructor.

MUSC 420 PRIVATE STUDY FOR ADVANCED COMPOSITION 3

Creative writing in vocal and instrumental media.

PREREQ: MUSC298 with a grade of C- or better.

RESTRICTIONS: May be repeated for up to six credit hours. Offered in fall and spring semesters.

MUSC 421 SPECIAL PROJECTS IN MUSIC THEORY 3

Theory majors do research and study under guidance of a faculty advisor on an approved topic for a formal paper to be presented at a public lecture.

PREREQ: MUSC415 with a grade of C- or better.

RESTRICTIONS: Offered in fall and spring semesters.

MUSC 424 MARCHING BAND LEADERSHIP STAFF 0-1

Marching band members apply/audition for leadership roles. (Auditions each spring semester.) During fall semester, topics include challenges in peer-to-peer teaching, time management, leadership hierarchy, and developing positive leadership skills. Practical field experience is gained as students engaged in peer-to-peer teaching during marching band rehearsals and events resulting in direct application of lecture materials. Offered in fall semester.

PREREQ: 1 semester of MUSC113 and audition in preceding spring.

COREQ: MUSC113.

MUSC 426 GERMAN LIEDER 2

Literature survey of the standard vocal repertoire of the German tradition. Includes examples of the works of such composers as Schubert, Brahms, Schumann, Wolf and Strauss.

RESTRICTIONS: MUSC211 with a grade of C- or better. Offered every third spring semester, in rotation with MUSC427 and MUSC428.

MUSC 427 FRENCH ART SONG 2

A literature survey of the standard vocal repertoire of the French tradition. Includes examples of the works of such composers as Faure, Debussy, Duparc and Poulenc.

PREREQ: MUSC211 with a grade of C- or better.

RESTRICTIONS: Offered every third spring semester, in rotation with MUSC426 and MUSC428.

MUSC 428 TWENTIETH-CENTURY ART SONG 2

A literature survey of the standard vocal repertoire of the 20th Century. Includes examples of the works of such composers as Barber, Britten, Schonberg, Ives, Vaughan Williams and Rorem.

PREREQ: MUSC211 with a grade of C- or better.

RESTRICTIONS: Offered every third spring semester, in rotation with MUSC426 and MUSC427.

MUSC 431 ORCHESTRATION 2

Advanced orchestral and band arranging; review of instrumental ranges and colors; scoring for small ensembles; special problems in scoring accompaniments. Final arrangement performed by a University Ensemble.

PREREQ: MUSC296 with a grade of C- or better.

RESTRICTIONS: Enrollment by permission of instructor. Offered in spring semester only.

MUSC 441 ACCOMPANYING CHAMBER MUSIC: PIANO 1

Accompanying vocalists and instrumentalists and experiences with piano, chamber and large ensembles, and degree recitals.

PREREQ: MUSC241

RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters. May be repeated 1 time for credit.

MUSC 451 PRIVATE STUDY FOR MUSIC EDUCATION VII 2

Continuing private study for senior music education majors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC352 with a grade of C- or better.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For music education majors only. Offered fall and spring semesters.

MUSC 452 PRIVATE STUDY FOR MUSIC EDUCATION VIII 2

Optional continuing private study for senior music education majors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC451 with a grade of C- or better.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For music education majors only. Offered fall and spring semesters.

MUSC 453 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS VII 2

Continuing private study for bachelor of arts (music) students and music minors.

The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC354, with a grade of C- or better, or permission of instructor.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For bachelor of arts (music) students and music minors only. Does not count for bachelor of arts degree credit. Offered fall and spring semesters.

MUSC 454 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS VIII 2

Continuing private study for bachelor of arts (music) students and music minors.

The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC353 with a grade of C- or better, or permission of instructor.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For bachelor of arts (music) students and music minors only. Does not count for bachelor of arts degree credit. Offered fall and spring semesters.

MUSC 457 PRIVATE STUDY FOR APPLIED MUSIC VII 4

Continuing private study for senior applied music majors, including preparation for Senior Recital. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC358 with a grade of C- or better.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 458 PRIVATE STUDY FOR APPLIED MUSIC VIII 4

Continuing private study for senior applied music majors, including preparation for Senior Recital. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC457 with a grade of C- or better.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 464 INTERNSHIP 1-3

Field experience with nonprofit performing arts organizations or commercial music businesses relevant to the student's area of interest.

RESTRICTIONS: Open to music management studies majors and minors only. Offered in fall and spring semesters.

MUSC 466 INDEPENDENT STUDY 1-3

MUSC 480 VOCAL PEDAGOGY 3

Designed for those who plan to work with the singing voice. Includes vocal research, comparative pedagogy, observation of teaching and practical teaching experience.

RESTRICTIONS: Offered fall semester only.

MUSC 481 PEDAGOGY AND LITERATURE 3

The study of teaching methods and literature (music scores, books, and other media). Shows teaching skills needed at the secondary level and lower.

RESTRICTIONS: Requires permission of instructor.

MUSC 484 RECORDING TECHNIQUES 3

Covers three parameters: history of recording and recording technology; recording techniques with hands-on experiences; and aesthetics of recording and its impact on music through the 20th and 21st centuries.

PREREQ: MUSC105 or MUSC195.

RESTRICTIONS: Enrollment by permission of instructor.

MUSC 488 PRINCIPLES OF MUSIC INDUSTRY PRACTICE 3

Offers an understanding of the fundamental workings of the music industry. Examines theory/practice of core principles, focusing on provisions of copyright law, standard agreements, and professional organization influences. Emphasis on framework for interaction among writers, artists, performers, publishers, record companies, producers.

MUSC 489 OPERA WORKSHOP 0-3

Dramatic and musical preparation of operatic roles through the production of a complete opera/opera/operetta.

RESTRICTIONS: Admission by audition, with permission of private instructor, and preference given to vocal performance majors. Offered fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit.

Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 561 NON-DEGREE PRIVATE STUDY 1-2

Continuing private study for all music majors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.

PREREQ: MUSC452, MUSC454, or MUSC458, and permission of instructor.

COREQ: MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.

RESTRICTIONS: Music education and applied music majors only. May be repeated for credit.

MUSC 600 MASTER'S PERFORMANCE IN CONDUCTING 2 PF

Reflects the culmination of student performances as a conductor with one or more large ensembles in the Department of Music.

PREREQ: MUSC662.

RESTRICTIONS: For students in the Master of Music degree, Performance Concentration (Conducting).

MUSC 601 MASTER'S RECITAL 2 PF

A sixty-minute public recital.

COREQ: MUSC663.

MUSC 602 ADVANCED KEYBOARD LITERATURE 3

An historical survey of selected keyboard works from various style periods, including structural analysis and performance implications.

RESTRICTIONS: Requires permission of instructor.

MUSC 603 CHAMBER MUSIC LITERATURE 3

Survey of chamber music literature from the 17th century to the present.

RESTRICTIONS: Requires permission of instructor. Offered in even numbered years, in spring semester only.

MUSC 604 STRING QUARTET LITERATURE 3

A survey of music for the string quartet from Haydn through the present day.

RESTRICTIONS: Requires permission of instructor.

MUSC 605 SYMPHONIC LITERATURE 3

Historical and structural analysis of major symphonic works from the 18th century to the present.

RESTRICTIONS: Requires permission of instructor. Offered in odd numbered years, in spring semester only.

MUSC 606 WIND LITERATURE 3

History of the wind band and its music from the Renaissance to the present, with emphasis on the wind music from the 19th and 20th centuries for wind ensemble and concert band. Examines wind literature suitable for secondary school and college-level performing groups.

RESTRICTIONS: Requires permission of instructor.

MUSC 607 CONTEMPORARY MUSIC LITERATURE 3

Analysis of styles and techniques of contemporary composers beginning with compositions of the late 1950s.

RESTRICTIONS: Requires permission of instructor. Offered in fall semester only.

MUSC 608 VOCAL MUSIC LITERATURE 3

A survey of important literature for solo voice. Area of emphasis varies by year and includes German Lieder, French Art Song, and twentieth-century Art Song.

RESTRICTIONS: Requires permission of instructor. May be repeated when topics vary.

MUSC 609 CHORAL MUSIC LITERATURE I 3

Study of style, structure and interpretations of representative choral works, including large and small forms composed since 1450. Particular emphasis on current research as related to the use of primary source material as applied to the modern edition.

RESTRICTIONS: Requires permission of instructor.

MUSC 610 CHORAL MUSIC LITERATURE II 3

Survey of the development of major choral genres (e.g. mass, motet, requiem) from 1500 to the present. The evolution of musical style and structure is examined through analysis and discussion regarding performance practice.

RESTRICTIONS: Requires permission of instructor.

MUSC 611 STUDIES IN MUSIC HISTORY	3
A survey of representative compositions from various periods of music history. Includes a study of the relationship of music to the socio-cultural background of each epoch and discussions of performance practice problems. Topics of study may change with each time of offering. RESTRICTIONS: Offered in spring semester only.	
MUSC 620 LARGE ENSEMBLE	1
Participation as a performer in a large ensemble. RESTRICTIONS: Entry audition required.	
MUSC 621 CHAMBER ENSEMBLE	1
Participation as a performer in a chamber ensemble. RESTRICTIONS: Entry audition required.	
MUSC 622 MATERIALS AND METHODS OF RESEARCH	3
Examines the major materials used in research in the areas of music history, theory, performance and education, as well as the methods of conducting research in these fields. RESTRICTIONS: Requires permission of instructor. Offered in fall semester only.	
MUSC 624 MARCHING BAND LEADERSHIP STAFF	0-1
Marching band members apply/audition for leadership roles. (Auditions each spring semester.) During fall semester, topics include challenges in peer-to-peer teaching, time management, leadership hierarchy, and developing positive leadership skills. Practical field experience is gained as students engaged in peer-to-peer teaching during marching band rehearsals and events resulting in direct application of lecture materials. RESTRICTIONS: Requires permission of instructor. Offered in fall semester.	
MUSC 631 ADVANCED ARRANGING	3
Advanced arranging for chamber, choral and orchestral ensembles, concert band and marching band percussion section. PREREQ: MUSC296. RESTRICTIONS: Enrollment by permission of instructor.	
MUSC 637 ADVANCED INSTRUMENTAL CONDUCTING	3
Advanced conducting techniques for directors of instrumental performing groups. RESTRICTIONS: Requires permission of instructor.	
MUSC 638 LARGE ENSEMBLE PRACTICUM	1
Participation in a large ensemble and seminar with ensemble director. RESTRICTIONS: Requires permission of instructor.	
MUSC 640 HISTORY AND PHILOSOPHY OF MUSIC EDUCATION	3
Topics include philosophical issues concerning the role of arts in education, intrinsic and extrinsic rationales for music in the schools, and arts advocacy at the local, state, and national levels. Also includes the history and philosophy of music education in the United States from the colonial period to the present. RESTRICTIONS: Requires permission of instructor.	
MUSC 661 ADVANCED PRIVATE STUDY	2-4
Advanced instruction in voice, instrument, composition or conducting. The student adds to course title the branch of study elected: piano, organ, voice or an orchestral instrument, conducting, or composition e.g., Advanced Private Study (Piano). RESTRICTIONS: Requires audition.	
MUSC 662 ADVANCED PRIVATE STUDY	2-4
Advanced instruction in voice, instrument, composition or conducting. The student adds to course title the branch of study elected: piano, organ, voice, orchestral instrument, composition or conducting e.g., Advanced Private Study (Piano). PREREQ: MUSC661. RESTRICTIONS: Requires permission of instructor.	
MUSC 663 ADVANCED PRIVATE STUDY	2
Advanced instruction in voice, instrument, composition or conducting. The student adds to course title the branch of study elected: piano, organ, voice, orchestral instrument, composition, or conducting e.g., Advanced Private Study (Piano). PREREQ: MUSC662. RESTRICTIONS: Requires permission of instructor.	
MUSC 664 ADVANCED PRIVATE STUDY	2
Advanced instruction in voice, instrument, composition or conducting. Student adds to course title the branch of study elected: piano, organ, voice, orchestral instrument, composition, or conducting e.g., Advanced Private Study (Piano). PREREQ: MUSC663. RESTRICTIONS: Requires permission of instructor.	
MUSC 676 SEMINAR IN MUSIC EDUCATION	3
Advanced topics in music education. RESTRICTIONS: Requires permission of instructor.	
MUSC 679 PROFESSIONAL IMPROVEMENT PROJECT I	3
Development of a portfolio to include unit plans based on synthesis of content from prior courses.	

RESTRICTIONS: Requires permission of instructor. Taken in sequence with MUSC680 as an alternative to thesis option.

MUSC 680 PROFESSIONAL IMPROVEMENT PROJECT II **3**
Implementation of the portfolio developed in MUSC679.
PREREQ: MUSC679.

RESTRICTIONS: Taken in sequence with MUSC679 as an alternative to thesis option.

MUSC 681 PEDAGOGY AND LITERATURE **3**
The study of teaching methods and literature (music scores, books and other media). Shows teaching skills needed at the university level and lower.

MUSC 684 ADVANCED RECORDING TECHNIQUES **3**
Covers advanced aspects of the following parameters: history of recording and recording technology; recording techniques with hands-on experiences; and aesthetics of recording and its impact on music through the 20th and 21st centuries.
PREREQ: MUSC095 or MUSC105.
RESTRICTIONS: Enrollment by permission of instructor.

MUSC 688 ADVANCED PRINCIPLES OF MUSIC INDUSTRY PRACTICE **3**
Offers an advanced understanding of the fundamental workings of the music industry. Emphasis on the advanced aspects of the theory/practice of core principles, with a focus on provisions of copyright law, standard agreements, professional organization influences, and the framework for interaction among writers, artists, performers, publishers, record companies, and producers.
RESTRICTIONS: Enrollment is by permission of instructor.

MUSC 695 ADVANCED ANALYTICAL TECHNIQUES **3**
Examination of structural, melodic, rhythmic, harmonic and textural aspects of selected music literature and their significance in artistic performance.
RESTRICTIONS: Requires satisfactory score on music theory graduate placement exam. Offered in fall semester only.

MUSC 697 ADVANCED JAZZ HARMONY **3**
Study of advanced aspects of melody, harmony, texture, dynamics, rhythm and form in selected jazz and American popular literature; development of advanced aural-perceptual and compositional skills related to jazz and American popular music.
RESTRICTIONS: Enrollment by permission of instructor.

MUSC 866 SPECIAL PROBLEM **1-3**

MUSC 869 MASTER'S THESIS **1-6**

NUTRITION AND DIETETICS

NTDT 103 INTRODUCTION TO NUTRITION PROFESSIONS	1 PF
Career opportunities in dietetics and nutrition. Provides information about undergraduate programs and the competencies required of dietitians and nutritional scientists. Introduces opportunities for undergraduate research. Introduction to concepts of a profession and relevant professional organizations. RESTRICTIONS: Open to freshmen and sophomores.	
NTDT 166 SPECIAL PROBLEM	1-12 PF
NTDT 168 FRESHMAN SPECIAL TOPICS	1-6
Freshman level independent study.	
NTDT 200 NUTRITION CONCEPTS	3
Functions and sources of nutrients, dietary adequacy, energy balance and metabolism with emphasis on health promotion. Includes weight control, evaluation of popular diets, vegetarianism, eating disorders, alcohol, other current issues and concerns in nutrition.	
NTDT 201 FOOD CONCEPTS	3
Food selection and preparation as related to chemical and physical properties of food. Includes composition and structure of foods, functions of ingredients and methods to achieve desirable sensory and nutritional attributes of foods. RESTRICTIONS: Open to APN, DIET, and NS majors and minors only.	
NTDT 222 NUTRITION CONTROVERSIES	1
Explores topical issues in nutrition via discussion format. COREQ: NTDT200.	
NTDT 250 INTRODUCTION TO THE NUTRITION CARE PROCESS	3
Introduction to skills and competencies of the clinical dietitian based on Nutrition Care Process (assessment, diagnosis, intervention, monitoring, and evaluation). Evidence-based practice promoted with emphasis on state-of-the-science and state-of-the-art of dietetics practice. PREREQ: NTDT200. RESTRICTIONS: Not available for credit to those who have taken NTDT450. Open only to APN, DIET and NS majors.	
NTDT 255 MULTICULTURAL FOOD HABITS	3
Food habits of diverse cultural groups. Determinants of traditional and current	

food habits, historical and cultural context. Emphasis on ethnic population groups in the United States. Contribution of selected dietary patterns to knowledge of health and disease prevention. Impact of migration to different cultural settings.

NTDT 266 SPECIAL PROBLEM 1-3 PF

NTDT 268 SOPHOMORE SPECIAL TOPICS 1-6
Sophomore level independent study.

NTDT 301 CULTURAL PERSPECTIVES ON FOOD AND NUTRITION 3
Examination of the cultural context from which ethnic foods and food habits emerge and evolve; social, religious, geographic and economic influences on ethnic dietary practices of culturally distinct groups; United States immigration patterns, cultural adaptations and nutrition-related health problems for selected groups.

NTDT 305 NUTRITION IN THE LIFESPAN 3
Nutrition and health during the different stages of life: pregnancy, lactation, infancy, preschool years, middle childhood, adolescence, adulthood and later maturity.
PREREQ: NTDT200 and a course in biology.

NTDT 310 NUTRITION AND ACTIVITY 3
Energy and nutrient needs for activity with emphasis on particular physical and athletic activities; common myths and fallacies concerning diet and athletic performance; and appropriate dietary approaches for specific activities and active people.
PREREQ: NTDT200 and a physiology course.

NTDT 321 QUANTITY FOOD PRODUCTION AND SERVICE 3
Principles of quantity food production and delivery systems; menu planning and purchasing design; safety, sanitation and technical operations in a food service system.
PREREQ: NTDT200 and NTDT201.

NTDT 322 MANAGEMENT OF FOOD AND NUTRITION SERVICES 3
Organization and administration of not-for-profit and entrepreneurial services. Functions and responsibilities related to these products including planning, marketing, total quality and human resource management, and food and labor cost accounting.
PREREQ: NTDT200 and NTDT201.

NTDT 326 ONSITE FOOD PRODUCTION 3
Laboratory experience in quantity food production and delivery with emphasis on equipment, production methods, quality standards and controls and environmental issues. Development of food production design considering material flow, functional areas and utility requirements. Food safety certification.
COREQ: NTDT321.

NTDT 328 FOOD SERVICE FACILITY DESIGN 1
Development of quantity food production kitchen design. Considerations include material flow, equipment requirements, functional areas, safety and sanitation, and energy and water resources.
PREREQ: NTDT325.
COREQ: NTDT321.

NTDT 330 NUTRITION COUNSELING 3
Theories, skills and techniques of nutrition interviewing and counseling applied to changing food behaviors.
PREREQ: NTDT200, NTDT250.

NTDT 350 NUTRITION AND OLDER ADULTS 3
Discussion of the physiology of aging on fundamental nutrition processes, food and nutrient requirements and intakes, assessment of nutritional status, and nutrition related problems of older adults.
PREREQ: NTDT200, and BISC106 or BISC276.

NTDT 366 INDEPENDENT STUDY 1-6 PF

NTDT 368 JUNIOR SPECIAL TOPICS 1-6
Junior level independent study.

NTDT 400 MACRONUTRIENTS 3
Metabolism of carbohydrates, proteins and fats in human nutrition, interdependence and relation to energy metabolism/balance, scientific bases of macronutrient requirement during the life cycle.
PREREQ: NTDT200, CHEM214 and CHEM216.

NTDT 401 MICRONUTRIENTS 3
Mechanisms and interactions of vitamins and minerals in cellular metabolism, scientific bases of nutrient requirements during the life cycle.
PREREQ: NTDT400.

NTDT 403 DIETETICS SEMINAR 1 PF
Provides direction for career decisions, including self-assessment, resume development, and interview preparation. Focuses on the post-baccalaureate career pathways of employment, graduate study, and the supervised practice experience. Explores registration, specialty certification and licensure for dietitians.
RESTRICTIONS: Open only to senior dietetics majors.

NTDT 410 OVERWEIGHT/OBESITY PREVENTION AND MANAGEMENT 3
Pathophysiology and therapies for overweight/obesity. Tools to assess and manage weight. Examination of diet/exercise, pharmacotherapy and surgery as treatment options. Treatment and prevention resources for client education. Review of popular weight loss regimens. Related legislative and policy issues.
PREREQ: NTDT200.

NTDT 420 MATERNAL AND INFANT NUTRITION 3
Maternal physiological adjustments in pregnancy and their relationship to nutritional needs; effect of maternal nutrition on fetal growth and development; physiology of lactation and maternal nutrient needs; and neonatal nutritional needs and current infant feeding practices.
PREREQ: NTDT400 and BISC276.

NTDT 421 NUTRITIONAL ASSESSMENT METHODS 3
Nutritional screening and assessment methods and techniques including evaluation of dietary intake, anthropometric measurements, biochemical tests and clinical assessment. Overview of the methodologies involved in nutrition research.
PREREQ: NTDT400 and a course in statistics.

NTDT 445 TEACHING METHODS: NUTRITION/FOODS 3
Needs assessment; writing instructional objectives; selecting appropriate methods, materials and resources for audiences varying in age, literacy and ethnicity; planning, implementing and evaluating education programs related to food and nutrition.
PREREQ: NTDT200.
RESTRICTIONS: Open to juniors and seniors only.

NTDT 450 MEDICAL NUTRITION THERAPY I 3
Skills required for patients' nutritional management. Medical nutrition therapy for dysphagia and adaptive feeding. Pathophysiology, diet and disease relationships and diet therapy for gastrointestinal conditions, obesity, diabetes and cardiovascular diseases.
PREREQ: NTDT250, NTDT400, BISC276.

NTDT 451 MEDICAL NUTRITION THERAPY II 3
Skills for patients' nutritional management. Pathophysiology, diet and disease relationships and diet therapy for diseases: liver, renal cancer, AIDS, inborn error of metabolism. Critical care nutrition, nutritional management of physiological stress and trauma.
PREREQ: NTDT250, NTDT400, BISC276.

NTDT 452 TOPICS IN NUTRITION AND DIETETICS 1-3
In-depth analysis of a specific topic in an area of nutrition and dietetics.
RESTRICTIONS: Junior-level NTDT course(s) relating to the specific topic required.

NTDT 460 COMMUNITY NUTRITION 3
Nutritional care as a part of health maintenance and health care delivery; the relationship of community resources, structure and dynamics to an individual's ability to be well fed. Nutritional needs and programs. Means of affecting change in nutrition knowledge and practice.
PREREQ: NTDT400 and NTDT321.

NTDT 466 INDEPENDENT STUDY 1-6 PF

NTDT 468 SENIOR SPECIAL TOPICS 1-6
Senior level independent study.

NTDT 475 TRANSCULTURAL FOODS AND CUISINE 3-5
Travel study of transcultural food habits: attitudes, beliefs, customs and taboos. Visits to major food industries and health organizations and interaction with indigenous population.
PREREQ: NTDT200.

NTDT 550 DIETETICS PRACTICUM I 1-4 PF
Introduces supervised practice experiences for incorporation and application of skills, knowledge, and attitudes with special emphasis on current dietetic issues facing the health professional in public health nutrition.
COREQ: NTDT650.
RESTRICTIONS: Open to dietetic internship students only.

NTDT 551 DIETETICS PRACTICUM II 1-4 PF
Continued supervised practice experiences for incorporation and application of skills, knowledge, and attitudes, focusing on entry-level competence with special emphasis on current dietetic issues facing the health professional.
PREREQ: NTDT550.
COREQ: NTDT651.
RESTRICTIONS: Open to dietetic internship students only.

NTDT 566 SPECIAL PROBLEM 1-12

NTDT 611 ADVANCED NUTRITION 3
Metabolism and its relation to human nutrition; current literature; methods and techniques of nutrition research.
PREREQ: NTDT400 or NTDT610.

NTDT 615	ADVANCED NUTRITION AND PHYSICAL ACTIVITY	3
Critical analysis of current research on effects of nutrition, food and diet on physical activity and optimal athletic performance. Develops specific topics and interests through independent projects. PREREQ: Undergraduate nutrition and physiology courses.		
NTDT 620	MATERNAL AND INFANT NUTRITION	3
Maternal physiological adjustments in pregnancy and their relationship to nutritional needs; effect of maternal nutrition on fetal growth and development; physiology of lactation and maternal nutrient needs; neonatal nutritional needs and current infant feeding practices. PREREQ: NTDT400 and BISC106 or BISC406.		
NTDT 621	NUTRITIONAL ASSESSMENT METHODS	3
Nutritional screening and assessment methods and techniques including evaluation of dietary intake, anthropometric measurements, biochemical tests and clinical assessment. Overview of the methodologies involved in nutrition research. PREREQ: Upper-division course work in nutrition, biochemistry and physiology.		
NTDT 630	TRACE MINERALS AND VITAMINS	3
Recent advances in knowledge of nutritional significance of trace minerals and vitamins; their physiological function(s); factors affecting needs and utilization; assessment of requirements; occurrence in food supply; and current issues and concerns. PREREQ: Biochemistry.		
NTDT 640	NUTRITION AND AGING	3
Addresses topics related to the effects of aging on fundamental nutrition processes, food and nutrient requirements, nutrition screening and assessment of nutritional status, nutrition intervention and food assistance programs and nutrition related disorders of older adults. PREREQ: NTDT310 or NTDT400 or NTDT401.		
NTDT 645	TEACHING METHODS: NUTRITION/FOODS	3
Needs assessment; writing instructional objectives; selecting appropriate methods, materials and resources for audiences varying in age, literacy and ethnicity; planning, implementing and evaluating education programs related to food and nutrition. PREREQ: NTDT200. RESTRICTIONS: Instructor permission required for non-majors.		
NTDT 650	CURRENT PERSPECTIVES IN DIETETICS I	2
Introduces exploration of roles and responsibilities of today's dietitian in food service management, clinical and community dietetics. Emphasis on concepts relevant to evolving therapies and technologies in the profession and issues influencing ethical, legal and professional responsibilities of dietitians.		
NTDT 651	CURRENT PERSPECTIVES IN DIETETICS II	2
Continued exploration of roles and responsibilities of today's dietitian in clinical, community and food service management dietetics. Emphasis on concepts relevant to evolving therapies and technologies in the profession and issues that influence ethical, legal and professional responsibilities of dietitians.		
NTDT 652	TOPICS IN NUTRITION AND DIETETICS	1-3
Analysis of a specific topic in an area of nutrition and dietetics. RESTRICTIONS: Requires permission of instructor.		
NTDT 654	ADVANCED RUMINANT NUTRITION	3
Emphasis of metabolic aspects of ruminant microbiology and intermediary metabolism. Discussions on methods to partition nutrients at the tissue level and methods to alter rumen fermentation. Crosslisted with ANFS654. PREREQ: Undergraduate or graduate courses in nutrition, microbiology, biochemistry, ANFS454 or equivalents. ANFS404 or ANFS417 recommended.		
NTDT 660	COMMUNITY NUTRITION	3
Nutritional care as part of health maintenance and health care delivery; relationship of community resources, structure and dynamics to an individual's ability to be well fed. Nutritional needs and programs. Nutrition program planning and evaluation; community assessment techniques. PREREQ: Advanced nutrition course. RESTRICTIONS: Permission of instructor required for non-majors.		
NTDT 665	SEMINAR	1-3 PF
NTDT 666	SPECIAL PROBLEM	1-12
NTDT 668	RESEARCH	1-6
NTDT 669	FIELD PROJECT OR THEORETICAL PAPER	1-6
Development, preparation and defense of written report of field project observations or theoretical analysis. RESTRICTIONS: Requires permission of instructor.		
NTDT 675	TRANSCULTURAL FOOD HABITS	5
Travel study of transcultural food habits: attitudes, beliefs, customs and taboos.		

Visits to major food industries and health organizations and interaction with indigenous population.
PREREQ: NTDT200.
RESTRICTIONS: Only three credit hours may count toward graduation for majors.

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

NTDT 866 **SPECIAL PROBLEM** **1-12**

NTDT 868 **RESEARCH** **1-6**

NTDT 869 **MASTER'S THESIS** **1-6**

NURSING

NURS 100	NEW STUDENT CONNECTIONS	1
Provides first semester students in College of Health and Nursing Sciences opportunities to explore and become familiar with the college and university. Students acquire information on campus resources and gain practical skills helpful for a successful transition to college. RESTRICTIONS: Open to nursing majors only.		
NURS 101	HUMAN ANATOMY	2
Introduction to the study of human anatomy which provides a foundation for the future study of human physiology and other related courses. Includes a clinically relevant, fundamental overview of the human body using a "systems" approach. RESTRICTIONS: Open to nursing and health studies majors only.		
NURS 110	NURSING CONNECTIONS	1
Introduction to the profession of nursing and basic clinical nursing skills. Includes the roles of nursing, historical development and nursing philosophy. RESTRICTIONS: Open to nursing majors only.		
NURS 166	SPECIAL PROBLEM	1-3
NURS 200	CLINICAL DECISION MAKING	2
Introduces and explores nurses' decision making processes including the nursing process. Builds upon basic clinical skills with psychomotor, cognitive, and affective skills used by nurses. PREREQ: NURS110, ENG110. RESTRICTIONS: Open to nursing majors only.		
NURS 220	CONCEPTS OF NURSING PRACTICE	3
Introduction to the nursing profession which includes psychomotor, cognitive and affective skills integral to basic nursing practice. The nursing process, professional ethics and basic clinical skills are covered. PREREQ: Accelerated students: BISC207, NURS101, BISC276, BISC300, CHEM105, CHEM106, IFST201, NTDT200, STAT200 ENGL110, PSYC100. COREQ: NURS230, NURS250. RESTRICTIONS: Open to accelerated nursing majors only.		
NURS 222	PHARMACOLOGY	3
Focuses on therapeutic and adverse biological, psychological and social reactions to pharmacological agents. Drug use and medication abuse, client teaching, laboratory data and current research discussed. Nursing responsibilities and clinical applications emphasized. PREREQ: Accelerated students: NURS220, NURS230, NURS250. Traditional students: NURS200. COREQ: Traditional students: NURS241 or NURS242. RESTRICTIONS: Open to nursing majors only.		
NURS 230	FOUNDATIONS OF NURSING	2
Examines the health continuum with an emphasis on wellness, health promotion across the lifespan, the aging process, and an introduction to community-based nursing. Clients are discussed as individuals, members of families, and as parts of cultural and global communities. PREREQ: BISC207, CHEM105, CHEM106, and a course in anatomy. COREQ: NURS220. RESTRICTIONS: Open to accelerated nursing majors only.		
NURS 231	HEALTH PROMOTION ACROSS THE LIFESPAN	2
Explores the continuum of healthcare with a focus on prevention, wellness initiatives and health promotion across the lifespan. Emphasizes the nurse's teaching role. Examines types of health promotion for individuals, families and communities. PREREQ: NURS110. RESTRICTIONS: Open to nursing majors only.		
NURS 232	CARE OF VULNERABLE POPULATIONS	2
Focuses on population-based healthcare. Examines community level nursing care.		

Explores vulnerability as it relates to pediatric, older adult, rural and disadvantaged, and culturally diverse populations within the American healthcare system.
PREREQ: NURS110.

RESTRICTIONS: Open to nursing majors only.

NURS 241 SCIENTIFIC BASIS OF NURSING 3

Examines pathophysiological concepts as a scientific basis of disease processes. Focuses on major body systems, including immune, endocrine, neurological and psychological. Emphasizes concepts of cancer, pain and infection.
PREREQ: BISC207, CHEM105, CHEM106, NURS101, NURS110.

COREQ: BISC276 or BISC300.

RESTRICTIONS: Open to nursing majors only.

NURS 242 SCIENTIFIC BASIS OF NURSING 3

Examines pathophysiological concepts as a scientific basis of disease processes. Focuses on major body systems, including cardiovascular, respiratory, gastrointestinal and renal. Emphasizes concepts of fluids and electrolytes.
PREREQ: BISC207, CHEM105, CHEM106, NURS101, NURS110.

COREQ: BISC276 or BISC300.

RESTRICTIONS: Open to nursing majors only.

NURS 250 HEALTH ASSESSMENT ACROSS THE LIFESPAN 2

Introduces and develops clinical skills of physical health assessment across the lifespan. Field experiences develop physical assessment skills.

PREREQ: Accelerated students: NURS362, NURS312, BISC207, NURS101, BISC276, BISC300, CHEM105, CHEM106, IFST201, NTDT200, STAT200. Traditional students: NURS110, NURS200, PSYC100.

COREQ: Accelerated students: NURS220, NURS230. Traditional students: BISC276, BISC300 (pre- or co-requisite).

RESTRICTIONS: Open to nursing majors only.

NURS 266 SPECIAL PROBLEM 1-3

NURS 312 PATHOPHYSIOLOGY 4

Focuses on biological processes leading to alterations of body structure and functions. Emphasis on identification of etiology and pathogenesis of selected diseases.

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

RESTRICTIONS: Open to nursing majors only.

NURS 335 BACCALAUREATE FOR THE REGISTERED NURSE ORIENTATION 1 PF

Provides an orientation to the on-line BRN major including a hands-on technology component. Includes initial preparation for the BRN Practicum. Emphasizes resources essential for successful program completion.

RESTRICTIONS: Must be taken prior to any other BRN nursing course. Open to BRN majors only.

NURS 345 CONCEPTUAL FOUNDATIONS FOR NURSING PRACTICE 3

Introduces conceptual foundations for practice within a pluralistic society. Provides overview of nursing education, practice, research, informatics and evolving technologies. Focuses on healthcare needs within diverse practice settings, emphasizing emerging legal and ethical responsibilities, and economic and sociocultural influences.

PREREQ: NURS335.

RESTRICTIONS: Open to BRN majors only. To be taken immediately following completion of NURS335.

NURS 350 WELLNESS AND HEALTH ASSESSMENT 3

Explores selected concepts, theories and skills utilized in health promotion and disease prevention of individuals from socioculturally diverse populations within the context of family, community and healthcare systems. Key elements include a health history, physical, and psychosocial assessment.

PREREQ: NURS335, NURS345.

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

NURS 352 ADULT HEALTH NURSING 3

Examines selected concepts and theories related to restoring and maintaining optimal health in adult populations. Focuses on major body systems, including immune, endocrine, renal and gastrointestinal; also discusses concepts of cancer. Selected laboratory and field experiences are included to enhance concepts.

PREREQ: BISC276, BISC300; all required 200 level nursing courses.

RESTRICTIONS: Open to nursing majors only.

NURS 354 PSYCHOSOCIAL NURSING 3

Presents and examines selected concepts and theories related to restoring and maintaining optimal health of patients experiencing psychopathology. Selected laboratory and field experiences included to enhance concepts.

PREREQ: All 200-level required nursing courses, BISC276, and BISC300.

RESTRICTIONS: Open to nursing majors only.

NURS 356 CARE OF CHILDREN AND FAMILIES 3

Presents selected concepts and theories related to the nursing care of infants, children and adolescents and their families. Selected laboratory and field experiences are included to enhance concepts.

PREREQ: All 200-level required nursing courses, BISC276 and BISC300.

RESTRICTIONS: Open to nursing majors only.

NURS 358 WOMEN'S HEALTH NURSING 3

Presents selected concepts and theories related to nursing care of the childbearing family and major women's health issues. Selected laboratory and field experiences included to enhance concepts.

PREREQ: All 200-level required nursing courses, BISC276 and BISC300.

RESTRICTIONS: Open to nursing majors only.

NURS 362 RESEARCH CONCEPTS IN HEALTHCARE 3

Application of the research process and the research utilization process to healthcare practice.

PREREQ: NURS200 (for traditional students only), STAT200.

COREQ: NURS312 (for accelerated students only).

RESTRICTIONS: Open to nursing and health studies majors only.

NURS 366 INDEPENDENT STUDY 1-6

NURS 372 ADULT HEALTH NURSING 3

Examines selected concepts and theories related to restoring and maintaining optimal health in adult populations. Focuses on major body systems, including cardiovascular, respiratory, and neurological.

PREREQ: All 200-level required nursing courses, BISC276 and BISC300.

RESTRICTIONS: Open to nursing majors only.

NURS 382 COMMUNITIES AND HEALTH POLICY 2

Examines nurse's role in community health and health policy. Major issues affecting healthcare and current political issues examined. Issues of bioterrorism, environment, and occupational health included.

PREREQ: All 200-level required nursing courses, BISC276 and BISC300.

RESTRICTIONS: Open to nursing majors only.

NURS 390 CLINICAL WORK EXPERIENCES 1-2 PF

Students receive credit for approved healthcare-related work/volunteer experience. Students must work/volunteer in an appropriate healthcare-related position and credit will be given based on hours worked.

PREREQ: NURS200.

RESTRICTIONS: Open to nursing majors only.

NURS 411 TOPICS IN HEALTHCARE DELIVERY 3

Consideration of selected issues and problems of nursing practice within the healthcare delivery system. Exploration of some topics may include a laboratory or clinical component. Variable topics.

RESTRICTIONS: Open to nursing and health studies majors, or by permission of professor. May be repeated for up to nine credit hours.

NURS 412 MULTICULTURAL TOPICS IN HEALTHCARE DELIVERY 3

Presents a cultural consideration of selected issues and problems of nursing practice within the global healthcare delivery system. Exploration of some topics may include a laboratory or clinical component. Variable topics.

COREQ: NURS362 or permission of instructor.

RESTRICTIONS: Open to nursing and health studies majors, or by permission of instructor. May be repeated for up to nine credit hours.

NURS 413 BIOMEDICAL RESEARCH ETHICS 3

Critically examines scientific integrity and responsible conduct in biomedical and translational research within theoretical and social context of research ethics using case examples and previous experiences. Topics include: individual and institutional responsibilities for promoting scientific integrity; protection of the rights of the researcher and human and animal subjects; data issues; collaboration; authorship practices; intellectual property; and impact of future developments in science. Students write case analyses, reflections and critiques about field experiences to ethical review boards and research laboratories and discuss the culmination of their experiences specific to research ethics.

NURS 435 LEADERSHIP AND MANAGEMENT IN HEALTH ORGANIZATIONS 3

Introduces the principles of leadership and management and their application in health systems where nursing care is delivered. Focuses on the roles of nurse leaders and managers across practice settings.

PREREQ: All 300-level BRN nursing courses must be completed prior to enrollment in 400 level courses.

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

NURS 442 COMMUNITY HEALTH NURSING 3

Focuses on conceptual foundations for community health nursing practice with the community, family and individual as clients. Diversity in nursing roles and practice is related to community health promotion and community health problems.

PREREQ: All 300-level BRN nursing courses must be completed prior to enrollment in 400 level courses.

NURS 443 BRN ROLE PRACTICUM 3

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

PREREQ: All 300-level BRN nursing courses must be completed prior to enrollment in 400 level courses.

