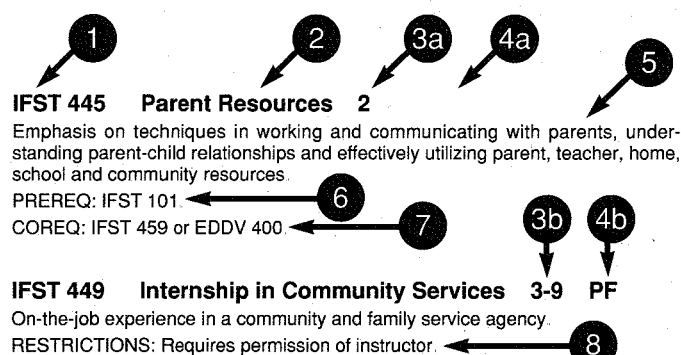




UNIVERSITY OF DELAWARE

1993-94 COURSES

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
 - a. When blank the course is a letter graded course.
 - b. Course for which the grade is only either pass or fail.
5. Brief description of the course.
6. Prerequisites may be satisfied by the course or courses indicated of by equivalent preparation.
7. Corequisite course or courses should be taken in the same semester as the course.
8. Special requirements for the course.

Interpretation of course numbers:

- 001-099 Below baccalaureate degree.
- 100-199 Introductory-level courses.
- 200-299 Introductory and intermediate courses, usually requiring some previous knowledge or experience in the discipline.
- 300-399 Courses with a more concentrated focus on the subject matter in a particular discipline.
- 400-499 Advanced courses for majors and other qualified students.
- 500-599 Graduate-level courses for the nonspecialist.
- 600-699 Graduate-level courses, also open to advanced undergraduates.
- 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
AFSC	Air Force Science
AGED	Agricultural Education
AGEG	Agricultural Engineering
AGRI	Agriculture
AMST	American Studies
ANSC	Animal Science
ANTH	Anthropology
ARSC	Arts and Science
ART	Art
ARTC	Art Conservation
ARTH	Art History
BAMS	Black American Studies
BISC	Biological Sciences
BUAD	Business Administration
BUEC	Business and Economics
CHEG	Chemical Engineering
CHEM	Chemistry and Biochemistry
CHIN	Chinese
CIEG	Civil Engineering
CISC	Computer and Information Sciences
CMLT	Comparative Literature
COMM	Communication
CRJU	Criminal Justice
CSCC	Center for Science and Culture
EAMC	Early American Culture
ECON	Economics
EDDV	Educational Development
EDST	Educational Studies
EDUC	Education
EGGG	Engineering, Graphics and General
EGTE	Engineering Technology
ELEG	Electrical Engineering
ENGL	English
ENTO	Entomology
FINC	Finance
FLLT	Foreign Languages and Literatures
FOSC	Food Science
FREC	Food and Resource Economics
FREN	French
GEOG	Geography
GEOL	Geology
GREK	Greek
GRMN	German
HIST	History
HRIM	Hotel, Restaurant and Institutional Management
HURE	Human Resources
IFST	Individual and Family Studies
ITAL	Italian
JAPN	Japanese
LATN	Latin
LEST	Legal Studies
LING	Linguistics
MALS	Liberal Studies
MASC	Materials Science
MAST	Marine Studies
MATH	Mathematics
MECH	Mechanics
MEDT	Medical Technology
MEEG	Mechanical Engineering
MLSC	Military Science
MSST	Museum Studies
MUED	Music Education
MUSC	Music
NTDT	Nutrition and Dietetics
NURS	Nursing
ORES	Operations Research
PHED	Physical Education
PHIL	Philosophy
PHYS	Physics and Astronomy
PHYT	Physical Therapy
PLSC	Plant Science
PORT	Portuguese
POSC	Political Science
PSYC	Psychology
RPAD	Recreation and Park Administration
RUSS	Russian
SCEN	Science
SOCI	Sociology
SPAN	Spanish
STAT	Statistics
TDCE	Textiles, Design and Consumer Economics
THEA	Theatre
UNIV	University Course
URAF	Urban Affairs
VOCS	Vocational Studies
WOMS	Women's Studies

TABLE OF CONTENTS

The course descriptions on the following pages are alphabetized in order of subject area codes.

Accounting (ACCT)	270	Hotel, Restaurant and Institutional Management (HRIM)	350
Agricultural Education (AGED)	271	Human Resources (HURE)	350
Agricultural Engineering (AGEG)	271	Individual and Family Studies (IFST)	351
Agriculture (AGRI)	272	Italian (ITAL)	354
Air Force Science (AFSC)	271	Japanese (JAPN)	354
American Studies (AMST)	272	Latin (LATN)	355
Animal Science (ANSC)	272	Legal Studies (LEST)	356
Anthropology (ANTH)	274	Liberal Studies (MALS)	360
Art (ART)	277	Linguistics (LING)	356
Art Conservation (ARTC)	281	Marine Studies (MAST)	362
Art History (ARTH)	282	Materials Science (MASC)	361
Arts and Science (ARSC)	276	Mathematics (MATH)	365
Biological Sciences (BISC)	287	Mechanical Engineering (MEEG)	370
Black American Studies (BAMS)	286	Mechanics (MECH)	368
Business Administration (BUAD)	290	Medical Technology (MEDT)	369
Business and Economics (BUEC)	292	Military Science (MLSC)	372
Chemical Engineering (CHEG)	293	Museum Studies (MSST)	372
Chemistry and Biochemistry (CHEM)	294	Music (MUSC)	373
Chinese (CHIN)	297	Music Education (MUED)	373
Civil Engineering (CIEG)	297	Nursing (NURS)	380
Communication (COMM)	305	Nutrition and Dietetics (NTDT)	378
Comparative Literature (CMLT)	304	Operations Research (ORES)	383
Computer and Information Science (CISC)	302	Philosophy (PHIL)	388
Criminal Justice (CRJU)	307	Physical Education (PHED)	383
Early American Culture (EAMC)	309	Physical Therapy (PHYT)	392
Economics (ECON)	310	Physics and Astronomy (PHYS)	390
Education (EDUC)	321	Plant Science (PLSC)	393
Educational Development (EDDV)	312	Political Science (POSC)	396
Educational Studies (EDST)	316	Portuguese (PORT)	396
Electrical Engineering (ELEG)	323	Psychology (PSYC)	399
Engineering Graphics and General (EGGG)	321	Recreation and Park Administration (RPAD)	403
Engineering Technology (EGTE)	321	Russian (RUSS)	404
English (ENGL)	324	Science (SCEN)	404
Entomology (ENTO)	329	Science and Culture, Center for (CSCC)	308
Finance (FINC)	331	Sociology (SOCI)	405
Food and Resource Economics (FREC)	334	Spanish (SPAN)	407
Food Science (FOSC)	333	Statistics (STAT)	410
Foreign Languages and Literatures (FLLT)	332	Textiles, Design and Consumer Economics (TDCE)	411
French (FREN)	336	Theatre (THEA)	414
Geography (GEOG)	338	University Course (UNIV)	418
Geology (GEOL)	340	Urban Affairs (URAF)	419
German (GRMN)	343	Vocational Studies (VOCS)	421
Greek (GREK)	343	Women's Studies (WOMS)	421
History (HIST)	345		

Accounting

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

An 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 direct costing. Includes LOTUS applications on the microcomputer.

PREREQ: ACCT207.

ACCT 260 Introduction to Business Information Systems I 3

Introduction to computers: components and operations. Introduction to management information/decision support systems and the systems development process. Emphasis on microcomputers and software packages used in business.

ACCT 261 Introduction to Business Information Systems II 3

Introduction to management information systems. Structured programming techniques for problem solving with business productivity tools and software. Emphasis on business applications.

PREREQ: ACCT260.

ACCT 302 Accounting Information Systems 3

Accounting information and its place within an organization's overall management information system. Emphasis on information and document flow, internal control, data organization, and the analysis, design, development, and audit of computer-based accounting systems. Includes some computer work.

PREREQ: ACCT208, ACCT260.

RESTRICTIONS: Requires Junior status.

ACCT 313 Federal Taxes for Managers 3

Explores taxable entities, tax aspects of selecting a business form, income concepts, business deductions, tax factors in the acquisition, use, and disposition of fixed assets, nontaxable transactions, capital gains and losses, and tax planning.

PREREQ: ACCT207.

RESTRICTIONS: Not open to Accounting majors.

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 a grade of C or better in ACCT315.

ACCT 327 Cost Accounting 3

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

PREREQ: ACCT208.

RESTRICTIONS: Requires Junior status.

ACCT 350 Business Law 3

The formation, use and performance of contracts, including both Common Law and the Uniform Commercial Code (Article 2, Sales). Other topics covered include product liability, negotiable instruments and accountants' legal liability.

ACCT 351 Business Law II 3

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

PREREQ: ACCT350.

ACCT 352 Law and Social Issues in Business 3

Focuses on the legal environment of business, including objectives of the law, sources of the law, the regulatory and judicial process, and the effect of government and society on the formation and evolution of the law.

RESTRICTIONS: Not open to Accounting majors.