NURS 450 SYNTHESIS OF PROFESSIONAL NURSING PRACTICE 1 PF

Provides opportunities to bring key aspects of professional nursing practice together utilizing a systems framework. Includes student presentation of projects related to NURS443.

PREREQ: All other courses in BRN program.

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

NURS 453 CLINICAL APPLICATIONS ADULT HEALTH NURSING I 3 PF

Clinical application of science and nursing theories of care for adult clients in hospitals.

PREREQ: All 300-level required nursing courses.

RESTRICTIONS: Open to nursing majors only.

NURS 457 CLINICAL APPLICATIONS: MATERNAL CHILD NURSING 3 PF

Clinical application of science and nursing theories of care for infants, children, adolescents and childbearing families.

PREREQ: All 300-level required nursing courses.

RESTRICTIONS: Open to nursing majors only.

NURS 459 CLINICAL APPLICATIONS: PSYCHOSOCIAL NURSING 3 PF

Clinical application of science and nursing theories of care for clients with acute and chronic psychiatric healthcare needs.

PREREQ: All 300-level required nursing courses.

RESTRICTIONS: Open to nursing majors only.

NURS 460 CLINICAL INTEGRATION SEMINAR I 2

Using a seminar format, students discuss major issues identified in clinical nursing care. Assists students in integrating scientific and theoretical knowledge into clinical practice. Focuses on legal and ethical issues, nursing roles, leadership, and nursing licensure issues that arise from clinical experiences.

PREREQ: All 300 level required nursing courses.

COREQ: NURS453, NURS457, NURS459.

RESTRICTIONS: Open to nursing majors only.

NURS 464 TEACHING ASSISTANTSHIP IN NURSING 1-2 PF

Allows junior and senior nursing students to develop professional teaching, peer leadership, and communication skills while enhancing their knowledge base in course content.

RESTRICTIONS: Must have a 3.0 GPA, have completed the course for which they TA in good standing, and be available the entire semester. Students must work at least 28 hours throughout the semester to receive 1 credit or 56 hours to receive 2 credits.

NURS 466 INDEPENDENT STUDY 1-6

NURS 473 CLINICAL APPLICATIONS: ADULT HEALTH NURSING II 3 PF

Advanced clinical application of science and nursing theories in acute care health settings. Builds upon clinical practice skills of NURS453.

PREREQ: NURS453, NURS460.

COREQ: NURS479 and NURS480.

RESTRICTIONS: Open to nursing majors only.

NURS 477 CLINICAL APPLICATIONS: CARE OF POPULATIONS 3 PF

Clinical application of science and nursing theories in community health settings. Local, national, and global issues are addressed.

PREREQ: NURS453, NURS457, NURS459, NURS460.

COREQ: NURS479, NURS480.

RESTRICTIONS: Open to nursing majors only.

NURS 479 CLINICAL PRECEPTORSHIP 3 PF

Clinical application of science and nursing theories in student-selected clinical settings. Provides a transition from student-faculty relationships to mentor-new graduate relationships. Students are mentored by a nurse preceptor.

PREREQ: NURS453, NURS460. For accelerated students, NURS473 must precede NURS 479.

COREQ: NURS473, NURS480.

RESTRICTIONS: Open to nursing majors only.

NURS 480 CLINICAL INTEGRATION SEMINAR II 2

Discussion of major issues identified in clinical nursing care. Assists students in integrating scientific and theoretical knowledge into clinical practice. Focuses on legal and ethical issues, nursing roles, leadership, and nursing licensure issues that arise from clinical experiences. Provides a transition to new graduate nurse experiences.

PREREQ: NURS460, NURS453.

COREQ: NURS473, NURS479.

RESTRICTIONS: Open to nursing majors only.

NURS 566 SPECIAL PROBLEM 1-12

NURS 600 ISSUES IN SCHOOL HEALTH NURSING 3

Focuses on roles of new school nurse and healthcare needs of school-age children and adolescents. Includes testing/screening, guidance/counseling, health teaching, and skills in school health setting.

PREREQ: Registered nurse.

NURS 604 ADVANCED PRACTICE ROLES FOR HEALTHCARE PROVIDERS 3

Focuses on roles and issues affecting healthcare providers engaged in advanced practice. Roles are analyzed in relation to current issues and concepts of advanced practice.

Crosslisted with HSAD604.

RESTRICTIONS: Permission required from department.

NURS 609 NURSING SCIENCE: THEORY AND RESEARCH 4

Examines the science of nursing from theoretical and research perspectives and emphasizes theory as the foundation for research and practice.

RESTRICTIONS: Open to majors only. Permission required from department. First clinical course and EDUC655 required as prerequisites or corequisites.

NURS 610 CROSSCULTURAL HEALTHCARE 3

An in-depth study of cultural diversity, delineating ethnocultural congruent healthcare practices in a pluralistic society. Assessment, planning and interventions for health promotion, illness and disease prevention, health restoration and health policy legislation are explored.

RESTRICTIONS: Open to only to graduate students or by permission of instructor.

NURS 613 DEATH EDUCATION 3

Focuses on the field of death education, its relevance to everyday life and most specifically to the professional practice of practitioners providing support to the dying and bereaved.

RESTRICTIONS: Admission to BRN major or BSN degree or bachelor's degree in another discipline.

NURS 616 PRIMARY CARE IN COMMUNITY HEALTH 3

Focuses on community based primary care issues in relation to individual, family, and community health. Clinical component includes health promotion and disease prevention activities.

RESTRICTIONS: Open to majors only. Requires permission from department.

NURS 617 PRECEPTORSHIP I 3

Focuses on clinical topics in primary care relevant to each practitioner concentration.

PREREQ: All required clinical courses except NURS627.

RESTRICTIONS: Open to nursing majors only. Permission of department required.

NURS 619 FINANCIAL MANAGEMENT IN HEALTH SERVICES ORGANIZATIONS 3

Provides the basic principles and concepts of effective management of budgets for healthcare units. Includes analysis of the environment and departmental organization and their impact on healthcare.

Crosslisted with HSAD619.

RESTRICTIONS: Permission of department required.

NURS 620 ADVANCED HEALTH ASSESSMENT 3

Assists graduate students in acquiring advanced knowledge and proficiency in performing health assessments. Includes eliciting a complete health history and performing a comprehensive examination.

PREREQ: NURS604 is a pre- or co-requisite.

RESTRICTIONS: Permission of department required.

NURS 621 ADVANCED PATHOPHYSIOLOGY 3

Presents the pathogenesis of common conditions affecting children and adults as a basis for clinical management.

RESTRICTIONS: Permission of department required.

NURS 622 ADVANCED PHARMACOLOGY 3

Applies principles of pharmacology to the therapeutic management of the client. Emphasizes prescribing, monitoring drug regimens, identifying adverse reactions, and anticipating changes inherent in self medication.

RESTRICTIONS: Permission of department required.

NURS 623 MANAGEMENT OF WOMEN'S HEALTHCARE 3

Focuses on gynecological and reproductive primary healthcare. Emphasizes management of gynecologic health needs and the normal reproductive cycle.

RESTRICTIONS: NURS604 and NURS622 are required as either corequisites or prerequisites.

NURS 624 MANAGEMENT OF CHILDREN'S HEALTH 3

Focuses on delivery of primary healthcare to children and adolescents.

Emphasizes physical and developmental variations and management of acute and episodic illness.

PREREQ: NURS620 and NURS621.

RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.

NURS 625 MANAGEMENT OF ADULT EPISODIC HEALTH NEEDS AND PROBLEMS 3

Focuses on delivery of primary care to adults and the elderly with acute episodic

health problems. Emphasizes the clinical decision making necessary to serve as a foundation for planning primary healthcare services.

PREREQ: NURS620 and NURS621.

RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.

NURS 626 MANAGEMENT OF ADULT CHRONIC HEALTH NEEDS AND PROBLEMS 3

Focuses on delivery of primary care to adults and the elderly with chronic health problems. Emphasizes management of ongoing needs.

PREREQ: NURS620 and NURS621.

RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.

NURS 627 PRECEPTORSHIP II 3

Emphasizes clinical decision making in an interdisciplinary environment with the nurse practitioner as the principal provider of primary care.

RESTRICTIONS: NURS617 required as either a corequisite or prerequisite.

NURS 635 HEALTH ADMINISTRATION THEORIES 3

Theories of administration, organization and management, their interaction with other health discipline theories and their influence on management of healthcare agencies. Includes the interaction of theories with attainment of institutional goals. Crosslisted with HSAD635.

RESTRICTIONS: NURS604 required as prerequisite or corequisite.

NURS 636 ADULT HEALTH I 4

Provides the conceptual foundation and practical knowledge base needed to develop the essential characteristics of the clinical nurse specialist in adult health. Core content is characterized around three spheres of influence: patient, families and communities; nursing and healthcare personnel; and organizations and networks; with a primary focus on patients, families and communities. Areas of emphasis include assessment skills, therapeutic interventions, education, evidence-based practice and issues and trends in healthcare.

COREQ: NURS604; NURS621.

RESTRICTIONS: Open to clinical nurse specialist students only.

NURS 637 HEALTH PLANNING STRATEGIES 3

Analyzes organizational systems and roles of managers and administrators. Students identify organizational needs, formulate goals and objectives appropriate to healthcare agencies and identify strategies appropriate to accomplishing goal attainment with ethical constraints of healthcare. Crosslisted with HSAD637.

RESTRICTIONS: NURS604 required as prerequisite or corequisite.

NURS 638 HEALTH SERVICES EVALUATION 3

Emphasizes the role of managers and administrators in personnel development, promotion of research in clinical settings and development and implementation of quality improvement initiatives and their implications for healthcare. Crosslisted with HSAD638.

RESTRICTIONS: NURS604 required as prerequisite or corequisite.

NURS 646 ADULT HEALTH II 4

Provides opportunities to develop advanced skills inherent to the clinical nurse specialist role as determined by the National Association of Clinical Nurse Specialists. Content organized around the three spheres of influence with emphasis on nursing and healthcare personnel and builds upon CNS content in previous courses. Areas of emphasis include leadership, collaboration, citizenship, cost effective care, innovations in practice, and mentorship.

PREREQ: NURS636.

RESTRICTIONS: Open to graduate clinical nurse specialist students only.

NURS 654 NURSING OF CHILDREN I 4

Explores the scientific basis for the routine healthcare guidance required by children and their families. Focuses primarily on the acutely ill child.

RESTRICTIONS: NURS604 and NURS621 required as prerequisites or corequisites.

NURS 655 NURSING OF CHILDREN II 4

Explores the biopsychosocial needs of children with chronic conditions and their families. Emphasizes the interventions of the advanced practice nurse to assist these children to attain, maintain or regain health.

PREREQ: NURS654.

RESTRICTIONS: Open to matriculated graduate nursing students only.

NURS 664 NURSING PRACTICUM 1-3

In conjunction with the faculty advisor and based on the student's individualized long range goals, the student selects a preceptor and healthcare setting in which to apply didactic contact in real life settings. Requires 135 hours of on-site experience, which can be taken in one semester or divided over three semesters. RESTRICTIONS: NURS635, NURS637, or NURS638 is required as a corequisite or prerequisite.

NURS 666 SPECIAL PROBLEM 1-12

NURS 671 PSYCHIATRIC MENTAL HEALTH NURSING I 4

Emphasizes theory and research related to assessment, diagnosis, clinical

management and psychopharmacological intervention in mental illness. Didactic and clinical components allow for the development of subspecialization.

PREREQ: Graduate psychopathology course.

RESTRICTIONS: Open to matriculated students only.

NURS 672 PSYCHIATRIC MENTAL HEALTH NURSING II 4

Focuses on the development of two modalities of psychiatric skills and treatment. Core concepts of cognitive and group therapy are integrated with specific strategies for behavioral change.

PREREQ: NURS671.

RESTRICTIONS: Open to matriculated graduate nursing students only.

NURS 686 CLINICAL NURSE SPECIALIST ROLE INTEGRATION 4

Integration of theories and concepts related to roles of the clinical nurse specialist. Emphasizes advanced practice roles within the broad context of healthcare.

PREREQ: All required clinical courses

NURS 687 NURSING SCIENCE: RESEARCH APPLICATION 3

Focuses on the application of research to nursing practice. Includes critical analysis of research through an organized critique process, examination of data, and examination of facilitators and barriers to research/research utilization, models of research utilization, and methods of quality management.

PREREQ: NURS609.

RESTRICTIONS: Open to majors only. Permission required from department.

NURS 811 CONCEPTS IN ADVANCED NURSING PRACTICE 2

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

RESTRICTIONS: Requires BSN and permission of instructor.

NURS 820 ADVANCED HEALTH ASSESSMENT 3

Assists graduate students in acquiring advanced knowledge and proficiency in performing health assessments. Includes eliciting a complete health history and performing a comprehensive examination.

RESTRICTIONS: Permission of department required.

NURS 821 ADVANCED PATHOPHYSIOLOGY 3

Presents the pathogenesis of common conditions affecting children and adults as a basis for clinical management.

RESTRICTIONS: Permission of department required.

NURS 830 ADVANCED MANAGEMENT OF CHILDREN AND ADOLESCENT HEALTHCARE 3

Focuses on the delivery of primary health care to specific populations. Emphasizes special problems of the neonate and high risk children and adolescents.

PREREQ: NURS824.

NURS 831 COMPREHENSIVE ASSESSMENT OF OLDER PERSONS 3

Provides a conceptual foundation for geriatric/gerontological clinical nurse specialists and nurse practitioners. Involves assessing older adults and their families and assisting them with a continuum of health promotion, disease prevention and disease management care.

RESTRICTIONS: NURS804 and NURS821 required as either prerequisites or corequisites.

NURS 832 HEALTH PROMOTION AND DISEASE PREVENTION/ MANAGEMENT FOR OLDER PERSONS 3-4

Builds on NURS831 by providing opportunities for students to gain knowledge and skills related to primary, secondary and tertiary prevention of disease and disabilities in older persons.

PREREQ: NURS831.

NURS 840 CARDIOPULMONARY NURSING I 3-4

Explores the scientific basis of prevention programs for cardiopulmonary problems as well as of therapy for newly diagnosed or acute problems. Emphasizes assessment and therapeutic intervention.

RESTRICTIONS: NURS804 and NURS821 required as prerequisites or corequisites.

NURS 845 ONCOLOGY/IMMUNE DEFICIENCY NURSING I 3-4

Explores the scientific basis of prevention programs and of therapy for newly diagnosed or acute oncological/immune deficiency problems in adults. Emphasizes assessment and therapeutic intervention.

RESTRICTIONS: NURS804 and NURS840 required as prerequisites or corequisites.

NURS 846 ONCOLOGY/IMMUNE DEFICIENCY NURSING II 3-4

Focuses on theoretical and clinical investigations of oncology/immune deficiency nursing problems requiring long-term care or follow-up of adult clients in a variety of community settings. Emphasizes assessment, health maintenance, home/hospice care and survivorship.

PREREQ: NURS845.

NURS 860 CLINICAL NURSE SPECIALIST ADVANCED CLINICAL PRACTICE 2 PF

Provides the opportunity for students in the clinical nurse specialist concentration to enhance proficiency as clinical experts within their chosen specialty area.
PREREQ: NURS831, NURS840, NURS850, NURS854 or NURS871.

RESTRICTIONS: Open to majors only. Permission required from department.

NURS 866 SPECIAL PROBLEM 1-12**NURS 868 RESEARCH: SCHOLARLY PROJECT 1-3**

Investigation of a problem in clinical settings related to finance, administration, personnel management, public policy or education, resulting in completion of a scholarly project.

NURS 869 MASTER'S THESIS 1-6**NURS 871 PSYCHIATRIC MENTAL HEALTH NURSING I 3**

Emphasizes theory and research related to assessment, diagnosis, clinical management and psychopharmacological intervention in mental illness. Didactic and clinical components allow for the development of subspecialization.
PREREQ: Graduate psychopathology course.

NURS 872 PSYCHIATRIC MENTAL HEALTH NURSING II 3

Focuses on the development of two modalities of psychiatric skills and treatment. Core concepts of cognitive and group therapy are integrated with specific strategies for behavioral change.
PREREQ: NURS871.

NURS 886 CLINICAL NURSE SPECIALIST ROLE INTEGRATION 4

Integration of theories and concepts related to roles of the clinical nurse specialist. Emphasizes advanced practice roles within the broad context of healthcare.
PREREQ: All required clinical courses.

OPERATIONS RESEARCH**ORES 401 INTRODUCTION TO OPERATIONS RESEARCH 3**

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

ORES 601 SURVEY OPERATIONS RESEARCH I 3

Covers various deterministic mathematical programming methods (LP, integer dynamic), network models and basic inventory models.
PREREQ: Requires permission of instructor.

ORES 602 SURVEY OPERATIONS RESEARCH II 3

Covers various stochastic operations research models including decision theory, game theory, project planning, inventory models, simulation, markov decision processes and Queuing models.
PREREQ: Linear Algebra and STAT601.

ORES 603 SIMULATION MODELING AND ANALYSIS 3

Instructors from hard sciences and social sciences introduce real-world Operations Research case studies based on their expertise. Students implement proposed solution methodologies using a variety of available computer software packages.
PREREQ: ORES601 and permission of director/instructor.
COREQ: ORES602

ORES 615 ADVANCED PRICES AND STATISTICS 3

Statistical tools used in agricultural economics research and operations research. Introduction to econometric specifications, estimation and interpretation.
Crosslisted with FREC615.

ORES 650 URBAN TRANSPORTATION SYSTEMS 3

Design and operation of urban transportation systems, characteristics of public transportation modes, vehicle design, right-of-way types and terminal facilities. Application of operations research techniques to analysis of scheduling, network optimization, capacity and evaluation of alternatives.
Crosslisted with CIEG650.
RESTRICTIONS: Requires permission of instructor.

ORES 664 OPERATIONS RESEARCH INTERNSHIP 1-6 PF

Supervised, on-the-job experience, performing technical work for clients including OR applications, econometrics and statistical applications.
RESTRICTIONS: Requires permission of instructor.

ORES 690 OPERATIONS RESEARCH SEMINAR 0 PF

Seminars to be given by faculty and by visiting academia, industry and government persons. Graduate students provide topical insights in significant methods and results of current research in operations research.

ORES 801 OPTIMIZATION MODELS AND METHODS 3

Models and methods of linear programming, integer programming and non-linear programming. Practical application of simplex method, branch and bound algorithms, and Kuhn-Tucker conditions. Examples from the classic operations research literature.
PREREQ: ORES601.

ORES 802 OPERATIONS RESEARCH APPLICATIONS 3

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

ORES 806 RESEARCH TECHNIQUES AND PROCEDURES 3

Planning research projects with emphasis on methods of collecting and analyzing data, and the presentation of results. A problems course.
Crosslisted with FREC806.
PREREQ: FREC608.

ORES 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.
Crosslisted with FREC810.

ORES 827 ADVANCED PRODUCTION ECONOMICS 3

Specification, identification and estimation of dual models for use in the evaluation, hypothesis testing and control of firm-level technological and production problems.
Crosslisted with FREC827.
PREREQ: ECON801 and an econometrics/statistics course.
RESTRICTIONS: Requires permission of instructor.

ORES 834 SEMINAR IN RESOURCE ECONOMICS 3

Quantitative analyses of natural resource markets, resource depletion and the design of optimal management strategies.
Crosslisted with FREC834.

ORES 868 RESEARCH 1-6**ORES 869 MASTER'S THESIS 1-6****ORES 964 PRE-CANDIDACY STUDY 3-12 PF**

Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

ORES 969 DOCTORAL DISSERTATION 1-12 PF**PHILOSOPHY****PHIL 100 PHILOSOPHIES OF LIFE 3**

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

PHIL 101 GREAT WESTERN PHILOSOPHERS 3

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

PHIL 102 INTRODUCTION TO PHILOSOPHY 3

An examination of such central philosophical problems as ethics, theories of knowledge, the nature of reality, philosophy of religion and political philosophy.

PHIL 105 CRITICAL THINKING 3

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

PHIL 125 TOPICS: PHILOSOPHY IN POPULAR CULTURE 1-4

Philosophical ideas expressed in popular media such as science fiction or fantasy literature, films and music. Topics are variable.
RESTRICTIONS: May be repeated for up to four credit hours.

PHIL 200 BUSINESS ETHICS 3

Ethical theory applied to moral problems in business. Corporate social responsibility, and ethical issues in advertising, personnel and investment.

PHIL 201 SOCIAL AND POLITICAL PHILOSOPHY 3

Classical and contemporary views on such problems as the proper scope and

functions of government, on what a just distribution of wealth is, and on the extent of an individual's rights, liberties and obligation to obey the law.

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

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

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

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

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

PHIL 208 INTRODUCTION TO JEWISH PHILOSOPHY 3
Fundamental issues in philosophy of religion reflecting both general theological approaches to resolving the tension between philosophy and religion and the uniquely Jewish attempt to do so. Topics include: God, miracles, good and evil, divine commandments and free will. May be crosslisted with JWST208.

PHIL 209 PHILOSOPHY OF RELIGION 3
Religious experience, proofs for God's existence, religious language and critiques of religion. Selected special topics such as mysticism, evil, atheism, miracles, immortality and myth.

PHIL 210 WOMEN AND RELIGION 3
Examines the impact of Near Eastern and Judeo-Christian scriptures on women in the family and society, especially focusing on women's roles as mystics and leaders within and outside of institutional religion. Also covers recent feminist approaches to religion. Crosslisted with WOMS210.

PHIL 211 BASIC DECISION THEORY 3
Rational decision-making using only elementary logic and high-school algebra. Decisions under ignorance: max-min rules for preference orderings. Decisions under risk: probability, utility, and the expected-utility rule. Game theory: equilibrium strategies; prisoner's dilemma. Social choices: voting paradoxes and Arrow's theorem.

PHIL 216 INTRODUCTION TO FEMINIST THEORY 3
The concepts of love, marriage, sexuality, family, work, power and equality of women. Theories of women and their position in society, including classical Marxism, the status politics of the suffragettes, radical feminism and socialist feminism. May be crosslisted with WOMS216.

PHIL 226 MIND, ESP AND SURVIVAL 3
An exploration of major philosophical conceptions of the relation of mind (soul) and brain. Implications for the nature of mind from the literature of psychic research and immortality.

PHIL 241 ETHICAL ISSUES IN HEALTHCARE 3
Interdisciplinary study of basic ethical thought and its application to contemporary biomedicine in such moral and ethical issues as care for the terminally ill, abortion and experimentation with human subjects.

PHIL 244 PHILOSOPHY OF ART 3
An introduction to main philosophic problems concerning art: the nature, evaluation and value of art.

PHIL 246 PHILOSOPHICAL PERSPECTIVES OF MEDICINE 3
Ethical and epistemological foundations of medicine; medicine as a way of knowing about the world compared with other ways.

PHIL 301 ANCIENT PHILOSOPHY 3
Beginnings of Western science and philosophy. The pre-Socratics, Sophists, Socrates, Plato, Aristotle, the Epicureans, Stoics and Skeptics.

PHIL 303 MODERN PHILOSOPHY 3
Scepticism and the birth of Modernity. Bacon and scientific experimentalism; Hobbes materialism, Descartes, Spinoza and Leibniz; Locke, Berkeley, Hume and Kant; and the Age of Enlightenment and its impact on philosophy, science and religion.

PHIL 304 NINETEENTH-CENTURY PHILOSOPHY 3
Major philosophies of the 19th century with special emphasis on Hegel and Nietzsche.

PHIL 305 TWENTIETH-CENTURY PHILOSOPHY 3
Major philosophical movements from the 20th century to the present. Includes logical empiricism and the recent criticism of this movement.

PHIL 306 PHILOSOPHY OF SCIENCE 3
A survey of central topics in the philosophy of science which may include the distinction between science (astronomy) and pseudo-science (astrology), the role of values in science, scientific realism, scientific reductionism, as well as the nature of scientific theories, explanations, and confirmation.

PHIL 307 BLACK THOUGHT AND PHILOSOPHY 3
Readings and discussions of Black philosophies, ideologies and concepts as reflected in the thought of significant Black figures. Crosslisted with BAMS307.

PHIL 308 TOPICS IN JEWISH THEOLOGY 3
Critical evaluation of the theological views of major branches of Judaism on such topics as: the significance of Israel, the status of Jewish law, the meaning of Jewish ritual and the mission of the Jewish people. May be crosslisted with JWST308. PREREQ: PHIL208 recommended.

PHIL 309 INDIAN RELIGION AND PHILOSOPHY 3
The Vedas, Upanishads, and Bhagavad-Gita; Sankhya, Yoga, Nyaya, Vaisheshika and Mimamsa; Jainism and Indian Hinayana and Mahayana Buddhism; Vedanta and modern developments such as Aurobindo.

PHIL 310 CHINESE RELIGION AND PHILOSOPHY 3
Ancient China: Confucianism, Taoism and the 100 Schools. The Buddhist conquest of China: Buddhism in China and Chinese Buddhism. Medieval Syntheses: Neo-Confucianism. The Response to the West: Maoism and Modern Confucianism.

PHIL 311 EARLY MEDIEVAL PHILOSOPHY 3
Examines the attempt to synthesize Greek philosophy with biblical religion in the late classical and early medieval period. Covers Plotinus, Augustine, Anselm and Abelard among others, on topics including God, scepticism, evil, the happy life, universals and more.

PHIL 312 LATE MEDIEVAL PHILOSOPHY 3
The rediscovery of Aristotle by the Islamic philosophers (10th-12th centuries) through Ockham (14th century) and includes Avicenna, Algazali, Averroes, Maimonides, Aquinas, and more. Topics include science and religion, divine command theory, talking about God, among others.

PHIL 313 KILLING AND LETTING DIE 3
Examines the moral basis for condemning killing while allowing, or even applauding, letting die.

PHIL 315 METAPHYSICS 3
Examination of central issues in metaphysics. Sample topics: universals and particulars, possibility and necessity, identity over time, free will, causality, and the philosophy of time. PREREQ: One philosophy course.

PHIL 316 TIME TRAVEL 3
Through philosophy applied to physics and science fiction, explores the connections of time travel to traditional philosophic issues concerning the nature of time, God, free will and personal identity.

PHIL 317 AMERICAN PHILOSOPHY 3
Classical American philosophers, including Emerson, Thoreau, Peirce, James and Dewey. Includes ethics, epistemology and social and political theory.

PHIL 320 THEORY OF KNOWLEDGE 3
An examination of some central issues in epistemology: classical and contemporary analyses of empirical knowledge; the nature of justification and rationality; implications for science, religion and metaphysics.

PHIL 322 EXISTENTIALISM 3
Study of the origins and development of existential philosophy. Emphasis on the fundamental insight into the nature of man that separates the existentialists from the rest of the Western philosophical tradition. Sources include Pascal, Kierkegaard, Nietzsche and Sartre.

PHIL 327	RACE, GENDER, SCIENCE	3
Critically examines a number of metaphysical, epistemological, and ethical issues related to science of race, gender, and sexual orientation. Topics may include (a) evolution of sex and gender, (b) gender and cognition, (c) biological basis, or lack thereof, of sexual orientation/preference (d) evolutionary, cognitive, historical, and political origins of race thinking, (d) relationship between everyday conceptions of race and gender as compared with scientific conceptions of race and gender, (e) ethical issues raised by human kind classification schemes. May be crosslisted with BAMS327, CGSC327, WOMS327.		
PHIL 330	PHILOSOPHY OF MIND	3
Coverage of central issues in the philosophy of mind including such topics as the relation between mind and body, the nature of thought, consciousness, perception, personal identity and the relation of cognitive psychology, neuroscience and computer science to the philosophy of mind. May be crosslisted with CGSC330.		
PHIL 340	CROSS CULTURAL ENVIRONMENTAL ETHICS	3
Critical and global study of the ethics of human-environment relations as suggested by the science of ecology, Western philosophy, physical science, the world views of Judaism, Christianity, Islam, Hinduism, Buddhism, Taoism, Native American traditions, African traditions ecofeminism and American law.		
PHIL 341	ETHICS OF ENGINEERING PROFESSION	1
Introduction to cases involving engineers' moral responsibilities; emphasis on making reasonable ethical choices.		
PHIL 344	SCIENCE AND RELIGION	3
Examines the relationship between science and religion and focuses on: whether our current cosmological picture of the Big Bang allows for a Creator; the rationality of miracle-reports; whether the scientific image of humanity is compatible with a religious worldview; the biological evolution/creation debate. May be crosslisted with SCEN344.		
PHIL 366	INDEPENDENT STUDY	1-6
PHIL 389	TOPICS: WOMEN AND HEALTH ISSUES	3
Varying special topics related to women's health. Topics may include, but are not limited to: the relationship between women, health and development; theoretical contributions of feminism to thinking about relationship between gender and health; women's health conditions in various parts of the world. Crosslisted with WOMS389. RESTRICTIONS: May be repeated for credit when topics vary.		
PHIL 390	HONORS COLLOQUIUM	3
See ARSC390 for course description.		
PHIL 404	ANIMAL MINDS	3
Examines philosophical, theoretical, and methodological issues raised by study of animal cognition and behavior. Topics may include mental continuity between human and nonhuman animals, animal communication and deception, self-recognition, emotions, culture, as well as the ethical treatment of animals. Crosslisted with CGSC404.		
PHIL 418	MEANING AND LANGUAGE USE	3
Introduction to theories of meaning based on the notion of truth and their application to language use. Crosslisted with LING418. PREREQ: LING101.		
PHIL 421	PHILOSOPHY, BIOLOGY, SOCIETY	3
Recent topics in philosophy of biology, with emphasis on those related to self, community, and society at large. Topics may include intelligent design, evolutionary altruism, psychological altruism, evolutionary psychology, cultural evolution, evolutionary game theory, and evolutionary ethics. Crosslisted with CGSC421.		
PHIL 444	MEDICAL ETHICS	3
Seminar focuses on such topics as experimentation with human subjects, genetic engineering and the moral problems of health care. RESTRICTIONS: For students of philosophy and health professions.		
PHIL 448	ENVIRONMENTAL ETHICS	3
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format.		
PHIL 450	RECENT TOPICS IN PHILOSOPHY OF MIND	3
Recent topics in the philosophy of mind such as theory of mind, naturalized semantics, animal cognition, evolution of language. May be crosslisted with CGSC450.		
PHIL 463	ETHICAL THEORY	3
Justification of ethical beliefs, alternative criteria of moral rightness and the meaning of moral concepts. PREREQ: PHIL202 or PHIL203.		

PHIL 465	SENIOR SEMINAR	3
Various authors and themes; e.g., Plato, Kant, epistemology, philosophy of mind. RESTRICTIONS: May be repeated once for credit when topics vary.		
PHIL 466	INDEPENDENT STUDY	1-6
PHIL 604	ANIMAL MINDS	3
Examines philosophical, theoretical, and methodological issues raised by study of animal cognition and behavior. Topics may include mental continuity between human and nonhuman animals, animal communication and deception, self-recognition, emotions, culture, as well as ethical treatment of animals. Crosslisted with CGSC604.		
PHIL 648	ENVIRONMENTAL ETHICS	3
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format. May be crosslisted with UAPP648.		
PHIL 650	RECENT TOPICS IN THE PHILOSOPHY OF MIND	3
Recent topics in the philosophy of mind such as theory of mind, naturalized semantics, animal cognition, evolution of language. May be crosslisted with CGSC650.		
PHIL 868	RESEARCH	1-3
A detailed study of certain philosophical problems with special reference to research problems under way in the department.		

PHYSICS AND ASTRONOMY

PHYS 133	INTRODUCTION TO ASTRONOMY	4
Objects of the universe from the earth to galaxies. How the universal laws that govern them; e.g., gravity and electromagnetic radiation, permit us to learn their nature from quantitative observations. Telescopic observations, visual and electronic, included in the laboratory. RESTRICTIONS: Not for credit for those who have taken PHYS144.		
PHYS 139	STAR AND CONSTELLATION IDENTIFICATION	1
Familiarity with the sky, its changing aspects, constellations, mythology, bright stars, and planets. Topics include use of sky maps and coordinates, how to estimate directions and time from knowledge of the sky, and the use of binoculars and small telescopes.		
PHYS 141	LIGHT, LASERS, CAMERAS, PERCEPTION	3
Introduction to the phenomena of light, optics and perception for non-science majors. Topics include: nature of light, sources of light and shadows, rainbows, mirages and other atmospheric phenomena, cameras, telescopes, microscopes, color creation and observation, physics influences in art, the human eye and perception.		
PHYS 143	ENERGY TECHNOLOGY AND SOCIETY	3
Basic principles of physics are applied to discuss forms of energy (mechanical, thermal, chemical, electrical and nuclear), and how energy is derived from sources such as coal, petroleum, solar, nuclear fission and fusion. Environmental consequences of energy use are treated. PREREQ: College algebra.		
PHYS 144	CONCEPTS OF THE UNIVERSE	3
Survey of astronomy emphasizing early and modern concepts. Stars, planets, galaxies, cosmic evolution and intelligent life are studied in the context of physical principles which describe the dynamics of the universe. Scientific process is used to interpret observations that shape our perceptions of the cosmos. RESTRICTIONS: Not for credit to students who have taken PHYS133.		
PHYS 145	BLACK HOLES AND COSMIC EVOLUTION	3
Geared toward a general audience and focuses on topics such as finding black holes in space; the nature of space, time and black holes; the origin of the Universe; and the development of complex life here on Earth.		
PHYS 146	QUARKS, GLUONS, AND THE BIG BANG: PARTICLES AND COSMOLOGY	3
Non-mathematical course focusing on the elementary particles and their influence on the early evolution of the universe. Major topics are quarks and the forces they feel, Einstein's theory of relativity, Quantum Mechanics made fairly simple, and the Inflationary Universe. RESTRICTIONS: Requires high school algebra.		
PHYS 169	PERSPECTIVES ON PHYSICS AND ASTRONOMY	1 PF
First year seminar providing introduction to the practice of physics and astronomy. Topics include research, education, careers, and the relation of physics to society. RESTRICTIONS: Priority given to first year students. Intended for physics and astronomy majors.		

PHYS 201 INTRODUCTORY PHYSICS I 4

First course in a sequence with PHYS202 that provides an introduction to physics for students in the life and environmental sciences. Introduction to concepts of force, energy, and momentum, with examples of linear, rotational, and oscillatory motion. Solid body and fluid mechanics discussed.

PREREQ: MATH115 or MATH117 or MATH 241.

RESTRICTIONS: Requires a strong mathematics background in geometry, algebra and trigonometry. MATH221 is not adequate preparation. Only one course among PHYS104, PHYS201, PHYS207 and SCEN101 can count toward graduation.

PHYS 202 INTRODUCTORY PHYSICS II 4

Second course in a sequence with PHYS201 that provides an introduction to physics for students in the life and environmental sciences. Topics include wave motion, electricity and magnetism, and optics.

PREREQ: PHYS201 or PHYS207, and either MATH115, MATH117 or MATH241.

RESTRICTIONS: Requires strong mathematics background in geometry, algebra and trigonometry. MATH221 alone is not adequate preparation. Only one course from PHYS202 and PHYS208 can count toward graduation.

PHYS 207 FUNDAMENTALS OF PHYSICS I 4

First course in a sequence with PHYS208 that provides an introduction to physics for those in physical sciences and engineering. Emphasis on Newton's laws of motion and conservation principles. These are applied to motion in a gravitational field, and to rotation of a rigid body. Integrates conceptual understanding with extensive problem solving and laboratory experience.

COREQ: MATH241.

RESTRICTIONS: One year of high school calculus is recommended. Only one course from PHYS104, PHYS201, PHYS207 and SCEN101 can count toward graduation.

PHYS 208 FUNDAMENTALS OF PHYSICS II 4

Second course in a sequence with PHYS207 that provides an introduction to physics for those in the physical sciences and engineering. Emphasis on electro- and magnetostatics in terms of forces, fields and potentials, with some elements of circuit theory. Furthermore, magnetic induction and Maxwell's equations in integral form are introduced. Integrates conceptual understanding with extensive problem solving and laboratory experience.

PREREQ: PHYS207, MATH241.

COREQ: MATH242.

PHYS 211 OSCILLATIONS AND WAVES 3

Builds on and extends concepts of classical physics introduced in PHYS207 and complement PHYS208. Contains: 1) introduction to continuum physics, with elements of elasticity theory and fluid mechanics; 2) thorough discussion of wave propagation, interference and diffraction with emphasis on acoustics; 3) oscillations and resonance phenomena in both mechanical systems and electrical circuits.

PREREQ: PHYS207, MATH241.

COREQ: MATH242.

PHYS 245 INTRODUCTION TO ELECTRICITY AND ELECTRONICS 4

Fundamentals of electricity and magnetism specific to DC and AC circuit analysis, transient circuit behavior and rotating machinery. Fundamentals of analog and digital electronics, with emphasis on applications in engineering, integrated circuits and operational amplifiers.

PREREQ: PHYS207.

COREQ: MATH243.

RESTRICTIONS: Not for major credit.

PHYS 266 SPECIAL PROBLEM 1-3

PHYS 309 PHYSICS OF THE TWENTIETH AND TWENTY-FIRST CENTURIES 3

Fundamentals in physics that help form a modern understanding of science and technology. Intended for physical science and engineering majors, the emphasis is on electromagnetic radiation, quantum mechanics, nuclear reactions, Bohr atom, solid state physics and devices, and special relativity.

PREREQ: PHYS208 and MATH 242.

COREQ: MATH243.

PHYS 310 INTRODUCTION TO THERMAL PHYSICS 3

General overview of thermal phenomena. Provides detailed treatment of the First Law of Thermodynamics. Introduces concepts of micro- and macro-states, and entropy and the Second Law are treated within a statistical context. First and second laws are applied to power and refrigeration cycles. The concept of free energies and their connection to phase transitions is developed. Finishes with brief introduction to Boltzmann factor and partition function.

PREREQ: PHYS207 and MATH 242.

PHYS 313 PHYSICAL OPTICS 4

A detailed treatment of optics at an intermediate level appropriate for physics, engineering and other students with a physical science background. Emphasis is on physical concepts and analysis of geometric optics, wave optics and applications of optics.

COREQ: MATH243.

PHYS 333 FUNDAMENTALS OF ASTROPHYSICS 3

A quantitative approach to astronomy and astrophysics. Treatment of stars, the interstellar medium, galaxies, and cosmology.

PREREQ: PHYS208, MATH243.

PHYS 366 INDEPENDENT STUDY 1-3

PHYS 419 CLASSICAL MECHANICS I 3

Emphasizes fundamental principles of classical mechanics. Treats in detail and with mathematical rigor Newton's Laws, projectile motion with drag, conservation laws, oscillations, calculus of variation, Lagrange's equations and their application, central force problems, rotational motion of rigid bodies, and coupled oscillations and normal modes. Concludes with introduction to Hamiltonian mechanics.

PREREQ: PHYS207, PHYS208 and MATH243.

COREQ: MATH302 or MATH341.

PHYS 424 QUANTUM MECHANICS I 3

First in a sequence with PHYS425 that provides introduction to basic principles and applications of quantum mechanics. Emphasis on formalism of quantum mechanics. Schrodinger equation is solved for simple cases such as free-particle motion, simple harmonic oscillator and hydrogen atom, with a basic treatment of angular momentum. Topic of identical particles also considered.

May be crosslisted with CHEM424, ELEG424.

PREREQ: MATH 341 and MATH 342 or MATH302 and MATH349.

PHYS 425 QUANTUM MECHANICS II 3

Second in a sequence with PHYS424 that provides introduction to basic principles and applications of quantum mechanics. Emphasis on approximation methods with illustrative applications. Topics include: time-independent and time-dependent perturbation theory, variational principle, WKB approximation, and introduction to scattering. Applications of quantum mechanics to modern physics and technology discussed.

PREREQ: PHYS424.

PHYS 431 ACOUSTICS 3

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

PREREQ: MATH243 and PHYS207.

PHYS 434 ASTROPHYSICS AND THE ORIGINS OF LIFE 3

Develops fundamental concepts of astronomy, physics, chemistry, and biology in order to identify conditions that may have helped life to originate in the young Earth, and to determine other environments in which those conditions might have occurred in the course of planetary evolution. Attention paid to (1) current cosmology, (2) generation of chemical elements necessary for life, (3) basics of chemistry prior to appearance of life, (4) steps in molecular evolution which could have led to cellular life, and (5) identification of most extreme conditions in which life known to exist, with a survey of where these conditions may arise in solar system and beyond.

PREREQ: PHYS207 and PHYS208 or PHYS201 and PHYS202.

PHYS 445 ELECTRONICS FOR SCIENTISTS 3

Fundamentals of analog and digital electronics, with emphasis on applications in science. Circuit analysis, operational amplifiers, filters, gates, flip-flops, counters, analog to digital and digital to analog converters.

PREREQ: PHYS208.

PHYS 446 INSTRUMENTATION FOR SCIENTISTS 3

Electronic measurements and instrumentation with emphasis on applications in science. Amplification, noise, low-level signal recovery, lock-in amplifiers, digital signal averaging, frequency and time measurements, transducers, bridges, interfacing to laboratory computers and automation of experiments.

PREREQ: PHYS208.

PHYS 449 INTRODUCTION TO RESEARCH 1-6

Undergraduate research on an assigned problem carried out under the supervision of the staff.

PHYS 460 COMPUTATIONAL METHODS OF PHYSICS 3

Introduction to basic computational techniques in science with application to a number of disciplines of current research interest, such as quantum physics, biophysics, statistical mechanics and chaos.

PREREQ: MATH302 or MATH341, CISC105 or equivalent, PHYS208.

PHYS 465 SENIOR SEMINAR 1

Senior seminar for physics majors.

PHYS 466 INDEPENDENT STUDY 1-3

PHYS 469 OBSERVATIONAL ASTRONOMY 3

Hands-on experience focusing on techniques and analysis of astronomical observation, with emphasis on CCD imaging. Topics include celestial coordinates, telescope handling, CCDs, data reduction, and data analysis.

RESTRICTIONS: Meets at Mt. Cuba Observatory in Greenville. Credit can only be received for either PHYS469 or PHYS669, not for both.

PHYS 511 TOPICS IN HIGH SCHOOL PHYSICS: FORCE, MOTION AND ENERGY 3

Application of physics principles to topics related to Newton's Three Laws, work and mechanical energy.

RESTRICTIONS: Restricted to in-service high school science teachers.

PHYS 600 PHYSICS RESEARCH TALKS 1 PF

Lectures by Physics and Astronomy faculty describing their current research to aid graduate students in selection of an area of thesis research.

PHYS 601 INTRODUCTION TO TEACHING PHYSICS AND ASTRONOMY 1 PF

Introduction to the methods and techniques of teaching and tutoring physics at a level appropriate for teaching assistants and tutors of undergraduate courses in Physics and Astronomy. Discussion and workshop formats are employed.

PHYS 603 ELECTRICITY AND MAGNETISM I 3

First of a two-part sequence (with PHYS604) that provides an intermediate level treatment of electrostatics and magnetostatics, as well as an introduction to electrodynamics. Topics include a discussion of different techniques used for the calculation of electrostatic and magnetostatic fields in vacuum and in matter, and effects of time varying electric and magnetic fields.

PREREQ: PHYS208; MATH302.

COREQ: MATH503 suggested.

PHYS 604 ELECTRICITY AND MAGNETISM II 3

Second in a two-part sequence (with PHYS603) that provides an intermediate level treatment of electrodynamics. Specific topics include a discussion of conservation laws, electromagnetic waves and radiation, and the theory of special relativity.

PREREQ: PHYS603.

PHYS 607 METHODS OF MATHEMATICAL PHYSICS 3

Mathematics commonly used in physics. main topics are linear algebra, vector calculus, fourier series, integral transforms, and eigenfunction methods for differential equations.

PHYS 608 METHODS OF MATHEMATICAL PHYSICS 3

Continuation of PHYS607. Main topics are partial differential equations, complex variables, tensors, calculus of variations, group theory and representation theory, and probability and statistics.

PREREQ: PHYS607.

PHYS 610 QUANTUM MECHANICS 3

Wave-particle duality. The Schrodinger equation. One-dimensional problems. Spherically symmetric potentials. Orbital angular momentum. Applications including hydrogenic atoms.

PHYS 616 KINETIC THEORY AND THERMODYNAMICS 3

Postulates of equilibrium thermodynamics; review of relevant mathematics; entropy maximum principle; energy minimum principle; Legendre transformations. Entropy representation, internal energy representation, Helmholtz representation and Gibbs representation. Maxwell relations; reduction of partial derivatives; phase transitions; statistical mechanics via Boltzmann's elementary method; equipartition of energy; applications.

May be crosslisted with ELEG616.

PHYS 620 CLASSICAL MECHANICS II 3

Topics covered are Lagrangian and Hamiltonian dynamics, dynamics of systems of particles, rigid bodies and fluids, oscillations of systems of coupled particles, oscillations and waves in continuous systems. Provides a classical introduction to techniques used extensively in quantum and statistical physics.

PHYS 624 INTRODUCTION TO CONDENSED MATTER PHYSICS 3

X-ray diffraction, structure and properties of metals, insulators and semiconductors, and band theory of solids; includes electrical, optical, magnetic and thermal properties.

PREREQ: PHYS616.

PHYS 626 INTRODUCTION TO ATOMIC, MOLECULAR AND OPTICAL PHYSICS 3

Introduction to fundamental atomic and molecular systems with emphasis on modern topics including recent advances in laser physics, quantum computing, Bose-Einstein condensation, and molecular structures.

PREREQ: PHYS603 and PHYS610.

PHYS 632 ASTROPHYSICS 3

Survey of diverse astronomical objects and the physical principles used in modeling them. Emphasis on the observational basis and foundations of astrophysics. Stellar magnitudes, colors and spectra; the HR diagram; solar and stellar activity; binary stars; the phenomena of galactic and extragalactic astronomy.

PHYS 633 INTRODUCTION TO STELLAR ASTROPHYSICS 3

Introduction to the physics of stellar interiors and atmospheres. The evolution of stars is explored by studying the changes in internal composition due to nuclear

reactions. The physical processes underlying stellar spectra are investigated.

Computer simulations of stars and their atmospheres may be used.

PREREQ: PHYS632.

PHYS 634 PHYSICS OF THE SUN 3

Physics of processes which occur in the outer regions of the sun. Topics include radiative transfer, convection, sound waves, magnetic fields, the chromosphere, the corona, the solar wind, and the cycle of solar activity.

PREREQ: MATH302 or MATH341 plus 14 credit hours of physics.

PHYS 635 SPACE PHYSICS 3

Introduction to physical processes and environments in our solar system. Topics include overview of plasma physics, magnetohydrodynamics, and turbulence theory; properties of solar wind; planetary magnetospheres; cosmic ray transport and acceleration; experimental and observational techniques; space weather and its impact on human activities.

PREREQ: PHYS603.

PHYS 638 SELECTED TOPICS IN PHYSICS 3

Treatment of a specialized subject taken from the following list: particle astrophysics, magnetic materials, electron microscopy, elementary particles, cosmology, solar physics and other advanced topics.

RESTRICTIONS: May be repeated for credit when topics vary.

PHYS 641 NANOMATERIALS AND THIN FILM PROCESSES 3

Includes physical and chemical vapor deposition processes. Topics selected from Vacuum Science and Technology, Thin-Film Evaporation Processes, Discharges, Plasmas, Ion-Surface Interactions, Chemical Vapor Deposition, Laser Ablation, Substrate Surfaces and Thin-Film Nucleation, Epitaxy, Film Structure, Characterization of Thin Films and nanostructures, etc.

May be crosslisted with MSEG641.

PHYS 644 ELEMENTARY PARTICLES AND BIG BANG COSMOLOGY 3

An introduction to the world of elementary particles, the fundamental building blocks of matter, and the essential role they play in the formulation of hot big bang and inflationary cosmologies.

PREREQ: Some knowledge of quantum mechanics and special relativity is recommended.

PHYS 645 ELECTRONICS FOR SCIENTISTS 3

Fundamentals of analog and digital electronics, with emphasis on applications in science. Circuit analysis, operational amplifiers, filters, gates, flip-flops, counters, analog to digital and digital to analog converters.

PREREQ: PHYS208.

PHYS 646 INSTRUMENTATION FOR SCIENTISTS 3

Electronic measurements and instrumentation with emphasis on applications in science. Amplification, noise, low-level signal recovery, lock-in amplifiers, digital signal averaging, frequency and time measurements, transducers, bridges, interfacing to laboratory computers and automation of experiments.

PREREQ: PHYS208.

PHYS 650 QUANTUM COMPUTATION 3

Introduction to quantum computation and quantum information. Quantum logic gates and quantum circuits. Efficient quantum algorithms: quantum Fourier transform and its applications and quantum search algorithms. Physical implementations of quantum computation. Quantum error-correction and fault-tolerant quantum computation. Quantum cryptography.

PREREQ: Prior knowledge of quantum mechanics recommended and familiarity with linear algebra.

PHYS 660 COMPUTATIONAL METHODS OF PHYSICS 3

Introduction to basic computational techniques in science with application to a number of disciplines of current research interest, such as quantum physics, biophysics, statistical mechanics and chaos.

PHYS 669 OBSERVATIONAL ASTRONOMY 3

Hands-on focus on techniques and analysis of astronomical observation, with emphasis on CCD imaging. Topics include celestial coordinates, telescope handling, CCDs, data reduction, and data analysis.

RESTRICTIONS: Meets at Mt. Cuba Observatory in Greenville. Credit can only be received for either PHYS469 or PHYS669, not both.

PHYS 806 ATOMIC, MOLECULAR AND OPTICAL PHYSICS 3

Treatment of atomic and molecular systems including experimentally observed phenomena and modern theory techniques. Topics include atomic and molecular structure, light-matter interactions, laser physics, quantum computing, Bose-Einstein condensation, and scattering phenomena.

PREREQ: PHYS811.

COREQ: PHYS809.

PHYS 809 ELECTROMAGNETIC THEORY I 3

Review of statics; Maxwell's equations, physical optics and wave guides.

May be crosslisted with ELEG809.

PHYS 810	ELECTROMAGNETIC THEORY II	3
Geometric optics limit of Maxwell's equations, Lienard-Wiechert fields, radiation fields, radiation damping, Wheeler-Feynman theory. May be crosslisted with ELEG810. PREREQ: PHYS809.		
PHYS 811	QUANTUM MECHANICS	3
Develops formal description of quantum systems as states in a complex vector space. Topics include time evolution, path integrals, symmetry groups and conservation laws, parity, angular momentum and tensor operators, operator treatment of the harmonic oscillator, identical particles, time independent and time dependent perturbation theory, and radiative transitions. Includes a summary of special functions and boundary problems appropriate to simple quantum systems. PREREQ: PHYS610.		
PHYS 812	QUANTUM MECHANICS	3
Continuation of PHYS811. Topics include: many-particle wave functions and many-body operators, helium atom, second quantization, advanced topics in perturbation theory, the Hartree-Fock method, a continuation of radiative transitions, scattering theory, and relativistic quantum mechanics. Measurement theory and the interpretation of quantum mechanics. Applications of quantum mechanics discussed throughout. PREREQ: PHYS811.		
PHYS 813	STATISTICAL MECHANICS AND THERMODYNAMICS	3
Review of equilibrium thermodynamics and probability theory. Kinetic theory including the Boltzmann equation. Gibbsian ensemble theory in classical and quantum statistical mechanics. Classical ideal gases with internal degrees of freedom. Dissociation equilibrium. The ideal Bose and Fermi gases with elementary applications to fluids and solids. May be crosslisted with ELEG813. PREREQ: PHYS616.		
PHYS 815	THEORY OF RELATIVITY	3
Critique of the special theory introductory to the general theory; physical basis of the general theory; Einstein's field equations; and problems of gravitational motion and radiation. PREREQ: PHYS809.		
PHYS 817	ADVANCED CLASSICAL DYNAMICS	3
Theoretical treatment of classical dynamics. PREREQ: PHYS620.		
PHYS 822	QUANTUM FIELD THEORY	3
Introduction to quantum field theory. Covers symmetry groups (including Lorentz and Poincare groups), classical field theory, relativistic wave mechanics, second quantization, scalar, vector and Fermion fields, quantum electrodynamics, Feynman rules, renormalization theory and the renormalization group.		
PHYS 824	INTRODUCTION TO NANOPHYSICS	3
Introduction to rapidly-evolving ideas in nanophysics. Covers principles involved in fabrication of nanosystems and in measurement of phenomena on the nanoscale. Concepts necessary to appreciate applications in such areas as nano-electronics, nano-magnetism, nano-mechanics and nano-optics, are discussed.		
PHYS 825	INTERMEDIATE CONDENSED MATTER PHYSICS	3
Second course in condensed matter physics sequence. Review of electrons, Phonons, Adiabatic Approximation. One Electron Approximation, Hartree-Fock. Density Functional Theory. Linear Response Theory. Scattering of Particles by Crystals. Optical properties (semiconductors). Transport Properties (electrons, phonons, semiconductors). Bose-Einstein Condensation. PREREQ: PHYS624.		
PHYS 826	ADVANCED TOPICS IN CONDENSED MATTER PHYSICS	3
Topics include Superfluidity, Superconductivity, Magnetism, Linear response theory, Bose-Einstein condensation, Electrodynamics of solids. PREREQ: PHYS825. RESTRICTIONS: May be repeated for up to six credits when topics vary.		
PHYS 827	NUCLEAR PHYSICS I	3
First of a two-sequence of nuclear physics. Topics include (1) the Fermi Gas Model, (2) Nuclear Matter, (3) the Independent Particle Model, (4) the Nuclear Shell Model, (5) Collective models of Nuclei, and (6) Many-body methods. PREREQ: PHYS811 and PHYS812.		
PHYS 828	NUCLEAR PHYSICS II	3
Second of a two-sequence nuclear physics. Topics include (1) Brueckner Theory, (2) Effective Interactions, (3) Electromagnetic Transitions, (4) the Weak Interaction, and (5) Nuclear Reactions. PREREQ: PHYS827.		
PHYS 832	GALACTIC ASTRONOMY	3
A treatment of galaxies with an emphasis on the Galaxy. Topics include stellar dynamics, galactic structure, star counts, stellar clusters, mass models, and dark matter. PREREQ: PHYS620.		

PHYS 833	ASTROPHYSICS OF COMPACT OBJECTS	3
Formation and evolution of white dwarf stars, neutron stars and black holes. Topics include supernovae, cataclysmic variables, x-ray and gamma-ray sources. PREREQ: PHYS633.		
PHYS 835	PLASMA PHYSICS I: FLUIDS AND MHD	3
Introduction to the properties of electrically conducting fluids and ionized gases. Topics are: particle drifts and adiabatic invariants, cold plasma waves, magnetohydrodynamics (MHD), MHD waves, equilibria, shocks, and instabilities. For each topic, applications to solar system space plasmas, astrophysical plasmas, and laboratory plasmas are presented. PREREQ: PHYS603 or equivalent. COREQ: PHYS604 or equivalent.		
PHYS 838	ADVANCED TREATMENT OF SELECTED TOPICS	3-6
Selected topics from: quantum field theory, renormalization group and critical phenomena, nuclear theory, elementary particles and applications of group theory in physics. RESTRICTIONS: May be repeated for up to six credit hours when topics vary.		
PHYS 862	SOLID STATE SEMINAR	1
Lectures and discussions by faculty and students on specialized topics in solid state physics.		
PHYS 868	RESEARCH	1-9
PHYS 869	MASTER'S THESIS	1-6
PHYS 964	PRE-CANDIDACY STUDY	3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.		
PHYS 969	DOCTORAL DISSERTATION	1-12 PF

PHYSICAL THERAPY

PHYT 166	SPECIAL PROBLEM	1-3
PHYT 466	INDEPENDENT STUDY	1-6
PHYT 600	PHYSICAL THERAPY AS A PROFESSION	1
Ethics, licensure laws and practice of physical therapy are explored. The Guide to Physical Therapy Practice is introduced and the importance to effective practice discussed. RESTRICTIONS: Open to physical therapy graduate students only.		
PHYT 604	FUNCTIONAL ANATOMY AND BIOMECHANICS	4
Gives a description of normal and abnormal human movement. Emphasis on joint structure and function and gait using arthrokinematic and osteokinematic analysis. Evaluation procedures such as EMG, cinematography and computer simulations utilized. PREREQ: PHYT622. RESTRICTIONS: Open to physical therapy graduate students only or with permission of instructor.		
PHYT 606	RESEARCH	3
An overview of methodological issues in the conduct of physical therapy research. Topics include scientific method, experimental design, statistical procedures and technical writing. Student expected to critically analyze current physical therapy literature. RESTRICTIONS: Open to physical therapy graduate students only.		
PHYT 608	MUSCULOSKELETAL EVALUATION AND TREATMENT	4
In-depth analysis of evaluation and treatment strategies of spinal and extremity joints, muscles and connective tissue. Emphasizes research on the physiological basis of immobilization and remobilization. The diagnoses, prognosis, treatment, consultation and basis for referral of orthopedic and musculoskeletal disorders is examined. PREREQ: PHYT604, PHYT622, PHYT626. RESTRICTIONS: Open to physical therapy graduate students only.		
PHYT 614	SPORTS PHYSICAL THERAPY	3 PF
Advanced orthopedics with emphasis in sports related injuries. Discuss evaluation and intervention of the athlete in the various major joints of the body, as well as other related topics in sports and orthopedics. PREREQ: PHYT608, PHYT622, PHYT604, PHYT802, AND PHYT808. RESTRICTIONS: Open to physical therapy graduate only.		
PHYT 620	EDUCATIONAL PROCESS IN COMMUNITY HEALTH	1
Focuses on the learning/teaching process as defined in the Guide to Physical Therapy Practice for application to the teaching roles of the health professional. RESTRICTIONS: Open to physical therapy graduate students only.		

- PHYT 622 CLINICAL GROSS ANATOMY 6**
Emphasis on structural and functional aspects of regions of body under study by means of human cadaver, bones, surface anatomy, lectures, computer technology and demonstrations. Clinical significance of anatomical structures is stressed.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 623 CLINICAL NEUROSCIENCES 4**
A study of the structure and function of the human nervous system with major emphasis on the cause-effect relationships between lesions and their symptoms. Emphasis on the neural mechanisms controlling movement.
PREREQ: PHYT622.
RESTRICTIONS: Open to physical therapy graduate students only or by permission of instructor.
- PHYT 624 BASIC EVALUATION TECHNIQUES 2**
Provides an understanding of the philosophy and practice of patient evaluation and physical therapy diagnosis. Muscle performance testing and measurement of joint motion of the extremities emphasized.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 626 ADVANCED REGIONAL ANATOMY 3 PF**
Structural and functional aspects of regions of the body under study are emphasized by means of a dissection of a specific region of the human body.
PREREQ: PHYT622.
- PHYT 630 HUMAN MOVEMENT CONTROL 3**
Examines theoretical, methodological and empirical issues required for understanding of control and coordination of human movement. Readings and group discussion of implication of issues raised in the literature. Development of proposal to study aspect of motor behavior.
May be crosslisted with BMSC630.
RESTRICTIONS: Open to DPT Program students only.
- PHYT 631 PHYSICAL THERAPY IN THE ACUTE CARE ENVIRONMENT 4**
Presents diagnoses commonly seen in the acute care environment. The pathological, anatomical, evaluation, documentation and treatment considerations in managing these diagnoses are discussed.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 632 APPLIED PHYSIOLOGY I 3**
In-depth analysis of the physiological mechanisms of the cardio-pulmonary system. Lectures in normal and abnormal function of this system. Emphasis on cardiopulmonary testing and rehabilitation techniques including stress tests and pulmonary function tests.
PREREQ: PHYT622.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 633 APPLIED PHYSIOLOGY II 3**
Discusses the research on the effects of exercise on the various patient populations (not including cardiopulmonary). Emphasis placed on the musculoskeletal system and on exercise prescription and progression.
PREREQ: PHYT632.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 634 ELECTROTHERAPY 4**
Provides an understanding of the physiological basis for the use of physical agents and electrotherapy. Emphasis placed on patient evaluation and clinical applications of modalities used in physical therapy clinics.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 635 THERMAL AGENTS AND SOFT TISSUE TECHNIQUES 2**
An introduction to thermal modalities and soft tissue mobilization techniques commonly used in current physical therapy practice.
PREREQ: PHYT622.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 641 ROUNDS I 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 642 ROUNDS II 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 643 ROUNDS III 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 644 ROUNDS IV 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 801 MEDICAL SCIENCE I: GENERAL MEDICINE 3**
Lectures in pathology, clinical medicine, cardiology and pharmacology across the lifespan. Implications for physical therapy are emphasized.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 802 MEDICAL SCIENCE II: ORTHOPEDICS AND MUSCULOSKELETAL IMAGING 4**
Focuses on orthopedic pathology, medical and surgical management of musculoskeletal conditions across the lifespan with implications for physical therapy intervention and musculoskeletal imaging. Strengthens physical therapist clinical expertise in comprehensive patient evaluation, diagnosis, treatment planning, and physician interaction.
- PHYT 803 MEDICAL SCIENCE III: NEUROLOGY 3**
Lectures of basic principles of neurology throughout the lifespan. Emphasis placed on medical principles related to diseases most frequently encountered in physical therapy practice.
PREREQ: PHYT623.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 804 NEUROPHYSIOLOGIC EVALUATION AND TREATMENT 4**
Basic evaluation and treatment methods for managing patients with neurological dysfunctions. Analysis of these methods in light of current issues and theories of motor control, motor learning and neurobehavioral plasticity. Emphasis on learning strategies for treatment rather than through details of specific approaches.
PREREQ: PHYT623.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 805 REHABILITATION 4**
Advanced instruction in the theory, research and clinical skills necessary for the comprehensive management of clients in a rehabilitation setting with an emphasis on building evidence-based program plans.
PREREQ: PHYT623 and PHYT631.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 806 GERIATRICS 3**
Personal-social, biological, socioeconomic and physiological factors accompanying the aging process examined and their impact on physical therapy intervention explored.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 807 ADVANCED SEMINAR 5**
Lectures pursue various topics in greater depth and develop advanced clinical skills. Topics include emergency response, wound care, hand therapy, women's health issues, vestibular rehabilitation and aquatic therapy.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 808 SPINE MANAGEMENT 4**
Discusses the biomechanics, pathophysiology and disability associated with spine pain and dysfunction. Includes an understanding of the role of physical therapy evaluation in the determination and implementation of physical therapy interventions.
PREREQ: PHYT604, PHYT608, PHYT622, and PHYT624.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 809 PSYCHOSOCIAL ASPECTS OF HEALTH AND DISEASE 3**
Discusses the psychosocial characteristics of patient populations and therapists that impact on the rehabilitation process. Death and dying, social implications of illness diagnosis and other topics are discussed.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 810 CLINICAL MANAGEMENT 2**
Discusses concepts of administration and issues in the management of hospital clinics, private practice and consultative ventures. Students introduced to current trends in billing and reimbursement strategies used by clinicians.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 811 PEDIATRICS 4**
Instruction in the theory, research and clinical skills necessary for the comprehensive management of pediatric clients and their families. Emphasis on the incorporation of modern developmental science into evidenced-based program plans.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 812 PEDIATRIC INTEGRATED CLINICAL EXPERIENCE 1 PF
Mentored clinical experience in pediatric healthcare facilities.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

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

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

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

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

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

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

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

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

PLANT AND SOIL SCIENCES

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

PLSC 101 BOTANY I 4
Introductory botany stressing fundamental concepts and processes in plants. Topics include cell structure and function, anatomy, genetics, reproduction, physiology, taxonomy, phylogeny and ecology.

PLSC 103 LANDSCAPE AND FIELD SKETCHING 4
Introduction to various field sketching and nature documentation techniques of landscape subjects. Emphasis on nature journaling using mixed media.

PLSC 105 INTRODUCTORY FORESTRY 3
Distribution, ecology, value, measurement and management of forest systems.

PLSC 120 FLOWER ARRANGING 1
Hands-on learning about floral supplies and mechanics, basic skills of preparing and arranging flowers and how to maximize an arrangement's lasting quality. Design techniques discussed.

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

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

PLSC 151 INTRODUCTION TO CROP SCIENCE 3
Plant structure and plant processes with practical application to the production and management of commercial crops.
RESTRICTIONS: Credit not allowed if preceded by PLSC401.

PLSC 154 TOPICS IN PRODUCTION AND MANAGEMENT OF ORNAMENTAL PLANTS 1-6
Topics combine theory and practice in the areas of turf and ornamental horticulture.
RESTRICTIONS: Not for major credit except as elective.

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

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

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

PLSC 202 HISTORY OF LANDSCAPE DESIGN 3
Overview of the history of landscape design from pre-history through the Modern and Post Modern Eras.

PLSC 203 PORTFOLIO REVIEW 1
Students present their work pertinent to the study of landscape design for critique by professional landscape designers. This includes work completed in design related courses including PLSC103,202 and 232. The work may also include samples of the student's independent work in artistic expression and landscape design projects.
PREREQ: PLSC103, PLSC202 and PLSC232.

PLSC 204 INTRODUCTION TO SOIL SCIENCE 3
Fundamentals of soil including origin, composition and classification; physical, chemical and biological properties; significance of soil properties to use and management, and to soil-plant relationships.
PREREQ: CHEM101 or CHEM 103.

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

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

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

PLSC 214 INDIGENOUS WOODY PLANTS OF THE EASTERN UNITED STATES 4
Focus on Eastern native United States and broad-leaf and coniferous plants used in the landscape. Topics include native habitat, ornamental features, potential pest problems and taxonomy using cut samples as well as landscape specimens.

- PLSC 232 BASIC LANDSCAPE DESIGN 4**
Application of design principles to actual field problems, drafting and presenting techniques
- PLSC 253 TRIAD INTERNSHIP 3**
On-site experience that introduces students to three regional institutions of public horticulture. For sophomores and juniors, giving them a broad orientation to the leaders, practices and operations of different botanic gardens, arboreta and other established sites of public horticulture.
- PLSC 270 BIOTECHNOLOGY: SCIENCE AND SOCIOECONOMIC ISSUES 3**
Introduction to agricultural biotechnology and socio-economic issues. Introduces genetic engineering and the basic scientific theory and the applications of biotechnology in agriculture production and research. Presents issues surrounding biotechnology-risk and technology assessment, animal rights, public and private research interface, media and environmental perspectives, consumer acceptance, regulation and economic development.
Crosslisted with ANFS270.
- PLSC 275 HEALING PLANTS: MEDICINE, MYTH, MAGIC 3**
Merges science, literature, folklore, world cultures, alternative medicine and analysis of current events. Hands-on learning activities include student-researched/developed medicine walk and propagating healing plants. Filed trip to Delaware's Herbarium and to plant-compounds analytical laboratory at Delaware State University planned.
- PLSC 300 PRINCIPLES OF ANIMAL AND PLANT GENETICS 3**
Introduction to the theory and application of genetics as related to the improvement of plants and animals.
Crosslisted with ANFS300.
PREREQ: ANFS101 and ANFS140, or PLSC101.
- PLSC 301 CAD FOR LANDSCAPE DESIGNERS 3**
Introduction to the application of computer assisted drafting (CAD) and 3-D modeling programs useful in the landscape industry.
- PLSC 302 VEGETABLE SCIENCE 4**
Basic factors affecting productivity and marketability of vegetable crops.
- PLSC 303 INTRODUCTORY PLANT PATHOLOGY 4**
Introduction to nature, causes, development, effects and control of plant disease. Laboratory involves microscope use for examining plant disease specimens and fungal structures, and experience in isolation and culture of pathogenic fungi.
PREREQ: PLSC201 or BISC207.
- PLSC 305 SOIL FERTILITY AND PLANT NUTRITION 4**
Practical application of the basic principles of soil chemistry, physics and microbiology to modern land use programs. Covers basic principles of nutrient management (availability and cycling in soils, roles in plant nutrition), soil acidity and liming, soil testing, environmental fate of non-essential elements and organic chemicals, and role of risk assessment in soil management.
PREREQ: CHEM102 and PLSC204.
- PLSC 306 INTRODUCTION TO PLANT MOLECULAR BIOLOGY 3**
Molecular biology of higher plants, including organization of plant genes, genomes, gene expression, gene transfer and genetic engineering.
PREREQ: BISC207.
- PLSC 308 FRUIT SCIENCE 3**
Major temperate zone fruit crops, climatic requirements, growth and fruiting habits, and principles involved in production, harvesting and marketing.
- PLSC 310 ANIMAL AND PLANT GENETICS LABORATORY 1**
Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems.
Crosslisted with ANFS310.
COREQ: ANFS300.
- PLSC 313 TURF ESTABLISHMENT AND MAINTENANCE 4**
Factors affecting the establishment and maintenance of fine and utility turf; emphasis on the management of golf courses, athletic fields and sod farms.
- PLSC 319 ENVIRONMENTAL SOIL MICROBIOLOGY 4**
Introduction to soil microbiology and biochemistry as related to environmental issues: microbial diversity and ecology in soil-plant systems, transformations of natural and synthetic organic compounds, biocycling of nutrients and metals, bioremediation. Introduction to laboratory methods for studying soil microorganisms and associated processes.
PREREQ: PLSC204 and CHEM102.
- PLSC 325 NURSERY PRODUCTION I 2**
The planning, production, management and marketing of field grown nursery stock. Student selects crops, propagates them and is responsible for all aspects of production, including cost accounting.
- PLSC 326 NURSERY PRODUCTION II 2**
The planning, production, management and marketing of container-grown nursery stock. Student selects crops, propagates them and is responsible for all aspects of production, including cost accounting.
- PLSC 330 LANDSCAPE CONSTRUCTION DETAILS 4**
Introduction to principles involved in the design and installation of landscape elements: stone, brick, concrete, wood and metal.
- PLSC 331 LANDSCAPE CONSTRUCTION SYSTEMS 4**
Introduction to principles involved in contour grading, site drainage, lighting and irrigation design related to landscaping.
- PLSC 333 ESTIMATING AND BIDDING 1**
Overview of the various estimating techniques used by landscape professionals to produce accurate bids and proposals.
- PLSC 340 PLANTS OF ECUADOR 3**
Plants of major forest types in Ecuador, including native and introduced species as well as plants of medicinal, industrial and agricultural use. Field trips demonstrate techniques and provide field experience in plant identification.
- PLSC 341 TROPICAL FOREST ECOLOGY 3**
See ENWC341 for course description.
- PLSC 344 FOREST ECOLOGY 2**
Dendrology, measurement techniques, tree biology, forest ecology, and concepts of forest management. Field work, demonstrations and guest lecturers in major forest types of the mid-Atlantic region.
Crosslisted with ENWC344.
PREREQ: BISC208.
- PLSC 364 LANDSCAPE HORTICULTURE INTERNSHIP 1-6**
Supervised, faculty-monitored, career-related experience in one or more aspects of the ornamental horticulture industry.
PREREQ: PLSC133.
- PLSC 366 INDEPENDENT STUDY 1-6**
- PLSC 390 HONORS COLLOQUIUM: CHOCOLATE 3**
The use of chocolate and its origin, horticulture, chemistry, nutrition and sensory evaluation.
- PLSC 399 TEACHING EXPERIENCE 1-2 PF**
Practical teaching experience assisting in instruction of an undergraduate course.
RESTRICTIONS: Requires overall gpa of 2.75 and 3.0 in major. Must have taken the course in which assisting or have equivalent experience.
- PLSC 401 AGRONOMIC CROP SCIENCE 3**
Production and management of the major grain and forage crops, with emphasis on diagnosis of production problems and decision making.
PREREQ: PLSC151.
- PLSC 403 NURSERY AND GARDEN CENTER MANAGEMENT 4**
Production, maintenance and marketing of plants relative to the establishment and management of a nursery or garden center.
PREREQ: PLSC101 or PLSC151.
- PLSC 404 PLANT TAXONOMY 3**
Identification, classification and nomenclature of vascular plants, including sight recognition as well as use of alternative-statement keys. Emphasis on economic plant families of eastern United States.
- PLSC 408 ADVANCED LANDSCAPE DESIGN 4**
Advanced design studio projects including small and large-scale landscapes, investigating issues pertinent to both residential and non-residential settings.
- PLSC 410 INTRODUCTION TO PLANT PHYSIOLOGY 3**
Physiology of green plants: light and energy conversion, carbon fixation, nitrogen metabolism, amino acid synthesis, protein synthesis mechanics and regulation, water and solute utilization, nutrient translocation, photomorphogenesis and photoperiodism and growth hormones, considered at fundamental level of operation.
PREREQ: PLSC201 or BISC208, and CHEM213 or CHEM321.
- PLSC 411 DIAGNOSTIC PLANT PATHOLOGY 3**
Consideration of major pathogenic causes of economic losses of plants. Emphasis on principles of etiology, epiphytology, symptoms and control.
PREREQ: PLSC303.
- PLSC 415 VASCULAR PLANT ANATOMY 3**
A developmental and comparative study of the cells, tissues and organs of vascular plants. Readings in the current anatomical literature.
- PLSC 416 PLANT VIROLOGY 4**
Epidemiology, detection, identification and control of plant viruses and virus-like agents.
PREREQ: PLSC303.

- PLSC 417 GREENHOUSE MANAGEMENT 4**
Greenhouse structures, environmental control, cultural techniques and general management practices in greenhouse operations. Laboratory exercises supplement lecture material.
- PLSC 419 SOIL MICROBIOLOGY 4**
Characterization of microorganisms and microbial habitats in soil environments. Processes and interactions involving soil microorganisms with respect to agricultural productivity and environmental quality. Introduction to laboratory techniques for the observation, enumeration and isolation of soil microorganisms and measurement of associated activities.
- PLSC 422 PLANT PROPAGATION 3**
Practical and physiological aspects of the propagation of economic plants including both sexual and asexual methods.
- PLSC 429 INTRODUCTION TO THE FUNGI 4**
Introduction to the terminology, structures, and classification of the fungi, through the study of representative cultures and specimens. Fungi, mushrooms and molds as food, in industry, plant pathology, and in human health and wellness. Practical laboratory experience emphasized.
- PLSC 433 PUBLIC GARDEN MANAGEMENT 3**
Introduces the history and principles of public horticulture institutional development within the United States. Comparisons of institutional initiation strategies, collections management, mission development and planning, revenue streams and budgeting, university and non university settings, and public and private considerations for operations.
- PLSC 435 PLANT DEVELOPMENTAL BIOLOGY 3**
Anatomical and molecular analysis of plant growth and development with focus on how genes regulate pattern formation and cellular differentiation.
PREREQ: PLSC300.
- PLSC 438 FATE/TRANSPORT SOIL CONTAMINANTS 3**
Fundamental concepts and mechanisms of contaminant fate and transport in porous media. Includes overview of soil and groundwater as resources; types of soil and groundwater contaminants; transformation and attenuation of contaminants; solute transport in saturated and unsaturated systems.
PREREQ: MATH221.
- PLSC 444 PHYSIOLOGY OF PLANT STRESS 3**
Angiosperms' response to biotic and abiotic environmental stresses; mineral nutrients, salt, drought, cold, heat, light, pathogens and herbivores at the physiological and molecular levels.
PREREQ: PLSC410.
- PLSC 450 PLANTING DESIGN 3**
Comprehensive solution of landscape problems. Field application of principles of construction and design.
PREREQ: PLSC211, PLSC212 and PLSC332.
- PLSC 453 PUBLIC HORTICULTURE PRACTICUM 3**
Focused on-site experience at a public horticulture institution that exposes students to specific management styles, administration structures and decision making situations. Students work with Longwood Graduate Program Fellows to coordinate this experience.
PREREQ: PLSC253.
- PLSC 455 ISSUES IN PLANT AND SOIL SCIENCES 3**
An introduction to current and emerging issues facing the plant and soil sciences professions. Ethics, professionalism, environment, politics, technology and practices will be the foci of discussion groups, student oral and written presentations, case studies, guest lecturers and field trips.
RESTRICTIONS: Open to junior and senior majors only.
- PLSC 461 SOILS AND WETLAND DELINEATION 4**
Soil taxonomy, use of a soil survey, properties of hydric soils and wetland delineation using soil characteristics, hydrology and plant ecological principles.
PREREQ: PLSC101, PLSC204 and PLSC205.
- PLSC 465 SEMINAR 1**
Oral and written reports in one of the fields of plant science.
- PLSC 466 INDEPENDENT STUDY 1-6**
- PLSC 470 WEED BIOLOGY AND CONTROL 4**
Introduction to weed science: weed biology and identification, survival strategies, competition, and impact of weeds. Weed management principles and practices including cultural, biological, and chemical control methods.
PREREQ: PLSC101 or PLSC151 or PLSC204.
- PLSC 601 AGRONOMIC CROP SCIENCE 3**
Production and management of the major grain and forage crops, with emphasis on diagnosis of production problems and decision making.
PREREQ: PLSC151.
- PLSC 603 SOIL PHYSICS 3**
Examines the importance of soil physics in relation to other disciplines of soil and environmental sciences. Topics include status of water in soil, fundamental principles of water flow, differences between saturated and unsaturated water flow, water balance in the field, infiltration, evapotranspiration, heat, gas and solute (contaminant) transport in soil.
May be crosslisted with BREG603.
- PLSC 604 PLANT TAXONOMY 3**
Identification, classification and nomenclature of vascular plants, including sight recognition as well as use of alternative-statement keys. Emphasis on economic plant families of eastern United States.
- PLSC 605 PLANT BREEDING 3**
Improvement of crops through application of genetic principles to breeding methods.
PREREQ: ANFS300 or PLSC300 or ENWC300.
RESTRICTIONS: Includes at least two mandatory Saturday field trips.
- PLSC 607 PLANT AND SOIL WATER RELATIONS 3**
Environmental aspects, measurement and control of water flux and storage in the soil-plant-atmosphere continuum; and development and significance of plant water deficits.
- PLSC 608 ENVIRONMENTAL SOIL CHEMISTRY 3**
Principles of soil chemical reactions and their application to environment including: inorganic and organic soil components, soil solution-solid phase equilibria, sorption phenomena, ion exchange reactions, kinetics of soil chemical processes, redox chemistry, soil acidity and salinity.
May be crosslisted with CHEM608.
PREREQ: CHEM102 or CHEM104.
- PLSC 611 DIAGNOSTIC PLANT PATHOLOGY 3**
Consideration of major pathogenic causes of economic losses of plants. Emphasis on principles of etiology, epiphytology, symptoms and control.
PREREQ: PLSC303.
- PLSC 615 VASCULAR PLANT ANATOMY 3**
A developmental and comparative study of the cells, tissues and organs of vascular plants. Readings in the current anatomical literature.
- PLSC 616 PLANT VIROLOGY 4**
Epi, detection, identification and control of plant viruses and virus-like agents.
PREREQ: PLSC303.
- PLSC 619 SOIL MICROBIOLOGY 4**
Characterization of microorganisms and microbial habitats in soil environments. Processes and interactions involving soil microorganisms with respect to agricultural productivity and environmental quality. Introduction to laboratory techniques for the observation, enumeration and isolation of soil microorganisms, and measurement of associated activities.
- PLSC 629 INTRODUCTION TO THE FUNGI 4**
Introduction to the terminology, structures, and classification of the fungi, through the study of representative cultures and specimens. Fungi, mushrooms and molds as food, in industry, plant pathology, and in human health and wellness. Practical laboratory experience emphasized.
- PLSC 630 COLLECTIONS MANAGEMENT AND CURATION 3**
Organization and maintenance of curatorial records including; plant records and labeling, organization of seed plants (phylogeny), nomenclature, policy statements and management concerns.
COREQ: PLSC402.
- PLSC 633 PUBLIC GARDEN MANAGEMENT 3**
Introduces the history and principles of public horticulture institutional development within the United States. Comparisons of institutional initiation strategies, collections management, mission development and planning, revenue streams and budgeting, university and non-university settings, and public and private considerations for operations.
- PLSC 635 PLANT DEVELOPMENTAL BIOLOGY 3**
An anatomical and molecular analysis of plant growth and development with a focus on how genes regulate pattern formation and cellular differentiation.
- PLSC 636 ADVANCED PLANT GENETICS 3**
Advanced survey of genetics in higher plants, including molecular methods of plant biotechnology. Topics include genome composition and evolution, disease resistance, transposable elements and retrotransposons, DNA methylation and epigenetics, quantitative traits, chromosome structure and gene expression.
PREREQ: PLSC300 and PLSC306.
- PLSC 644 PHYSIOLOGY OF PLANT STRESS 3**
Angiosperms' response to biotic and abiotic environmental stresses; mineral nutrients, salt, drought, cold, heat, light, pathogens and herbivores at the physiological and molecular levels.
PREREQ: PLSC410.