ACCT 366 Independent Study 1-6

ACCT 383 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 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 413 Income Tax Accounting 3

Analysis of recent revenue acts; use of federal law and regulations to determine tax liability.

PREREQ: ACCT208.

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 a grade of C or better in ACCT316.

ACCT 417 Auditing 3

An introduction to the standards and procedures underlying contemporary auditing. Topics include ethics, legal liability, internal control, audit evidence, audit reports, statistical sampling, the audit of computerized systems, operational auditing, other engagements and services.

PREREQ: ACCT316.

RESTRICTIONS: Requires a grade of C or better in ACCT316.

ACCT 466 Independent Study 1-6

ACCT 551 Fundamentals of Accounting 3

A survey of techniques and methodologies underlying financial statements. Emphasizes the rationale and implications of important accounting concepts for internal and external information users.

ACCT 614 Federal Tax Research and Planning 3

Introduces the masters student to the techniques and tools of technical tax research. Using these developing skills, the student begins exploration of the corporate and partnership taxation area.

PREREQ: ACCT413 or comparable undergraduate accounting course.

ACCT 801 Management Control Systems 3

The study of how managers use accounting information for the strategic and operational control of organizations. Specific attention directed to information value, strategic cost management, performance evaluation, transfer pricing and executive compensation.

PREREQ: ACCT551.

RESTRICTIONS: Not open to M.S. in Accounting students.

ACCT 802 Management Information Systems 3

Approaches to information system design, introduction to systems analysis, data base concepts, system evaluation, justification, and implementation; management and behavioral considerations. Case studies and independent research. No programming required.

PREREQ: ACCT551.

ACCT 803 Accounting Systems: Analysis and Implementation 3

Identifying accounting systems requirements and designing systems to meet these requirements. Topics included are design proposals, cost/benefit considerations, output and input design, file structures, and record handling, data communication and internal control.

PREREQ: ACCT302.

ACCT 807 Applied Statistical Methods in Accounting 3

Promotes understanding and use of statistical methods and models fundamental to accounting research and practice. Applies statistical techniques in the context of promulgated professional standards and other institutional requirements.

PREREQ: ACCT327, STAT201 and STAT202.

RESTRICTIONS: Open to Accounting graduate students only.

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 813 Advanced Federal Tax Accounting 3

Advanced federal tax concepts including corporations, partnerships, estates and trusts.

PREREQ: ACCT413.

ACCT 817 Advanced Auditing 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: ACCT316.

ACCT 840 Contemporary Issues in Accounting 3

Selected problems of current interest to the accounting profession.

PREREQ: ACCT316 and ACCT327.

RESTRICTIONS: Requires permission of instructor.

ACCT 868 Accounting Research 1-6

Air Force Science

AFSC 100 Development of Air 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 deployment in military and non-military operations in support of national objectives. Assesses oral and written communication skills.

AFSC 101 Development of Air Power II 1

Continuation of AFSC100. Focuses on growth and development of air power since 1945 in response to Korea, the Cold War, Southeast Asia, the Persian Gulf and the space age. Also includes peaceful employment of aerospace forces for relief and civic action programs. Assesses oral and written communication skills.

AFSC 200 The Air Force Today 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 201 The Air Force Today II 1

Continuation of AFSC200. 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 310 Leadership and Management 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 and Management 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 410 National Security Forces in U.S. Society 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 Forces in U.S. Society 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.

Agricultural Education

AGED 380 Agricultural Education Materials and Approaches I 3

Teaching methods: treatment of aims, materials, unit organization, evaluation, and teaching techniques.

AGED 381 Agricultural Education Materials and Approaches II 3

Methods of teaching and organization in the areas of supervised occupational experience programs, agricultural mechanics, FFA, adult education and community activities as related to agriculture.

AGED 466 Independent Study 1-6

Agricultural Engineering

AGED 603 Soil Physics 3

Relationship of soil moisture, soil temperature, soil structure, shear strength and compaction to irrigation, drainage, plant growth, tillage and erosion. May be cross-listed with PLSC603.

PREREQ: PLSC204.

AGED 628 Land Application of Wastes 3

Principles and design of land treatment systems for municipal and industrial wastes. Topics include nutrient and metal transport in soils, slow rate systems, rapid infiltration systems, overland flow systems, on-site wastewater systems and land disposal of sludges.

PREREQ: AGEG328 or CIEG331.

Agriculture

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.

American Studies

AMST 366 Independent Study 1-6

AMST 466 Independent Study 1-6

Animal Science

ANSC 101 Introduction to Animal Science 3

An introduction to the practical nature of animal agriculture. Discusses similarities and differences in the vital life processes and management practices with emphasis on cattle, sheep, swine, horses and poultry.

COREQ: ANSC111.

RESTRICTIONS: Corequisite mandatory for majors, optional for nonmajors. Offered in Fall only.

ANSC 111 Animal Science Laboratory 1

Laboratory providing the opportunity to handle animals and to become familiar with common management practices.

COREQ: ANSC101.

RESTRICTIONS: Corequisite mandatory for majors, optional for nonmajors. Offered in Fall only.

ANSC 140 Functional Anatomy of Domestic Animals 4

Emphasis on identifying the relationships that exist between form and function associated with growth, digestion, circulation, body defense and locomotion in domestic farm animals.

RESTRICTIONS: Offered in Spring only.

ANSC 201 Behavior of Domesticated Animals 3

Feeding, reproductive and social patterns of domesticated mammals and birds. Relationships between physical environment and behavior. Use of telemetry and recording systems.

RESTRICTIONS: Offered in Spring of even-numbered years.

ANSC 221 Nutrition and Feeding of Horses 2

Study of proper feeding and use of quality feedstuffs to maintain health and productivity of horses.

ANSC 251 Livestock Nutrition and Feeding 3

Study of nutrients and their metabolism, nutrient requirements of livestock, nutritional value of feedstuffs and principles of ration formulation.

PREREQ: ANSC101 and ANSC140.

ANSC 262 Practical Veterinary Experience 1-3 PF

Opportunity to gain experience by working with a veterinarian. Student is responsible for making contact with the veterinarian.

RESTRICTIONS: Not for major credit. Offered in Winter only.

ANSC 270 Biotech: Science and Socioeconomic Issues 3

Introduction to agricultural biotechnology and socio-economic issues. Topics: animal science - growth regulation, disease control and prevention; plant science - regeneration and improvement, microorganisms in food and soil; food and resource economics - structural changes, environmental impacts, and legal issues. Supplemented with field trips.

May be cross-listed with FREC270 and/or PLSC270.

ANSC 300 Principles of Animal and Plant Genetics 3

See PLSC300 for course description.

ANSC 304 Dairy Cattle Judging and Selection 1

Characteristics of breeds, relationship of form to function in young stock and mature animals.

RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 305 Food Science 2

See FOSC305 for course description.

ANSC 306 Food Science Laboratory 1

See FOSC306 for course description.

ANSC 310 Animal and Plant Genetics Laboratory 1

See PLSC310 for course description.

ANSC 322 Horsemanship 3

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

ANSC 332 Introduction to Animal Diseases 3

Nature and mechanisms of disease processes with emphasis on their prevention and control.

PREREQ: ANSC140.

ANSC 342 Exercise Physiology and Conditioning of Horses 2

Introduction to equine structure at rest and in motion. Includes anatomical, physiological and management factors pertinent to the development of horses into sound and fit athletes.

PREREQ: ANSC140.

ANSC 345 Comparative Physiology of Domestic Animals 4

Comparative approach to the study of the physiology of domestic animals of economic importance in animal agriculture. Emphasis on cardiovascular physiology, the immune system, excretion, respiration, stress physiology and the control and coordination of body functions via the nervous and endocrine system.

PREREQ: ANSC140.

RESTRICTIONS: Offered in Fall only.

ANSC 366 Independent Study 1-6

ANSC 404 Dairy Production 3

Principles of modern dairy production units emphasizing breed characteristics, genetic principles in sire evaluation and mathematical considerations.

PREREQ: ANSC101 and ANSC251.

RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 409 Food Processing I 4

See FOSC409 for course description.

ANSC 410 Food Processing II 4

See FOSC410 for course description.

ANSC 417 Beef Cattle and Sheep Production 4

Principles of modern beef cattle and sheep production; nutrition, reproduction, housing, health and management.

PREREQ: ANSC101 and ANSC251.

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

ANSC 418 Swine Production 4

Principles of modern swine production: nutrition, reproduction, housing, health and management.

PREREQ: ANSC101 and ANSC251.

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

ANSC 420 Equine Management 3

History and importance of the horse industry; anatomy, reproduction, physiology, disease and parasites, applied nutrition, marketing, buildings and facilities.

PREREQ: ANSC140 and ANSC251.

ANSC 421 Poultry Production 3

Application of the fundamental principles of incubation, feeding, brooding, growing, disease control, processing and marketing as applied to broilers, heavy breeders, commercial egg producers, turkey flocks and other poultry.

PREREQ: ANSC101 and ANSC140.

ANSC 428 Food Chemistry 4

See FOSC428 for course description.

ANSC 429 Food Analysis 4

See FOSC429 for course description.

ANSC 431 Infection and Immunity in Animal Diseases 4

Study of the relationships of domestic animals with particular infectious agents and the nature of the immune response.

PREREQ: BISC371.

RESTRICTIONS: Offered in Fall of even-numbered years.

ANSC 441 Reproductive Physiology of Domestic Animals 3

Emphasis on physiology and endocrinology of reproductive function in males and females, comparative aspects of reproductive function and opportunity for enhancing production through newer management practices. Discussion and laboratory involves both classic and current state of knowledge in mammalian and avian reproduction.

PREREQ: ANSC345.

ANSC 446 Environmental Physiology of Domestic Animals 4

Impact of physical environment on function and productivity of domestic animals. Principles of physical environment, animal energetics, shelter design, principles of animal husbandry and biometeorological instrumentation.

PREREQ: ANSC345 or BISC306.

RESTRICTIONS: Offered in Fall of even-numbered years.

ANSC 452 Advanced Comparative Animal Nutrition 4

Comparative approach to the study of nutrients and their metabolism among species. Application of basic principles of nutrition and metabolism to feeding practices and programs. Lab exercises demonstrate nutritional principles, methodologies used in determining ingredient composition and quality, nutritional requirements and status of the animal.

PREREQ: ANSC251.

ANSC 464 Animal Science Field Experience 1-3 PF

Opportunity to gain career-related work experience in a field related to the animal sciences and to explore potential occupational areas.

RESTRICTIONS: Maximum of 3 credits allowed for Animal Science majors; maximum of six credits allowed for B.S. in Agriculture.

ANSC 465 Seminar 1

Development and presentation of oral reports on selected topics related to animal science. Proper selection, design, production and use of visual aids. Emphasis on the development of communication skills.

RESTRICTIONS: Senior status recommended.

ANSC 466 Independent Study 1-6**ANSC 470 Principles of Molecular Genetics 3**

Uses fundamentals of nucleic acid biochemistry (replication, repair, recombination) and bacterial genetics to provide the background needed for detailed study of selected topics in animal and plant molecular biology.

PREREQ: BISC301, and ANSC300 or PLSC300 or ENTO300.

ANSC 609 Comparative Vertebrate Histology 4

See BISC618 for course description.

ANSC 624 Monogastric Nutrition 3

Advanced study of the digestion, absorption and metabolism of nutrients in terms of the needs of monogastrics. Application of principles to swine, poultry and equine nutrition.

May be cross-listed with NTDT624.

PREREQ: ANSC452 or NTDT400, and CHEM214.

RESTRICTIONS: Offered in Spring of odd-numbered years

ANSC 630 Trace Minerals and Vitamins 3

See NTDT630 for course description.

ANSC 632 Elements of Pathology 3

Microscopic and gross changes in cells, tissues and organs as a result of a disease process.

PREREQ: ANSC332 or ANSC633.

RESTRICTIONS: Offered in Spring of even-numbered years

ANSC 633 Poultry Pathology 3

Study of poultry diseases with emphasis on their causes, prevention, treatment and control.

PREREQ: ANSC332, ANSC431 and ANSC635.

RESTRICTIONS: Offered in Fall of even-numbered years.

ANSC 635 Introduction to Virology 3

Biological properties and processes of animal viruses influencing the pathogenesis, diagnosis and control of disease. Laboratory emphasis on standard methods of detecting viral activity.

PREREQ: ANSC431 or BISC371.

ANSC 639 Food Microbiology 4

See FOSC639 for course description.

ANSC 643 Molecular Endocrinology 3

Brief overview of endocrinology covering hormone types and hormone systems. Detailed discussion of molecular aspects of hormone action including hormone-receptor interactions, second messengers and gene regulation by hormone. Presents methodologies used to approach current topics in endocrinology.

PREREQ: ANSC345 or ANSC441.

RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 645 Avian Physiology 4

Systemic and comparative physiology of birds. Nervous, respiratory, digestive, excretory, endocrine and thermoregulatory systems.

PREREQ: ANSC345.

RESTRICTIONS: Offered in Fall of odd-numbered years.

ANSC 654 Ruminant Nutrition and Metabolism 3

Basic aspects of nutrition and metabolism of ruminant animals with emphasis on rumen microbiology, lactation, physiology and growth.

May be cross-listed with NTDT654.

PREREQ: ANSC452 or NTDT400 and CHEM214.

ANSC 668 Research 1-6**ANSC 670 Principles of Molecular Genetics 3**

Uses fundamentals of nucleic acid biochemistry (replication, repair, recombination) and bacterial genetics to provide background needed for detailed study of selected topics in animal and plant molecular biology.

PREREQ: BISC301, and ANSC300 or PLSC300 or ENTO300.

ANSC 842 Avian Microanatomy 3

Study of avian histology using microscopy. Examines the microscopic structure, cytochemical and functional aspects of cells, tissues and organ systems using domestic fowl as the prototype species. Lectures supplemented with laboratory examination of tissue sections.

PREREQ: Basic Physiology.

ANSC 851 Special Topics in Animal Nutrition 1-3

Advanced study in selected current topics of ruminant and/or nonruminant nutrition.

PREREQ: Course in Advanced Nutrition.

RESTRICTIONS: May be repeated for credit when topics vary.

ANSC 865 Seminar 1**ANSC 868 Research 1-9****ANSC 869 Master's Thesis 1-6****ANSC 870 Molecular Biology in Agriculture 2**

Illustrates principles of recombinant DNA technology and the application of these methods in plant and animal agricultural research.

PREREQ: CHEM527, and ANSC300 or PLSC300.

RESTRICTIONS: Concurrent enrollment in ANSC871 recommended.

ANSC 871 Molecular Biology in Agriculture Laboratory 2

Utilizes recombinant DNA technology to illustrate application in plant and animal agricultural research. Exercises focus on construction of plasmids and lambda libraries, screening of libraries and characterization of recombinant clones.

COREQ: ANSC870.

ANSC 874 Topics in Molecular Biology 1

Provides a forum for the discussion of current topics in molecular biology, with critical reading of relevant primary literature.
May be cross-listed with PLSC874.

RESTRICTIONS: Requires permission of instructor.

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

ANTH 103 Introduction to Prehistoric Archaeology 3

Fundamental concepts and research procedures of archaeology. The history of archaeology, methods of fieldwork and artifact analysis, and theories of human behavior in archaeological research.

RESTRICTIONS: Only one of either ANTH103 or ANTH104 can count for degree credit.

ANTH 104 Introduction to Archaeology and Biological Anthropology 3

The fossil and archaeological record of human biological and cultural evolution. Emphasis on how archaeological and biological anthropological research are conducted, and how their treatment of data distinguish them as scientific disciplines.

RESTRICTIONS: Degree credit for ANTH102 and ANTH103 not granted if ANTH104 is taken.

ANTH 202 Human Evolution and the Fossil Record 3

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

ANTH 205 Anthropology and Human Nature 3

Archaeological, biological and cultural anthropology organized around the theme of human nature.

ANTH 222 Technology and Culture 3

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

ANTH 225 Peasant Societies 3

Comparative study of peasant communities in European, Asian, African and Latin American societies, including case studies of family life, religion and forms of social 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 231 Personality and Culture 3

Relationship of the individual to culture. Child-rearing customs and life cycles in cross-cultural perspective. Cultural influences on motivation and cognition.

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 260 Sociocultural History of Africa 3

Development of African civilization: the varieties of these social systems as functioning entities through time, and the ways they have affected each other and have been changed by the impact of Western colonialism.

ANTH 261 Peoples and Cultures of the Middle East 3

Cultures, institutions and ethnic groups of the Middle East. Description and analysis of major cultural traditions and social institutions.

ANTH 265 High Civilizations of the Americas 3

The origin and development of pre-Columbian civilizations in the Gulf Coast lowlands, Central Mexico, Yucatan peninsula and Andean area.

ANTH 269 Early Civilizations of the Old World 3

Early civilization in Southeast Asia, the Near East, Egypt, China and India.

ANTH 275 Delaware Prehistoric Archaeology 3

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

ANTH 278 Historic Cultures of the Middle Atlantic Region 3

Explores the development of American culture utilizing the Middle Atlantic region — today's states of Delaware, Maryland, New Jersey, Pennsylvania, New York and Virginia — as a microcosm. Takes a comparative and synthetic approach, drawing on the work of scholars in several disciplines.
May be cross-listed with HIST278.

ANTH 298 Honors Topics 1

Weekly meetings with faculty to expand on topics treated in 200-level courses in which the student is currently enrolled.

ANTH 300 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 cross-listed with WOMS305.

ANTH 316 Introduction to Material Culture Studies 3

Introduces material culture studies, broadly defined as the study of all things produced by human beings and all ways human beings have altered the physical environment. Explores the concepts, approaches and methods of numerous disciplines which investigate human material culture.
May be cross-listed with HIST316.

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 322 The City in American Culture 3

Approaches the study of the historic American city from an interdisciplinary perspective. Emphasis on reconstructing the culture and life of the city at specific points in time, as well as on the processes of urbanization and change.
May be cross-listed with HIST322.