PLSC 660	PESTICIDES IN THE ENVIRONMENT	3
Roll of pesticides in agriculture and public health. Classification and environmental fate in soil, water and atmosphere. Management practices, non-target effect, detoxification of pesticide waste, risk assessment, regulation, impact of pesticide alternatives. PREREQ: CHEM102.		
PLSC 670	WEED BIOLOGY AND CONTROL	4
Introduction to weed science: weed biology and identification, survival strategies, competition, and impact of weeds. Weed management principles and practices including cultural, biological, and chemical control methods. PREREQ: PLSC101 or PLSC151 or PLSC204.		
PLSC 675	CURRENT TOPICS: PLANT BIOLOGY	1 PF
Journal club for those interested in discussing hot issues of plant biology.		
PLSC 800	CURRENT TOPICS IN PLANT SCIENCE	1-3
Discussion of selected topics and recent literature in plant science.		
PLSC 802	PROFESSIONAL DEVELOPMENT	1
Professional development including grantsmanship, manuscript writing and reviewing, resume preparation, job interviewing and presentation of research at professional meetings.		
PLSC 804	PLANT MOLECULAR BIOLOGY	3
Fundamental and applied aspects of plant molecular biology, including organization of plant genes, genomes, gene expression, gene transfer and genetic engineering. PREREQ: ANFS670 or BISC653.		
PLSC 805	INSECT-PLANT CHEMICAL ECOLOGY	3
Chemically mediated interactions between insects and plants and other organisms involved in the relationship. Perceptual organs, behavioral and physiological response, plant-insect interactions, insect and plant defense, and intraspecific interactions that relate to natural chemicals produced by plants and insects. Presentation-discussion format. Crosslisted with ENWC805.		
PLSC 810	KINETICS AND SURFACE CHEMISTRY OF SOILS	3
Kinetics and mechanisms of soil chemical reactions, including application of chemical kinetics to natural systems, rates of sorption/desorption, redox, precipitation/dissolution, and ion exchange processes and application of surface spectroscopic and microscopic techniques to elucidate reactions at the soil mineral/water interface. May be crosslisted with CHEM810. PREREQ: PLSC608, and either CHEM418 or CHEM443.		
PLSC 819	ECOLOGICAL SOIL MICROBIOLOGY	3
Ecological principles of microbial activities and processes in soil-plant systems: dynamics of soil and rhizosphere populations, symbiotic interactions with plants, and selected topics in environmental quality. PREREQ: PLSC619.		
PLSC 832	BOTANIC GARDEN MANAGEMENT	1-10
Lecture and laboratory format conducted at Longwood Gardens to familiarize Longwood Fellows with the operations and purposes of all areas of Longwood Gardens and other botanic gardens. RESTRICTIONS: May be repeated for up to ten credits.		
PLSC 833	SEMINAR: SOIL SCIENCE	1
Current topics in soil science discussed from the literature.		
PLSC 864	SEMINAR PLANNING AND DEVELOPMENT	1 PF
Planning, developing and hosting a major seminar series: topic and speaker selection, format and schedule development, marketing, local arrangements and hosting.		
PLSC 865	SEMINAR	1
PLSC 868	RESEARCH	1-9
PLSC 869	MASTER'S THESIS	1-6
PLSC 874	TOPICS IN MOLECULAR BIOLOGY	1
Provides a forum for the discussion of current topics in molecular biology, with critical reading of relevant primary literature. Crosslisted with ANFS874. RESTRICTIONS: Requires permission of instructor.		
PLSC 964	PRE-CANDIDACY STUDY	3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.		
PLSC 969	DOCTORAL DISSERTATION	1-12 PF

PORTUGUESE

PORT 105	BRAZILIAN PORTUGUESE I - ELEMENTARY	4
Introduction to Brazilian Portuguese language and development of speaking, listening, reading and writing skills through the use of basic texts.		
PORT 106	BRAZILIAN PORTUGUESE II - ELEMENTARY/INTERMEDIATE	4
Completion of basic Brazilian Portuguese. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: PORT105. RESTRICTIONS: Two or three years of high school Brazilian Portuguese acceptable in lieu of prerequisite.		
PORT 207	BRAZIL: PAST AND PRESENT	3
Introduction to Brazil, its people, and the issues confronting them, with emphasis on understanding historical developments that have shaped contemporary Brazilian society. RESTRICTIONS: Taught abroad in English. Does not satisfy the Arts and Sciences language requirement.		
PORT 216	PORTUGUESE FOR SPANISH SPEAKERS I	3
Covers all the basic structures and vocabulary of Portuguese in a concentrated manner covering all of the material in PORT105 and PORT106 in one single semester. PREREQ: Any 300-level Spanish course, or graduate status in Spanish, or being a Heritage speaker of Spanish.		
PORT 316	INTENSIVE PORTUGUESE FOR SPANISH SPEAKERS II	3
Continuation of PORT 315. Continued refinement of Portuguese grammar and further development of listening and speaking skills. Includes a reading and writing component. PREREQ: PORT315 or equivalent. RESTRICTIONS: Not open to native speakers of Portuguese.		

POLITICAL SCIENCE

POSC 100	INTRODUCTION TO POLITICAL SCIENCE	3
Introduction to the study of central concepts of the discipline, such as political power, authority, decision making, conflict management, representation and institutions of government.		
POSC 102	CIVICS AND ECONOMICS FOR TEACHERS	3
Provides teacher candidates with an understanding of the fundamental content and concepts embedded within the core social studies subjects of civics and economics as they relate to K-8 standards-based instruction. Focuses on developing an understanding of the content in the two subject areas and how that content might be taught effectively. May be crosslisted with ECON102. RESTRICTIONS: Elementary teacher education majors only. Cannot be taken for credit toward economics major or minor.		
POSC 150	AMERICAN POLITICAL SYSTEM	3
Constitutional principles, structure and functions of the political process in the United States.		
POSC 151	EXPLORING AMERICAN POLITICS	1
Analysis of an array of problems in American government and politics. Individual and group participation expected. COREQ: POSC150. RESTRICTIONS: Open only to freshmen and sophomore political science and political science education majors.		
POSC 201	INTRODUCTION TO GLOBAL ISLAM	3
Introduction to theology, philosophy and history of Islam. Provides basic introduction to Quran, Traditions of Prophet Muhammad, and fundamentals of Islam law and jurisprudence. Explores different interpretations and manifestations of Islam, both historically and contemporaneously. Surveys rapid globalization of Islam and Muslim communities. May be crosslisted with HIST201.		
POSC 202	INTRODUCTION TO SCIENTIFIC INQUIRY	3
Introduces students to the foundations of scientific social research, with emphasis on political phenomena. Prepares students in the skills needed to conduct scientific research. RESTRICTIONS: Students cannot take both POSC202 and POSC300 for credit.		
POSC 211	INTRODUCTION TO POLITICS IN DEVELOPING COUNTRIES	3
Forces affecting politics in emerging nations. Impact of colonialism, economic development, military rule, instability and environment. Discussion of how developing nations affect the world political system.		

RESTRICTIONS: Only one of either POSC211 or POSC311 can count for degree credit.

POSC 220 INTRODUCTION TO PUBLIC POLICY 3
Emphasis on what government does, with a focus on substantive policy areas as well as the mechanisms of policy making. Case studies of policy areas (e.g., health policy, environmental policy, social welfare policy, etc.) used to illustrate processes of agenda setting, decision making and policy implementation.

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

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

POSC 270 COMPARATIVE POLITICS 3
Introduction to comparison of politics "within nations." Covers Europe, Africa, Asia and Latin America.

POSC 285 CURRENTS IN POLITICAL THEORY 3
Basic introduction to political philosophy, organized not around particular historical periods or specific philosophers, but around some of the most important, enduring questions of political theory: What is the nature of the state? What are the obligations and responsibilities of citizens?

POSC 300 DATA ANALYSIS FOR POLITICAL SCIENCE 3
Applied statistical analysis, including regression, analysis of variance, descriptive statistics and exploratory data analysis, statistical inference, and measurement.

POSC 301 STATE AND LOCAL GOVERNMENT 3
American federalism with emphasis on government and politics, with special attention to Delaware.

POSC 303 PUBLIC ADMINISTRATION 3
Introduction to management in the public sector; personnel, budgeting, leadership, ethics, and the role of civil service in government.

POSC 309 POLITICAL CULTURE BY COUNTRY 3
Introduction to the political and civic cultures underpinning and supporting different political systems. Topics may vary depending on host country.
May be crosslisted with BAMS309, FLT309.
RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.

POSC 310 EUROPEAN GOVERNMENTS 3
Structure and process of British, French, German and Russian governments.

POSC 311 POLITICS OF DEVELOPING NATIONS 3
Forces determining public policy among the emerging nations. Cross-national comparative analysis.
RESTRICTIONS: Only one of either POSC211 or POSC311 can count for degree credit.

POSC 312 POLITICS OF EAST ASIAN DEVELOPMENT 3
Examines contemporary issues and questions of political legitimacy and economic development in East and Southeast Asia. Traditional patterns of authority, impact of Western colonialism, emergence of new Southeast Asian states and the political and economic development of selected countries are covered.

POSC 313 AMERICAN FOREIGN POLICY 3
The theory, policies and administration of U.S. foreign policy.

POSC 315 THIRD WORLD WOMEN IN POLITICS 3
Introduction to the role of women in politics and society in Africa, Asia, Latin America and the Middle East.
May be crosslisted with WOMS315.

POSC 316 INTERNATIONAL POLITICAL ECONOMY 3
Interaction of international political and economic phenomena. Considers history and development of political economy, and the political underpinnings and effects of global monetary, trade, financial and investment systems. Both relations among advanced countries, and between the advanced and poor countries will be considered.

POSC 318 PUBLIC OPINION, POLITICS AND SOCIETY 3
Examines acquisition and change of political beliefs, attitudes, and opinions, and relationship between political considerations and political behavior. Applied emphasis on survey methods and problems of measuring public opinion.

POSC 319 TOPICS IN POLITICS AND BROADCAST JOURNALISM 3
Topics vary and may include the influence of the media on foreign policy, the

responsibility of the media on foreign policy or for policy failures or successes. Crosslisted with COMM319.

RESTRICTIONS: For majors only. May be repeated up to three times for credit when topics vary.

POSC 320 PARTIES AND INTEREST GROUPS 3
Organization and behavior of political parties and interest groups, including structure, leadership, recruitment and decision making.

POSC 322 RACE AND POLITICS 3
Provides an insight and understanding of race as an intricate part of the political process in the United States. Role of race in United States politics is explored primarily through the political experiences of black Americans and how the political system has responded.
May be crosslisted with BAMS322.

POSC 323 INTRODUCTION TO WOMEN AND POLITICS 3
Political-legal status of American women since the Revolution, and their participation in the political process. Women's present political-legal status, as illustrated through current issues such as reproductive rights, pay equity and the feminization of poverty.
May be crosslisted with WOMS323.

POSC 324 VOTING AND ELECTIONS 3
Examines various aspects of political behavior including political socialization, the formation of political attitudes and opinion, electoral behavior and political participation. Attention also given to the relationship of political behavior and public policy.

POSC 329 INTERNATIONAL MIGRATION 3
Interdisciplinary introduction to alternative/complementary disciplinary approaches to the study of human movement between states. Offered on a rotational basis by faculty involved in the University of Delaware migration group.
May be crosslisted with GEOG329, HIST329, SOCI329.

POSC 330 POLITICAL TERRORISM 3
Selectively examines cases, trends and organizations which have made the violence termed terrorism so salient. Also examines whether governments, including the U.S., are responding appropriately to the challenge.
RESTRICTIONS: Not open to freshmen except with consent of instructor.

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

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

POSC 340 POLITICS AND THE MEDIA 3
Political roles of the media in socialization, political competence, agenda setting, the electoral process and political crises. Emphasis on media-political system interaction and its import in a democratic society.
May be crosslisted with COMM340.
RESTRICTIONS: Open to majors only.

POSC 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.
Crosslisted with BUAD341.
PREREQ: ECON152.
RESTRICTIONS: Counts as a BUAD elective for BS candidates. Credit for BUAD341 given only once.

POSC 343 SOCIETY, POLITICS AND HEALTHCARE 3
Interdisciplinary study of the political, social, economic and humanistic issues of healthcare and health policy. Students will develop the capacity to understand the political process and its relationship to the healthcare delivery system.
May be crosslisted with SOCI343.

POSC 350 POLITICS AND THE ENVIRONMENT 3
The political context of environmental issues; air and water pollution, population control, and conservation.

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

- POSC 362 DIPLOMACY** 3
Diplomacy is the art of formal representation and policy implementation. Diplomats need to understand complex material and represent positions in an effective manner. These skills are applicable in a variety of contexts. Readings, discussions, cases and simulations are used to introduce diplomatic skills.
- POSC 363 INTERNATIONAL LAW AND ORGANIZATION** 3
Introduction to the development of international law and international organization.
- POSC 366 INDEPENDENT STUDY** 1-6
- POSC 372 EAST CENTRAL EUROPEAN POLITICS** 3
Survey of East Central European political systems (Poland, Hungary, Czechia and Slovakia, Germany, Romania, former Yugoslavia, Bulgaria and Albania) after World War II. The so-called new federal states in Germany (ex-DDR) will be emphasized.
- POSC 377 ARAB-ISRAELI POLITICS** 3
Development of the Arab-Israeli conflict analyzed from the Dreyfus Affair and the Balfour Declaration to current events.
May be crosslisted with JWST377.
- POSC 380 INTRODUCTION TO LAW** 3
Broad overview of the nature, functions and limits of law. Emphasis on law as the political instrument used to regulate, control and promote behavior and deal with social problems.
May be crosslisted with LEST380.
- POSC 387 AMERICAN POLITICAL THOUGHT** 3
Overview of American political thought. Focuses on critical formative periods in American politics, such as the Founding, Civil War and Industrial Revolution, with readings selected from the writings and speeches of key American statesmen.
- POSC 390 HONORS COLLOQUIUM** 3
May be crosslisted with GEOG390.
- POSC 400 PRACTICUM IN TEACHING POLITICAL SCIENCE** 3 PF
Available to outstanding senior political science majors interested in obtaining teaching experience at the college level. Provides opportunity to lead discussion sections of students in lower division courses.
RESTRICTIONS: Requires permission of instructor.
- POSC 401 TOPICS IN CONSTITUTIONAL LAW** 3
Critical topics of constitutional law. Topics vary by instructor.
May be crosslisted with WOMS402.
RESTRICTIONS: May be repeated for credit when topics vary.
- POSC 402 CIVIL LIBERTIES: INDIVIDUAL FREEDOMS** 3
Constitutional issues of freedom of speech, press, religion, and separation of church and state.
- POSC 403 CIVIL LIBERTIES: EQUAL PROTECTION CLAUSE** 3
Focuses on fundamental rights and the constitutional guarantee of equal protection of the laws.
- POSC 404 THE JUDICIAL PROCESS** 3
Structure, process and personnel of American courts; factors influencing decisions and judicial policy making.
- POSC 405 CONSTITUTIONAL LAW OF THE UNITED STATES** 3
Constitutional principles regulating organization and function of federal government. United States Supreme Court decisions placed in a socio-political context.
- POSC 407 AMERICAN PRESIDENCY** 3
Modern American presidency with emphasis on presidential recruitment, organization and staffing. The nature and exercise of presidential power in the decision making process.
- POSC 408 INTERNATIONAL ORGANIZATION** 3
Analysis of the organization of the international system, its structure, operating principles, formal and informal components.
- POSC 409 CONTEMPORARY PROBLEMS OF WORLD POLITICS** 3
Critical areas of international politics. Topics vary by instructor.
May be crosslisted with JWST409.
RESTRICTIONS: May be repeated once when topics vary.
- POSC 410 ISLAM IN GLOBAL AFFAIRS** 3
Explores three main elements of political Islam - epistemological, reformative and militant, and examines how the struggle to construct Islam is reconstructing the international system.
- POSC 411 POLITICS AND POVERTY** 3
Relationship of policy making and social conditions in the United States with regard to capacity of government to cope with problems arising from overpopulation and socio-economic differences.
- POSC 412 FOREIGN POLICY OF THE POST-SOVIET UNION** 3
Principles, foreign policies and administration of the former Soviet government and its most important successor states.
- POSC 413 PROBLEMS IN AMERICAN GOVERNMENT** 3
Contemporary problems in American government and politics.
May be crosslisted with WOMS413.
RESTRICTIONS: May be repeated for credit once when topics vary.
- POSC 414 PROBLEMS IN AMERICAN FOREIGN POLICY** 3
Contemporary problems in American foreign policy and policy making.
RESTRICTIONS: May be repeated for credit once when topics vary.
- POSC 415 FORCE AND WORLD POLITICS** 3
Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.
- POSC 418 CONSTITUTIONAL ISSUES IN AMERICAN PUBLIC SCHOOLS** 3
Case studies are used to explore how controversial issues have arisen in public education over the years, what laws and legal precedents presently govern them, how policies have evolved over time and what questions remain unsolved.
- POSC 419 HUMAN ROLE IN ENVIRONMENTAL CHANGE** 3
Explores the impact that human activity has on earth systems and how the behavior of earth systems affects human activity. Topics include climate change, biodiversity, conservation, western water management and industrial ecology.
Offered only in partnership with the Biosphere 2 Center in Arizona.
- POSC 422 POLITICAL LEADERSHIP** 3
Study of the theories and practices of effective political leadership in both contemporary and historical contexts. Includes case materials and may include non-U.S. cases for study.
- POSC 423 CONGRESS AND PUBLIC POLICY** 3
Democratic functions of a modern legislature; legislative structures and processes; coalitions and cleavages; parties, ideological factions and interest groups; the Federal budget, national priorities and Congressional intervention in the economy; central policy issues before Congress; Congressional oversight of the bureaucracy; Congress and the Presidency, and election of the Congress.
- POSC 424 ENERGY POLICY AND ADMINISTRATION** 3
World and U.S. energy policies with emphasis on nuclear power, solar energy and fossil fuels. Analyzes progress and design of U.S. science and technology policy in energy domain.
- POSC 425 ADVANCED TOPICS IN POLITICS AND BROADCAST JOURNALISM** 3-9
Topics vary and may include influence of crisis news on national and international politics, effectiveness of political documentaries and ethical and historical underpinnings of broadcast journalism.
Crosslisted with COMM425.
RESTRICTIONS: Open to junior and senior communication majors only. May be repeated for credit when topics vary.
- POSC 426 LATIN AMERICAN POLITICAL SYSTEMS** 3
Impact of social and economic change on the political processes.
- POSC 427 POLITICS IN CHINA** 3
General introduction to politics of the People's Republic of China, including examination of politics and modernization efforts under Mao Zedong and Deng Xiaoping and legacies left by both. Significance of Tiananmen, dilemmas of economic and political liberalization, regionalization, and future of Communist Party also discussed.
- POSC 429 SOUTHEAST ASIA AND THE WORLD** 3
Examines patterns of international relations within Southeast Asia and between the region and greater powers, Southeast Asia's insecurity and patterns of relations at the domestic, regional and global levels. Discussion of contemporary issues including the emergence of economic blocs, the rise of China and the future of the Association of Southeast Asian Nations.
- POSC 430 INTERMESTIC RELATIONS OF ISLAM AND AMERICA** 3
Capstone experience for political science and international relations majors. Explores intermestic (international and domestic) relations between Islam and United States. Integrates and applies prior learning about American domestic politics, America's foreign relations, world politics and existing global crisis between United States and Muslim World in wake of attacks of September 11, 2001 and subsequent United States invasion and occupation of Iraq.
- POSC 432 POLITICAL SYSTEM OF THE POST-SOVIET UNION** 3
Structure and process of the political system of the USSR and its most important successor states (Russia, Ukraine, Byelarus, Kazakhstan and others).

- POSC 433 AFRICAN POLITICS 3**
Overview of politics and society in sub-saharan Africa including: colonialism, the rise of nationalism, decolonization, single-party and military rule, the role of social movements and religious, class, gender and ethnic identities and the move toward economic and political liberalization.
- POSC 434 POLITICAL THOUGHT I 3**
From Plato to Machiavelli.
- POSC 435 POLITICAL THOUGHT II 3**
From Machiavelli to present.
- POSC 436 POLITICS AND LITERATURE 3**
Class, civil rights, feminism, revolution and other political issues examined through novels, film and other literary works.
May be crosslisted with FLIT436, WOMS436.
- POSC 438 TOPICS IN POLITICAL THEORY 3**
Focuses on selected topics in political theory. Topics vary by instructor.
RESTRICTIONS: May be repeated for credit when topics vary.
- POSC 439 PROBLEMS IN AFRICAN POLITICS 3**
Examination of selected topics in contemporary African politics. Will focus in-depth on aspects of politics and society in a specific region of Africa or will investigate in greater detail issues confronting Africa today such as economic structural adjustment, democratization and state-society relations.
May be crosslisted with BAMS439.
- POSC 441 PROBLEMS OF WESTERN EUROPEAN POLITICS BY COUNTRY 3**
Intensive examination of European politics from the perspective of a specific country, e.g., Spain, England and France.
RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.
- POSC 442 PROBLEMS OF WESTERN EUROPEAN POLITICS 3**
Examination of current political trends in Western European politics, including changes in party systems and problems of European integration.
- POSC 443 CHINA AND THE WORLD 3**
Historical and theoretical examination of Chinese foreign policy since 1949, including discussion of China's relations with larger and developing powers, China's historical conception of itself in the world, significance of China's interdependence with the world and China's participation in international and regional organizations.
- POSC 444 GLOBAL AGENDA 3**
Seminar survey of current geopolitical problems facing the US government and global news media. Guest lecturers and practitioners in diplomacy and the international media explore the problems, US foreign policy and media influence upon both.
May be crosslisted with COMM444.
RESTRICTIONS: May be repeated for credit when topics vary.
- POSC 445 HUMAN RIGHTS AND WORLD POLITICS 3**
Alternative theories of human rights examined in cross-cultural and international contexts. International documents, contemporary cases (e.g. South Africa) and U.S. foreign policies also examined and evaluated.
- POSC 446 INTERNATIONAL HUMAN RIGHTS ON FILM 3**
A study of the history, evolution and current status of universal human rights using film as a primary medium. Content covers origins of the international human rights movement during and after WWII. A series of feature films and documentaries also highlights recent and current human rights violations in foreign nations.
- POSC 448 THEORIES OF INTERNATIONAL RELATIONS 3**
Surveys the theoretical debates regarding how we can conceive of and understand world politics, as well as how we can evaluate contending perspectives. Considers such schools of thought as ancient, idealist, realist, behavioralist, interdependency, radical, neo-realist and post-structuralist perspectives.
- POSC 450 PROBLEMS OF LATIN AMERICAN POLITICS 3**
Current political issues in selected Latin American countries.
- POSC 451 PROBLEMS IN POLICY AND ADMINISTRATION 3**
Examination of select topics related to contemporary public administration or the study of public policy and issues and controversies in a select policy area.
- POSC 452 PROBLEMS IN URBAN POLITICS 3**
Examines the exercise of political power, the policymaking process, and contemporary policy issues in urban areas. Special emphasis on the study of contemporary political relationships and the social, political, and economic problems and dilemmas within urban communities.
- POSC 454 ORGANIZATIONAL BEHAVIOR AND THEORY IN THE PUBLIC SECTOR 3**
Examines major administrative and organizational theories ranging from Weberian bureaucracy to organizational humanism as applied to public organizations. Explores various aspects of behavior in the public organizational settings through analysis of individuals, groups and the organizations as a whole.
- POSC 455 PUBLIC BUDGETING AND FINANCIAL MANAGEMENT 3**
Revenue and expenditure systems, alternative budget formats, basic principles of accounting and capital financing in the public sector.
- POSC 456 DISASTER AND POLITICS 3**
U.S. emergency management and disaster policy examined through books, articles and video tapes dealing with governmental preparedness for, and response to, natural and human-caused disasters and emergency incidents.
- POSC 463 THE UNITED NATIONS AND WORLD AFFAIRS 3**
Examines the development, institutional structure, and prospects of the United Nations and UN system.
- POSC 464 INTERNSHIP IN POLITICAL SCIENCE 1-6**
Internship in a political science or international relations-related field. Includes preparation of a journal of activities and a final project.
RESTRICTIONS: Requires permission of instructor.
- POSC 465 MODEL ORGANIZATION OF AMERICAN STATES 3**
Theoretical and practical preparation for participation in the Model Organization of American States conference held in Washington, D.C. each year. Participation as delegates to the week-long simulation.
RESTRICTIONS: May be repeated once for credit when topics vary. May only count toward political science or international relations major one time.
- POSC 466 INDEPENDENT STUDY 1-6**
- POSC 468 UNDERGRADUATE RESEARCH 1-6**
Research conducted under the direction of or in conjunction with a faculty member. May result in a major research paper or be incorporated into a faculty project.
- POSC 475 MODEL UNITED NATIONS 3**
Intensive preparation for effective participation in the National Model United Nations held in New York City each spring.
RESTRICTIONS: May be repeated once for credit when topics vary. May only count toward political science or international relations major one time.
- POSC 604 INTERNATIONAL LAW 3**
Origins, sources and applications of law to international relations, including the nature of treaties, the legal powers of states and international organizations, jurisdiction and immunities, and the role of international courts. Special attention given to the law of the sea for navigation, fisheries conservation, mineral exploitation and environmental protection.
Crosslisted with MAST673.
RESTRICTIONS: Requires permission of instructor.
- POSC 605 TOPICS IN LAW AND COURTS 3**
Content varies from year to year. Possible topics may be comparative public law, jurisprudence, constitutionalism. A major research paper is required.
- POSC 610 ISLAM IN GLOBAL AFFAIRS 3**
Explores three main elements of political Islam - epistemological, reformative and militant, and examines how the struggle to construct Islam is reconstructing the international system.
- POSC 612 FOREIGN POLICY OF THE POST-SOVIET UNION 3**
Principles, foreign policies and administration of the former Soviet government and its most important successor states.
- POSC 614 JUDICIAL PROCESS 3**
Examines the structure, personnel, and process of the American judiciary, including factors that influence judicial decisions and the scope and nature of judicial policy making.
- POSC 615 FORCE AND WORLD POLITICS 3**
Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.
- POSC 624 ENERGY POLICY AND ADMINISTRATION 3**
World and U.S. energy policies with emphasis on nuclear power, solar energy and fossil fuels. Analyzes progress and design of U.S. science and technology policy in energy domain.
May be crosslisted with MAST620, UAPP625.
- POSC 626 CONSERVATION AND RENEWABLE ENERGY POLICY 3**
Covers current policy issues for energy conservation, energy efficiency, and renewable energy sources. Some prior background in energy policy is assumed.

Topics include environmental impacts, utility programs, and international comparisons. Crosslisted with UAPP626.
PREREQ: POSC624.

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

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

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

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

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

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

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

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

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

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

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

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

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

POSC 663 DECISION TOOLS FOR POLICY ANALYSIS 3
Develops quantitative decision-making skills for science and technology policy decisions. Covers decision-making under uncertainty, axioms of decision analysis, decision trees, influence diagrams, sensitivity analysis, confidence intervals, value of information, probabilistic risk assessment, and multi-attribute decision theory.
Crosslisted with MAST663.

POSC 678 ADMIRALTY AND MARITIME LAW 3
Introduction to U.S. admiralty and maritime law including jurisdiction carriage of goods by sea, personal injuries, collisions, salvage, insurance and marine pollution.
Crosslisted with MAST678.
RESTRICTIONS: Open to juniors, seniors and graduate students.

POSC 679 SHIPPING AND PORT MANAGEMENT 3
A seminar to study the structure and management of the shipping industry and ports, policies for ocean commerce, international trade, and merchant marine.
Crosslisted with MAST679.

POSC 686 STATE AND LOCAL GOVERNMENT: CONCEPT AND ISSUES 3
Explores state and local government context in which public managers work. Examines organizational, administrative, and economic forces shaping state and local public action, as well as political decision making apparatus used by subnational governments. Assesses their contemporary role in federal system.
Crosslisted with UAPP686.

POSC 687 STATE GOVERNMENT POLICY AND MANAGEMENT 3
Focuses on roles and functions of United States state government. Topics include legislative policy making and operations, executive branch organization and functions, structure and role of state courts, and the role of the governor and the states in intergovernmental policy making. State government in the mid-atlantic region will receive special attention.
Crosslisted with UAPP687.

POSC 802 SEMINAR: DEVELOPING AND TRANSITIONAL SYSTEMS 3
Issues, concepts, and scholarship regarding the politics of the developing and transitional countries of Africa, Asia, Eastern Europe and Latin America in a global governance context. Topics may include democratic transition and consolidation, comparative democracy, political economy of liberal economic reform, religion and political culture, new nationalisms and ethnic conflict, and international systemic influences on all the above.

POSC 803 SEMINAR: PUBLIC ADMINISTRATION 3
Reading and discussion of theories and problems of public administration, including organization, coordination, field administration, contracts, personnel, policy making, participation, adjudication, budgeting and administrative behavior.
Crosslisted with UAPP803.

POSC 804 SEMINAR: POST-INDUSTRIAL SYSTEMS 3
Issues, concepts, and scholarship regarding the politics of advanced industrial nations of Europe, North America and East Asia in a global governance context. Topics may include state theory and the new institutionalism, political culture and nationalism, the welfare state and reform, party systems, civil society and new social movements, regional integration and transnational dimensions of policy processes.

POSC 805 SEMINAR: PUBLIC LAW 3
Core seminar for the field of law and courts. Provides a broad overview of the range, depth and variety of approaches of current research within this field.
RESTRICTIONS: Graduate students only.

POSC 806 NORMATIVE ISSUES IN GLOBAL GOVERNANCE 3
Examines normative issues in contemporary global governance from perspective of diverse ethical traditions and/or political philosophy.

POSC 807 UNITED STATES IN THE GLOBAL SYSTEM 3
Introduction to the institutions, politics and social forces that shape United States conduct in the global system. Topics include democratic theory, constitutional foundations, political culture and development, and the historical and institutional dynamics of United States politics.

POSC 808 AMERICAN POLITICAL INSTITUTIONS 3
Explores major themes, viewpoints, issues and topics pertaining to the American political system. Themes include stability, change, conflict, American exceptionalism, American political thought, alternative perspectives on democracy, analysis of political parties, interest groups, Congress, the presidency and the courts.

POSC 811 TOPICS IN COMPARATIVE GOVERNMENT 3
Focuses on selected topics in Comparative Government and Politics.

POSC 813 SEMINAR: AMERICAN FOREIGN POLICY 3
Overview of contemporary American foreign policy and policy making, as well as the analytical, conceptual and methodological problems associated with foreign policy analysis.

POSC 814 POLITICAL ECONOMY OF THE ENVIRONMENT 3
Reviews major theories developed over the last half century to explain nature-society relations. Policy case studies on environmental justice, trade and environment, global climate change, and sustainable development used to evaluate current range of political-economic explanations of nature-society relations. International, national and local responses to these problems are analyzed.
Crosslisted with UAPP810.

POSC 815 INTRODUCTION TO STATISTICAL ANALYSIS FOR POLITICAL SCIENCE 3
Training in the basics of statistical analysis and quantitative approaches to politics and society. Topics include elementary statistics, probability theory, hypothesis testing and regression analysis. Provides foundation for further quantitative methods.

POSC 816 ADVANCED SOCIAL RESEARCH FOR POLITICAL SCIENCE 3
Provides advanced training in applied social research methods. Topics may include econometrics, qualitative methods, game theory, and agent-based modeling. Includes lectures and discussion supplemented by laboratory work involving computer statistical packages and simulations.

- POSC 818 ENVIRONMENTAL POLICY AND ADMINISTRATION 3**
U.S. and international environmental politics, policies, laws, and agreements regarding air, water, and natural resource protection. Examines environmental governance regimes, politics and science, theories of environmental policy, public and private interaction, and epistemic communities in global warming, ozone layer protection, environmental public health, etc.
May be crosslisted with MAST871, UAPP818.
- POSC 819 MANAGEMENT DECISION MAKING IN PUBLIC AND NONPROFIT SECTORS 3**
Focuses on analytical decision making within public and nonprofit organizations. Examines processes by which decisions can be made and evaluated. Emphasis on conceptual factors that provide a guide to decisions and evaluations of decision methodologies, e.g., systems analysis, cost-benefit analysis, PERT/critical path method, decision trees, performance measurement and time series.
Crosslisted with UAPP819.
PREREQ: Excel.
- POSC 820 INTERNATIONAL PERSPECTIVES ON ENERGY AND ENVIRONMENT 3**
Policy analysis and political economy at international energy and environmental issues and problems. Encompasses international and multi-national government and private sector organizations, as well as non-governmental, non-profit organizations.
May be crosslisted with UAPP820.
- POSC 821 PROSEMINAR: TECHNOLOGY, ENVIRONMENT AND SOCIETY 3**
Over the last two centuries, forces of industrialization and urbanization have transformed economic, social and political life and the natural environment. Examines theories that explain and assess these transformations, with the goal of fostering critical analysis of social and environmental transformation in international, national and local contexts.
Crosslisted with UAPP821.
- POSC 829 TAXATION AND FISCAL POLICIES 3**
Advanced course in theory and application of financing, spending and regulatory policy instruments of state and local governments. Topics include efficiency, equity and impacts of different types of taxation, user charges, expenditure approaches (transfers/subsidies) and regulation alternatives.
Crosslisted with UAPP829.
- POSC 830 SEMINAR: INTERNATIONAL RELATIONS 3**
Surveys broad range of international relations theory including realism, neo-realism, interdependence, unit-level analysis, regime theory, world system theories, post-structuralism, feminism and normative theory. Epistemological and conceptual problems associated with international relations research are explored.
- POSC 835 ORGANIZATION AND MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
Explores 1) theories and concepts of organizational phenomena, 2) current challenges and implications for the public and nonprofit sectors, and 3) issues for individuals who work in these organizations. Behavioral competencies are developed.
Crosslisted with UAPP835.
- POSC 837 HUMAN RESOURCES MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
Examines the human resources function from three perspectives: 1) basic technical competencies (recruitment, selection, compensation, benefits), 2) legal and constitutional issues in HR, and 3) leadership and organizational change.
Crosslisted with UAPP837.
- POSC 838 PUBLIC POLICY ANALYSIS 3**
Seminar covers an overview of the policy process and considers all topics central to an understanding of policy making in the United States.
May be crosslisted with MAST838, UAPP838.
- POSC 839 FINANCIAL MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
Principles of public finance and public sector economics are used to examine issues of demand for and delivery of public goods by state and local governments and nonprofit organizations. Topics include revenues, expenditures, intergovernmental and cross-sectoral relationships, budgeting, debt management and asset allocation.
Crosslisted with UAPP833.
PREREQ: UAPP834.
- POSC 840 INTERNATIONAL POLITICAL ECONOMY 3**
Considers the political underpinnings and effects of the interaction of political and economic processes at the global level. Reviews schools of thought and various topics including long cycles, foreign investment, monetary and trade regimes, and the political dilemmas of growth and stagnation.
- POSC 842 INTERNATIONAL ORGANIZATION 3**
Introduction to theories of international organization. Focuses on the organization

and governance of the international system. Areas of inquiry include the role of norms in structuring interactions in world politics, international regimes, formal international organization and international law.