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 327 Peoples of the Caribbean 3

Culture, history and variations of Caribbean Island peoples; basic characteristics of social institutions, religion, language; and continuity and change to the modern period.

ANTH 330 Development and Underdevelopment 3

Anthropological perspectives of sociocultural change in Africa, Asia and Latin America. Emphasis on the economic and political relationships established between these areas and industrial societies.

ANTH 333 Peoples of Africa 3

Social institutions and cultural traditions of Africa; political, economic, legal and kinship systems, and modes of thought.

ANTH 337 South American Indians 3

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

ANTH 338 Arts and Crafts of Native South America 3

Arts and crafts technological processes invented by or available to tribal societies of South America. Artistic and technical achievements in ceramic and textile.

ANTH 340 Historical Archaeology 3

Survey of the concepts and methods historic archaeologists use in studying processes of culture change.

ANTH 345 Methods of Cultural Analysis 3

Introduces the range of methods employed by scholars in the study of human cultures: observation, participation, interview techniques, the study of historic documents and the study of material culture by archaeologists, anthropologists and others.

ANTH 360 Humanities Colloquium 3

See ARSC360 for course description.

ANTH 363 Women in Cross-Cultural Perspective 3

See WOMS363 for course description.

ANTH 366 Independent Study 1-6

ANTH 368 Anthropology of Slavery 3

Types and forms of servitude that have existed in societies around the world; and the use of case studies to understand particular societies in greater detail.

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 377 Ecological Anthropology 3

Ecology in human adaptation. The ecology of hunting and gathering economies; domestication of plants and animals; development of craft and industrial technologies.

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 cross-listed with HIST379.

ANTH 380 Peoples and Cultures of Mexico and Central America 3

Cultures, institutions and ethnic groups of contemporary Mexico and Central America. Description and analysis of major cultural traditions and social institutions of Indian and non-Indian groups.

ANTH 390 Honors Colloquium 3

See ARSC390 for description.

May be cross-listed with WOMS390.

RESTRICTIONS: Requires a GPA of 3.0 or higher.

ANTH 398 Honor Topics 1

Weekly meetings with faculty to expand on topics treated in 300-level courses in which the student is concurrently enrolled.

ANTH 401 The Idea of Race 3

The idea of race in historical and anthropological perspective. The interpretation of racial differences in 18th- and 19th-century Europe and America and an examination of modern approaches to the question of human variability.

RESTRICTIONS: Requires permission of instructor.

ANTH 402 Fossil Humans and the Plio-Pleistocene Epochs 3

Seminar course dealing with the details of Pleistocene climatic and geological events; evolutionary development of humans within this context.

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 410 Archaeological Analysis of Material Culture 3

Procedures of archaeological laboratory analysis stressing lithic and ceramic analysis, microscopy, experimental archaeology and application of the principles of artifact classification and taxonomy.

PREREQ: ANTH103.

ANTH 424 Introduction to Archaeological Field Methods 6

Excavation at selected sites; laboratory work and field trips to museum sites.

ANTH 428 Prehistory of Eastern North America 3

Detailed examination of the cultural sequence and prehistoric adaptations of eastern North America from Paleo-Indian times to European contact.

ANTH 451 Myth and Culture 3

The relationships between world views, cosmology, mythology and social institutions, illustrating the analytic methods of structuralist and functional anthropology.

RESTRICTIONS: Requires permission of instructor.

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 cross-listed with ARTH457.

ANTH 460 Humanities Colloquium 3

See ARSC460 for course description.

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 cross-listed with HIST463.

ANTH 465 Philosophy of Social Science 3

See PHIL454 for course description.

ANTH 466 Independent Study 1-6

ANTH 473 Comparative Political Systems 3

Methods and theories used by anthropologists in studying political dynamics, with selected case studies from African, Latin American and Asian societies.

ANTH 475 The Teaching of Anthropology 3

Emphasis on the structure and coherence of the discipline - identifying central questions and assembling relevant data - as seen from the perspective of an anthropologist offering an introductory-level survey course.

PREREQ: 15 hours of anthropology.

RESTRICTIONS: Requires permission of instructor teaching the introductory course. Tutorial and primarily for majors.

ANTH 486 Tutorial in Social and Cultural Anthropology 3

History, theory and method in the field of social and cultural anthropology.

RESTRICTIONS: Open to majors only. Requires permission of instructor.

ANTH 487 Tutorial in Archaeology 3

History, theory and method in the field of archaeology.

RESTRICTIONS: Open to majors only. Requires permission of instructor.

ANTH 488 Tutorial in Physical Anthropology 3

History, theory and method in the field of physical anthropology.

RESTRICTIONS: Open to majors only. Requires permission of instructor.

ANTH 498 Honor Topics 1

Weekly meetings with faculty to expand on topics treated in 400-level courses in which the student is concurrently enrolled.

ANTH 601 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 602 Fossil Humans and the Plio-Pleistocene Epochs 3

Seminar course dealing with the details of Pleistocene climatic and geological events; evolutionary development of humans within this context.

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 610 Archaeological Analysis of Material Culture 3

Procedures of archaeological laboratory analysis stressing lithic and ceramic analysis, microscopy, experimental archaeology and application of the principles of artifact classification and taxonomy.

PREREQ: ANTH103.

ANTH 628 Prehistory of Eastern North America 3

Detailed examination of the cultural sequence and prehistoric adaptations of eastern North America from Paleo-Indian times to European contact.

ANTH 651 Myth and Culture 3

Comparative study of the relationships between world view, cosmology, mythology and social institutions, illustrating the analytic methods of structuralist and functional anthropology.

RESTRICTIONS: Requires permission of instructor.

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 cross-listed with ARTH657.

ANTH 660 Humanities Colloquium 3

See ARSC660 for course description.

May be cross-listed with MALS660.

ANTH 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.

May be cross-listed with HIST663.

Arts and Science

ARSC 125 The Shaping of the Modern Mind I 1 PF

Lectures by faculty from various departments on classical, medieval and Renaissance thinkers who have most deeply influenced the modern mind.

ARSC 126 The Shaping of the Modern Mind II 1 PF

Lectures by faculty from various departments on 17th- to 20th-century thinkers who have most deeply influenced the modern mind.

ARSC 127 Shaping of the Modern World 3

Introductory lectures by faculty from disciplines throughout the University on what makes the world international and interdependent. Examines historical and contemporary issues from different regions and cultures of the world.

ARSC 293 Honors Short Course 1

Topics vary.

RESTRICTIONS: Three and one-half-week course.

ARSC 294 Honors Short Course: Multicultural 1

Approved topic is: Myth and Expression. Course counts toward the three-credit multicultural requirement.

RESTRICTIONS: Three and one-half-week course.

ARSC 295 Honors Performing Arts Forum 1

Study done mostly through video and film presentations, with some live performances. Presentations include orchestras, soloists, dance, theatre and opera.

RESTRICTIONS: For students with an interest in serious music and excellence in performance.

ARSC 296 Honors Forum: Multicultural 1

Approved topics are: Women in Western Thought; Roots and Reflections - Issues in Contemporary Afro-American Culture; and Playing with Stories. Course counts toward the three-credit multicultural requirement.

ARSC 316 Peer Tutoring/Advanced Composition 3

Training in writing techniques through application of recent composition theories to students' own writing.

May be cross-listed with ENGL316.

ARSC 360 Humanities Colloquium 3

Papers and discussion by faculty members and students participating in Humanities Semester offerings. Interdisciplinary approach: topics related to all courses in a particular group offering. May be cross-listed with ENGL360, HIST360, ANTH360, ARTH360, CMLT360, FLLT360, PHIL360.

RESTRICTIONS: Requires enrollment (current or past) in two courses offered in a particular Humanities Semester group. May be repeated once for credit when topics vary.

ARSC 366 Independent Study 1-6

ARSC 390 Honors Colloquium 3

Team-taught colloquium. Specific topics vary.

ARSC 391 Honors Colloquium 3

See ARSC390 for course description.

ARSC 392 Honors Colloquium: Multicultural 3

Team-taught colloquium. Approved colloquia are: Development of Civilization; The Case of the Americas; Giving Form to Expression; Recent Modernization of China; Home and Homelessness in America; Changing Ideals and Realities; Racism, Sexism and Speciesism; and Images of American Labor in Fiction, Film and Folk Song. Specific topics vary.

ARSC 466 Independent Study 1-6

ARSC 869 Master's Thesis 1-6

Art

ART 110 Foundation I Drawing 3

Basic elements of visual thinking through the manipulation of various drawing media and techniques. Emphasis on line, line systems, form and structural relationships.

COREQ: ART 111.

ART 111 Foundation I Design 3

Approaches the basic elements of visual thinking as both two- and three-dimensional problem solving. Stresses the manipulation of tools and various materials.

ART 112 Foundation II Drawing 3

Further studies in visual thinking through drawing. Problems include gesture, tonality and color; covers various aspects of spatial organization. Subjects include still life, landscape, the figure and abstraction.

PREREQ: ART 110 and ART 111.

ART 129 Design in Visual Arts 3

Introduction to design through the physical application of various art media. Study of design criteria and art objectives as they relate to the environment.

RESTRICTIONS: Open to nonmajors only.

ART 130 Drawing I: Tools and Techniques 3

Problems include color and black-and-white studies.

RESTRICTIONS: Open to nonmajors only.

ART 138 Elementary Drawing and Painting I 3

Representational drawing and painting: still lifes, landscapes, the human head in pastel, charcoal, etc.

RESTRICTIONS: Open to nonmajors only.

ART 140 Introduction to Printmaking 3

Basic printmaking techniques as they apply to relief, intaglio, viscosity and multiple plate printing processes as applied to individual expression.

ART 144 Introduction to Photography 3

Study of photographic imagery and processes, its uses past and present. Photography as a fine art medium. Considerable camera work with slide processing done by students.

RESTRICTIONS: Open to nonmajors only.

ART 170 Basic Computer Aided Design: Fibers 3

Use of computers to improve creativity and assist design and drawing visualization processes within especially applied fiber problems. Computer Aided Design (CAD) uses tools, e.g., commercial software, graphics tablets, video digitizers, and computer aided manufacturing tools like computerized looms and thermal transfer prints.

ART 200 Visual Communications Process I 4

An introduction to the development of conceptual thinking in the visual design process through the use of typography and imagery in visual communications.

ART 201 Visual Communications Process II 4

Continuation of the development of conceptual thinking in the visual design process through the use of typography and imagery in visual communications.

PREREQ: Art 200.

ART 210 Photo Design 4

Introduction to photographic principles and techniques as applied to design, visual thinking and communication problem solving. Includes various films and light sources for color and black and white photography, line processes, image modification and the aesthetics of photo design.

PREREQ: Art 244.

ART 222 Illustration I 3

Basic use of illustration media and techniques. General approaches to illustration as visual imagery.

PREREQ: Art foundation courses.

ART 223 Illustration II 3

Application of creative illustrative imagery to editorial and advertising design problems.

PREREQ: ART 222.

ART 230 Drawing III: Figure 3

Various media; action and still poses.

PREREQ: ART 112.

ART 234 Painting I 3

Introduction to media, processes, techniques and aesthetics of painting.

PREREQ: ART 112.

ART 235 Painting II 3

Problems and principles of techniques and aesthetics in painting; various media.

PREREQ: ART 234.

ART 236 Basic Watercolor 3

Basic techniques in the use of watercolor and materials. Subjects range from still life to landscape painting.

PREREQ: Art foundation courses.

ART 240 Introduction to Woodcut and Etching Processes 3

An introduction to basic woodcut and/or linoleum processes with relief printing, and to basic etching processes, such as drypoint, line etching, soft ground, sugar lift ground and aquatint techniques.

PREREQ: Art foundation courses.

ART 241 Introduction to Screenprinting and Lithography Processes 3

An introduction to basic water-based screenprinting and lithographic processes. Covers such screenprinting processes as block-out, drawing fluid and crayon resist techniques for multi-color screenprints. Covers stone and plate lithography.

PREREQ: Art foundation courses.

ART 242 Introduction to Monoprinting and Papermaking Processes 3

An introduction to Western and Eastern papermaking processes and cast paper techniques as well as oil-based and water-based processes of the monotype and monoprint with collage.

PREREQ: Art foundation courses.

ART 244 Photography I 3

Introduction to the tools, techniques, processes and aesthetics of photography.

ART 245 Photography II 3

Use of the medium for artistic communication. Advanced technical and aesthetic concepts applied to fine and applied art problems.

PREREQ: ART 244.

ART 250 Sculpture I 3

Introduction to sculptural media and the three-dimensional aesthetic.

ART 251 Sculpture II 3

Problems in sculptural media and aesthetics.

PREREQ: ART 250.

ART 254 Ceramics I 3

Introduction to the tools, processes and aesthetics of ceramics.

ART 255 Ceramics II 3

Continuation of ART 254.

PREREQ: ART 254.

ART 260 Metals I 3

Introduction to the tools, processes and aesthetics of jewelry and metalwork.

ART 261 Metals, Colors and Chemicals 1

Application of chemicals and industrial processes to art: including copper electroforming, patinization of nonferrous metals, anodizing of titanium, and anodizing and dyeing of aluminum. Laboratory work includes anodizing of titanium and aluminum.

ART 271 Fabric Forms 3

Design and embellishment of "soft" fabric through the following methods: batik; tie-dye; starch resists; print; stitched, stuffed, sewn and padded forms. Emphasis on conceptual application of visual and tactile sensations of material as a medium for individual creative production.

ART 272 Off Loom I: Fiber Forms 3

Simple and off-loom fabrication in a variety of processes; crochet, coiling and wrapping, macrame, twining and simple weaving. Emphasis on individual conceptual application in production.

ART 273 On Loom Weaving I 3

Use of various types of multiple-harness (4 or more) looms as a creative medium in the development of nonplanar woven forms.

ART 302 Introduction to Graphic Design 3

Exploration of visual systems, conceptual principles and procedures underlying the practice of graphic design. In particular the process of problem solving through visual design; the visualization of problems and solutions; and the correlation of forms with their content, function and context.

PREREQ: ART 201.

ART 303 Graphic Design 3

Development of sound visual concepts and economy of thought in basic graphic forms. Emphasis on the medium and message of design through the integration of typography and images.

PREREQ: ART 302.

ART 304 Introduction to Advertising Design 3

Introduction to the design of advertising, emphasizing the responsibilities of the art director. Projects stress development of creative strategies, creative evaluation of marketing strategies, conceptual thinking and composition for solutions to consumer and trade magazine, newspaper and outdoor advertising.

PREREQ: ART 201.

ART 305 Advertising Design 3

Application of the principles of concept and design to more complex advertising problems. Development of basic presentation and communication skills as well as the analysis and implementation of creative strategies.

PREREQ: ART 304.

ART 309 Book Arts 3

Exploration of the book as a complete object that integrates content and form through visual narratives and sequential picture planes. Emphasis on elements of design that underlie the verbal/visual relationship and the understanding of such principles through the planning and production of a book.

RESTRICTIONS: Requires permission of instructor.

ART 310 Introduction to Applied Photography 3

Examines the place of photography in the business world by defining and executing photographic solutions with emphasis on graphic, advertising and editorial design problems.

PREREQ: ART 210.

ART 311 Applied Photography 3

Study and application of photographic solutions to specific graphic and advertising design problems, including still life, location, studio lighting techniques and the relationship between the photographer, the art director and the designer.

PREREQ: ART 310.

ART 321 Topics: Illustration 3

In-depth study of selected media and functions of illustration. Aims to develop professional level skills in the handling of materials and in the conceptualization of images.

RESTRICTIONS: Requires permission of instructor.

ART 322 Illustration III 3

Specializes in the areas of story, cinema and product illustration.

ART 323 Airbrush 3-6

Presents elementary uses of the airbrush and various airbrush media and materials.

PREREQ: ART 223, ART 234, or ART 236.

RESTRICTIONS: May be repeated for up to nine credit hours.

ART 330 Advanced Figure Drawing 3

Continued studies in figure drawing. Emphasis on aesthetic issues concerning figurative imagery.

PREREQ: ART 230.

RESTRICTIONS: May be repeated for credit when topics vary.

ART 334 Figure Painting 3

Light, color, space and expression as related to painting the human figure.

PREREQ: ART 230 and ART 235 or ART 223.

ART 335 Painting III 3

Continuation of the theory and practice of painting with an emphasis on exploring an individual direction. Criticism and research are important aspects of this course.

PREREQ: ART 235.

ART 336 Advanced Watercolor 3

In-depth study of the aesthetics, materials and techniques of watercolor.

PREREQ: ART 236.

ART 340 Printmaking II 3

Provides a continued investigation of relief, intaglio, screenprinting or lithography with an emphasis on color printing methods. Explores reductive color relief processes; multi-block, plate and stone approaches to color printing; and direct photo emulsion stencil techniques for screenprinting.

PREREQ: ART 240 and ART 241.

RESTRICTIONS: May be repeated for credit when topics vary.

ART 344 Photography III 3

Concentration on conceptual factors in photographic imagery; e.g., magic and metaphor, series and sequence.

PREREQ: ART 245.

ART 345 Color Photography I 3

Basic color photography. Shooting and processing of color slides and color negatives, and producing color prints from each. Examines color theory, color emulsions and contemporary ideas in color photography.

PREREQ: ART 244.

ART 346 Color Photography II 3

Intermediate color photography. Conception, production and presentation of individual projects demonstrating aesthetic and technical maturity.

PREREQ: ART 345.

ART 348 Photo Reportage and Documentation I 3

Study and production of photographs dealing with analysis and record. Examination of aesthetic, social and political interplays. Individual and team projects. Color and black-and-white prints and slides, single images and multiples.

RESTRICTIONS: Requires basic photographic skills.

ART 350 Sculpture III 3

Further development of concepts and techniques of sculpture.

PREREQ: ART 251.

ART 354 Ceramics III 3

Continuation of ART 255 with emphasis on the technical properties of clay and glazes.

PREREQ: ART 255.

ART 355 Ceramic Sculpture 3

Ceramic processes, concepts and materials for the creation of sculpture.