- POSC 843 GLOBAL GOVERNANCE: THEORY AND CASES 3**
Exploration of international organization, regime and global governance theory. Analysis of global governance arrangements in various issue areas such as the environment, ocean issues, human rights, development, world health, telecommunications, trade and finance.
May be crosslisted with MAST843, UAPP843.
- POSC 844 INTERNATIONAL SECURITY 3**
Introduction to the theoretical, empirical and policy-relevant literatures connected with international security affairs, defined as issues connected with the use or threat of force in international affairs. Topics include nuclear deterrence and proliferation, grand strategy, ethnic violence, peacekeeping, and terrorism and counterterrorism.
- POSC 845 HUMAN RIGHTS AND GLOBAL GOVERNANCE 3**
A seminar that surveys international human rights issues with a special focus on those dimensions of rights most relevant to global governance. Topics include (but are not limited to) cosmopolitan ethics, just war theory, cultural relativism, and human rights regimes.
- POSC 850 COLLOQUIUM ON GLOBAL GOVERNANCE AND SOCIETY 1-3**
Departmental speaker series.
RESTRICTIONS: First and second year students enroll for one credit and attend the speaker series. Third year Ph.D. students enroll for three credits and the speaker series accompanies a research colloquium.
- POSC 868 RESEARCH 3**
To be taken by M.A. students seeking to satisfy the program's research requirement through the research paper option.
- POSC 869 MASTER'S THESIS 1-6**
- POSC 899 RESEARCH PAPER FOR MASTER OF ARTS 0 PF**
Independent study, where the MA student works with a supervising faculty member to complete the master of arts research paper.
- POSC 964 PRE-CANDIDACY STUDY 3-12 PF**
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.
- POSC 969 DOCTORAL DISSERTATION 1-12 PF**
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- PRESERVATION STUDIES**
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- PRES 801 RESEARCH PRESENTATION SEMINAR 0 PF**
Seminar for presentation of research in progress.
RESTRICTIONS: Required for three semesters.
- PRES 866 SPECIAL PROBLEM 1-12**
- PRES 868 RESEARCH 1-12 PF**
- PRES 964 PRE-CANDIDACY STUDY 1-12 PF**
- PRES 969 DOCTORAL DISSERTATION 1-12 PF**
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- PSYCHOLOGY**
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- PSYC 100 GENERAL PSYCHOLOGY 3**
Provides foundation in the application of the scientific method to problems of human behavior and experience.
- PSYC 207 RESEARCH METHODS 3**
Reviews the major issues involved in the design of psychological experiments. Includes measurement issues, internal and external validity of experiments, research with single subjects, and research ethics. Discusses both laboratory and field research.
PREREQ: Grade of C- or better in PSYC100.
RESTRICTIONS: Majors and minors only.
- PSYC 209 MEASUREMENT AND STATISTICS 3**
Theory and the application of statistical techniques to psychological data.
PREREQ: Grade of C- or better in PSYC100 and one course in basic college mathematics.
RESTRICTIONS: Majors and minors only.

- PSYC 270 FAMILIES AND DEVELOPMENTAL DISABILITIES 3**
Focuses on people with developmental disabilities in the context of their family and culture from a multidisciplinary perspective. Covers disabilities and their causes; changing needs across the lifespan, gender, cross-cultural and legal issues; and information about prevention/intervention, employment, inclusion, and empowerment. Crosslisted with IFST270.
- PSYC 301 PERSONALITY 3**
A survey of data and theories of human personality and affect.
PREREQ: PSYC100.
- PSYC 303 INTRODUCTION TO SOCIAL PSYCHOLOGY 3**
Analysis of interpersonal behavior with special emphasis on problems of conformity and influence; the organization and dynamics of social groups; and the development of opinions and attitudes.
PREREQ: PSYC100.
- PSYC 310 SENSATION AND PERCEPTION 3**
Theories and experimental study of sensation and perception.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to psychology majors and minors only.
- PSYC 312 LEARNING AND MOTIVATION 3**
Experimental study of contemporary theories of learning and motivation.
PREREQ: PSYC207 and PSYC209.
RESTRICTIONS: Open to psychology majors and minors only.
- PSYC 314 BRAIN AND BEHAVIOR 3**
Study of the brain mechanisms underlying hunger, sex, aggression, learning, memory, perception, sleep and waking.
May be crosslisted with CGSC314.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to psychology majors and minors only.
- PSYC 316 BIOLOGICAL BASIS OF BEHAVIOR 3**
Evolutionary approach towards depression, aging, immunity, eating and sleep disorders, emotions, temperament, development, and aging, and how problems in these areas are made worse by stress.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to psychology majors and minors only.
- PSYC 318 PHYSIOLOGICAL PSYCHOLOGY 3**
Introduction to neural substrates underlying brain/behavior relations. Focuses on neuroanatomy, neurophysiology, neurochemistry, and neuropharmacology.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to majors and minors only.
- PSYC 320 INTRODUCTION TO NEUROSCIENCE 3**
Survey of the basic sciences of the brain (neuroanatomy, neurophysiology, neuropharmacology), building on these principles to examine the neurobiological bases of a variety of phenomena, including perception and cognition, memory and amnesia, fear and aggression, and the pharmacokinetics of several mental disorders.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to psychology majors and minors only.
- PSYC 325 CHILD PSYCHOLOGY 3**
Survey of the interactions of physiological, psychological, and environmental factors determining psychological development. Consideration of major theories of child development.
PREREQ: PSYC100.
- PSYC 333 PSYCHOLOGY OF WOMEN 3**
Psychological analysis of the meaning and implications of being a woman and cause and consequences of the female experience. Biological sex vs. psychological sex-role identity, stereotyping, discrimination, self-concept and the feminist perspective.
May be crosslisted with WOMS333.
PREREQ: PSYC100.
- PSYC 334 ABNORMAL PSYCHOLOGY 3**
Disorders of behavior and consciousness including the various psychoses, psychoneuroses, mental deficiency, and other conditions.
PREREQ: PSYC100.
- PSYC 336 PSYCHOLOGY OF HUMAN SEXUALITY 3**
Examination of human sexuality using the theoretical perspectives and empirical methods of psychology. Topics include sexuality development, sexual behavior and communication, and sexual disorders and dysfunctions. Emphasis is placed on the influence that social factors have on individual sexual expression.
PREREQ: PSYC100.
- PSYC 340 COGNITION 3**
Survey of major themes in human thought processes, concept formation, problem solving, creativity, language use and cognitive development.

May be crosslisted with CGSC340.
PREREQ: Grades of C- or better PSYC207 and PSYC209.
RESTRICTIONS: Open to psychology majors and minors only.

- PSYC 344 PSYCHOLOGY OF LANGUAGE 3**
Describes the nature of human language, how it is used to speak and comprehend, and how it is learned. Subtopics include language and thought, animal communication, and language in special populations, such as children born deaf or blind.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to psychology majors and minors only.

- PSYC 346 PSYCHOLOGY AND THE LAW 3**
Seminar exploring the rapidly expanding field of psychology and the law. Review 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.
Crosslisted with CRJU346.

- PSYC 350 DEVELOPMENTAL PSYCHOLOGY 3**
An analysis of theory and research in developmental psychology including the topics of developmental processes, developmental risk, systems theory and contemporary social issues.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: If both PSYC325 and PSYC350 are taken, PSYC350 will not count for major credit. Open to psychology majors and minors only.

- PSYC 365 PSYCHOLOGY FIELD PLACEMENT 3**
Student contracts with any psychology instructor. Requirements include minimum of four hours per week working in an agency, institution or business, reading assignments and writing a term paper. Placement made with assistance from Career Planning and Placement. Inquiries should be made several months in advance.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.

- PSYC 366 INDEPENDENT STUDY 1-6**
Participation in research program of a faculty member.
PREREQ: Grades of C or better in PSYC100, PSYC207, and PSYC209.
RESTRICTIONS: Requires permission of faculty member.

- PSYC 370 RESEARCH IN PERSONALITY 3**
An analysis of contemporary issues and research in personality including the assessment of personality traits, the personality situation interaction and the social and biological bases of individual differences.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: If both PSYC301 and PSYC370 are taken, PSYC370 will not count for major credit. Open to psychology majors and minors only.

- PSYC 380 PSYCHOPATHOLOGY 3**
Exploration of research on diagnosis, etiology and treatment of major pathological disorders. Emphasis on original research articles, class discussion and assessment instruments, in addition to analysis of video-taped interviews with patients used to illustrate the disorders.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: If both PSYC334 and PSYC380 are taken, PSYC380 will not count for major credit. Open to psychology majors and minors only.

- PSYC 385 APPLIED SOCIAL PSYCHOLOGY 3**
Application of basic principles of interpersonal behavior to everyday life. Topics include persuasion, reciprocation, liking, authority, organizations, criminal justice, and health.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to majors and minors only.

- PSYC 390 SOCIAL PSYCHOLOGY 3**
An analysis of theory and research in social psychology including the topics of social cognition, attitudes, interpersonal, group and intergroup relations. Student-designed research projects including data analysis.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: If both PSYC303 and PSYC390 are taken, PSYC390 will not count for major credit. Open to psychology majors and minors only.

- PSYC 394 CULTURAL PSYCHOLOGY 3**
Introduction to the study of how culture shapes psychological experience, including social behavior, cognition, motivation, and the experience of the self. Covers psychological theory and research on human cultural variation and focuses on different national populations (especially North Americans and East Asians), with some attention to the psychological experience of multicultural populations within the United States.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to psychology majors and minors only.

- PSYC 403 PSYCHOLOGY OF NONVERBAL BEHAVIOR 3**
Seminar on social psychological implications of research literature on nonverbal

behavior in social interaction. Focuses on interpersonal attraction, leadership, impression formation, causal attribution, deception, social attitudes and cross-cultural factors, with practical applications.
PREREQ: Grades of C- in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 406 REDUCTION OF INTERGROUP CONFLICT 3
Reduction of intergroup conflict in business, educational and experimental laboratory settings, with special attention given to organizational mergers. Investigation of strategies for reducing intergroup conflict.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 407 EMOTIONS AND PREVENTIVE INTERVENTION 3
Emotions: their neural, expressive, and experiential components and their relation to adaptive and maladaptive behavior. Translating emotion theory and research into therapeutic and preventive interventions. Requirements include doing emotion tutoring with a child.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Requires permission of instructor. Open to junior and senior psychology majors and minors only.

PSYC 409 ETHICS IN PSYCHOLOGY 3
Focuses on ethical issues, codes, principles, and dilemmas relevant to experimental and applied fields of Psychology.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 412 HORMONES AND BEHAVIOR 3
Focuses on description of physiology of human hormones and relations of hormones to behavior.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors and students in the neuroscience program.

PSYC 414 DRUGS AND THE BRAIN 3
Topics covered include drug treatment of mental illness, and drug abuse/addiction.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 415 HISTORY AND SYSTEMS OF PSYCHOLOGY 3
Psychology from the early Greeks through the more important "schools" of the twentieth century.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 416 PSYCHOLOGICAL PERSPECTIVES ON THE BLACK AMERICAN 3
Experience of Black Americans as viewed from a psychological perspective. Psychological theory and research pertaining to Black Americans; reactions to oppression, collective behavior, personality development, and life styles. May be crosslisted with BAMS416.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 420 MENTAL ILLNESS: HISTORICAL AND CRITICAL PERSPECTIVES 3
Explores historical and current issues in understanding mental illness from biomedical and social constructionist perspectives. Focuses on recent advances and problems in conceptions of cause, diagnosis, and intervention.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 421 BIOLOGY AND BEHAVIOR: GENDER, INTELLIGENCE, PSYCHOPATHOLOGY 3
Critically examines psychological claims about relations between biology and behavior. Organized around topics of gender, intelligence, and psychopathology and addresses issues raised by evolutionary psychology, behavioral genetics, and biological and brain reductionism.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Restricted to junior and senior psychology majors and minors.

PSYC 424 APPLIED SOCIAL PSYCHOLOGY 3
Application of basic principles of interpersonal behavior to everyday life. Topics include persuasion, reciprocity, employee motivation, organizational development, liking and authority.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 425 FAMILY CONFLICT AND THE CHILD 3
Analysis of specific topic areas in child psychology, such as infancy and cognitive and social development. Topics may vary from year to year.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 433 COGNITIVE NEUROSCIENCE 3
Examines brain mechanisms responsible for cognitive functions such as perception, memory, and language. Surveys neural mechanisms underlying cognition and current methods for relating mind and brain, including studies of brain-damaged patients and brain imaging techniques.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 438 HUMAN COMPUTER INTERACTION 3
Explores the design, implementation and evaluation of interactive computing systems for human use. Hands-on project examples include the design of web pages and mobile devices. Basic concepts and applied techniques necessary for the design of user-friendly interfaces are presented. Course structure allows application of creative abilities, with knowledge gained in the course, to design user-centric innovative technologies. Previous computer programming experience is not a prerequisite.

PSYC 440 TOPICS IN PSYCHOLINGUISTICS 3
Advanced study in psychology of language. Topics may include linguistic and conceptual development, language and space, acquisition of the lexicon, biology and environment in language learning, and language comprehension.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 442 PERCEPTION, MEMORY AND IMAGINATION 3
Addresses controversial issues about what it means to perceive, remember, and imagine our world. Examines research from cognitive psychology, cognitive science, and neuropsychology and includes in-class demonstrations of perceptual illusions, memory distortions, and imagery.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 443 TOPICS IN ORGANIZATIONAL COMMUNICATION 3-9
Focuses on significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships. Crosslisted with COMM442.
RESTRICTIONS: May be repeated for up to nine credits when topics vary.

PSYC 445 TOPICS IN ADOLESCENT PSYCHOLOGY 3
Analysis of physiological, psychological and social factors influencing psychological development from late childhood through adolescence.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 460 ASSESSMENT OF CHILDREN 3
Study of multiple roles of formal and informal assessment. Primary focus on integration of curriculum, assessment and programing. Strategies for family involvement will be identified.
Crosslisted with IFST452.
PREREQ: IFST220, IFST221, IFST222, and IFST224.
COREQ: IFST411 and IFST431.

PSYC 462 LANGUAGE ACQUISITION 4
The factors which distinguish human language from animal communication, as well as the development of many facets of language (semantics, syntax and phonology). To supplement reading and discussion, students gain research experience by working approximately eight hours per week on the on-going language acquisition projects.
Crosslisted with EDUC462.

PSYC 466 ADVANCED RESEARCH 3
Participation in research program of a faculty member. Expected to contribute to conceptualization of research problems, design and methodological discussions. Normally follows PSYC366.
PREREQ: Overall GPA of 3.0 and at least 18 credits in psychology.
RESTRICTIONS: Requires permission of faculty member.

PSYC 468 THESIS RESEARCH 3
Independent work on research project in collaboration with faculty. Prepare and defend a formal research report.
PREREQ: Overall GPA of 3.0 and at least 18 credits in psychology.
RESTRICTIONS: Requires permission of instructor.

PSYC 481 CLINICAL PSYCHOLOGY 3
Introduction to clinical theories, research and practices. Diagnosis, classification and treatment of behavior disorders.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 484 SOCIAL MOTIVATION 3
Analysis of theory and research in the social psychology of motivation. Students may choose to study either leisure behavior or work motivation.

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

RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 490 SOCIAL INTERDEPENDENCE 3
Presents theoretical and empirical approaches of social psychology to the study of conflict versus cooperation between mutually dependent people. Cooperation/conflict is analyzed in terms of effects of environmental influence, reward structure of the relationship, and interpersonal values of participants.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 491 PSYCHOLOGY OF TEMPORAL ORIENTATION 3
Scientific study of how temporal frames of reference regarding the past, present and future affect a variety of basic human processes, especially human behavior.
PREREQ: Grades of C- or better in PSYC207 and PSYC209.
RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 612 HUMAN PSYCHOPHYSIOLOGY 3
Introduction to psychophysiological recording techniques. Elementary anatomy and physiology of the human nervous system. Application of psychophysiological techniques to the investigation of psychopathology, information processing and social psychology. Laboratory demonstration of polygraphic measurement of autonomic and CNS variables with small computer analysis.
RESTRICTIONS: Requires permission of instructor.

PSYC 614 PSYCHOPHARMACOLOGY 3
Addresses the actions and neurobiology of psychoactive drugs. Emphasis on therapeutic drugs used for major classes of mental and neurological disorders. Drugs of abuse and mechanisms of drug addiction also are discussed.

PSYC 626 NEUROSCIENCE I 4
Structure and function of the sense organs, nervous system and motor systems in relation to integrated behavior.
May be crosslisted with BISC626.
PREREQ: BISC306, PSYC314, and PSYC310 or PSYC312.

PSYC 627 NEUROSCIENCE II 3
Further study of the structure and function of the nervous system with emphasis on molecular, cellular, and network neurophysiology.
Crosslisted with BISC627.
PREREQ: BISC306, PSYC310 or PSYC312, and PSYC314.

PSYC 630 NEURONS AND NETWORKS 3
Introduction to computational neuroscience: computing by real and artificial neurons and networks, and modeling of brain function. Covers theoretical background and involves hands-on projects to explore processing of sensory information, pattern discrimination, learning, memory and behavior.
May be crosslisted with CGSC630, CPEG630.
RESTRICTIONS: Requires permission of instructor.

PSYC 642 MENTAL REPRESENTATION AND MEMORY 3
Human memory can be conceptualized in terms of representation and information storage within various interrelated mental systems. Critically evaluates research on human memory and representation within the context of major cognitive models.
May be crosslisted with CGSC642.
RESTRICTIONS: Requires permission of instructor.

PSYC 668 RESEARCH 1-6

PSYC 675 LANGUAGE ACQUISITION 4
Examines the factors which distinguish human language from animal communication as well as the development of many facets of language (semantics, syntax and phonology). Main emphasis on how children in the first three years acquire language.
Crosslisted with EDUC675.

PSYC 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 curricula.
Crosslisted with EDUC692.

PSYC 806 SOCIAL COGNITION 3
Focuses on the major research topics in social cognition, including their theoretical and historical roots. Topics include implicit and explicit attitudes, dual-process models of cognition and their behavioral consequences, and systematic biases in social perception.
RESTRICTIONS: Requires permission of instructor.

PSYC 807 GROUP AND INTERPERSONAL PROCESSES 3
Addresses basic theoretical and empirical knowledge of group processes, structures and interactions.
RESTRICTIONS: Requires permission of instructor.

PSYC 808 PERSONALITY IN SOCIAL CONTEXTS 3
Examines temporally stable individual differences ("traits") from a variety of perspectives including their origins, assessment, and relationships to behavior in social settings. Special attention is given to the interaction of trait and environmental influences on social behavior.
RESTRICTIONS: Requires permission of instructor.

PSYC 809 RESEARCH DESIGN 3
An overview of methodological issues in the conduct of psychological research, including correlational, experimental, and quasi-experimental studies. Special emphasis on clinical and personality research.
RESTRICTIONS: Requires permission of instructor.

PSYC 812 SEMINAR IN SOCIAL INTERDEPENDENCE 3
Examines theory and research on the conflict between self interest and collective welfare. Special attention is given to the interaction between intrapersonal motivation and features of the interdependent environment as a model for understanding the resolution of this conflict.
RESTRICTIONS: Requires permission of instructor.

PSYC 813 SEMINAR IN INTERGROUP RELATIONS 3
Cognitive, motivational and cultural factors involved in the creation of and reduction of intergroup bias and conflict. Emphasis on theoretical and applied perspectives.
RESTRICTIONS: Requires permission of instructor.

PSYC 814 SEMINAR IN EMPLOYEE MOTIVATION 3
Examines current research on the motivation of people at work. Special emphasis is given to the application of social psychological theory and empirical findings. Examples of topics are organizational commitment, perceived organizational support, self-efficacy, goal setting, and creativity.
RESTRICTIONS: Requires permission of instructor.

PSYC 817 INDIVIDUAL INTELLIGENCE TESTING 3
Administration and interpretation of major individually administered intelligence tests used in school and child clinical psychology. Five tests will be highlighted: the Stanford Binet, EISC-R, WPPSI, WAIS-R and K-ABC.
Crosslisted with EDUC817.
RESTRICTIONS: Requires permission of instructor.

PSYC 819 CHILD PSYCHOTHERAPY: ETHICS, DIVERSITY, TREATMENTS 3
Survey of theories, schools and techniques of child psychotherapy with a focus on ethics and diversity issues.
RESTRICTIONS: Requires permission of instructor.

PSYC 820 PSYCHODIAGNOSTICS: OBJECTIVE TRAIT AND BEHAVIORAL ASSESSMENT 3
Theory and techniques of psychological classification, structured personality assessment, and behavioral assessment. Administration, scoring and interpretation of the MMPI and other self-report inventories. Behavior observation in clinical settings. Clinical vs. statistical prediction.
RESTRICTIONS: Requires permission of instructor.

PSYC 823 LEARNING AND DEVELOPMENT 3
The study of contemporary theory and research in human development, with an emphasis on issues of educational significance, and mechanisms that affect development.
Crosslisted with EDUC823.

PSYC 827 ADULT PSYCHOTHERAPY: EMPIRICALLY-SUPPORTED TREATMENTS 3
Schools, theories and techniques focusing on empirically-supported treatments in adult psychotherapy.
PREREQ: PSYC819.
RESTRICTIONS: Requires permission of instructor.

PSYC 829 ADVANCED PSYCHOPATHOLOGY 3
Nosology and etiology of the behavior disorders of non-organic origin. Theories of psychopathology, including various modes of conceptualizing psychopathology, i.e., medical vs. behavioral and psychosocial models. Reliability and validity of psychodiagnosis; and relevant research and problems of experimental clinical research with institutionalized populations.
RESTRICTIONS: Requires permission of instructor.

PSYC 834 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY I 1-3 PF
Limited diagnostic and therapeutic practice in clinical setting under professional supervision.
RESTRICTIONS: Requires permission of instructor.

PSYC 835 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY II 1-3 PF
Continuation of PSYC834.
RESTRICTIONS: Requires permission of instructor.

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

PREREQ: PSYC834 and PSYC835.

RESTRICTIONS: Requires permission of instructor.

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

Continuation of PSYC834, PSYC835 and PSYC836.

PREREQ: PSYC836.

RESTRICTIONS: Requires permission of instructor.

PSYC 840 TEACHING PRACTICUM 3

Preparation for being instructor of record for first course in psychology. Topics include course planning, writing syllabi, writing and grading exams, developing lesson plans, teaching writing, handling academic problems, and integrating teaching into an academic career. Read and discuss empirical research on effective teaching of psychology. Required for graduate students who wish to teach their own courses in the psychology department.

RESTRICTIONS: Open only to graduate students in psychology.

PSYC 845 CHILDHOOD PSYCHOPATHOLOGY 3

Survey of various developmental and behavioral disorders in childhood. Seminar will examine the issues of diagnosis and treatment theoretical perspectives. Special emphasis on current major psychological research.

Crosslisted with EDUC813.

RESTRICTIONS: Requires permission of instructor.

PSYC 860 PSYCHOLOGICAL STATISTICS 3

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

RESTRICTIONS: Requires permission of instructor.

PSYC 861 PSYCHOLOGICAL STATISTICS 3

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

RESTRICTIONS: Requires permission of instructor.

PSYC 864 TEACHING PRACTICUM IN PSYCHOLOGY 3

Prepares graduate students in psychology to teach undergraduate courses. Topics include course design, active learning techniques, effective lecturing, teaching writing, student assessment, campus resources, and teaching philosophies and portfolios.

RESTRICTIONS: Requires permission of instructor.

PSYC 868 RESEARCH 1-6

PSYC 869 MASTER'S THESIS 1-6

RESTRICTIONS: Requires department permission.

PSYC 964 PRE-CANDIDACY STUDY 3-12 PF

Research and readings in preparation of dissertation and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

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

PSYC 969 DOCTORAL DISSERTATION 1-12 PF

RUSSIAN

RUSS 105 RUSSIAN I - ELEMENTARY 4

Introduction to the Russian language and development of speaking, listening, reading and writing skills through the use of basic texts.

RUSS 106 RUSSIAN II - ELEMENTARY/INTERMEDIATE 4

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

PREREQ: RUSS105.

RESTRICTIONS: Two to three years of high school Russian acceptable in lieu of prerequisite.

RUSS 107 RUSSIAN III - INTERMEDIATE 4

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

PREREQ: RUSS106.

RESTRICTIONS: Four years of high school Russian acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.

RUSS 200 RUSSIAN GRAMMAR REVIEW 3

Systematic review of elementary and intermediate Russian grammar, study of complex sentence structure and idioms. Some conversational practice.

PREREQ: RUSS107.

RUSS 205 RUSSIAN CONVERSATION 3

Practical use of the language. Emphasis on topics drawn from contemporary

Russian life and literature.

PREREQ: RUSS107.

RUSS 211 RUSSIAN READING AND COMPOSITION: SHORT FICTION 3

Reading and discussion of 20th century Russian short stories and novellas.

Several short compositions. Grammar review where appropriate.

PREREQ: RUSS107.

RUSS 305 RUSSIAN CONVERSATION AND COMPOSITION 3

Discussion of current cultural, social and political topics in Russia and the former republics. Vocabulary building, grammar exercises and frequent compositions.

PREREQ: Any 200-level course conducted in Russian.

RUSS 310 INTRODUCTION TO RUSSIAN LITERATURE I 3

Masterpieces of poetry, narrative prose and drama from the 19th century.

PREREQ: RUSS211 or RUSS305.

RUSS 312 INTRODUCTION TO RUSSIAN LITERATURE II 3

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

PREREQ: RUSS211 or RUSS305.

RUSS 325 RUSSIAN CIVILIZATION AND CULTURE 3

Survey of the major cultural, social and political developments in Russia from its inception to the present.

PREREQ: RUSS211 or RUSS305.

RUSS 366 INDEPENDENT STUDY 1-3

RUSS 401 ADVANCED RUSSIAN GRAMMAR AND COMPOSITION 3

Selected topics in advanced Russian grammar, with special attention to participial constructions, verbs of motion, aspect and problems of syntax and word order. Exercises in writing correct and idiomatic Russian.

PREREQ: One 300-level Russian course.

RUSS 440 SPECIAL TOPICS: RUSSIAN DRAMA, PROSE OR POETRY 3

Explores one of the three major genres by examining a specific theme. Subject matter varies and will be announced in registration booklet.

PREREQ: Any two 300-level Russian courses.

RESTRICTIONS: May be repeated for credit when topics vary.

RUSS 455 SELECTED AUTHORS, WORKS AND THEMES 3

Works of one or more outstanding authors or on a special theme.

PREREQ: Two 300-level Russian literature courses.

RESTRICTIONS: May be repeated for credit when topics vary.

RUSS 465 SEMINAR 3

Various authors and themes.

PREREQ: One 400-level Russian literature course.

RESTRICTIONS: May be repeated for credit when topics vary.

RUSS 466 INDEPENDENT STUDY 1-3

RUSS 665 SEMINAR 3

Various authors and themes.

RESTRICTIONS: May be repeated for credit when topics vary.

SCIENCE

SCEN 101 PHYSICAL SCIENCE 3-4

Structure, processes and concepts of the physical world. Focus is physical sciences topics presented to a general science class consisting of non-science majors. Laws and theories of the physical world are presented and applied to applications, including motion, gravity, energy, waves, light, electricity including photoelectricity, and magnetism.

RESTRICTIONS: Requires high school algebra. For non-science students with no physics or chemistry background. Not for physics or chemistry major credit. Only one course from among SCEN101, PHYS104, PHYS201 or PHYS207 can count toward graduation.

SCEN 102 PHYSICAL SCIENCE 3-4

The structure, processes and concepts of the physical world.

RESTRICTIONS: Requires high school algebra. For non-science students with no physics or chemistry background. Not for physics or chemistry major credit. Only one course from among SCEN102, PHYS202 or PHYS208 can count toward graduation.

SCEN 103 CONCEPTS OF SCIENCE AND TECHNOLOGY 3

Introduction to some of the fundamental science concepts underpinning high technology, emphasizing everyday devices and practical experience, for the development of scientific and computer literacy of non-science majors.

RESTRICTIONS: Requires high school algebra.

SCEN 210 SCIENCE OF COLOR PHENOMENA 4
Introduction to basic physical and chemical principles which describe nature of light and the phenomena of color. Targeted for non-science majors who seek a descriptive understanding of scientific principles underlying formation of color phenomena found in nature and works of art.
Crosslisted with ARTC210.
PREREQ: High school chemistry and algebra.

SCEN 340 ADVANCED SCIENCE FOR TEACHERS 4
Provides advanced background study for students in the Elementary Teacher Education Milford Program. Topics are drawn from physical, earth and biological sciences and build on science courses previously taken in the program. The areas of science outlined in the State Science Performance Indicators are covered. Along with lecture/discussion, students have hands-on laboratories (including the Smithsonian kits used by the District).
RESTRICTIONS: Offered to students in the Milford ETE program.

SCEN 344 SCIENCE AND RELIGION 3
Examines the relationship between science and religion and focuses on: whether our current cosmological picture of the Big Bang allows for a Creator; the rationality of miracle-reports; whether the scientific image of humanity is compatible with a religious worldview; the biological evolution/creation debate.
Crosslisted with PHIL344.

SCEN 466 INDEPENDENT STUDY 1-12

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

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

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

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

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

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

SCEN 650 SCIENTIFIC INQUIRY FOR CURRENT AND FUTURE TEACHERS 3
Advanced problem-based learning and scientific research course for Elementary Teacher Education majors seeking a second licensure area in middle school science. May also be taken by current middle school and high school teachers. Topics rotate among life, earth, and physical sciences.

SEXUALITIES AND GENDER STUDIES

SGST 200 CULTURAL INTRODUCTION TO SEXUALITIES AND GENDER STUDIES 3
An exploration of the variations in the social construction of lesbian, gay, bisexual, heterosexual, transgender and queer identities and communities in contemporary American society by study of gay literature, history, theory, religious

and legal issues and the arts including film, music, television, and visual arts.
May be crosslisted with WOMS200.

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

SGST 266 SPECIAL PROBLEM 1-3

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

SGST 366 INDEPENDENT STUDY 1-6

SGST 387 HISTORY OF SEXUALITY IN THE U.S. 3
A survey of American sexual ideals, practices, and identities, from the Colonial period to the present. How anxieties about interracial sex shaped life in the American South, how the advent of more reliable contraceptives provoked both social movements and political debate, and how the emergence of a scientific discourse of sexual difference simultaneously propelled the gay rights movement and enabled scientists to categorize same-sex love as pathology and perversion.
Crosslisted with HIST387.

SGST 466 SPECIAL PROBLEM 1-6

SOCIOLOGY

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

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

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

SOCI 206 WOMEN AND WORK 3
Covers a variety of topics including women in traditional and non-traditional occupations, gender-based discrimination (wage inequities, sexual harassment, exclusionary policies), the contributions of women to the economy and the role of law in shaping conditions for women in the workplace.
Crosslisted with WOMS206.

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

SOCI 211 MEN, CONFLICT AND SOCIAL CHANGE 3
Examination of male roles and images in society, utilizing an interdisciplinary social science perspective. Topics include the family, work, military, violence and the implications of feminism for men. Issue oriented.
Crosslisted with WOMS211.

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

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

SOCI 266 SPECIAL PROBLEM 1-3

SOCI 270	FAMILIES AND DEVELOPMENTAL DISABILITIES	3
Focuses on people with developmental disabilities in the context of their family and culture from a multidisciplinary perspective. Covers disabilities and their causes; changing needs across the lifespan, gender, cross-cultural and legal issues; and information about prevention/intervention, employment, inclusion, and empowerment. Crosslisted with IFST270.		
SOCI 301	INTRODUCTION TO SOCIOLOGICAL RESEARCH	4
Survey of research methods and data analysis employed in sociology. PREREQ: SOCI201 and completion of the College of Arts and Sciences math requirement. RESTRICTIONS: Junior status and completion of 12 social science credits strongly recommended.		
SOCI 302	SOCIAL DEVIANCE	3
Defining deviance, research on deviance and explaining deviance. May be crosslisted with CRJU302.		
SOCI 303	JUVENILE DELINQUENCY	3
Historical definition of delinquency, abuse and neglect, research in delinquency, causes and treatment of delinquents. May be crosslisted with CRJU303. PREREQ: SOCI201 or SOCI209.		
SOCI 304	CRIMINOLOGY	3
The nature, kinds and causes of crime. Criminal liability, criminal careers and organized racketeering. May be crosslisted with CRJU304. PREREQ: SOCI201 or SOCI209		
SOCI 305	SOCIAL CLASS AND INEQUALITY	3
Internal differentiation as a basis for inequality and differential life chances of human societies.		
SOCI 308	THE FAMILY	3
Comparative study of the family in various societies provides a background for the analysis of family organization in modern America. PREREQ: SOCI201 or SOCI203 or SOCI209.		
SOCI 311	SOCIOLOGY OF HEALTHCARE	3
Professionalization of health occupations, hospitals as social systems, medical education and practice organizations, healthcare organizations and their interrelationships (politics of health), and health service patterns.		
SOCI 312	THEORIES OF SOCIETY	3
Covers writings of Karl Marx, Emile Durkheim, Max Weber and related current approaches. Focuses on theoretical perspectives concerned with social development, social conflict, solidarity, social class and gender. PREREQ: SOCI201.		
SOCI 319	SOCIOLOGY OF LATIN AMERICA	3
Survey of sociology of Latin American, with sections on geography, population, urbanization, history, politics, family, religion, economy, and education and on race, class, and gender relations.		
SOCI 322	CROWDS, CULTS AND REVOLUTIONS	3
Analysis of forms of behavior in relatively unstructured situations such as crowds, panics, riots and demonstrations; and processes of interaction: susceptibility, contagion, polarization and communication. May be crosslisted with CRJU322. PREREQ: SOCI201.		
SOCI 323	SOCIOLOGY OF RISK	3
Focuses on how individuals, organizations, and government agencies assess various types of risk and act with respect to those assessments. Topics include: risk perception, risk assessment, risk management under conditions of scientific uncertainty, and public debates about safety. PREREQ: SOCI201.		
SOCI 324	ISSUES IN EMERGENCY MANAGEMENT	3
Overview of the development of emergency management in the United States as a profession. Issues associated with emergency management are also discussed with reference to the disaster research literature. PREREQ: SOCI325.		
SOCI 325	DISASTERS AND SOCIETY	3
Sociological introduction to the field of disaster studies, including the ways in which societies attempt to prepare for, respond to, and recover from their impacts. PREREQ: SOCI201.		
SOCI 326	EMERGENCY AND ENVIRONMENTAL MANAGEMENT PRACTICUM AND SEMINAR	4 PF
Internship in an organization or agency responsible for emergency or		

environmental management. With approval of the area coordinator, student is assigned to an organization to become familiar with issues, policies and practices pertaining to disasters. Student under direct supervision of agency personnel while in the placement position. In addition to the internship, students are expected to meet weekly in a seminar with the area coordinator and other students to discuss issues and experiences. PREREQ: SOCI321 or SOCI327, and SOCI470. RESTRICTIONS: Approval of the area coordinator		
SOCI 327	SOCIOLOGY OF ORGANIZATIONS	3
Business enterprises, the military, governmental bureaus and other large-scale organizations. Bureaucratic structure, internal systems of status and authority, division of labor, social control, and the individual in the organization. PREREQ: SOCI201.		
SOCI 328	WORK IN A GLOBAL ECONOMY	3
Role of work in contemporary society. Social, institutional and cultural influences on work. Special emphasis on problem areas such as job satisfaction, professionalism, career patterns, leisure and occupational choice.		
SOCI 329	INTERNATIONAL MIGRATION	3
Interdisciplinary introduction to alternative/complementary disciplinary approaches to the study of human movement between states. Offered on a rotational basis by faculty involved in the University of Delaware migration group. Crosslisted with POSC329.		
SOCI 330	POPULATION, LAW AND SOCIETY	3
Interrelationships among population, law and social structure with an emphasis on analyzing strategies of adaptation to change. Introduction to demographic techniques; contemporary issues such as family planning, population policies, migration, marriage and divorce.		
SOCI 331	WORLD POPULATION: PROFILES AND TRENDS	3
Study of the size, composition and distribution of world populations. An examination of the structure and dynamics of selected countries and the specific problems—causes, consequences and possible solutions. Population problems are examined in relationship to social organization, environment and technology.		
SOCI 336	THE DETECTIVE IN FILM AND FICTION	3
Study of detective fiction and film has applications to a liberal arts approach to crime and justice. Blends literary analysis with the insights of social science research on the work of private and police detectives. Crosslisted with CRJU336. PREREQ: CRJU201		
SOCI 341	WELFARE AND SOCIETY	3
Institutional apparatus created to deal with the welfare problems of an industrial society, development of welfare institutions, their structure and functioning. PREREQ: 18 credit hours in sociology, psychology, political science or economics.		
SOCI 343	SOCIETY, POLITICS AND HEALTHCARE	3
Interdisciplinary study of the political, social, economic and humanistic issues of healthcare and health policy. Students will develop the capacity to understand the political process and its relationship to the healthcare delivery system. Crosslisted with POSC343.		
SOCI 345	SOCIOLOGY OF LAW	3
Analysis of law as a social process in both historical and comparative perspective. Focuses on various theories of law and society and relevant empirical research. May be crosslisted with CRJU345.		
SOCI 346	GENDER AND AGING	3
Empirical and theoretical investigation of the aging process. PREREQ: SOCI201 or SOCI203 or PSYC100.		
SOCI 348	THEORIES OF SOCIAL WORK PRACTICE	3
Methods of social work practice; casework, group work, community organization; sociological and psychological foundations underlying social services. PREREQ: SOCI201.		
SOCI 350	SOCIAL INEQUALITY AND FILM	3
Using a sociological framework for understanding equality, major films are used to explore the depictions and representations of race, gender, sexuality and social class issues. Examines the ideologies presented in films, the contexts that create them and how they contrast with social realities. PREREQ: SOCI201.		
SOCI 356	INEQUALITY, CRIME AND JUSTICE	3
Introduction to challenges in addressing crime in multiracial, multiethnic, class-stratified society. This context serves as backdrop for inquiry into crime causation, operations of the criminal justice system, and experiences of relevant actors. Crosslisted with CRJU355.		
SOCI 360	SOCIOLOGY OF RELIGION	3
Sociological analysis of major religions and the societies with which they have		

been associated; social settings of particular systems of belief; the relation of status; religious affiliation and personal behavior in modern societies.
May be crosslisted with JWST360.