PREREQ: ART 354.

ART 360 Metals II 3

Problems in various media.

PREREQ: ART 260.

ART 366 Independent Study 1-6**ART 370 Fiber Work II 3-9**

Intermediate level course dealing with fabric forms, off-loom and on-loom media.

PREREQ: Appropriate 200-level fiber course.

RESTRICTIONS: May be repeated for up to nine credit hours.

ART 402 Advanced Graphic Design I 3-6

Mastering the principles of effective conceptual design through solutions in which the elements of type, illustration and photography support the concept. Emphasis on strong visual and typographic concepts in multi-page publications. Introduction to the development of a graphic design portfolio.

ART 403 Advanced Graphic Design II 3-6

Continuation of ART 402 directed toward the production of a portfolio which accurately and effectively defines the student's conceptual and practical skills in graphic design situations.

ART 404 Advanced Advertising Design I 3-6

Mastering the principles of effective and persuasive advertising through the composition of a printed page such that all elements of type, illustration and photography support and define the creative concept. Emphasizes visual concepts that communicate without the aid of text. Introduction to the development of an advertising design portfolio.

PREREQ: ART 305.

ART 405 Advanced Advertising Design II 3-6

Continuation of ART 404 directed toward the production of a portfolio which accurately and effectively defines the student's conceptual and practical skills in advertising situations.

PREREQ: ART 404.

ART 408 Practicum 3

Field experience in an advertising agency, design studio, corporate design department or commercial photography studio in the student's major area of concentration.

RESTRICTIONS: Requires Junior or Senior status in Visual Communications. Requires permission of instructor. May be repeated for up to six credit hours.

ART 410 Advanced Applied Photography I 3-6

Emphasis on the development of a portfolio and the understanding of the role of the applied photographer. Includes introduction to large format techniques and equipment and the professional studio.

PREREQ: ART 311.

RESTRICTIONS: May be repeated for up to twelve credit hours.

ART 411 Advanced Applied Photography II 3-6

Continuation of ART 410 directed toward the production of a portfolio which accurately and effectively defines the student's conceptual and practical capabilities in applied photography situations.

PREREQ: ART 410.

RESTRICTIONS: May be repeated for up to twelve credit hours.

ART 422 Advanced Illustration IV 3-6

Directs portfolio/resume preparation and aids in developing a specific area of illustration for each student. Explores advanced illustration techniques.

PREREQ: ART 322.

RESTRICTIONS: May be repeated for up to nine credit hours.

ART 430 Drawing Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

PREREQ: ART 230.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 431 Advanced Drawing 3

Advanced-level course designed for students interested in developing imagery of a more personal aesthetic.

PREREQ: ART 230.

ART 434 Advanced Painting 3

Advanced-level course for students interested in developing their work in painting toward a more individual direction.

PREREQ: ART 335.

ART 435 Painting Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

PREREQ: ART 434.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 440 Printmaking Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

PREREQ: ART 340.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 441 Advanced Printmaking 3

Advanced printmaking in a print area of the student's choice.

PREREQ: ART 340.

ART 444 Advanced Photography 3

Conception, production and presentation of an individual project demonstrating aesthetic, philosophical and technical maturity, color and black-and-white.

PREREQ: ART 344.

RESTRICTIONS: May be repeated once for credit.

ART 445 Photography Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

PREREQ: ART 344.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 446 Portfolio and Exhibition Techniques 3

Emphasis on professional methods involved in presenting a portfolio for publication or for exhibition. Organization, editing and sequencing, as well as attitudes and strategies form the basis of study.

ART 447 The Creative Portrait 3

Concentrates on developing portrait skills in a wide array of situations. Techniques for photographing friends and strangers, individuals and groups, the well-to-do and the indigent, etc., explored in detail.

ART 448 The Photographic Sequence 3

Term-long projects aimed at making a coherent body of images, each one relating to and extending the meaning of the others. Issues such as content, style, size, structure and flow explored in depth.

ART 449 Photographic Reportage and Documentation II 3

Advanced independent problems in photographic reportage and documentation.

PREREQ: ART 348.

ART 450 Sculpture Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

PREREQ: ART 350.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 451 Advanced Sculpture 3

Continuation of Art 350. Further development of concepts and techniques of sculpture.

PREREQ: ART 350.

ART 454 Advanced Ceramics 3

Continuation of ART 354 with emphasis on individual development of design and form.

PREREQ: ART 354.

ART 455 Ceramics Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

PREREQ: ART 354.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 460 Metals Studio 3

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

PREREQ: ART 360.

RESTRICTIONS: May be repeated for credit.

ART 461 Advanced Jewelry and Metalwork 3

Advanced problems in jewelry and metalwork.

PREREQ: ART 360.

ART 466 Independent Study 1-9**ART 470 Advanced Fibers 3**

Advanced textile fiber work to meet individual needs as arranged between instructor and student.

PREREQ: ART 370.

ART 471 Fibers Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

PREREQ: ART 470.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 480 Contemporary Art Criticism 3

A seminar to study various topics in contemporary art criticism and its applications. Investigations include reviews of publications and trips to collections and exhibitions. Topics will change each offering.

RESTRICTIONS: Requires permission of instructor.

ART 498 B.F.A. Senior Exhibition 0 PF

The concluding exhibit required of all B.F.A. candidates and usually held during the final semester of residency.

ART 610 Advanced Applied Photography 3-6

Emphasis on the development of a portfolio and the understanding of the role of the applied photographer. Includes introduction to large format techniques and equipment and the professional studio.

PREREQ: ART 411.

RESTRICTIONS: May be repeated for up to twelve credit hours.

ART 611 Advanced Applied Photography 3-6

Continuation of ART 610 directed toward the production of a portfolio which accurately and effectively defines the student's conceptual and practical capabilities in applied photography situations.

PREREQ: ART 411.

RESTRICTIONS: May be repeated for up to twelve credit hours.

ART 630 Drawing Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 631 Drawing 3

Problems in application of various media and techniques for development of finished creative works.

ART 634 Painting 3-6

Advanced problems in the media and aesthetics of painting.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 635 Painting Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 640 Printmaking Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 641 Printmaking 3-6

Provides independent work in a chosen print area. Course requirements will be determined by agreement of the student and the teacher.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 644 Photography 3-6

Individual problems in still photography applied to art education, fine arts or applied design.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 645 Photography Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 646 Portfolio and Exhibition Techniques 3

Emphasis on professional methods involved in presenting a portfolio for exhibition. Organization, editing, sequencing, as well as attitudes and strategies form the basis of study.

ART 647 The Creative Portrait 3

Concentrates on developing portrait skills in a wide array of situations. Techniques for photographing friends and strangers, individuals and groups, the well-to-do and the indigent, etc., explored in detail.

ART 650 Sculpture Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 651 Sculpture 3-6

Problems in development of idioms and imagery through sculptural media.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 654 Ceramics 3-6

Problems in throwing, glazing and firing techniques.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 655 Ceramics Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 660 Jewelry Studio and Metalwork 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 661 Jewelry and Metalwork 3-6

Advanced problems in jewelry techniques.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 662 Enameling 3-6

Application of advanced enameling techniques.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 670 Fibers 3-6

Application of advanced fiber techniques.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 671 Fibers Studio 3-6

Advanced studio work based on agreement between student and instructor as to content and quantity of work required.

RESTRICTIONS: May be repeated for up to six credit hours.

ART 679 Seminar: Current Issues in Art 3

Readings, discussions, presentations and on-site visits dealing with issues related to the practice of art.

RESTRICTIONS: Requires permission of instructor. May be repeated for up to nine credit hours.

ART 680 Contemporary Art Criticism 3

A seminar to study various topics in contemporary art criticism and its applications. Investigations include reviews of publications and trips to collections and exhibitions. Topics will change with each offering.

RESTRICTIONS: Requires permission of instructor.

ART 681 Materials and Techniques of the Contemporary Painter and Draftsman 3

Twentieth-century artists' materials. Topics: acrylic emulsion and solution, alkyd resin, PVA paints; collage-assemblage; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, felt-tip markers, colored inks-pencils; airbrush-spray gun; and non-art materials. Potential health hazards. Conservation topics: pH, lightfastness, adhesion and storage environments. May be cross-listed with ARTC681 and/or ARTH681.

ART 682 Studio in the Materials and Techniques of Drawing in the West 3

See ARTC680 for course description.

ART 685 Color Mixing and Matching 3

See ARTC685 for course description.

ART 688 Studio Materials and Techniques of Painting I 3

See ARTC688 for course description.

ART 689 Studio Materials and Techniques of Painting II 3

See ARTC689 for course description.

ART 690 Studio in the Materials and Techniques of Printmaking I 3

See ARTC690 for course description.

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 concern characterizing personal artistic development experienced during graduate study.

RESTRICTIONS: Approval of the student's individual Graduate Committee.

Art Conservation

ARTC 301 Care and Preservation of Cultural Property 3

Examines philosophy and practice of art conservation and the issues pertaining to collections management of cultural property. Typical deterioration characteristics and preservation alternatives for a wide variety of materials likely to be encountered in a fine arts or archival collection will be presented and discussed.