- SOCI 361 RACIAL INEQUALITY 3**
A detailed examination of racial inequality, including the social construction of race, the nature of oppression and advantage, government policies and resistance strategies. There will be attention to the status of men and women and social class diversity within racial-ethnic communities.
May be crosslisted with BAMS361.
PREREQ: SOCI201
- SOCI 366 INDEPENDENT STUDY 1-3**
- SOCI 368 INDEPENDENT RESEARCH 1-6**
Independent research under the supervision of a faculty member. Requirements include preparation of a research report consistent with the professional literature in the field. Student and faculty member will file a learning contract describing the research and a report with the department chair.
RESTRICTIONS: Requires permission of instructor.
- SOCI 369 ALCOHOL, DRUGS AND CRIME 3**
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.
Crosslisted with CRJU369.
PREREQ: CRJU110 or SOCI201
- SOCI 399 PRACTICUM: TEACHING SOCIOLOGY 3 PF**
Practical experience in undergraduate education is gained by serving as a discussion leader in a course taught by a regular member of the faculty.
RESTRICTIONS: Requires permission of instructor. Not for major credit.
- SOCI 401 SENIOR SEMINAR 3**
Culminates the legal studies minor by requiring an independent research project resulting in a term paper. Seminar focuses on a specific substantive issue, provides guidance from professor and chance to share ideas and problems with fellow students.
Crosslisted with LEST401.
- SOCI 407 SOCIOLOGY OF SEX AND GENDER 3**
Seminar on sex and gender relations from a sociological perspective. Surveys current research on gender stratification in the paid work force, the feminization of poverty, gender relations in the family, sexual violence, and feminism as a social movement. Special attention given to current theoretical debates on the origins and persistence of sexual inequality and the intersection of gender with race and class in patterns of social stratification.
May be crosslisted with WOMS407.
PREREQ: SOCI201, and either SOCI213 or WOMS201.
RESTRICTIONS: Restricted to junior and senior sociology and women's studies majors.
- SOCI 410 HEALTH SERVICES PRACTICUM AND SEMINAR 4 PF**
Field experience and related seminar. Placement in health service settings where student works for about 160 hours under supervision of health service administrators. Students meet in a weekly seminar with coordinator.
RESTRICTIONS: Requires permission of instructor.
- SOCI 412 RESEARCH PRACTICUM 4 PF**
Field experience and related seminar. Placement in research, planning and service agencies where students work for approximately 160 hours under professionally trained supervisors. Students meet in a weekly seminar with coordinator.
PREREQ: SOCI301.
RESTRICTIONS: Requires permission of instructor.
- SOCI 415 RACE, CLASS AND GENDER 3**
Analysis of current American social issues that show interrelationship of race, class and gender. Readings from sociology, Afro-American studies, feminist studies, history and literature.
May be crosslisted with BAMS415, WOMS415.
- SOCI 416 SOCIAL THOUGHT AND CONTEMPORARY SOCIETY 3**
Seminar focuses on ways in which social thought defines and analyzes contemporary society. Explores how alternative theories and methods serve to create knowledge about contemporary concerns with everyday life, democracy, equality, social structure and power.
PREREQ: SOCI312.
- SOCI 418 RACE, GENDER AND POVERTY 3**
An examination of contemporary American poverty with attention to race and gender as fundamental dimensions of inequality. Social policy, employment and family composition are key topics.
May be crosslisted with BAMS418, WOMS418.
PREREQ: SOCI201.

- SOCI 422 FADS AND FASHIONS 3**
Examination of the dynamics of short-term enthusiasms. Emphasis will be on fads and fashions in education, science, medicine, and other institutions, rather than on fashions in clothing.
- SOCI 428 CORPORATE CRIME 3**
Nature and causes of the deviant behaviors and crimes of large organizations. How organizations act, are accused of deviance and defend themselves in cases such as price-fixing, sale of unsafe drugs and illegal spying.
May be crosslisted with CRJU428.
- SOCI 430 COMPARATIVE SOCIOLOGY 3-6**
Exposes sociological similarities and differences between the United States and a selected country on a number of critical sociological topics. Topics include ethnic and religious diversity, culture, demographic structure, social institutions, social stratification and urbanization.
May be crosslisted with JWST430.
RESTRICTIONS: Requires permission of instructor. Only three credits may apply toward departmental requirement of six 400-level credits. Offered only in the study abroad program and subject to acceptance by the Office of International Programs.
- SOCI 441 SOCIAL WELFARE PRACTICUM AND SEMINAR 4 PF**
Field experience and related seminar. Placement in social service agencies where students work for approximately 160 hours under professionally trained supervisors; students meet in a weekly seminar with coordinator.
PREREQ: SOCI341.
RESTRICTIONS: Requires permission of instructor.
- SOCI 442 LAW AND SOCIETY PRACTICUM AND SEMINAR 4 PF**
Field experience and related seminar. Placement in court, law firm or other law-related institution where students work for approximately 160 hours under professionally trained supervisors; weekly seminar with program coordinator.
PREREQ: SOCI345.
RESTRICTIONS: Requires permission of instructor.
- SOCI 444 APPROACHES TO QUALITATIVE INQUIRY 3**
Explores such approaches to research as conducting interviews, observing social behavior, content analysis of such material items as films, newspapers, and historical documents, and conducting focus groups. Given opportunity to choose a project and conduct research using these qualitative methods.
- SOCI 450 POLITICS AND SOCIETY 3**
Analysis of political organization and action, including evaluation of major approaches. Case studies of political structures and behavior.
PREREQ: SOCI201.
- SOCI 452 DRUGS AND THE CRIMINAL JUSTICE SYSTEM 3**
Covers both drug and criminal justice issues, focusing on the drugs-crime nexus and the criminal justice system response. Examines issues of race, gender, victimization, international policy, and new policy responses including drug treatment, harm reduction, and restorative justice. Class is held at a local correctional facility, and half the students are inmates.
Crosslisted with CRJU452.
RESTRICTIONS: Permission of instructor.
- SOCI 455 YOUTH STREET OUTREACH 4**
Implements an outreach program to youth in a low income, urbanized community in Wilmington. Students trained and monitored as outreach workers by their professor and by community volunteers. Outreach workers trained to approach youth hanging out on the street, engage them (through conversation and recreational activities), identify their needs, and direct them to resources. Students keep journals to record their observations and feelings. The goal of the class is to increase social capital among youth by encouraging and facilitating youth participation in community educational, recreational, and social support services/activities.
May be crosslisted with CRJU455.
- SOCI 464 INTERNSHIP 1-4 PF**
Provides students an opportunity to apply sociological theory and research while working in an agency or other organizational setting under supervision of department faculty. Must complete an internship agreement and secure approval from faculty member to sponsor internship.
- SOCI 466 INDEPENDENT STUDY 1-3**
- SOCI 470 ENVIRONMENTAL SOCIOLOGY 3**
A substantive and theoretical introduction to the major issues in environmental sociology: the emergence and development of the environmental movement; the development of environmental issues; and how environmental issues are related to structural, contextual and perceptual factors.
PREREQ: SOCI201 and SOCI312.
RESTRICTIONS: Requires upper division status.
- SOCI 471 DISASTERS, VULNERABILITY & DEVELOPMENT 3**
Introduces students to social vulnerability analysis of disaster. Students examine

how social, geographical, and cultural factors as well as patterns of development put people differentially at risk to disasters. Emphasizes the intersection of gender, race, class, age, and ability. Disasters in the US are compared and contrasted to international disasters. Students will explore how vulnerable social groups are affected by and cope with hazardous conditions and events, as well as study the capacities of these groups to increase resiliency. Readings draw from disasters studies, feminist studies, and development studies.

SOCI 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.
Crosslisted with CRJU495.
RESTRICTIONS: Requires permission of instructor. Not for major credit.

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

SOCI 605 DATA COLLECTION AND ANALYSIS 3
A survey of methods and techniques for defining research problems and for gathering and analyzing data in sociological research.
RESTRICTIONS: Requires permission of instructor.

SOCI 606 QUALITATIVE METHODOLOGY 3
Focuses on research design, the logic of inquiry and an elaboration of selected issues introduced in SOCI605. Special emphasis on epistemological issues, methodological concerns central to the social sciences and non-positivistic research strategies and techniques.

SOCI 607 SOCIOLOGY OF GENDER 3
Reviews current research and theory in the sociology of gender with particular attention to issues arising from the gender division of labor, feminism and social change, gender and the structure of social institutions, and the interaction of gender, race, class and sexuality. Introduces sociological theory and methodology as used and revised by scholars working on gender issues.

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

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

SOCI 612 DEVELOPMENT OF SOCIOLOGICAL THEORY 3
Historical survey of the development of sociology and sociological theory beginning with the period of the Social Contract theorists through the classic European theorists of the 19th century.

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

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

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

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

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

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

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

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

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

SOCI 666 SPECIAL PROBLEM 1-12

SOCI 671 DISASTERS, VULNERABILITY & DEVELOPMENT 3
Introduces students to social vulnerability analysis of disaster. Students examine how social, geographical, and cultural factors as well as patterns of development put people differentially at risk to disasters. Emphasizes the intersection of gender, race, class, age, and ability. Disasters in the US are compared and contrasted to international disasters. Students will explore how vulnerable social groups are affected by and cope with hazardous conditions and events, as well as study the capacities of these groups to increase resiliency. Readings draw from disasters studies, feminist studies, and development studies.

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

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

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

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

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

SOCI 866 SPECIAL PROBLEM 1-12

SOCI 868 RESEARCH 1-6

SOCI 869 MASTER'S THESIS 1-6

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

SOCI 969 DOCTORAL DISSERTATION 1-12 PF

SPANISH

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

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

SPAN 105	SPANISH I - ELEMENTARY	4	Introduction to the Spanish language and a development of speaking, listening, reading and writing skills through the use of basic texts. RESTRICTIONS: No Spanish background, fewer than two years of high school Spanish, or two years in 9th and 10th grades only.	works, discussions and collateral readings. PREREQ: SPAN201.
SPAN 106	SPANISH II - ELEMENTARY/INTERMEDIATE	4	Completion of basic Spanish. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: SPAN105. RESTRICTIONS: Two to three years of high school Spanish acceptable in lieu of prerequisite.	SPAN 303 SURVEY OF SPANISH-AMERICAN LITERATURE 3 Representative works in all genres of Latin American literature from pre-Columbian to Modernism. PREREQ: SPAN201.
SPAN 107	SPANISH III - INTERMEDIATE	4	Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: SPAN106. RESTRICTIONS: Four years of high school Spanish acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.	SPAN 304 SURVEY OF SPANISH-AMERICAN LITERATURE 3 Representative works in all genres of Latin American literature in the 20th century. PREREQ: SPAN201.
SPAN 111	INTERMEDIATE SPANISH I	3	Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: SPAN102 or SPAN106. RESTRICTIONS: Three years of high school Spanish acceptable in lieu of prerequisite.	SPAN 305 ORAL COMMUNICATION 3 For individuals with a comprehensive knowledge of Spanish grammar and vocabulary. Emphasis on refinement of expression of abstract ideas as well as mastery of practical communication. PREREQ: SPAN200. RESTRICTIONS: Not intended for native speakers.
SPAN 112	INTERMEDIATE SPANISH II	3	Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed. PREREQ: SPAN111 or SPAN106. RESTRICTIONS: Four years of high school Spanish acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.	SPAN 306 PRACTICAL ORAL/WRITTEN EXPRESSION 3 Strengthens skills in grammar and vocabulary in preparation for advanced courses. Includes oral exposes, discussion of articles and videos, textual analysis and compositions. PREREQ: SPAN200. RESTRICTIONS: Taught abroad only.
SPAN 200	SPANISH COMPOSITION AND GRAMMAR	3	First part of a thorough grammar review and intensive practice, targeting structure, essential vocabulary, speaking, listening and extensive writing. PREREQ: SPAN107 or SPAN112.	SPAN 307 CONTEMPORARY LATIN AMERICA II 3 Discussion and study of issues related to contemporary cultural, political and social developments in Latin America. PREREQ: SPAN200.
SPAN 201	SPANISH READING AND COMPOSITION	3	Reading, discussion, and analysis of various genres of Hispanic literature. Several short compositions. Grammar review where appropriate. PREREQ: SPAN200. RESTRICTIONS: Not intended for students who have already taken 300 and 400 level literature courses in Spanish.	SPAN 308 CONTEMPORARY SPAIN II 3 Discussion and study of issues related to contemporary cultural, political and social developments in Spain, including its place in today's European community. PREREQ: Any two 200-level Spanish courses taught in the Spanish language. RESTRICTIONS: Taught abroad and in Spanish.
SPAN 205	SPANISH CONVERSATION	3	Practical use of Spanish by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work. PREREQ: SPAN107 or SPAN112. RESTRICTIONS: Prerequisites require a minimum grade of B. Not intended for native speakers.	SPAN 314 SPANISH PHONETICS AND PHONOLOGY 3 Study and practice of Spanish pronunciation and intonation. Contrastive analysis of Spanish and American English phonological systems. Introduction to Spanish dialectology. PREREQ: SPAN200. RESTRICTIONS: Recommended for prospective teachers.
SPAN 206	CULTURE THROUGH CONVERSATION	3	Discussion of topics drawn from contemporary Spanish or Latin American life. For students who wish to broaden their knowledge of Hispanic culture while improving their oral and aural language skills. PREREQ: SPAN107 or SPAN112. RESTRICTIONS: Taught abroad only.	SPAN 325 SPANISH CIVILIZATION AND CULTURE 3 Survey of geography, history, art and society of Spain. PREREQ: SPAN200.
SPAN 207	CONTEMPORARY LATIN AMERICA I	3	Introduction to contemporary Latin America, its culture, its people, their way of life and the issues confronting them. RESTRICTIONS: Taught abroad, in both English and Spanish. Not for major credit. Does not satisfy College of Arts and Sciences language requirement. May be repeated for credit when taken on different study abroad programs.	SPAN 326 LATIN AMERICAN CIVILIZATION AND CULTURE 3 Survey of geography, history, art and society of Latin American lands. PREREQ: SPAN200.
SPAN 208	SPAIN: PAST AND PRESENT	3	Introduction to contemporary Spain, its culture, its people, their way of life and the issues confronting them. RESTRICTIONS: Taught abroad in English. Not for minor credit. Does not satisfy College of Arts and Sciences language requirement.	SPAN 352 INTRODUCTION TO BUSINESS SPANISH 3 Introduction of essential business/commercial terminology in common business context, reinforcing strategies for understanding, interpreting, and responding to new information, and providing opportunities for interactive practice. Familiarizes student with basic policies and practices of the Hispanic business community. Includes writing, conversation, grammar and culture. PREREQ: SPAN200 and SPAN201.
SPAN 300	ADVANCED SPANISH COMPOSITION AND GRAMMAR I	3	Second part of a thorough review and intensive practice, targeting structure, essential vocabulary, speaking, listening and extensive writing. PREREQ: SPAN200.	SPAN 355 SPECIAL TOPICS 3-12 Explores an area of special interest in Hispanic literature. Subject matter varies and announced in the registration booklet. PREREQ: SPAN201. RESTRICTIONS: May be repeated for credit when topics vary.
SPAN 301	SURVEY OF SPANISH LITERATURE	3	Development of Spanish literature from its origins through the 17th century. Study of representative works, discussions and collateral readings. PREREQ: SPAN201.	SPAN 366 INDEPENDENT STUDY 1-3
SPAN 302	SURVEY OF SPANISH LITERATURE	3	Spanish literature from the 18th century to the present. Selection of representative	SPAN 370 STUDIES IN SPANISH LITERATURE TAUGHT IN SPAIN 3 Presents a historical overview of an area of special interest in Spanish literature. Topics may include a general survey of Spanish literature from its medieval roots in Latin, Arabic, and Hebrew texts to the multiple influences impacting Spanish literature of the twentieth century. May be repeated for credit when topics vary. PREREQ: SPAN201.
				SPAN 401 ADVANCED SPANISH COMPOSITION AND GRAMMAR II 3 Study and practice of selected problems of written and oral Spanish syntax and vocabulary as well as textual analysis. PREREQ: One 300-level Spanish course.
				SPAN 403 HISTORY OF THE SPANISH LANGUAGE 3 History of the language from Latin to the present. Historical phonology and morphology. PREREQ: One 300-level Spanish course.

SPAN 406	ADVANCED SPANISH LANGUAGE	3
Advanced grammatical structure and stylistics with special attention given to technical vocabulary and discourse (e.g., business, law, science, agriculture). PREREQ: One 300-level Spanish course. RESTRICTIONS: Taught abroad only.		
SPAN 415	LATIN AMERICAN LITERATURE AND ITS POLITICAL CONTEXT	3
Analysis of selected works by contemporary Latin American authors, focusing on the techniques used by these writers to reveal the political upheaval that has affected Latin America in recent years. PREREQ: One SPAN300-level survey of literature.		
SPAN 416	CERVANTES: DON QUIJOTE	3
The reading of Don Quijote in Spanish; major themes of the book. The life and times of Cervantes. Antecedents to Don Quijote in Spanish literature. The purpose of Don Quijote. Introduction to the language of Cervantes. PREREQ: One SPAN300-level survey of literature.		
SPAN 417	HISPANIC NOBEL PRIZE AUTHORS	3
Covers the works of Spanish and Latin American Nobel Prize authors - Echegaray, Benavente, Mistral, Jimenez, Asturias, Aleixandre, Neruda, Garcia Marquez, Paz and Cela - in relation to their cultural milieu on the regional, national and international levels and in relation to their authors' biographies. PREREQ: One SPAN300-level survey of literature.		
SPAN 418	GOD, MAN AND WOMAN	3
Analysis of the presentation of God, man and woman in a selection of narrative poems, dramas and novels from the 15th to the 17th centuries. Authors studied include Santillana, Diego de San Pedro, Luis de Leon, Zayas and others. PREREQ: One SPAN300-level survey of literature.		
SPAN 420	TOPICS: MEDIEVAL LITERATURE	3
Works of one or more authors or of a special theme or genre within Spanish medieval literature. Example: Love and Passion in the Middle Ages on the Iberian Peninsula. May be repeated for credit when topics vary. PREREQ: One SPAN 300-level survey of literature.		
SPAN 421	SPANISH MEDIEVAL LITERATURE	3
Survey of the major authors and genres of Spanish medieval literature from the early lyric poetry through narrative poetry, short story, drama, novel to the 15th century. PREREQ: One SPAN 300-level survey of literature course.		
SPAN 430	LATIN AMERICAN NOVEL AND CINEMA	3
Study of a selection of novels of the 20th century which brought international recognition to Latin American writers. These novelists depict the social, economic, political and cultural traits of their respective countries. Film versions of some of the novels illustrate artistic interpretations of the subject matter. PREREQ: One SPAN300-level survey of literature.		
SPAN 436	TOPICS: LITERATURE OF THE SPANISH GOLDEN AGE	3
Works of one or more authors or of a special theme or genre within Spanish literature of the Golden Age (16th and 17th centuries). May be repeated for credit when topics vary. PREREQ: One SPAN 300-level survey of literature course.		
SPAN 439	POSTWAR SPANISH NARRATIVE	3
The Spanish novel from 1962 to the present. Focuses on novels by leading authors such as Luis Martin-Santos, Juan Goytisolo, Juan Benet, Carmen Martin Gaité, Ana Maria Moix and Esther Tusquets. Analysis of these works grounded in international literary theory and criticism. PREREQ: One SPAN300-level survey of literature.		
SPAN 440	TOPICS: EIGHTEENTH AND NINETEENTH CENTURY HISPANIC LITERATURE	3
Works of one or more authors or of a special theme or genre within Hispanic literature of the 18th and 19th centuries. May be repeated for credit when topics vary. PREREQ: One SPAN 300-level survey of literature course.		
SPAN 447	CONTEMPORARY HISPANIC FICTION BY WOMEN	3
Explores current fiction by women in Spain and Spanish America. Analyzes selected works as individual literary creations, and also situates them in their cultural, historical and aesthetic contexts, using appropriate critical methodologies. PREREQ: One 300-level survey of Spanish literature course.		
SPAN 450	TOPICS: MODERN HISPANIC LITERATURE 1898 - 1936	3
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1898 to 1936. May be repeated for credit when topics vary. PREREQ: One SPAN 300-level survey of literature course.		
SPAN 451	CONTEMPORARY SPANISH POETRY	3
Analysis of Spanish poetry from Becquer to the present day. PREREQ: One SPAN300-level survey of literature.		
SPAN 452	ADVANCED BUSINESS SPANISH	3
Refines basic knowledge of Spanish business/commercial terminology by helping student realize the importance of cultural awareness in doing business in Hispanic countries or with Hispanics in the United States. PREREQ: SPAN200 and SPAN201. SPAN300 and SPAN352 highly recommended.		
SPAN 454	INTRODUCTION TO SPANISH CINEMA	3
Study of modern Spanish cultural history through the films of such masters as Bardem, Saura, Bunuel, Almodovar, Berlanga, Miro, Amenabar, Medem, Paris, Fejerman, etc. Relation of these films to Spanish culture, politics, history, and to European film theory and analysis. PREREQ: Any 300-level survey of Spanish literature. SPAN325 is strongly recommended.		
SPAN 455	SELECTED AUTHORS, WORKS AND THEMES	3-12
Works of one or more outstanding authors or on a special theme. PREREQ: One 300-level Spanish literature course. RESTRICTIONS: May be repeated for credit when topics vary.		
SPAN 460	TOPICS: CONTEMPORARY HISPANIC LITERATURE 1936 - PRESENT	3
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1936 to the present. May be repeated for credit when topics vary. PREREQ: One SPAN 300-level survey of literature course.		
SPAN 462	TOPICS: HISPANIC SHORT FICTION	3
Explores short stories and novellas by major writers of the Hispanic world. Each narrative is analyzed as an individual work of literature and is situated in its literary, historical and critical contexts. May be repeated for credit when topics vary. PREREQ: One SPAN 300-level survey of literature course.		
SPAN 464	CONTEMPORARY SPANISH AMERICAN LITERATURE BY WOMEN	3
Explores twentieth-century fiction by women authors from diverse regions of Spanish America. Analyzes selected works as individual literary creations and situates each author in her specific socio-cultural, historical and literary contexts. PREREQ: One SPAN 300-level survey of literature course.		
SPAN 466	INDEPENDENT STUDY	1-3
SPAN 475	TOPICS IN HISPANIC CULTURE AND CIVILIZATION	3
Study of topics in Hispanic culture and civilization, ranging through the geography, history, art and society of Spain and Latin American countries. PREREQ: Any of the following: SPAN307, SPAN308, SPAN325, SPAN326.		
SPAN 601	ADVANCED SPANISH GRAMMAR	3
Study and practice of selected problems of written and oral Spanish syntax and vocabulary as well as textual analysis.		
SPAN 603	HISTORY OF THE SPANISH LANGUAGE	3
History of the language from Latin to the present. Historical phonology and morphology.		
SPAN 615	LATIN AMERICAN LITERATURE AND ITS POLITICAL CONTEXT	3
In-depth analysis of selected works by contemporary Latin American authors, focusing on techniques used by these writers to reveal the political upheaval that has affected Latin America in recent years.		
SPAN 616	CERVANTES: DON QUIJOTE	3
The reading of Don Quijote in Spanish; major themes of the book. The life and times of Cervantes. Antecedents to Don Quijote in Spanish literature. The purpose of Don Quijote. Introduction to the language of Cervantes.		
SPAN 617	HISPANIC NOBEL PRIZE AUTHORS	3
Studies the works of Spanish and Latin American Nobel Prize authors - Echegaray, Benavente, Mistral, Jimenez, Asturias, Aleixandre, Neruda, Garcia Marquez, Paz and Cela - in relation to their cultural milieu on the regional, national and international levels and in relation to their authors' biographies.		
SPAN 618	GOD, MAN AND WOMAN	3
Analysis of the presentation of God, man and woman in a selection of narrative poems, dramas and novels from the 15th to the 17th centuries. Authors studied include Santillana, Diego de San Pedro, Luis de Leon, Zayas and others.		
SPAN 620	TOPICS: MEDIEVAL LITERATURE	3
Works of one or more authors or of a special theme or genre within Spanish medieval literature. Example: Love and Passion in the Middle Ages on the Iberian Peninsula. May be repeated for credit when topics vary.		
SPAN 621	SPANISH MEDIEVAL LITERATURE	3
Survey of the major authors and genres of Spanish medieval literature from the early lyric poetry through narrative poetry, short story, drama, novel to the 15th century.		
SPAN 630	LATIN AMERICAN NOVEL AND CINEMA	3
Study of a selection of novels of the 20th century which brought international recognition to Latin American writers. These novelists depict the social, economic,		

political and cultural traits of their respective countries. Film versions of some of the novels illustrate artistic interpretations of the subject matter.

SPAN 636 TOPICS: LITERATURE OF THE SPANISH GOLDEN AGE 3
Works of one or more authors or of a special theme or genre within Spanish literature of the Golden Age (16th and 17th centuries). May be repeated for credit when topics vary.

SPAN 639 POSTWAR SPANISH NARRATIVE 3
Covers the Spanish novel from 1962 to the present. Focuses on novels by leading authors such as Luis Martin-Santos, Juan Goytisolo, Carmen Martin Gaité, and Esther Tusquets. Analysis of these works is grounded in international literary theory and criticism.

SPAN 640 TOPICS: EIGHTEENTH AND NINETEENTH CENTURY HISPANIC LITERATURE 3
Works of one or more authors or of a special theme or genre within Hispanic literature of the 18th and 19th centuries. May be repeated for credit when topics vary.

SPAN 647 CONTEMPORARY HISPANIC FICTION BY WOMEN 3
Explores current fiction by women in Spain and Spanish America. Analyzes selected works as individual literary creations, and also situates them in their cultural, historical and aesthetic contexts, using appropriate critical methodologies.

SPAN 650 TOPICS: MODERN HISPANIC LITERATURE 1898 - 1936 3
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1898 to 1936. May be repeated for credit when topics vary.

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

SPAN 655 SELECTED AUTHORS, WORKS AND THEMES 3-12
Works of one or more outstanding authors or on a special theme. May be repeated for credit when topics vary.

SPAN 660 TOPICS: CONTEMPORARY HISPANIC LITERATURE 1936 - PRESENT 3
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1936 to the present. May be repeated for credit when topics vary.

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

SPAN 664 CONTEMPORARY SPANISH-AMERICAN LITERATURE BY WOMEN 3
Explores 20th century fiction by major women authors from diverse regions of Spanish America. Analyzes works as individual literary creations, and situates each author in her specific socio-cultural, historical and literary contexts. Examines the international criticism elicited by each work.

SPAN 675 TOPICS: HISPANIC CULTURE AND CIVILIZATION 3
Study of topics in Hispanic culture and civilization, ranging through the geography, history, art and society of Spain and Latin American countries. May be repeated for credit when topics vary.
PREREQ: Either SPAN325 or SPAN326.

SPAN 869 MASTER'S THESIS 1-6

SPAN 875 SEMINAR: TOPICS IN SPANISH LITERATURE 3-12
Study of selected topics, authors and works in the various fields of Spanish literature. Variable content. Emphasizes preparation of seminar presentations and term papers. May be repeated for credit when topics vary.

STATISTICS

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

STAT 266 SPECIAL PROBLEM 1-3

STAT 366 INDEPENDENT STUDY 1-6

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

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

STAT 408 STATISTICAL RESEARCH METHODS I 3
Descriptive and inferential statistics in agribusiness and biological applications focusing on hypothesis testing, multiple regression, and analysis of variance techniques.
Crosslisted with FREC408.

STAT 409 REGRESSION AND EXPERIMENTAL DESIGN 3
Introduction and overview of inferential methods used in analyzing regression models and linear models for experimental designs.
PREREQ: STAT200 or FREC408 or equivalent.

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

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

STAT 466 INDEPENDENT STUDY 1-6

STAT 475 STATISTICS FOR ENVIRONMENTAL SCIENCE 3
Introduction to statistical methods for analyzing environmental data. Relevant probability and sampling theory is introduced, as well as procedures for summarizing, modeling and estimating and making inferences from environmental data. A computer-based statistical package is used to explore behavior of different statistical techniques with a variety of environmental data sets.
May be crosslisted with ENSC475.
PREREQ: MATH243 and GEOG250.
RESTRICTIONS: If STAT475 is taken, degree credit cannot be given for any of the following courses: MATH300, STAT370, STAT371 or MATH450.

STAT 601 PROBABILITY THEORY FOR OPERATIONS RESEARCH AND STATISTICS 3
Provides the basic background in probability theory for further work in statistics and operations research. Basic topics: sample spaces and axioms of probability; conditional probability and independence; Bayes theorem; random variables; moments and moment generating functions; transformations of random variables; common families of distributions; multivariate distributions, covariance and correlation; probability inequalities and limit theorems.
PREREQ: MATH243.

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

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

STAT 608 STATISTICAL RESEARCH METHODS 3
Experimental design and plot plans, collection, analysis and presentation of data in agricultural and biological research.
Crosslisted with FREC608.

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

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

STAT 612 ADVANCED REGRESSION TECHNIQUES 3
Selected topics in advanced regression analysis.
RESTRICTIONS: Requires permission of instructor.

STAT 615 DESIGN AND ANALYSIS OF EXPERIMENTS 3
Fundamental principles of design, randomized designs, Latin squares, sources of

error, components of error. Factorial designs, response surfaces, models for design.
PREREQ: STAT371.

STAT 616 ADVANCED DESIGN OF EXPERIMENTS 3
Planning of experiments, designs for specific problems, fractional factorials, quasifactorial experiments, balanced and unbalanced designs, confounding, introduction to linear estimation.
PREREQ: STAT615.

STAT 617 MULTIVARIATE METHODS 3
Multivariate analysis of variance and covariance; classification and discrimination; canonical correlation; principal components; factor analysis.
PREREQ: STAT371.

STAT 618 SAMPLING TECHNIQUES 3
Simple random sampling; stratified random sampling; ratio estimates; regression estimates; systematic sampling; cluster sampling; double sampling.
PREREQ: STAT371.

STAT 619 TIME SERIES ANALYSIS 3
Fundamental topics in time series analysis - features the Box and Jenkins techniques of fitting time series data. Includes an introduction to appropriate statistical packages.
RESTRICTIONS: Requires permission of instructor.

STAT 620 NONPARAMETRIC STATISTICS 3
Statistical procedures valid under unrestrictive assumptions; scales of measurement; efficiency comparisons; signed rank procedures; two-sample rank tests; zeros, ties, and other problems of discrete data; order statistics; k-sample procedures; nonparametric measures of correlation.
PREREQ: STAT371, STAT601.

STAT 621 SURVIVAL ANALYSIS 3
Statistical techniques used in the analysis of censored data including the Kaplan-Meier estimator, the analysis of one, two and K sample problems, and regression analysis based on the Cox proportional hazards model.
RESTRICTIONS: Requires permission of instructor.

STAT 624 ADVANCED TOPICS IN STATISTICS 3
Current statistical and research techniques not covered in other courses.
RESTRICTIONS: Requires permission of instructor.

STAT 635 STATISTICAL QUALITY CONTROL 3
Process variation, sequence plotting, control charts, cumulative sum process control procedures; process capability studies, acceptance sampling, quality management and organization, and trouble shooting using graphical techniques.
PREREQ: STAT371.

STAT 640 STATISTICAL CONSULTING 3
Topics include the client/consultant relationship; effective communication; identifying the question, developing a plan and presenting the results; following up; actual consulting experience.

STAT 641 STATISTICAL LABORATORY 1
Requires attendance at the weekly statistical laboratory meetings.

STAT 656 BIOSTATISTICS 3
An introduction to statistics focused toward applications in biological, medical and other life sciences. Topics include graphical and numerical techniques, random variables and their distribution, estimation and inference.
PREREQ: MATH201.

STAT 657 STATISTICS FOR EARTH SCIENCES 3
Spatial distributions; directional data; statistical graphics, regression and time series analysis; model validation; sampling; principal components; cluster analysis; discriminant analysis; and statistical software routines.
May be crosslisted with GEOL657.
PREREQ: MATH201.

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

STAT 674 APPLIED DATA BASE MANAGEMENT 3
Provides an in-depth understanding of using computers to manage data using programs such as SAS and Microsoft/Access.
Crosslisted with FREC674.
RESTRICTIONS: Requires permission of instructor.

STAT 675 LOGISTIC REGRESSION 3
Practical and computational introduction to logistic regression and related topics. Applications include financial, marketing and biomedical research. The use of SAS and other statistical packages will be emphasized.
RESTRICTIONS: Requires permission of instructor.

STAT 800 ESTIMATION AND STATISTICAL INFERENCE I 3
Selected topics in estimation and inference such as uniformly most powerful tests, uniformly most powerful unbiased tests, similarity and completeness, sufficiency, likelihood ratio tests, invariant tests, permutation test.
PREREQ: STAT602, MATH602.

STAT 801 ESTIMATION AND STATISTICAL INFERENCE II 3
Further topics in estimation and inference will be covered.
PREREQ: STAT800.

STAT 815 LINEAR STATISTICAL INFERENCE I 3
Vector random variables, matrix operations, multivariate normal distributions, distribution of functions of vector random variables, topics from multivariate analysis and specific linear models.
PREREQ: STAT602, STAT615.

STAT 816 LINEAR STATISTICAL INFERENCE II 3
Topics from general linear hypotheses of full rank and not full rank.
PREREQ: STAT815.

STAT 818 MULTIVARIATE ANALYSIS 3
Likelihood estimation, vector random variables, Hotelling's T-squared distribution of correlation coefficients, classification and discrimination, distribution of sample covariance matrix and generalized variance, and testing multiple hypotheses.
PREREQ: STAT800.

STAT 824 ADVANCED TOPICS IN STATISTICS I 3
A presentation of a current area of statistical application or research. Examples of topics which may be covered include: biometry, bootstrapping, data analysis, response surfaces, survival analysis and time series.
PREREQ: STAT816.

STAT 831 TIME SERIES ANALYSIS 3
Introduction to fundamental topics in time series analysis featuring analysis in both time and frequency domains. The Box and Jenkins technique of fitting data to autoregressive moving average models will be used in time domain. Emphasis on model building, evaluation and forecasting. Analysis in frequency domain includes such topics as digital filtering and methods of estimating and interpreting the spectrum.
PREREQ: STAT602.

STAT 832 TOPICS IN DATA ANALYSIS 3
Topics: graphical analysis; model evaluation, robust procedures; influence functions; multidimensional data plots, residual analysis; Bayesian concepts in data analysis.

STAT 836 RESPONSE SURFACE METHODOLOGY 3
Derivation of nonlinear relationships between variables. Techniques for characterization and interpreting multidimensional systems through canonical and ridge analysis. Correlation analysis through eigenvalues and eigenvectors for linear systems.
PREREQ: STAT602 and either STAT611 or STAT617.

STAT 840 STATISTICAL COMPUTING 3
Computer organization. Error in floating point computation. Approximating probabilities. Random numbers: generating and testing. Simulation. Computational linear algebra. Optimization methods appropriate for maximum likelihood computation. Fast Fourier transforms.
PREREQ: STAT602 and CISC105.

STAT 852 ADVANCED TOPICS IN MATHEMATICAL STATISTICS 3
Selected topics: Sequential methods, reliability theory, multivariate contingency tables, large sample theory, density estimation, robust and nonparametric estimation.
RESTRICTIONS: Requires permission of Department.

STAT 969 DOCTORAL DISSERTATION 1-12 PF

THEATRE

THEA 102 INTRODUCTION TO PERFORMANCE 3
Survey of performance training techniques for the non-minor. Topics may include elements of voice, improvisation, movement, dance, and character analysis and portrayal.

THEA 104 INTRODUCTION TO THEATRE AND DRAMA 3
Survey of the elements of theatre and drama. Includes attendance at theatrical productions, readings of representative plays, discussion of a method of dramatic analysis, explanation of staging in periods of major importance and discussion of the actor, the designer and the director.

THEA 106 THE THEATRICAL EXPERIENCE ABROAD 3
Survey of the elements of performance, theatre and drama in relationship to observed field performances. Attendance at rigorous program of theatrical performances. Studies elements of voice, improvisation, movement, dance, character analysis and portrayal specifically based on observed performances.
RESTRICTIONS: Taught abroad.

- THEA 200 INTRODUCTION TO THEATRE PRODUCTION 3**
Processes involved in the production of scenery, properties, lighting, sound and costumes for live performance events. Plays read and analyzed for production requirements.
RESTRICTIONS: Mandatory attendance at performance events.
- THEA 202 INTRODUCTION TO THEATRE DESIGN 3**
Survey of the evolution of design theory and aesthetics for live production. Elements include the design of scenery, properties, costumes, lighting and sound. Plays read and analyzed for design requirements.
RESTRICTIONS: Mandatory attendance at performance events.
- THEA 203 INTRODUCTION TO COSTUMING 3**
Explores the evolution of costume design and technology. Discusses and analyzes all aspects of costuming through reading of plays.
- THEA 204 INTRODUCTION TO VOICE AND SPEECH 3**
The use of voice and speech in performance. Includes exercises to develop relaxation, breath support, resonance, vocal strength, optimum pitch and articulatory precision, as well as studies in basic vocal anatomy. Studio format.
RESTRICTIONS: Involves some strenuous physical activity.
- THEA 205 INTRODUCTION TO STAGE MOVEMENT 3**
Introduction to a variety of physical skills and techniques for the actor. Topics may include exercises to develop strength, flexibility, control, awareness, rhythm, balance, and expressiveness.
- THEA 206 INTRODUCTION TO DANCE 3**
Examines the function and impact of dance in the lives of individuals, societies, and cultures. Lecture and participatory format.
- THEA 207 TECHNICAL PRODUCTION PRACTICUM 1-4**
Laboratory for the non-minor for the production of scenery, properties, lighting, and sound for public performances of the Professional Theatre Training Program productions.
- THEA 209 COSTUME PRODUCTION PRACTICUM 1-4**
Laboratory for the non-minor for the production of costumes and costume crafts for public performances of the Professional Theatre Training Program productions.
- THEA 226 FUNDAMENTALS OF ACTING I 3**
Exploration of basic elements of the actor's art and craft so as to deepen and broaden the experience of viewing the theatre. May utilize theatre games, basic text work, improvisation, and lecture/demonstrations.
- THEA 227 FUNDAMENTALS OF ACTING II 3**
Continuation of THEA226 in the exploration of the actor's art and craft. May utilize theatre games, basic text analysis, improvisation, and scene study.
PREREQ: THEA226 or permission of instructor.
- THEA 236 FUNDAMENTALS OF JAZZ DANCE 3**
Jazz Dance as an art form and vehicle for individual and group expression. Emphasis on rhythm and style.
RESTRICTIONS: Previous dance experience recommended.
- THEA 300 FUNDAMENTALS OF STAGECRAFT 3**
Concentrates on traditional techniques used in the construction and rigging of scenery and properties for the stage. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience.
PREREQ: THEA200, or THEA202, or by permission of instructor.
- THEA 301 FUNDAMENTALS OF PROPERTIES CONSTRUCTION 3**
Introduces basics of organization and management of properties for a theatrical production in addition to basic techniques of property construction. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience.
PREREQ: THEA200, or THEA202, or by permission of instructor.
- THEA 302 FUNDAMENTALS OF STAGE LIGHTING 3**
Introduces basic techniques and processes used in the lighting of theatrical productions. Emphasis on the use and manipulation of lighting equipment. Demonstrates equipment and basic techniques and processes through a combination of classroom lecture and laboratory experience.
PREREQ: THEA200, or THEA202, or by permission of instructor.
- THEA 303 FUNDAMENTALS OF SCENE PAINTING 3**
Introduction to the tools, materials, and techniques of painting scenery for the stage. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience.
PREREQ: THEA200, or THEA202, or by permission of instructor.
- THEA 304 FUNDAMENTALS OF AUDIO FOR THE THEATRE 3**
Introduces the physical phenomenon of sound and the techniques of controlling and manipulating it for theatrical productions. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience.
PREREQ: THEA200, or THEA202, or by permission of instructor.
- THEA 305 FUNDAMENTALS OF COSTUME CONSTRUCTION FOR THE STAGE 3**
Introduces basic costume construction techniques through lectures, demonstrations, and laboratory experience. Culminates in the construction of a finished costume.
PREREQ: THEA203, or by permission of instructor.
- THEA 306 FUNDAMENTALS OF PATTERNMAKING FOR THE STAGE 3**
Teaches basic patternmaking techniques required in costuming through lectures, demonstrations, and laboratory experience. Includes how to recreate historical details used for period theatrical garments.
PREREQ: THEA203, or by permission of instructor.
- THEA 307 FUNDAMENTALS OF DRAPING FOR THE STAGE 3**
Teaches basic draping skills and applies them to period costumes. Examines several historical periods commonly used in theatrical productions. Students create muslins or finished garments from at least four historical periods.
PREREQ: THEA203, or by permission of instructor.
- THEA 308 FUNDAMENTALS OF COSTUME CRAFTS 3**
Provides basic experience in several crafts-related areas commonly utilized in costuming, including maskmaking, surface design, hatmaking, leather work and thermoplastics.
PREREQ: THEA203, or by permission of instructor.
- THEA 309 FUNDAMENTALS OF STAGE MANAGEMENT 3**
Study of the techniques and procedures used in managing theatrical productions from conception through performance.
PREREQ: THEA200 or THEA202.
- THEA 310 FUNDAMENTALS OF MASKMAKING 3**
Includes casting, sculpting human and animal features, and explores various methods and materials for constructing theatrical masks. Students construct three to four masks.
- THEA 311 FUNDAMENTALS OF SCENE DESIGN 3**
Introduction to the exploration of conceptual principles underlying the practice of scene design. Explore elements of visual thinking through the manipulation of drafting and drawing with emphasis on line, form, color, and spatial relationships as they relate to the play. Some artistic ability is helpful.
PREREQ: THEA200, or THEA202, or permission of instructor.
- THEA 312 CAD AND COMPUTER APPLICATIONS FOR THEATRE PRODUCTION 3**
Examine various ways of applying computer technology to the production of live theatre. Emphasis placed on CAD and graphic software in addition to Power Point, spreadsheets, databases, and the internet.
PREREQ: THEA200, or THEA202, or by permission of instructor.
- THEA 341 THEATRE/DRAMA: CLASSIC/MEDIEVAL 3**
Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period.
May be crosslisted with CMLT341.
- THEA 342 THEATRE/DRAMA: RENAISSANCE TO 1700 3**
Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period.
May be crosslisted with CMLT342.
- THEA 343 THEATRE/DRAMA: 1700 - 1900 3**
Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period.
May be crosslisted with CMLT343.
- THEA 344 THEATRE/DRAMA: 1900 - PRESENT 3**
Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period.
May be crosslisted with CMLT344.
- THEA 345 HISTORY OF THEATRE: AMERICAN MUSICAL THEATRE 3**
Musical-dramatic forms of the 18th, 19th and 20th centuries in the United States and their impact on the modern musical theatre. Complete works read and compared to a series of criteria that are found in successful modern shows. Comparison of older and current works.
Crosslisted with MUSC345.
RESTRICTIONS: Offered fall semester only.
- THEA 347 SPECIAL TOPICS IN THEATRE HISTORY 3**
A series of changing topics in history and theory. Topics range from studies of significant movements in theatre to the study of theoretical issues and individual playwrights and genres.

THEA 348	SPECIAL TOPICS IN THEATRE PERFORMANCE	3	Series of changing topics in theatre performance. Topics may include Audition Preparation and Introduction to Professional Theatre Practices.	RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting or Directing.
THEA 360	FUNDAMENTALS OF ORAL INTERPRETATION	3	Basic course in interpretation of text for the stage. Concentrates on texts from plays; explores prose and poetry. Emphasis on diction, meaning and presentation. Studio format.	THEA 609 STAGE MOVEMENT IB 1 Continuation of THEA608. PREREQ: THEA608.
THEA 366	INDEPENDENT STUDY	1-6		THEA 610 STAGE MOVEMENT IIA 1 Continuation of THEA609, with an emphasis on stage combat, tumbling, circus and other advanced movement techniques. PREREQ: THEA609.
THEA 407	THEATRE PRACTICUM FOR MAJORS	1-4	Production responsibilities assigned on departmental productions in the areas of lighting, sound, scenery, properties, costuming, stage management, painting and theatre management. RESTRICTIONS: Open to majors only, or by permission of instructor.	THEA 611 STAGE MOVEMENT IIB 1 Continuation of THEA610. PREREQ: THEA610.
THEA 408	THEATRE PRACTICUM FOR MINORS	1-4	Production responsibilities assigned on departmental productions in the areas of lighting, sound, scenery, properties, costuming, stage management, painting, and theatre management.	THEA 612 STAGE MOVEMENT IIIA 1 Individual instruction to identify habitual movement patterns and to strengthen individual weaknesses in stage movement. PREREQ: THEA611.
THEA 410	FUNDAMENTALS OF DRAMATURGY	3	Topics covered include various methods of dramatic and entertainment analysis, scene analysis, development of dramaturgical plot, fable and practice. Survey of function and role of the dramaturgy in contemporary theatre. Readings in primary and secondary material.	THEA 613 STAGE MOVEMENT IIIB 1 Continuation of THEA612. PREREQ: THEA612.
THEA 420	FUNDAMENTALS OF STAGE DIRECTING	3	Exploration of the director's part in the creative process of theatre. Philosophy, techniques and problems of directing plays. PREREQ: THEA104.	THEA 614 STAGE SPEECH IA 2 Ear training and phonetics. Corrective work on regional speech habits. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting or Directing.
THEA 466	INDEPENDENT STUDY	1-6		THEA 615 STAGE SPEECH IB 2 Continuation of THEA614. Beginning work on verse scansion. PREREQ: THEA614.
THEA 490	SEMINAR IN THEATRE AND DRAMA	3	Seminar in theatre and drama. Topics will be announced. RESTRICTIONS: Requires permission of instructor.	THEA 616 STAGE SPEECH IIA 1 Continuation of THEA615 with an emphasis on phrasing and verse scansion. PREREQ: THEA615.
THEA 600	DISTINCTIONS OF PROFESSIONAL THEATRE PRACTICE	1-3	Inquiry into the nature of the theatre as an art form; techniques and issues of communication, organization, management, leadership team participation and creativity necessary to the pursuit and accomplishment of fulfilling careers in institutional and commercial theatres. Explores how the nature and purpose of the theatre as an art informs the day-to-day practices, values and behavior of the individual artist. RESTRICTIONS: Requires enrollment in Professional Theatre Training Program. May be repeated up to 12 credit hours.	THEA 617 STAGE SPEECH IIB 1 Continuation of THEA616. PREREQ: THEA616.
THEA 601	DYNAMICS	1	A vocal/physical warmup. Exercises designed to prepare student for the day's work. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to six credit hours.	THEA 618 STAGE SPEECH IIIA 1 Stage dialects and advanced work in phrasing and verse scansion. Individual tutoring in problem areas. PREREQ: THEA617.
THEA 602	VOICE DEVELOPMENT IA	1	Basic breath control and tone production to develop strength, control, flexibility and awareness. RESTRICTIONS: Requires enrollment in the Professional Theatre Program/Acting or Directing.	THEA 619 STAGE SPEECH IIIB 1 Continuation of THEA618. PREREQ: THEA618.
THEA 603	VOICE DEVELOPMENT IB	1	Continuation of THEA602. PREREQ: THEA602.	THEA 620 REHEARSAL AND PERFORMANCE/ACTING 1-6 Practical instruction and assignments in the preparation, rehearsal and performance of theatrical productions. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting. May be repeated up to 24 credit hours.
THEA 604	VOICE DEVELOPMENT IIA	1	Continuation of THEA603, with an emphasis on range extension and the development of greater variety in expressiveness. PREREQ: THEA603.	THEA 621 VERSE SPEAKING, RHETORIC, AND COMMUNICATION IA 1 Consists of exercises and assignments to develop power, freedom, beauty, clarity, presence, and self-expression in communication in classic plays, particularly those of William Shakespeare, as well as in prose writing of all periods. Particular emphasis placed on cultivating ability to recognize and embody the changing structures and rhythms of speech which have been codified in the scripts of plays. REQUIRES ENROLLMENT IN THE PROFESSIONAL THEATRE TRAINING PROGRAM/ACTING.
THEA 605	VOICE DEVELOPMENT IIB	1	Continuation of THEA604. PREREQ: THEA604.	THEA 622 VERSE SPEAKING, RHETORIC, AND COMMUNICATION IB 1 Consists of exercises and assignments to develop power, freedom, beauty, clarity, presence, and self-expression in communication in classic plays, particularly those of William Shakespeare, as well as in prose writing of all periods. Particular emphasis placed on cultivating ability to recognize and embody the changing structures and rhythms of speech which have been codified in the scripts of plays. PREREQ: THEA621.
THEA 606	VOICE DEVELOPMENT IIIA	1	Individual instruction to identify habitual vocal patterns and to strengthen individual weaknesses in voice. PREREQ: THEA605.	THEA 623 VERSE SPEAKING, RHETORIC, AND COMMUNICATION IIA 1 Consists of exercises and assignments to develop power, freedom, beauty, clarity, presence, and self-expression in communication in classic plays, particularly those of William Shakespeare, as well as in prose writing of all periods. Particular emphasis placed on cultivating ability to recognize and embody the changing structures and rhythms of speech which have been codified in the scripts of plays. PREREQ: THEA622.
THEA 607	VOICE DEVELOPMENT IIIB	1	Continuation of THEA606. PREREQ: THEA606.	THEA 624 VERSE SPEAKING, RHETORIC, AND COMMUNICATION IIB 1 Consists of exercises and assignments to develop power, freedom, beauty, clarity,
THEA 608	STAGE MOVEMENT IA	1	Exercises and assignments to develop alignment, strength, flexibility, control, awareness, endurance, rhythmic sensitivity, balance and expressiveness.	

presence, and self-expression in communication in classic plays, particularly those of William Shakespeare, as well as in prose writing of all periods. Particular emphasis placed on cultivating ability to recognize and embody the changing structures and rhythms of speech which have been codified in the scripts of plays. PREREQ: THEA623.

THEA 633 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IA 1-2

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

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

THEA 634 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IB 1-2

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

PREREQ: THEA633.

THEA 635 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIA 1-2

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

PREREQ: THEA634.

THEA 636 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIB 1-2

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

PREREQ: THEA635.

THEA 638 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIIB 1-2

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

PREREQ: THEA637.

THEA 639 STAGE MANAGEMENT PRODUCTION SKILLS IA 1-2

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

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

THEA 640 STAGE MANAGEMENT PRODUCTION SKILLS IB 1-2

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

PREREQ: THEA639.

THEA 641 STAGE MANAGEMENT PRODUCTION SKILLS IIA 1-2

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

PREREQ: THEA640.

THEA 642 STAGE MANAGEMENT PRODUCTION SKILLS IIB 1-2

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

PREREQ: THEA641.

THEA 644 STAGE MANAGEMENT PRODUCTION SKILLS IIIB 1-2

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

PREREQ: THEA643.

THEA 645 REHEARSAL AND PERFORMANCE/STAGE MANAGEMENT 1-5

Practical instruction and assignments in the preparation, rehearsal and performance of theatrical productions.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage Management. May be repeated up to 24 credit hours.

THEA 648 COSTUME CONSTRUCTION 1

Introductory exploration of the mechanics and technology of the art of costuming. Surveys all aspects of the costumer's craft including practical work in the costume shop.

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

THEA 664 INTERNSHIP IN PROFESSIONAL THEATRE 1-9

Engagement with professional theatre in individual discipline area.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to 18 credit hours.

THEA 665 THEATRE LITERACY 2

Discussion, research, and practicum in theatre terminology, literature and history.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to 12 credit hours.

THEA 668 RESEARCH 1-6

THEA 674 SCENERY PRODUCTION 1

Materials, tools, hardware and construction methods used for scenery construction. Emphasis on traditional scenic construction with wood as the primary material.

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

THEA 675 PROPERTIES PRODUCTION 1

Concentrates on property production techniques with emphasis on properties management, acquisition, and health and safety.

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

THEA 676 SCENERY: METALWORKING 1

Materials, tools and methods of working with metal for scenery construction.

PREREQ: THEA674.

THEA 677 PROPERTIES PRODUCTION II 1

Tools, materials and methods for upholstery and drapery, casting, mold-making, and other properties techniques.

PREREQ: THEA675.

THEA 680 LIGHTING PRODUCTION 1

Electrical theory and practice as applied to theatre production. Emphasis on current lighting production practice, systems and equipment.

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

THEA 681 AUDIO PRODUCTION 1

Sound theory and practice as applied to contemporary theatre production. Emphasis placed on utilizing current systems, equipment and technology for audio production.

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

THEA 682 LIGHTING DESIGN 1

Essential skills and procedures for creating, documenting and realizing a lighting design for a theatrical production.

PREREQ: THEA680.

THEA 683 PRODUCTION PROJECT MANAGEMENT 1

Examines how project management techniques are applied to technical production. Techniques for project analysis, priority setting, scheduling, resource allocation and project tracking will be examined.

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

THEA 684 TECHNICAL PRODUCTION SEMINAR 1

Investigation and discussion of technical problems and issues encountered in productions.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production. May be repeated up to six credit hours.

THEA 685 STAGE RIGGING, MECHANICS, AND AUTOMATION I 1

Theory and practice in rigging stage scenery to fly, creating mechanical systems to actuate scenic units, and utilizing control systems to automate scenic shifting. Emphasis on stage rigging systems and proper techniques to utilize them as well as an introduction to fluid power mechanics. **REQUIRES ENROLLMENT IN THE PROFESSIONAL THEATRE TRAINING PROGRAM/TECHNICAL PRODUCTION.**

THEA 686 INFORMATION TECHNOLOGIES FOR THEATRE 1

Application of computer software to theatrical production practice. Emphasis is placed on CAD (drafting) techniques for theatre production.

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

THEA 687 SCENERY PAINTING 1

Painting tools, materials, color theory and scenery painting techniques for theatrical production.

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

THEA 688 COMPUTER AIDED DRAFTING AND SCENERY CONSTRUCTION 1

Continued work on CAD (drafting) with emphasis on construction work drawings for scenery construction. Further study of standard and specialized scenery construction methods.

PREREQ: THEA686.

THEA 689 STAGE RIGGING, MECHANICS AND AUTOMATION II 1

Continuation of THEA685, with added emphasis on horizontal scenic shifting techniques and motion control systems.

PREREQ: THEA685.

- THEA 692 PRODUCTION AND PERFORMANCE/TECHNICAL 1-6**
Practical instruction and assignments in the technical preparation and production of Professional Theatre Training Program public performances. Assignments include (but are not limited to): Master Carpenter, Master Electrician, Property Master, Audio Engineer, Scenic Artist and Technical Director.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production. May be repeated up to 20 credit hours.
- THEA 693 PRODUCTION SEMINAR 1**
Development of management and communication techniques for effective interaction among stage management, costume production and technical production areas of theatre.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to six credit hours.
- THEA 694 SPECIAL TOPICS IN THEATRE PRODUCTION 1-3**
Multiple units on advanced topics in theatre production and management. Students select topics from a list offered by PTPP production faculty.
RESTRICTIONS: Requires enrollment in the Professional Theater Training Program. May be repeated up to nine credit hours.

URBAN AFFAIRS AND PUBLIC POLICY

- UAPP 601 MEASURING AND DEFINING PLANNING PROBLEMS 1**
Methods for identifying and measuring planning-related problems, including analyses of land use patterns, population dynamics, economic trends, social indicators, and ecological characteristics as predictors and determinants of future development.
- UAPP 602 INTRODUCTION TO COMPREHENSIVE PLANNING 1**
Overview of the comprehensive planning process. Description of goals, objectives and components behind the development of a comprehensive plan and methods for preparing and understanding the value of a comprehensive plan to the community.
- UAPP 603 INTRODUCTION TO ZONING AND LAND USE CONTROLS 1**
Survey of the theories underlying land use patterns and description of the legal structure and methods surrounding public sector control and management of land use including police power, eminent domain, zoning, subdivision control, and master plans.
- UAPP 604 LEADERSHIP IN ORGANIZATIONS 3**
Understanding the process of change and positively affecting change in organizations through the exercise of leadership skills and knowledge.
- UAPP 606 LOCAL ECONOMIC DEVELOPMENT: POLICY AND PRACTICE 3**
Examines theory and contemporary practice for promoting the economic development of local communities. Reviews alternative ways of understanding the dynamics of local economic development and devising strategies that will benefit community residents.
- UAPP 607 SEMINAR IN COMMUNITY DEVELOPMENT AND NONPROFIT LEADERSHIP 1**
Examines complex ways in which concepts of community analysis and development are used and understood.
May be crosslisted with IFST607.
- UAPP 608 POVERTY, NEIGHBORHOODS AND COMMUNITY DEVELOPMENT 3**
Examines social science literature through which multidisciplinary analysts have described and explained poverty, analyzed neighborhoods, and categorized community development efforts. Focusing on the United States, particular attention is paid to analyses from 1960 to the present.
May be crosslisted with IFST608.
- UAPP 609 FINANCIAL STATEMENT ANALYSIS FOR NONPROFITS 1**
Geared toward graduate students with little or no background in accounting or reading financial statements. Gives basic understanding of financial statement analysis. Covers basic accounting concepts with an emphasis on understanding the financial statements of nonprofit organizations.
- UAPP 611 REGIONAL WATERSHED MANAGEMENT 3**
Reviews the practical applications of watershed planning as a tool to manage land, water and ecosystem resources. Explores public policies and practices of watershed planning by examining case studies. Uses a multidisciplinary approach involving the fields of geography, environmental science, geology, public policy, land planning, geographic information systems (GIS) and engineering.
May be crosslisted with FREC611.
- UAPP 612 URBAN HOUSING POLICY AND ADMINISTRATION 3**
Examines problems associated with providing adequate and affordable housing in the United States. Covers the structure and dynamics of the housing market; supply and demand factors; market failure; financing methods; federal, state and local public policy affecting housing, including taxation, regulation, subsidy programs, and land use controls.
- UAPP 613 PLANNING THEORY AND URBAN POLICY 3**
Provides an overview of the development and current conceptual normative and methodological issues in planning theory as applied to urban regions.
- UAPP 614 THE AMERICAN SUBURB 3**
An examination of historical and geographical origins of the American suburb and its role in metropolitan development and larger society. Includes evolution of streetcar and automobile suburbs with special emphasis on post World War II suburban boom and contemporary post-suburban trends.
May be crosslisted with GEOG614, HIST614.
- UAPP 616 VOLUNTEER MANAGEMENT 1**
Provides an introduction and overview of the field of volunteer administration, explores the components of the effective management of volunteers and builds students' problem solving skills. Comparisons to the management of paid staff and the role of volunteerism in the larger organizational structure.
- UAPP 617 CONTEMPORARY ISSUES IN ENVIRONMENTAL AND ENERGY POLICY 1**
Links students with leading energy and environmental policy scholars on a bi-weekly basis to debate key issues such as global warming, ozone layer deterioration, environmental justice, sustainable development and ecological democracy. International, national and community dimensions of these and other policy issues are explored through seminar discussion.
- UAPP 619 CONTEMPORARY ISSUES IN URBAN AFFAIRS AND PUBLIC POLICY 2**
Overview of the origins of urban affairs and public policy and its current academic role and status as a profession. Students meet with and engage in discussions with leading scholars and policy makers invited to the campus to talk about their current research and interests.
- UAPP 620 CRIMINAL JUSTICE ADMINISTRATION 3**
Focuses on issues of concern to students planning careers as administrators in the criminal justice system. Covers administrative policy, organizational dynamics, budgetary matters, and the role of the computer in criminal justice. Explores the complexities, conflicts and ambiguities of criminal justice management.
- UAPP 621 CONFLICT RESOLUTION 1**
Introduction to conflict resolution skills. Provides communication and problem solving skills designed to de-escalate conflicts and create win-win solutions. Students learn new ways of approaching conflict while gaining an understanding of their own conflict management style. Examines how these skills transfer to the workplace.
RESTRICTIONS: Requires permission of instructor.
- UAPP 622 RESOURCES, DEVELOPMENT AND THE ENVIRONMENT 3**
Focuses on food, resources, energy and population issues in relationship to economic development and the global environment. Engages students in discussion and debate on sustainable development policies.
Crosslisted with GEOG622.
- UAPP 623 INDEPENDENT STUDY IN GEOGRAPHICAL INFORMATION SYSTEMS 1**
Students complete self-paced individualized tutorials and apply knowledge in a project of their choice. Material addressed includes creation and display of digital maps and data bases, preparation of data sets, sources of data and GIS standards.
- UAPP 625 ENERGY POLICY AND ADMINISTRATION 3**
World and U.S. energy policies with emphasis on nuclear power, solar energy and fossil fuels. Analyzes progress and design of U.S. science and technology policy in energy domain.
Crosslisted with POSC624.
- UAPP 626 CONSERVATION AND RENEWABLE ENERGY POLICY 3**
Covers current policy issues for energy conservation, energy efficiency, and renewable energy sources. Some prior background in energy policy is assumed. Topics include environmental impacts, utility programs, and international comparisons.
May be crosslisted with MAST622, POSC626.
PREREQ: POSC624
- UAPP 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.
Crosslisted with GEOG628.
- UAPP 629 THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING 3**
Examines the historic preservation planning process, the theory supporting this process and contemporary practices. Case studies used to demonstrate the integration of theory and practice.
May be crosslisted with ARTH628, HIST652, MSST629.
- UAPP 630 METHODS IN HISTORIC PRESERVATION 4**
Upper-level field research seminar concentrating on developing graphic, photographic and narrative skills for architectural documentation and professional skills related to historic preservation. Involves classroom and field sessions.

- UAPP 631 DOCUMENTATION OF HISTORIC STRUCTURES 1**
Focuses on learning to create scaled, annotated field notes of historic resources in preparation for making measured drawings of buildings. Students spend all of their time in the field, working as part of a team to record a variety of buildings through plans, sections, elevations and details.
May be crosslisted with HIST638.
- UAPP 635 THE EVOLUTION OF THE AMERICAN URBAN LANDSCAPE 3**
Reading and research seminar on evolution of American urban landscape from approximately 1850 to present. Examination of historical, cultural and geographical issues and processes related to industrialism and capitalism, technology, gender and ethnicity, housing, poverty and wealth as means of understanding formation of historic American urban landscape. Includes field trips to cities in region.
May be crosslisted with GEOG635, HIST635.
- UAPP 636 RESEARCH TOPICS IN HISTORIC PRESERVATION 3**
Seminar addresses a specific research issue within historic preservation including hypothesis construction, design of research methodology and evaluation of results. Emphasis on use of primary sources and application of data-base techniques.
May be crosslisted with ARTH622, GEOG636, HIST636.
- UAPP 637 ORGANIZING FOR SOCIAL JUSTICE 1**
An analysis and comparison of four contemporary types of organizing styles used in the United States; examining their ideologies, methods of application, theories of change and expected outcomes relative to initiatives to change, propose, and/or oppose social, economic and political policies and practices.
- UAPP 638 WORLD CITIES IN COMPARATIVE PERSPECTIVE 3**
World city as a new and distinctive geographic urban form in the world economy. Case studies explore common features of internal structure and external relationships of world cities, their growing environmental problems and extent to which they have decoupled from national cultures and economies.
Crosslisted with GEOG638.
- UAPP 639 COMMUNITY DEVELOPMENT THEORY, CONCEPTS AND PRACTICE 3**
Explores the evolution of core principles and concepts associated with community development, examines various models of practice, and identifies and assesses current challenges and issues confronting the field in the United States.
- UAPP 640 INTERNATIONAL DEVELOPMENT POLICY AND ADMINISTRATION 3**
Poverty and inequality in developing countries and the economic development policies employed to alleviate them. Emphasis on policy reform, trade strategies, sustainable development, and the role of the state. The approaches used by the World Bank, the IMF and USAID.
Crosslisted with POSC640.
- UAPP 641 TOPICS IN NONPROFIT MANAGEMENT AND LEADERSHIP 3**
Offers an additional and advanced opportunity to delve into nonprofit management and leadership in the context of the current sociopolitical and economic environment. Expands knowledge and understanding of the issues confronting the sector as a whole and builds analytic and problem-solving skills.
RESTRICTIONS: May be repeated for credit when topics vary.
- UAPP 642 STRATEGIC PLANNING FOR PUBLIC AND NONPROFIT ORGANIZATIONS 1**
Provides an introduction to the process of strategic planning and attempts to build the skills and knowledge required for carrying out strategic planning in private nonprofit and public agencies. Focuses on the organizational environments in which planning takes place, examines the theories which underlie planning in general and strategic planning in particular and presents a usable model for strategic planning.
- UAPP 643 HISTORIC ROADSIDE ARCHITECTURE 3**
Examines various historic hospitality and retail venues with emphasis on their development throughout this automobile based century. Hotels, motels, diners, fast food and full service restaurants, roadside attractions and retail outlets are discussed as they relate to travel and tourism.
May be crosslisted with HRIM643.
- UAPP 644 GRANTSMANSHIP AND PROPOSAL WRITING 1**
Helps public and nonprofit managers hone their abilities to successfully secure grant funding. Sessions cover currently available resources for identifying promising targets for one's grant proposal, do's and don'ts in dealings with foundations, what grantmakers really look for in a winning grant proposal, and strategies for transforming an idea into a feasible proposal capable of effectively attracting grant support.
- UAPP 645 CIVIC ENGAGEMENT 3**
Provides both hands-on experience and skill-building in engaging community groups in planning and implementing civic engagement initiatives that address government and nonprofit decision-making; and, the opportunity to examine and explore concepts and philosophies that support civic engagement, collaborative leadership, and facilitative participation.
- UAPP 646 ADMINISTRATIVE LAW AND POLICY 3**
Introduces the basic concepts and rules of administrative law and of the legal issues affecting public and nonprofit organizations in dealing with governmental agencies. Special attention placed on the impact politics has on efforts by administrators to comply with administrative law rules and regulations. No prior legal training or command of legal language necessary.
May be crosslisted with LEST646.
- UAPP 648 ENVIRONMENTAL ETHICS 3**
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format.
Crosslisted with PHIL648.
- UAPP 649 CIVIL RIGHTS LAW AND POLICY 3**
Examines the origin and evolution of the laws and policies that govern the rights of African-Americans and other people of color in the United States. Examines emerging approaches to civil rights scholarship and considers the implications of the Supreme Court's recent embrace of a conservative posture in civil rights issues.
May be crosslisted with BAMS649, LEST649.
- UAPP 650 VALUES AND ETHICS OF LEADERSHIP 3**
Looks at the "ends" served by leaders in various contexts (including government, nonprofits, business, and media) and the ethical standards by which the leaders' actions are judged. Examines cases of unethical conduct as well as cases of exemplary conduct.
- UAPP 651 MANAGING RISK AND SECURITY 1**
Examines the policy agenda regarding risk reduction during a time of increasing threats to safety and security. Readings and presentations by practitioners introduce public entity and intergovernmental risk assessment and response strategies. Topics include information system development, exposure reduction, loss prevention, incident management, and resource coordination.
- UAPP 652 GEOGRAPHIC INFORMATION SYSTEMS IN PUBLIC POLICY 1**
Hands-on introduction to Geographic Information Systems (GIS) and their uses in public policy areas. Content varies. Exercises focus on using geographic data in fields such as environmental analysis, land use planning, and socio-economic analysis.
- UAPP 653 POLITICS AND HEALTHCARE 3**
Prepares students to understand and assess the American healthcare delivery system. Examines the political dynamics involved in developing healthcare policies in both the public and private sectors.
Crosslisted with POSC653.
- UAPP 654 VERNACULAR ARCHITECTURE 3**
Study of traditional American folk architecture from the 17th century to the present. Examination of changes in construction, house types and decoration in vernacular buildings, as well as issues of regional differences and individual craftsmanship.
Crosslisted with HIST654.
- UAPP 655 GEOGRAPHIC INFORMATION SYSTEMS IN THE PUBLIC AND NONPROFIT SECTORS 3**
Introduction to the use of Geographic Information Systems (GIS) in urban planning and water-resources fields. Emphasis on practical experience in developing research methodologies employing GIS techniques. Topics include data/metadata creation, remote sensing as it relates to GIS, cartographic representation of spatial data, and vector/raster spatial modeling. No previous GIS experience required.
- UAPP 656 POLITICS AND DISASTER 3**
The politics and public administration of governmental preparedness for, and response to, natural and human-caused disasters and emergency incidents.
Crosslisted with POSC656.
- UAPP 657 HEALTH POLICY 3**
Provides students with a basic understanding of the U.S. health system and gives them practical experience in analyzing how healthcare reform and health policy more generally affect various sectors of the economy.
- UAPP 658 CONTEMPORARY ISSUES IN PUBLIC ADMINISTRATION 1-3**
Focus on "cutting edge" issues in the field of public administration and public affairs, including the response of those in public administration as they seek to establish more clearly the role of administrators in the governance process.
- UAPP 661 COMPARATIVE PUBLIC ADMINISTRATION AND POLICY 1**
Examines contemporary experience in public administration and policy in other cultures and systems.
- UAPP 663 DECISION TOOLS FOR POLICY ANALYSIS 3**
Develops quantitative decision-making skills for science and technology policy decisions. Covers decision-making under uncertainty, axioms of decision analysis, decision trees, influence diagrams, sensitivity analysis, confidence intervals, value of information, probabilistic risk assessment, and multi-attribute decision theory.
Crosslisted with MAST663.

- UAPP 664 CASE STUDIES IN STATE AND LOCAL MANAGEMENT 3**
Uses analyses of cases in state and local decision making to enable students to improve their communication, decision making and management skills. Cases deal with a broad range of subject areas (e.g., health and recreation) and problems (e.g., facility location and personnel).
- UAPP 666 SPECIAL PROBLEM 1-12**
- UAPP 670 FUND DEVELOPMENT: FUNDRAISING FROM INDIVIDUALS 1**
Introduction to the principles of fund development, a guide to organizing for fund development, and an overview of the fundamentals of annual, major and planned fundraising from individuals.
- UAPP 671 FUND DEVELOPMENT: FUNDRAISING FROM INSTITUTIONS 1**
The second in a series of three, one-credit courses which focuses on corporate, foundation and government fund development activity in support of the nonprofit organization. Includes presentations by practitioners from the corporate, foundation and government sectors, helping students to understand the issues from the perspective of the funding sources and from professional fundraisers on identifying potential donors through research.
- UAPP 675 LAND USE AND TRANSPORTATION LINKAGES 1**
Explores the linkages between land use planning and the provision of transportation infrastructure. Discussions include guest speakers who are recognized practitioners in the fields of land use and transportation planning. Land development techniques and patterns which influence transportation needs are covered. Shows how the interplay between land use patterns and transportation infrastructure influences travel and development characteristics.
- UAPP 676 SURVEY RESEARCH 1**
Introduces the major concepts of survey research to include questionnaire development, sampling, survey management, quality control, and analytical concerns. Follows all aspects of pre-election polling undertaken by Center for Applied Demography and Survey Research during the semester.
- UAPP 677 PLANNING INFORMATION TECHNOLOGY - ENHANCED PROJECTS 1**
Introduces the issues surrounding planning for projects requiring the acquisition and application of technology in the public and nonprofit sectors. Focuses on three themes that impact the adoption, implementation, and evaluation of information technology (IT) efforts: technology, policy, and administration.
- UAPP 678 ADMIRALTY AND MARITIME LAW 3**
Introduction to U.S. admiralty and maritime law including jurisdiction carriage of goods by sea, personal injuries, collisions, salvage, insurance and marine pollution. Crosslisted with MAST678.
RESTRICTIONS: Open to juniors, seniors and graduate students.
- UAPP 679 VIRTUAL GOVERNMENT 1**
Explores the evolving field of E-government and evaluates opportunities to enhance the delivery of government services. Reviews developments throughout the world and strategies for implementation in Delaware.
- UAPP 680 MYERS-BRIGGS AND PERSONAL DEVELOPMENT 1**
Emphasis is on an intensive understanding of the elements of the Myers-Briggs Type Indicator (MBTI) indexes as they apply to individuals. Includes the application to and opportunity for individual development, conflict, communication, change and leadership. Although not as rigorous as the full qualifying program, it offers a thorough understanding and direct application to many other areas that impact individuals personally.
- UAPP 684 PERFORMANCE MANAGEMENT 3**
Increases knowledge of techniques and definitions used in managing-for-results movement; introduces indicators used by government and their use for accountability and improved effectiveness; furthers competence in areas of strategic planning, benchmark indicators, performance-based budgeting, and performance measurement; and explores linkages and alignments of systems for improved efficiency and effectiveness.
- UAPP 686 STATE AND LOCAL GOVERNMENT: CONCEPT AND ISSUES 3**
Explores state and local government context in which public managers work. Examines organizational, administrative, and economic forces shaping state and local public action, as well as political decision making apparatus used by subnational governments. Assesses their contemporary role in federal system. May be crosslisted with POSC686.
- UAPP 687 STATE GOVERNMENT POLICY AND MANAGEMENT 3**
Focuses on roles and functions of United States state government. Topics include legislative policy making and operations, executive branch organization and functions, structure and role of state courts, and the role of the governor and the states in intergovernmental policy making. State government in the mid-atlantic region will receive special attention.
May be crosslisted with POSC687.
- UAPP 692 ENVIRONMENTAL VALUES, MOVEMENTS AND POLICY 3**
Examines citizens' beliefs and values, voluntary environmental groups and the

ways in which individuals and groups affect environmental policy. Shows how research in areas such as environmental sociology and ecological anthropology can inform policy.
Crosslisted with MAST692.

- UAPP 800 RESEARCH METHODS AND DATA ANALYSIS 4**
Focuses on concepts, issues and techniques related to research design, data acquisition and data analysis in the fields of urban affairs and public policy.
- UAPP 801 PROCESSES OF SOCIAL INQUIRY 3**
Explores philosophical underpinnings of social inquiry and epistemological and methodological issues surrounding development and use of social research. Encourages students to consider role of critical analysis in social change. Students prepare research designs on topics of their choosing and are assisted by instructors in developing them into thesis and dissertation proposals.
- UAPP 802 ELECTRICITY POLICY AND PLANNING 3**
Analyzes the technological and regulatory policy evolution of the electricity industry. Considers how technology innovations and policy/regulatory actions have guided the planning of the industry from its early days.
- UAPP 803 SEMINAR: PUBLIC ADMINISTRATION 3**
Reading and discussion of theories and problems of public administration, including organization, coordination, field administration, contracts, personnel, policy making, participation, adjudication, budgeting and administrative behavior.
May be crosslisted with POSC803.
- UAPP 804 PROGRAM EVALUATION FOR HEALTH AND SOCIAL SERVICES 3**
Introduces quantitative and qualitative methods for evaluating health and social service programs. Emphasizes program design evaluation, process evaluation, experimental and quasi-experimental design, and clinical trials.
- UAPP 808 QUALITATIVE METHODS FOR PROGRAM EVALUATION 3**
Provides skills and examines issues in use of qualitative methods in context of program evaluation. Qualitative design, sampling approaches, data collection, and analysis included.
PREREQ: UAPP800, IFST615 or comparable research methods course.
RESTRICTIONS: Enrollment limited to 15.
- UAPP 810 POLITICAL ECONOMY OF THE ENVIRONMENT 3**
Reviews major theories developed over the last half century to explain nature-society relations. Policy case studies on environmental justice, trade and environment, global climate change, and sustainable development used to evaluate current range of political-economic explanations of nature-society relations. International, national and local responses to these problems are analyzed.
May be crosslisted with MAST814, POSC814.
- UAPP 815 PUBLIC MANAGEMENT STATISTICS 3**
Emphasis on the practical knowledge of statistical techniques and their use in the management of data (or data systems) in the public sector. Discussion and appraisal of various statistical tools from a theoretical standpoint, and application of statistical methods and procedures in a laboratory situation for the collection, organization and analysis of statistical information in public management research.
- UAPP 816 ADVANCED SOCIAL STATISTICS 3**
Provides advanced training in applied social research. Topics include analysis of variance, regression analysis, analysis of covariance, multi-dimensional cross-classifications and future analysis. Lectures supplemented by laboratory work involving computer statistical packages and simulations.
- UAPP 818 ENVIRONMENTAL POLICY AND ADMINISTRATION 3**
U.S. and international environmental politics, policies, laws, and agreements regarding air, water, and natural resource protection. Examines environmental governance regimes, politics and science, theories of environmental policy, public and private interaction, and epistemic communities in global warming, ozone layer protection, environmental public health, etc.
Crosslisted with POSC818.
- UAPP 819 MANAGEMENT DECISION MAKING IN PUBLIC AND NONPROFIT SECTORS 3**
Focuses on analytical decision making within public and nonprofit organizations. Examines processes by which decisions can be made and evaluated. Emphasis on conceptual factors that provide a guide to decisions and evaluations of decision methodologies, e.g., systems analysis, cost-benefit analysis, PERT/critical path method, decision trees, performance measurement and time series.
May be crosslisted with POSC819.
PREREQ: Excel
- UAPP 820 INTERNATIONAL PERSPECTIVES ON ENERGY AND ENVIRONMENT 3**
Policy analysis and political economy at international energy and environmental issues and problems. Encompasses international and multi-national government and private sector organizations, as well as non-governmental, non-profit organizations.
Crosslisted with POSC820.

UAPP 821 PROSEMINAR: TECHNOLOGY, ENVIRONMENT AND SOCIETY 3
Over the last two centuries, forces of industrialization and urbanization have transformed economic, social and political life and the natural environment. Examines theories that explain and assess these transformations, with the goal of fostering critical analysis of social and environmental transformation in international, national and local contexts.
May be crosslisted with POSC821.