ARTC 466 Independent Study 1-6**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 Properties and Structure of Art Materials II 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.

PREREQ: ARTC615.

RESTRICTIONS: Full-time fellowship students only.

ARTC 666 Independent Study 1-6**ARTC 670 Chemical and Physical Techniques Used in the Examination of Art Materials I 3**

Classroom discussion and laboratory application of important chemical and physical techniques that art conservators should be able to perform on their own to identify and characterize metals, glass, ceramics, and natural and synthetic polymers.

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 important chemical and physical techniques that art conservators should be able to perform on their own to identify and characterize metals, glass, ceramics, and natural and synthetic polymers.

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. Includes studio reconstructions of masterworks, lectures and library research.

May be cross-listed with ART 682 and/or ARTH680.

RESTRICTIONS: Requires permission of instructor.

ARTC 681 Materials and Techniques of the Contemporary Painter and Draftsman 3

See ART 681 for course description.

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 the manufacture of paint studied. Major topics include color interaction, nomenclature and the Munsell system of color description.

May be cross-listed with ART 685.

RESTRICTIONS: Requires permission of instructor.

ARTC 688 Studio Materials and Techniques of Painting I 3

Major materials including tools, supports and techniques of architectural painting, manuscript illumination and panel painting in encaustic, watercolor, and egg tempera from about 1500 BC to 1500 AD. Major topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.

May be cross-listed with ART 688 and/or ARTH688.

RESTRICTIONS: Requires permission of instructor.

ARTC 689 Studio Materials and Techniques of Painting II 3

Major masters and the materials, tools and techniques of indirect and direct oil painting. Time frame: 1500-1900. Major topics include the development of canvas, brushes, oil paint, mediums, varnishes, solvents and the complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.

May be cross-listed with ART 689 and/or ARTH689.

RESTRICTIONS: Requires permission of instructor.

ARTC 690 Studio in the Materials and Techniques of Printmaking I 3

Major masters and the materials, tools, and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1900. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.

May be cross-listed with ART 690 and/or ARTH690.

RESTRICTIONS: Requires permission of instructor.

ARTC 695 Conservation Issues and Ethics 3

Seminar exploring historical and contemporary issues in art conservation and related fields. Includes balanced discussion of controversies and ethical dilemmas such as application of inadequately tested treatments, ethnographic collections, treatment philosophies, authenticity and provenance studies and interdisciplinary development of conservation science.

ARTC 860 Seminar in Art Conservation 1

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

PREREQ: ARTC865.

RESTRICTIONS: Full-time fellowship students only.

ARTC 864 Examination and Treatment of Art Objects I 3

Application of scientific and art historical techniques to the examination and treatment of ceramics, glass, metals, paintings, paper, textiles, wood, photographs and other materials, under the supervision of museum conservators.

RESTRICTIONS: Full-time fellowship students only.

ARTC 865 Examination and Treatment of Art Objects II 3

Application of scientific and art historical techniques to the examination and treatment of ceramics, glass, metals, paintings, paper, textiles, wood, photographs and other materials, under the supervision of museum conservators.

PREREQ: ARTC864.

RESTRICTIONS: Full-time fellowship students only.

ARTC 868 Advanced Apprenticeship and Research in Art Conservation I 6

Discussion, demonstration, practice and research on current treatment techniques used in the conservation of ceramics, glass, metals, paintings, paper, wood, photographs and objects made with other materials. Requirements for this course may be fulfilled by work in cooperating institutions outside The Winterthur Museum.

PREREQ: ARTC864 and ARTC865.

RESTRICTIONS: Full-time fellowship students only.

ARTC 869 Advanced Apprenticeship and Research in Art Conservation II 6

Discussion, demonstration, practice and research on current treatment techniques used in the conservation of ceramics, glass, metals, paintings, paper, wood, photographs and objects made with other materials. Requirements for this course may be fulfilled by work in cooperating institutions outside The Winterthur Museum.

PREREQ: ARTC865 and ARTC868.

RESTRICTIONS: Full-time fellowship students only.

ARTC 870 Internship in Conservation 1-9

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

PREREQ: ARTC869.

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

ARTC 969 Doctoral Dissertation 1-12 PF

Art History

ARTH 150 Monuments and Methods in the History of Art 3

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

RESTRICTIONS: Usually offered in Fall semester.

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.

RESTRICTIONS: Usually offered in Spring semester.

ARTH 152 Design and Expression in the Visual Arts 3

An introduction to visual analysis of painting, sculpture and architecture. Principles of two- and three-dimensional design, spatial composition, color and technical methods used by artists to create emotional and aesthetic effects. Examples chosen from a variety of periods and places.

ARTH 153 Introduction to Art History I 3

Painting, sculpture and architecture from Prehistoric times through ancient Egypt, Greece, Rome and the Middle Ages studied in historical and cultural context.

RESTRICTIONS: Usually offered in Fall semester.

ARTH 154 Introduction to Art History II 3

Painting, sculpture and architecture of Western Europe from the Renaissance to the present studied in historical and cultural context.

RESTRICTIONS: Usually offered in Spring semester.

ARTH 155 Asian Art 3

Introduction to the artistic traditions of China, Japan, India, Korea and Southeast Asia. Emphasis on historical, religious and social context. Focus on the arts of Buddhism; also considers Hindu, Confucian, Taoist and other localized religious and cultural influences on the visual arts.

ARTH 161 Art in East and West 3

Similarities and differences between works of art typical of Asian and Western traditions and examination of their points of contact, emphasizing such themes as nature, humanity and the divine, world of the ruler, religious art and private art.

ARTH 162 Buildings, Builders and the Human Environment 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 207 Origins of Art 3

Art and architecture of the Stone Age, the Near East, Egypt, Crete, Mycenaean Greece and Barbarian peoples. Includes politics and religion as factors influencing artistic change. Ancient literature used to clarify the meaning of the works.

RESTRICTIONS: Offered in Fall semester, every other year.

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.

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

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.

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

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.

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

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.

RESTRICTIONS: Usually offered in Fall semester.

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.

RESTRICTIONS: Usually offered in Spring semester.

ARTH 220 Architecture and Urbanism in Renaissance Italy 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 223 Baroque and Rococo Architecture and Urbanism 3

Architecture and urban design in Europe from 1580 to 1750 in its religious, political and cultural context. Studies Italy, France, England and Germany. Architects such as Bernini, Borromini, Le Vau, Mansart and Neumann.

ARTH 225 Rococo to Neoclassicism 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.

RESTRICTIONS: Usually offered in Spring semester.

ARTH 227 Neo-Classicism to Impressionism 3

Important 19th-century European movements in art such as Neo-Classicism, Romanticism, Realism and Impressionism studied in their cultural and socio-political context. Artists such as David, Delacroix, Turner, Courbet and Monet.

RESTRICTIONS: Usually offered in Fall semester.

ARTH 228 Post-Impressionism to Contemporary Art 3

Art and theory of major movements from 1880 to the present. Post-Impressionism, Fauvism, Cubism, Futurism, Constructivism, Dada, Surrealism, Abstract Expressionism, Pop Art, Minimalism, Conceptualism, Neo-Expressionism and Post-Modern developments. Painting, sculpture, photography, environments and performance art.

RESTRICTIONS: Usually offered in Spring semester.

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.

RESTRICTIONS: Usually offered in Fall semester.

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.

RESTRICTIONS: Usually offered in Spring semester.

ARTH 233 Art of China 3

Survey of the arts of China from neolithic times to the 20th century. Discussions center on such phenomena as Confucian thought and political art, the importation of Buddhist beliefs and their Chinese expressions, and the search for harmony with the natural world.

ARTH 234 Art of Japan 3

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

ARTH 235 Art of India 3

Survey of the art of Indian Asia from the prehistoric culture of the Indus Valley through the development of Buddhist, Hindu and Islamic religious structures and imagery. Emphasizes the interrelationships of philosophical, religious and aesthetic concepts in shaping Indian art and the spread of Indic culture.

ARTH 236 The Arts of Islam 3

Survey of architecture, painting, ceramics and metalwork of Islam in Western and Southern Asia, Islamic Africa and the Iberian peninsula. Also treats influences of Islamic design on the arts of Judaeo-Christian Europe and the rich secular cultures that flourished in Moslem nations.

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.

RESTRICTIONS: Usually offered in Spring semester.

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.

RESTRICTIONS: Offered in Fall semester.

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 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 308 Modern Architecture I: 1750-1900 3

Aesthetic and technological developments in architecture, interior design and the planned environment, beginning with the mid-18th century break from Renaissance tradition to Art Nouveau and the end-of-19th century rise of the skyscraper. Architects such as Ledoux, Soane, Richardson, Sullivan, Horta and Gaudi.

ARTH 309 Modern Architecture II: The Twentieth Century 3

Aesthetic and technological developments in architecture, interior design and the planned environment from the early work of Wright through the contributions of the Bauhaus, Mies van der Rohe and Le Corbusier to Post-Modernism and other trends of the last third of the 20th century.

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 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 321 History of Afro-American Art 3

See BAMS320 for course description.

ARTH 339 Art and Architecture of Europe 3

Primary focus on painting, sculpture and architecture in Central Europe from the Romanesque to the Modern Eras. Subject matter determined by country in which overseas program is conducted.