UAPP 822 PROSEMINAR IN GOVERNANCE, PLANNING AND MANAGEMENT 3
Deals with policy and research issues concerning the making, administering and outcomes of public policies affecting urban populations and with how urban governance, planning and management processes are influenced by the interaction of the public, private and third sectors at the local, national and international scales.

UAPP 823 PROSEMINAR: SOCIAL AND URBAN POLICY 3
Social policy attempts to promote the well-being of individuals, families and communities through public action. Explores efforts to address social and economic problems in urban society. Considers differential policy impacts by social class, race/ethnicity, gender and age. Topics: welfare, housing, social security, health, education, criminal justice and employment.
May be crosslisted with EDUC825, IFST823.

UAPP 824 SUSTAINABLE ENERGY POLICY AND PLANNING 3
Analyzes sustainable energy strategies in terms of their technology, economics, impacts on the environment and governance attributes. Also analyzes policy options to facilitate a sustainable energy future.
May be crosslisted with ENEP834.

RESTRICTIONS: Graduate students with a background in policy, economics and/or technology. Senior-level undergraduate students only with permission of the instructor.

UAPP 827 PROGRAM AND PROJECT ANALYSIS 3
Explores the ways in which decision-makers in the public sector evaluate the feasibility of government programs and projects through the application of Cost-Benefit Analysis (CBA), Cost Utility Analysis (CUA), and Cost Effectiveness Analysis (CEA). Focuses on the determination of social costs and social benefits of public policies.
PREREQ: UAPP834 or comparable course in public economics and permission of instructor.

UAPP 828 URBAN SOCIETY AND URBAN POLICY 3
Traces the evolution of the major social, economic and physical dimensions of U.S. cities in order to understand the nature of current challenges facing American society. Compares the "American" model of urban society with societal forms found in other parts of the world. Examines the role of public policy as a major determinant of the nature of urban communities.

UAPP 829 TAXATION AND FISCAL POLICIES 3
Advanced course in theory and application of financing, spending and regulatory policy instruments of state and local governments. Topics include efficiency, equity and impacts of different types of taxation, user charges, expenditure approaches (transfers/subsidies) and regulation alternatives.
May be crosslisted with POSC829.

UAPP 833 FINANCIAL MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3
Principles of public finance and public sector economics are used to examine issues of demand for and delivery of public goods by state and local governments and nonprofit organizations. Topics include revenues, expenditures, intergovernmental and cross-sectoral relationships, budgeting, debt management and asset allocation.
May be crosslisted with POSC839.
PREREQ: UAPP834.

UAPP 834 ECONOMICS IN PUBLIC AND NONPROFIT SECTORS 3
Develops microeconomic concepts and applies them to public issues, policies, and programs. Applications deal with a wide range of topics, including health care, education, transportation, housing, community development, energy, and the environment. Emphasizes how microeconomic analysis can enhance decision making.

UAPP 835 ORGANIZATION AND MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3
Explores (1) theories and concepts of organizational phenomena, (2) current challenges and implications for the public and nonprofit sectors, and (3) issues for individuals who work in these organizations. Behavioral competencies are developed.
May be crosslisted with POSC835.

UAPP 836 REAL WORLD ETHICS 1
Examines real world situations requiring ethical considerations. Variety of topics to be covered including public policy issues, managerial responsibility and demonstrating ethical integrity in leadership.

UAPP 837 HUMAN RESOURCES MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3
Examines the human resources function from three perspectives: 1) basic technical competencies (recruitment, selection, compensation, benefits), 2) legal and

constitutional issues in HR, and 3) leadership and organizational change.
May be crosslisted with POSC837.

UAPP 838 PUBLIC POLICY ANALYSIS 3
Seminar covers an overview of the policy process and considers all topics central to an understanding of policy making in the United States.
Crosslisted with POSC838.

UAPP 839 ADMINISTRATIVE LAW SURVEY 1
Introduces basic concepts and rules of administrative law and an understanding of the legal issues affecting public and nonprofit organizations in dealing with governmental agencies. Special attention placed on the impact politics has on efforts by administrators to comply with administrative law rules and regulations. No prior legal training or command of legal language necessary.

UAPP 840 HISTORY AND DEVELOPMENT OF THE NONPROFIT SECTOR 3
Traces history and development of the nonprofit sector in the United States with a focus on social, economic, political and legal factors. Volunteerism and philanthropy are emphasized. The role of nonprofit organizations in furthering the goals of community development is explored.

UAPP 841 MANAGEMENT AND GOVERNANCE OF NONPROFIT ORGANIZATIONS 3
Provides an introduction to the leadership and management issues facing nonprofit executives and governing boards. Topics include board relationships and voluntary leadership, financial management and budgeting, human resource management, organizational marketing and strategic planning, records management and the use of information technology in management and governance.

UAPP 843 GLOBAL GOVERNANCE: THEORY AND CASES 3
Exploration of international organization, regime and global governance theory. Analysis of global governance arrangements in various issue areas such as the environment, ocean issues, human rights, development, world health, telecommunications, trade and finance.
Crosslisted with POSC843.

UAPP 860 INTERNSHIP SEMINAR 1
Prepares students for the Internship Fieldwork requirement of the Master of Public Administration program. Focuses on informational interview skills, resume preparation and personal statement development. Introduces job search strategies and provides an orientation to the Career Services Center. Helps students make decisions about specialization, internship and career objectives.

UAPP 861 ACADEMIC AND PROFESSIONAL DEVELOPMENT FOR UAPP DOCTORAL STUDENTS 1
Explores a range of topics related to academic processes and professional development for doctoral students. Topics may include: strategies for successful graduate study, advisor/committee strategies, topic selection, the research experience, writing skills, time/stress management strategies, conference presentations, publishing, job searches, professional organizations and networking. Guest speakers include various faculty members, students and alumni.
RESTRICTIONS: Open only to UAPP doctoral students.

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

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

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

UAPP 866 SPECIAL PROBLEM 1-12

UAPP 868 RESEARCH 1-6

UAPP 869 MASTER'S THESIS 1-6

UAPP 870 READINGS 1-6
May be crosslisted with ENEP870.

UAPP 872 ANALYTICAL PAPER 3
Demonstrates the student's ability to analyze a particular policy or administrative

problem and develop an appropriate response.

May be crosslisted with ENEP872.

RESTRICTIONS: A requirement of the M.A. and M.P.A. programs.

UAPP 964 PRE-CANDIDACY STUDY 3-12 PF

Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

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

UAPP 969 DOCTORAL DISSERTATION 1-12 PF

UNIVERSITY COURSES

UNIV 100 HONORS FIRST YEAR EXPERIENCE 0 PF

Students are asked to reflect upon changes in their knowledge, skills, and attitudes that occur during their Honors First Year Experience.

UNIV 101 FIRST YEAR EXPERIENCE I 1 PF

Provides an integrated, content-based, co-curricular experience for LIFE cluster students. Fosters academic and social competencies necessary for university success and provides structured, regular time for LIFE cluster students to meet with peer mentors and faculty.

RESTRICTIONS: For freshmen only.

UNIV 102 FIRST YEAR EXPERIENCE II 1 PF

Continuation of UNIV101.

PREREQ: UNIV101.

UNIV 103 FIRST YEAR EXPERIENCE III 1 PF

Continuation of UNIV102.

PREREQ: UNIV102.

UNIV 110 ETE SCIENCE SEMESTER 0

UNIV 111 UST FRESHMAN SEMINAR: FINDING YOUR WAY 1 PF

Aids University Studies freshmen in achieving a successful transition from high school to the University of Delaware. Self-exploration exercises and exposure to the many majors at UD enable each student to develop a plan of action for selecting and seeking admission to the desired major.

RESTRICTIONS: Open only to UST first-time freshmen.

UNIV 112 SKILMOD: ACADEMIC SELF MANAGEMENT 1 PF

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

UNIV 113 SKILMOD: STUDY SKILLS 1 PF

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

UNIV 114 SKILMOD: CRITICAL THINKING 1 PF

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

UNIV 115 SKILMOD: PROBLEM SOLVING 1 PF

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

UNIV 116 FYE: STRATEGIES FOR ACADEMIC SUCCESS 1 PF

Designed for Associate in Arts freshmen. Effective study skills and time management techniques to ensure academic success in the freshman year and beyond. Also includes information about resources available to students.

RESTRICTIONS: Enrollment restricted to first-year Associate in Arts students. Cannot be repeated for credit. Duplicate credit with any of the following: UNIV101, UNIV111, UNIV112, UNIV113.

UNIV 166 SPECIAL PROBLEM 1-4

UNIV 240 PEER TUTOR PRACTICUM I 0-1 PF

Focus on strategies for individual and group tutorials for tutors in Academic Enrichment Center tutoring program.

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

UNIV 260 EXPERIENTIAL TEACHING 0-3 PF

Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or

undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process.

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

UNIV 262 EXPERIENTIAL LEARNING 0-6

Learning experience on or off campus under supervision of faculty member. Instructional learning out of class and beyond existing department courses. Non-major required discovery learning experiences such as service learning, fieldwork, co-op, apprenticeship, internship, and independent study.

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

UNIV 266 SPECIAL PROBLEM 1-3

UNIV 268 UNDERGRADUATE RESEARCH 0-6

Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member.

RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.

UNIV 301 PEER MENTOR PRACTICUM I 1 PF

Seminar for peer mentors working in the LIFE program. Covers issues in peer mentor activities and LIFE clusters.

UNIV 302 PEER MENTOR PRACTICUM II 1 PF

Continuation of UNIV301.

PREREQ: UNIV301.

UNIV 303 PEER MENTOR PRACTICUM III 1 PF

Continuation of UNIV302.

PREREQ: UNIV302.

UNIV 304 PEER MENTOR PRACTICUM IV 1 PF

Continuation of UNIV303.

PREREQ: UNIV303.

UNIV 305 PEER MENTOR PRACTICUM V 1 PF

Continuation of Peer Mentor Practicum IV.

PREREQ: UNIV 304.

UNIV 320 CONTEMPORARY ISSUES FOR RESIDENT ASSISTANTS I 1

Introduces new resident assistants to issues affecting college students, specifically issues of social justice, leadership, and citizenship. All topics focus on needs of new resident assistant in Office of Residence Life.

RESTRICTIONS: Must be a resident assistant.

UNIV 321 CONTEMPORARY ISSUES FOR RESIDENT ASSISTANTS II 1

Discovery learning experience for resident assistants in their second, third, or fourth semesters as RAs. Explores concepts of citizenship, leadership, and community through self reflection and service learning experiences within the context of the Resident Assistant position.

PREREQ: UNIV320.

RESTRICTIONS: Must be resident assistants.

UNIV 322 CONTEMPORARY ISSUES FOR RESIDENT ASSISTANTS III 1

Advanced discovery learning experience for resident assistants in their third or fourth semesters as RAs. Explores concepts of citizenship, leadership, and community through self reflection and service learning experiences and apply these concepts to civic engagement and issues of sustainability.

PREREQ: UNIV320, UNIV321.

RESTRICTIONS: Must be resident assistant.

UNIV 340 PEER TUTOR PRACTICUM II 0-1 PF

Continuation of UNIV240.

PREREQ: UNIV240.

RESTRICTIONS: requires permission of instructor.

UNIV 355 SEMESTER IN WOLVERHAMPTON 0

UNIV 360 EXPERIENTIAL TEACHING 0-3 PF

Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process.

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

UNIV 361 SERVICE-LEARNING 0 PF

Students are asked to reflect upon changes in their knowledge, skills, and attitudes that occur as a result of participation in their service-learning experience.

UNIV 362 EXPERIENTIAL LEARNING	0-6	Learning experience on or off campus under supervision of faculty member. Instructional learning out of class and beyond existing department courses. Non-major required discovery learning experiences such as service learning, fieldwork, co-op, apprenticeship, internship, and independent study. RESTRICTIONS: Requires permission of instructor. May not substitute major courses required in department curriculum.
UNIV 363 EXPERIENTIAL LEARNING SUSTAINING	0 PF	Experiential learning under the supervision of a faculty mentor. RESTRICTIONS: Limited to students appointed as Experiential Learning Scholars within the Discovery Learning Experience. Must have approval of the Associate Director of Undergraduate Studies.
UNIV 364 EXPERIENTIAL INTERNSHIP	3	Internship experience of fifty hours combined with a seminar emphasizing career development, reflection, and personal learning skills. Internship must be arranged and Learning Contract signed prior to first class meeting. Open to major and non-major related internships, paid or volunteer. RESTRICTIONS: May not substitute major courses required in department curriculum.
UNIV 366 INDEPENDENT STUDY	1-6	
UNIV 368 UNDERGRADUATE RESEARCH	0-6	Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member. RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.
UNIV 369 UNDERGRADUATE RESEARCH SUSTAINING	0 PF	Research apprenticeship with faculty mentor. RESTRICTIONS: Limited to those appointed as Undergraduate Research Scholars in the Undergraduate Research Program. Must have approval of the Coordinator of Undergraduate Research.
UNIV 370 STUDY ABROAD	0-6 PF	Students are asked to reflect upon changes in their knowledge, skills, and attitudes that occur due to their study abroad experience.
UNIV 371 DOMESTIC TRAVEL STUDY	0-6 PF	Students are asked to reflect upon changes in their knowledge, skills, and attitudes that occur due to their domestic travel study experience.
UNIV 401 SENIOR THESIS	2-4	Senior thesis for students working toward a degree with distinction. RESTRICTIONS: Total credits for UNIV401 and UNIV402 not to exceed six.
UNIV 402 SENIOR THESIS	2-4	Continuation of UNIV401. RESTRICTIONS: Total credits for UNIV401 and UNIV402 not to exceed six.
UNIV 440 PEER TUTOR PRACTICUM III	0-1 PF	Continuation of UNIV340. PREREQ: UNIV340. RESTRICTIONS: Requires permission of instructor.
UNIV 460 EXPERIENTIAL TEACHING	0-3 PF	Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process. RESTRICTIONS: Requires permission of instructor. May not substitute major courses required in department curriculum.
UNIV 462 EXPERIENTIAL LEARNING	0-6	Learning experience on or off campus under supervision of faculty member. Instructional learning out of class and beyond existing department courses. Non-major required discovery learning experiences such as service learning, fieldwork, co-op, apprenticeship, internship, and independent study. RESTRICTIONS: Requires permission of instructor. May not substitute major courses required in department curriculum.
UNIV 468 UNDERGRADUATE RESEARCH	0-6	Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member. RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.
UNIV 490 HONORS TUTORIAL: HUMANITIES	3	Designated faculty direct the studies of up to four students per semester. Readings of classical works in the humanities described. Group as well as individual discussions. RESTRICTIONS: Requires 3.4 GPA, junior standing or above, and permission of the Honors Program.
UNIV 491 HONORS TUTORIAL: NATURAL/SOCIAL SCIENCE	3	Designated faculty direct the studies of up to four students per semester. Reading of classical works in the social and natural sciences described. Group as well as independent discussions. RESTRICTIONS: Requires 3.4 GPA, junior standing or above and permission of the Honors Program.
UNIV 495 HONORS SEMINAR	3-6	Topics vary; usually interdisciplinary. RESTRICTIONS: Requires 3.4 GPA, junior status or above, and permission of the Honors Program. May be repeated for credit with a different topic and instructor.
UNIV 500 LEAVE OF ABSENCE	0	
UNIV 554 GRADUATE INTERNSHIP SEMESTER	0	
UNIV 555 ADVANCED GRADUATE STUDY	1-3	
UNIV 566 SPECIAL PROBLEM	1-12	
UNIV 600 LEARNING	0 PF	Explores cognitive, affective and social aspects of the learning process through research and reflection on learning and teaching literature in higher education. Students develop skills to facilitate learning in their respective disciplines. Modern information technologies and library resources access essential.
UNIV 601 PEDAGOGY	0 PF	Presents research-based teaching principles and innovative teaching methodologies. Offers practical orientation to enhance pedagogical effectiveness in respective disciplines. Opportunity to observe and reflect on outstanding UD faculty's instructional practices. Modern information technologies and library resources access essential.
UNIV 602 FACULTY ROLES	0 PF	Introduces the range of faculty roles and responsibilities at different types of institutions. Assists with identifying ideal academic settings and understanding the possibilities and responsibilities concomitant to such appointments. Modern information technologies and library resources access essential.
UNIV 603 ACADEMIC JOB SEARCH	0 PF	Prepares for insertion into the academic workplace by focusing on CV construction, teaching portfolio preparation, and refining interviewing skills. Modern information technologies and library resources access essential.
UNIV 604 RESEARCH ETHICS: GUIDES AND REGULATION	0 PF	Exploration of professional codes of ethics across research disciplines with discussion of commonalities and differences between different areas. Institutional policies for research as well as pertinent federal regulations will be discussed. Conflicts of Interest, how they can influence behavior in research settings, and how they are managed effectively.
UNIV 605 RESEARCH MISCONDUCT	0 PF	What is research misconduct? Exploration of the major issues in research misconduct: fabrication, falsification, and plagiarism. What are the pressures that lead to research misconduct? How do we avoid or manage them? How is a formal research misconduct allegation made, and how does the process work?
UNIV 606 CONDUCTING AND PRESENTING RESEARCH	0 PF	Best practices for data management will be discussed. Is there one size that fits all? What are the challenges and opportunities that come with working in collaborative environments? Does the size of the lab or research group matter? Does mentoring matter? How is authorship determined?
UNIV 607 PEER REVIEW	0 PF	The peer review process for both grant review and publications. Faculty panels include members who serve as editors and reviewers for publications as well as members who serve in the peer review process for major federal funding agencies.
UNIV 666 SPECIAL PROBLEM	1-12	
UNIV 866 SPECIAL PROBLEM	1-12	
UNIV 895 MASTER'S SUSTAINING: NON-THESIS	0	
UNIV 899 MASTER'S SUSTAINING	0	
UNIV 999 PH.D. SUSTAINING	0	

WOMEN'S STUDIES

WOMS 200 CULTURAL INTRODUCTION TO SEXUALITIES AND GENDER STUDIES	3	An exploration of the variations in the social construction of lesbian, gay, bisexual, heterosexual, transsexual, transgender and queer identities and communities in
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contemporary American society by study of gay literature, history, theory, religious and legal issues and the arts including film, music, television, and visual arts. Crosslisted with SGST200.

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

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

WOMS 203 CONTEMPORARY MORAL PROBLEMS 3
The application of philosophical techniques to contemporary moral problems such as abortion, punishment, biomedical ethics, reverse discrimination and sexual morality. Crosslisted with PHIL202.

WOMS 204 GENDER AND COMMUNICATION 3
Deals with gender differences in communication in varied contexts, such as conflict, marriage, family, friendship, and work. Crosslisted with COMM204.

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

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

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

WOMS 208 CURRENT ISSUES IN SEXUALITY AND GENDER LECTURE SERIES 1-3
Lecture series in which faculty and guest speakers discuss their research on contemporary and historical perspectives on sexuality and gender. Research presented from several disciplines, including sociology, history, literature, art, music, anthropology and psychology, among others. Crosslisted with SGST208. RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 210 WOMEN AND RELIGION 3
Examines the impact of Near Eastern and Judeo-Christian scriptures on women in the family and society, especially focusing on women's roles as mystics and leaders within and outside of institutional religion. Also covers recent feminist approaches to religion. May be crosslisted with PHIL210.

WOMS 211 MEN, CONFLICT AND SOCIAL CHANGE 3
Examination of male roles and images in society, utilizing an interdisciplinary social science perspective. Topics include the family, work, military, violence and the implications of feminism for men. Issue oriented. May be crosslisted with SOCI211.

WOMS 212 MOTHERHOOD IN CULTURE AND POLITICS 3
Examines contemporary cultural and political issues related to motherhood and mothering experience, including definitions and cultural significance of motherhood, experiences of childbirth, effects of new reproductive technologies, surrogate mothering and "maternal thinking;" also, efforts to avoid motherhood through contraception and abortion and related legal controversies.

WOMS 213 MEN AND WOMEN IN AMERICAN SOCIETY 3
Designed to provide students with a sociological framework for analyzing sex and gender relations in contemporary American society. Topics include the social construction of gender, patterns of sex-role socialization, gender stratification in the paid work force, gender relations in the family and other social institutions. Crosslisted with SOCI213.

WOMS 215 QUEER SEXUAL IMAGERY IN THE VISUAL ARTS 3
Introduction to the diversities of representation of the human body in western visual art with an emphasis on coded as well as explicit images of queer sexuality. Crosslisted with MSST215.

WOMS 216 INTRODUCTION TO FEMINIST THEORY 3
The concepts of love, marriage, sexuality, family, work, power and equality of women. Theories of women and their position in society, including classical Marxism, the status politics of the suffragettes, radical feminism and socialist feminism. Crosslisted with PHIL216.

WOMS 222 LANGUAGE AND GENDER 3
Explores various ways in which gender is reflected in language. Topics include sexism in language, sexist language and differences in the structural aspects of men's and women's language and conversational style. Emphasis on the social implications of these differences. Crosslisted with LING222.

WOMS 223 FOOD, GENDER AND CULTURE 3
Explores how preparing, eating, and thinking about food demonstrates culturally determined gender and power relations in different societies. Using cross-cultural and interdisciplinary perspectives, explores various understandings of issues such as nutrition, eating disorders, body images, and gender differences around food. Crosslisted with ANTH223.

WOMS 233 WOMEN, BIOLOGY AND MEDICINE 3
Considers societal theories and medical practices concerning women and discusses their biological basis, their biological effects, sources of information with which to evaluate them, etc. Emphasis on preparing the student to make own medical and obstetrical decisions and to critically evaluate claims concerning male/female differences.

WOMS 240 WOMEN AND VIOLENCE 3
Analyzes a variety of issues and topics relating to women and violence, including rape, domestic violence, images of women in popular culture, incest and child abuse, pornography, sexual harassment and women who use violence. Presents descriptive materials, sociological analysis and strategies for change.

WOMS 250 TOPICS IN INTERNATIONAL WOMEN'S STUDIES 3-6
Explores topics related to women's lives in various parts of the world and may include women's history, women's creativity, and social movements in Africa, Asia, Europe, Australia or Latin America. RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 260 WOMEN: CULTURAL REPRESENTATIONS 3
Examines issues of representation across time and cultures. Offers critical analysis of how women have presented and represented themselves, as well as how their cultural productions and creative labors in a variety of media have been represented by others.

WOMS 290 WOMEN AND GENDER IN INTERNATIONAL FILMS 1 PF
Through viewing feature films about women and/or gender in cultures outside that of mainstream United States, explores how sex and gender shape lives and experiences. Enriches understanding of the diversity of gendered cultural norms and ways filmmakers choose to illustrate them.

WOMS 291 WOMEN'S HISTORY THROUGH FILM 1
Explores women's historical experiences through the medium of film. Students will view and discuss a variety of documentary films on women and read materials related to topics covered in the films. Films will deal with historical and contemporary issues in the United States and internationally. May be crosslisted with HIST291. RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 298 RESEARCH ON RACE, ETHNICITY AND CULTURE 1 PF
Lecture series in which faculty and guest speakers discuss their research on contemporary and historical perspectives on race, ethnicity and culture. Research presented from several disciplines, including sociology, history, literature, anthropology and psychology, among others. May be crosslisted with BAMS298. RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 299 RESEARCH ON WOMEN 1 PF
Interdisciplinary lectures in which faculty, staff and advanced students share results of their research on women. Lectures cover issues in anthropology, sociology, political theory, psychology, philosophy, literature, history, theology, ethnic studies, music, art, math education, health, etc. RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 300 WOMEN IN AMERICAN HISTORY 3
The position of women in American life viewed from a historical perspective including such topics as home and family life, women in the work force, women as agents of social change and feminism. Crosslisted with HIST300.

WOMS 301 GAY AND LESBIAN FILM 3
Explores gay and lesbian issues represented in film and an academic analysis of these issues. Through film, students study the social constructs of sexuality and

gender, analyze the role of homosexuality, examine the development of gay and lesbian characterization, and explore the differences between sex and sexuality. Crosslisted with SGST301.

WOMS 302 WOMEN IN MUSIC: AN ALTERNATE SURVEY 3
Survey of women's contributions to Western art music traditions from 12th century to present day through the study of women as composers, performers, patrons, and as the subject of musical expression. Explores cultural systems that have alternately encouraged and suppressed women's creativity. Crosslisted with MUSC302.

WOMS 305 THE EVOLUTION OF HUMAN SEX ROLES AND REPRODUCTION 3
Survey of the evolution of human reproduction and sex differences. Evidence derived from the human fossil record, living non-human primates, modern biological differences between human males and females and cross-cultural comparisons of reproductive behavior and sex roles. Crosslisted with ANTH305.

WOMS 310 ASIAN WOMEN'S LIVES 3
Using examples from China, Japan, Southeast Asia, South Asia, and the Middle East, examines how lives of Asian women have been constructed by cultural, historical, and international forces and seeks to understand and challenge culturally pervasive stereotypes that define their lives. Crosslisted with ANTH310.

WOMS 311 RENAISSANCE WOMEN, SOCIETY AND THE ARTS 3
Focuses on the role of women in Italian art and society from 1300-1650. Interdisciplinary and feminist readings emphasize a variety of approaches. Topics include gender and power; women as patrons; female eroticism and mysticism; the masculine vision of ideal beauty; women writers and their complaints; nuns, prostitutes and saints. Crosslisted with ARTH311.

WOMS 312 ASIAN WOMEN IN THE GLOBALIZED WORKPLACE 3
Focuses on relationship between work, gender, and social, cultural, and economic transformations associated with globalization in East and Southeast Asia. Crosslisted with ANTH312.

WOMS 315 THIRD WORLD WOMEN IN POLITICS 3
Introduction to the role of women in politics and society in Africa, Asia, Latin America and the Middle East. Crosslisted with POSC315.

WOMS 316 ISLAM AND GENDER 3
Uses anthropological case studies and historical material to comprehend ideals, practices, and themes of gender and gender relations in Islam. Introduces representations of Islamic belief in doctrinal, historical, and contemporary contexts. Crosslisted with ANTH316.

WOMS 318 STUDIES IN FILM 3-6
Special topics such as film genres, major directors and Soviet cinema. Crosslisted with ENGL318.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 319 TOPICS: FRENCH LITERATURE IN TRANSLATION 3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced prior to the registration period. Crosslisted with FLIT319.

WOMS 320 VARYING AUTHORS AND GENRES 3
Cultural, especially cross-cultural and/or interdisciplinary studies with primary emphasis on the aesthetic context of the announced topic, e.g., Nordic Saga and Myth; Courtly Love; and the European Postwar Novel. Crosslisted with FLIT320.
RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 321 TOPICS: CHINESE LITERATURE IN TRANSLATION 3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet. Crosslisted with FLIT321.
RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 322 TOPICS: CLASSICAL LITERATURE IN TRANSLATION 3
Special topics in Greek and Roman culture and civilization. Particular areas and writers to be announced, e.g., ancient epic, ancient drama, Greek literature in translation. Crosslisted with FLIT322.
RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 323 INTRODUCTION TO WOMEN AND POLITICS 3
Political-legal status of American women since the Revolution, and their participation in the political process. Women's present political-legal status, as illustrated through current issues such as reproductive rights, pay equity and the feminization of poverty. Crosslisted with POSC323.

WOMS 324 FEMINISM AND SEXUALITIES 3
Examines issues of sexual identity from a feminist perspective and may focus on topics such as cross-dressing, transgenderism, queer studies, etc.

WOMS 325 TOPICS: GERMAN LITERATURE IN TRANSLATION 3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics may vary and are announced in registration booklet. Crosslisted with FLIT325.
RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 326 TOPICS: HISPANIC LITERATURE IN TRANSLATION 3-12
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration booklet. Crosslisted with FLIT326.
RESTRICTIONS: May be repeated for credit when topics vary.

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

WOMS 328 TOPICS: JAPANESE LITERATURE IN TRANSLATION 3-6
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Topics vary and are announced in registration Crosslisted with FLIT328.
RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 329 TOPICS: ITALIAN LITERATURE IN TRANSLATION 3
Study of the works of one or more outstanding authors or of a special theme. Taught in English. Crosslisted with FLIT329.
RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 330 VARYING AUTHORS, THEMES AND MOVEMENTS 3
Cultural, especially cross-cultural, study with primary emphasis on the historical development of the announced area, e.g., The Faust Theme in Western Literature, Dante Through the Ages, Don Juan, and the Transformation of a Myth. Topics vary and are announced in registration booklet. Crosslisted with FLIT330.
RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 332 WOMEN, RACE, AND ETHNICITY 3
Examines intersection of gender with issues of racial and ethnic identity in either national or transnational context.

WOMS 333 PSYCHOLOGY OF WOMEN 3
Psychological analysis of the meaning and implications of being a woman and cause and consequences of the female experience. Biological sex vs. psychological sex-role identity, stereotyping, discrimination, self-concept and the feminist perspective. Crosslisted with PSYC333.
PREREQ: PSYC100.

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

WOMS 337 VICTORIAN FICTION 3
Authors may include Dickens, the Brontës, Eliot, Hardy and their contemporaries. Crosslisted with ENGL338.
PREREQ: ENGL110.

WOMS 350 GENDER AND CRIMINAL JUSTICE 3
Reviews historical and contemporary explanations for women's participation in crime and evaluates these explanations in light of current research on gender. Other topics include treatment of women offenders by judicial and correctional systems, women as victims of crime and women as criminal justice personnel. Crosslisted with CRJU350.

WOMS 352 STUDIES IN NINETEENTH CENTURY LITERATURE 3
Special topics in an author or authors, a genre, literary movement, or an idea. Crosslisted with ENGL352.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.

- WOMS 353 TWENTIETH CENTURY BRITISH LITERATURE** 3
Broadly focused study of literature in several genres, including a variety of eras and movements such as turn-of-the-century realism, war poetry, modernism, and post-colonial writing.
Crosslisted with ENGL353.
PREREQ: ENGL110.
- WOMS 363 WOMEN IN CROSS-CULTURAL PERSPECTIVE** 3
Social realities of women within the cultures of Asia, Africa and Latin American societies. How institutions such as motherhood, the family, sexuality and work structure women's lives within the dominant social ideologies.
May be crosslisted with ANTH363.
- WOMS 366 INDEPENDENT STUDY** 1-6
- WOMS 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.
Crosslisted with HIST372.
PREREQ: HIST370.
RESTRICTIONS: Not open to first year students.
- WOMS 375 TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION** 3
Special topics in Russian and Soviet culture. Taught in English. Topics vary and are announced in registration booklet.
Crosslisted with FLT375.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 380 WOMEN WRITERS** 3
Study of a variable set of women writers. Addresses such topics as the idea of a women's tradition, formation of the canon, use of genre, language and form.
Crosslisted with ENGL380.
PREREQ: ENGL110.
- WOMS 381 WOMEN IN LITERATURE** 3
Cultural representations of women by male as well as female writers. Variable in historical range, geography, and genre.
Crosslisted with ENGL381.
PREREQ: ENGL110
- WOMS 382 STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH** 3
Consideration of multiculturalism as it pertains to American culture or literature in English from Africa and other non-European societies. Variable in historical range, geography, and genre.
Crosslisted with ENGL382.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.
- WOMS 383 CHINESE CULTURE IN TRANSLATION** 3
Special topics in Chinese culture. Taught in English. Topics vary and are announced in registration booklet.
Crosslisted with FLT383.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 385 WOMEN AND THE ECONOMY** 3
Examines a wide range of economic issues relating to women's lives, with special emphasis on family, work and income. Public policy applications and international comparisons are stressed.
Crosslisted with ECON385.
PREREQ: ECON151.
- WOMS 387 HISTORY OF SEXUALITY IN THE U.S.** 3
A survey of American sexual ideals, practices, and identities, from the Colonial period to the present. How anxieties about interracial sex shaped life in the American South, how the advent of more reliable contraceptives provoked both social movements and political debate, and how the emergence of a scientific discourse of sexual difference simultaneously propelled the gay rights movement and enabled scientists to categorize same-sex love as pathology and perversion.
Crosslisted with HIST387.
- WOMS 389 TOPICS: WOMEN AND HEALTH ISSUES** 3
Varying special topics related to women's health. Topics may include, but are not limited to: the relationship between women, health and development; theoretical contributions of feminism to thinking about relationship between gender and health; women's health conditions in various parts of the world.
May be crosslisted with PHIL389.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 401 FOUNDATIONS OF HUMAN SEXUALITY** 3
A multidisciplinary study of human sexuality focusing on the implications for individuals and society of the biological, psychological and sociocultural

determinants of human sexuality. Deals with sexually explicit material.
Crosslisted with IFST401.

- WOMS 402 TOPICS IN CONSTITUTIONAL LAW** 3
Critical topics of constitutional law. Topics vary by instructor.
Crosslisted with POSC401.
RESTRICTIONS: May be repeated for credit when topics vary.

- WOMS 407 SOCIOLOGY OF SEX AND GENDER** 3
Seminar on sex and gender relations from a sociological perspective. Surveys current research on gender stratification in the paid work force, the feminization of poverty, gender relations in the family, sexual violence, and feminism as a social movement. Special attention given to current theoretical debates on the origins and persistence of sexual inequality and the intersection of gender with race and class in patterns of social stratification.
Crosslisted with SOCI407.
PREREQ: SOCI201, and either SOCI213 or WOMS201.
RESTRICTIONS: Restricted to junior and senior sociology and women's studies majors.

- WOMS 409 DOMESTIC VIOLENCE SERVICES** 3
Examines issues in providing services to families in which domestic violence is occurring. Multiple service systems are explored, with emphasis on service coordination, service gaps, and public policy.
Crosslisted with IFST409.
PREREQ: IFST235 or SOCI201 or WOMS201.
RESTRICTIONS: Open to juniors and seniors only.

- WOMS 410 THE STUDY OF WOMEN'S STUDIES** 3
Capstone for majors. Explores purpose, development, and developing concerns in field of women's studies. Aims to reflect upon what majors have learned in their WOMS classes, consider ongoing challenges to the field, and help prepare them for a future in which their WOMS major can play a significant and positive role.
RESTRICTIONS: Senior majors. Requires approval of women's studies advisor and instructor.

- WOMS 411 SEMINAR IN AMERICAN HISTORY** 3
Topics vary. Recent topics include Jefferson and His Time, Women in 20th Century America, The Nightmare Years: The U.S. 1960-1980, American Religious History and Conservatism in Recent America.
Crosslisted with HIST411.
PREREQ: HIST268.
RESTRICTIONS: Majors only, or permission of instructor.

- WOMS 413 PROBLEMS IN AMERICAN GOVERNMENT** 3
Contemporary problems in American government and politics.
Crosslisted with POSC413.
RESTRICTIONS: May be repeated for credit once when topics vary.

- WOMS 415 RACE, CLASS AND GENDER** 3
Analysis of current American social issues that show interrelationship of race, class and gender. Readings from sociology, Afro-American studies, feminist studies, history and literature.
Crosslisted with SOCI415.

- WOMS 418 RACE, GENDER AND POVERTY** 3
An examination of contemporary American poverty with attention to race and gender as fundamental dimensions of inequality. Social policy, employment and family composition are key topics.
Crosslisted with SOCI418.
PREREQ: SOCI20.

- WOMS 420 WOMEN'S STUDIES SENIOR THESIS** 3-6
Senior thesis for women's studies majors or minors.
COREQ: Students enrolled in WOMS420 must also take WOMS410 the same semester or the following semester.
RESTRICTIONS: Women's studies majors or minors and permission of the WOMS program.

- WOMS 430 FAMILY LIFE EDUCATION** 3
Investigates curriculum and instructional strategies for use in support, prevention and empowerment-based programs across the lifespan.
Crosslisted with IFST430.
PREREQ: IFST201 or IFST202.

- WOMS 436 POLITICS AND LITERATURE** 3
Class, civil rights, feminism, revolution and other political issues examined through novels, film and other literary works.
Crosslisted with POSC436.

- WOMS 439 WOMEN AND REVOLUTION IN AFRICA** 3
Discusses the critical roles played by women in African revolutionary movements. Why did women join these revolutionary movements? What is the relationship between feminism and revolution?
Crosslisted with HIST439.

PREREQ: HIST268.

RESTRICTIONS: Majors only, or permission of instructor.

WOMS 440 TOPICS IN INTERPERSONAL COMMUNICATION 3

Topics vary and focus on significant areas of theory and research in interpersonal communication. Topics may include nonverbal communication, lifespan communication and communication in intimate relationships.

Crosslisted with COMM440.

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

WOMS 442 TOPICS IN ORGANIZATIONAL COMMUNICATION 3-9

Focuses on significant areas of theory and research in organizational communication. Topics may include gender, communication, or interpersonal relations in organizations, such as superior/subordinate relationships.

Crosslisted with COMM442.

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

WOMS 444 SEMINAR: WOMEN IN THE ISLAMIC MIDDLE EAST 3

Examines the major developments, themes and problems in women's history in the Middle East from the advent of Islam to the present. By tracing women's legal status, sexual morality, family and social life, and female economic and political participation, it seeks to shed light on the process of women's roles in society and to challenge the notion that gender divisions and roles have been static over time.

Crosslisted with HIST444.

PREREQ: HIST268.

RESTRICTIONS: Majors only, or permission of instructor.

WOMS 466 INDEPENDENT STUDY 1-6

WOMS 472 SEMINAR IN MEDIEVAL HISTORY 3

Topics may include Europe in the 10th Century, Europe in the 11th Century, and Women in Europe to 1600.

Crosslisted with HIST471.

PREREQ: HIST268.

RESTRICTIONS: Majors only, or permission of instructor.

WOMS 475 SEMINAR IN MODERN EUROPEAN HISTORY 3

Topics vary and may include The Holocaust, The Cold War, Hitler's Germany, or The Age of Revolution.

Crosslisted with HIST475.

PREREQ: HIST268.

RESTRICTIONS: Majors only, or permission of instructor.

WOMS 480 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., autobiography). Stresses critical writing and literary research.

Crosslisted with ENGL480.

WOMS 484 WOMEN IN SPORTS 3

Historical and contemporary perspectives on the female athlete, encompassing biological, psychological, sociological, and legal issues that are gender dependent and culturally unique.

Crosslisted with HESC484.

WOMS 498 INTERNSHIP IN WOMEN'S STUDIES 3

Students work 115 hours per semester in an agency or program associated with women's and/or gender issues. Academic knowledge is applied to actual work situations. Seminar discussions focus on service learning in light of research and theory.

RESTRICTIONS: Requires permission of instructor.

WOMS 610 CRITICAL ISSUES IN FEMINIST SCHOLARSHIP 3

Provides a survey introduction to women's studies for graduate students.