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

ARTH 360 Humanities Colloquium 3

See ARSC360 for course description.

ARTH 366 Independent Study 1-6**ARTH 402 Undergraduate Seminar in the History of Art 3**

Topics change with each time of offering. Emphasis on art historical reading and research. Student oral reports. Recent seminar topics include The Age of Tutankhamen, Places of Delight: The Villa from Antiquity to the Present, The Art and Science of Leonardo da Vinci, Caravaggio.

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

ARTH 403 History, Philosophy, Functions and Future of Museums 3

See MSST403 for course description.

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. Topics change with each time of offering. Recent topics include Archaic Greek Vase Painting, Hellenistic Greek Sculpture, Late Roman Portraiture and Roman Architecture.

PREREQ: ARTH208.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 406 Seminar in Medieval Art 3

The art of Europe from the fall of Rome to the late Gothic period. Topics change with each time of offering. Recent topics include The Court of Charlemagne, Early Irish and Anglo-Saxon Art, and Saint Denis and the Origins of Gothic Architecture.

PREREQ: ARTH209 or ARTH210.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 408 Seminar in Northern Renaissance Art 3

The arts in Northern Europe from 1300 to 1600. Topics may change with each time of offering.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 413 Seminar in Italian Renaissance Art 3

Italian art from 1300 to 1600. Topics change with each time of offering. Recent topics include Leonardo da Vinci, Michelangelo, Titian and Medici Patronage in the Golden Age.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 414 Seminar in Italian Renaissance Architecture 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

Painting, sculpture and architecture in Italy in the 17th century. Topics change with each time of offering. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Poetics and Imagery, Caravaggio, and Origins of the Baroque: The Carracci and their Academy.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 417 Seminar in Northern Baroque Art 3

Seventeenth-century art in northern Europe. Topics change with each time of offering. Recent topics include Rembrandt and Rubens, Vermeer and Dutch Genre Painting, Northern Baroque Portraiture, and Prints in the Age of Rembrandt.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 419 Seminar in Eighteenth-Century Art 3

Art from the Enlightenment to the Age of Revolution. Topics change with each time of offering. Recent topics include Goya and the Spanish Enlightenment, David and Early Romanticism.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 421 Seminar in Nineteenth-Century Art 3

Art from David to Impressionism. Topics change with each time of offering. Recent topics include Gericault, Delacroix, Cezanne, Art and Politics, The Theory and Practice of Romanticism, Historicism from David to Gerome, and Orientalism.

PREREQ: ARTH227.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 423 Seminar in Twentieth-Century Art 3

Art in Europe, with some reference to American art, from Post-Impressionism to the present. Topics may change with each time of offering. Recent topics include Symbolism, Picasso, Dada and Surrealism, Cubism and its Influence, and Post-Modernism.

PREREQ: ARTH227 or ARTH228.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 424 Seminar in Nineteenth-Century Photography 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.

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

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.

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

ARTH 429 Seminar in Modern Architecture 3

Architecture in Europe and/or America from 1750 to the present. Topics change with each time of offering. 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

American architecture from the Colonies to the present. Topics change with each time of offering. 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

American art from the Colonies to the present. Topics change with each time of offering. Recent topics include Eakins and American Realism, Early American Modernism, and American Painting and Sculpture after World War II.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 440 Seminar on Prints and Drawings 3

Graphic art from the 15th to 19th century with an emphasis on original works of art. Topics change with each time of offering. Recent topics include Renaissance and Baroque Graphic Art, Prints in the Age of Durer, and Problems in Prints from the Renaissance to the 19th Century.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 454 Vernacular Architecture 3

See HIST454 for course description.

ARTH 457 Survey of African Art 3

See ANTH457 for course description.

ARTH 466 Independent Study 1-6

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 Archaic Greek Vase Painting, Hellenistic Greek Sculpture, Late Roman Portraiture, and Roman Architecture.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 606 Studies in Medieval Art 3

The art of Europe from the fall of Rome to the late Gothic period. Topics change with each time of offering. 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 608 Studies in Northern Renaissance Art 3

The arts in Northern Europe from 1300 to 1600. Topics may change with each time of offering.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 611 Studies in Italian Renaissance Art 3

Italian art from 1300 to 1600. Topics change with each time of offering. Recent topics include Leonardo da Vinci, Michelangelo, Titian, Tintoretto, Veronese, and Medici Patronage in the Golden Age.

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 615 Studies in Early Christian and Byzantine Art 3

The beginnings of Christian expression under the Romans to the fall of the Byzantine Empire. Topic of study may change with each time of offering.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 616 Studies in Italian Baroque Art 3

Italian art in the 17th century. Recent topics include Bernini and Roman Baroque Sculpture, Seicento Poetics and Imagery, Caravaggio, and Origins of the Baroque: The Carracci and their Academy.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 617 Studies in Northern Baroque Art 3

Seventeenth-century art in northern Europe. Recent topics include Rembrandt and Rubens, Vermeer and Dutch Genre Painting, Northern Baroque Portraiture, and Prints in the Age of Rembrandt.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 619 Studies in Eighteenth-Century Art 3

Art from the Enlightenment to the Age of Revolution. Recent topics include Goya and the Spanish Enlightenment, J.L. David and Early Romanticism.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 621 Studies in Nineteenth-Century Art 3

Art from David to Impressionism. Recent topics include Gericault, Delacroix, Cezanne, Art and Politics (1780-1880), The Theory and Practice of Romanticism, Historicism from David to Gerome, and Orientalism.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 623 Studies in Twentieth-Century Art 3

Art in Europe, with some reference to later American art, from 1900 to the present. Recent topics include Symbolism, Picasso, Dada and Surrealism, and Cubism and French Art.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 627 Studies in the History of Photography 3

Aspects of the history and aesthetics of photography. Recent topics include 19th-Century Documentary Photography, 19th-Century "Art" Photography, 20th-Century Photography and Criticism, and 20th-Century Photography and Art.

RESTRICTIONS: Usually offered in Fall semester, every other year. May be repeated for credit when topics vary.

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 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. Recent topics include Colonial and Federal American Architecture and Philadelphia Architecture. Includes field trips.

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. Includes field trips.

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 637 Studies in English Art and Architecture 3

The art of England, emphasizing the period from the 16th century through the end of the 19th century. Recent topics include the English Country House, British Painting, English Architecture, and Collecting in England.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 638 European Decorative Arts 3

Interiors, furniture and decorative arts in Europe from the Renaissance to the 20th century. Application of art-historical techniques and interpretation. Field trips to New York and Philadelphia.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 639 American Decorative Arts 3

Interiors, furniture and decorative arts in America from the 17th century to the present.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 640 Studies in Eighteenth-Century Art 3

Art and art theory in England and the Continent. Topic of study may change with each time of offering.

PREREQ: ARTH214 or ARTH215.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 647 Seminar in Prints and Drawings 3

Graphic art from the 15th to 19th century emphasizing original works of art. Recent topics include Renaissance and Baroque Graphic Art, Prints in the Age of Durer, and Problems in Prints from the Renaissance to the 19th Century.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 657 Survey of African Art 3

See ANTH657 for course description.

ARTH 680 Studio in the Materials and Techniques of Drawing in the West 3

See ARTC680 for course description.

ARTH 681 Materials and Techniques of the Contemporary Painter and Draftsman 3

See ART 681 for course description.

ARTH 688 Studio Materials and Techniques of Painting I 3

See ARTC688 for course description.

ARTH 689 Studio Materials and Techniques of Painting II 3

See ARTC689 for course description.

ARTH 690 Studio in the Materials and Techniques of Printmaking I 3

See ARTC690 for course description.

ARTH 801 Introduction to Decorative Arts in America to 1850 3

See EAMC801 for course description.

ARTH 810 Studies in Nineteenth- and Twentieth-Century European and American Sculpture 3

Academic and non-academic traditions of European and American sculpture of the 19th century and the several phases of modernism. Among the artists treated are Canova, Carpeaux, Rodin, Greenough, Powers, Saint-Gaudens, Calder and Smith.

RESTRICTIONS: Open to graduate students only.

ARTH 811 Studies in American Painting Before 1800 3

Painting of Colonial and Early Federal America. Topics change with each time of offering. Recent topics include the Puritan Aesthetic, the Influence of English Art, the Rise of Native-born Talent, and the Work of Such Artists as Copley and Peale.

PREREQ: ARTH320.

RESTRICTIONS: Open to graduate students only. May be repeated for credit when topics vary.

ARTH 812 Studies in American Painting: 1800-1875 3

Topics change with each time of offering. Recent topics include Neoclassicism, Romanticism, and the Grand Manner in the Art of West, Trumbull, Allston and Vanderlyn. Landscape and Genre Painting in the Work of Cole, Durand, Mount and the Hudson River School.

PREREQ: ARTH320.

RESTRICTIONS: Open to graduate students only. May be repeated for credit when topics vary.

ARTH 850 Bibliography and Research Methods in Art History 0 PF

An introduction to the art historical resources of the University of Delaware and to the techniques of scholarly research and bibliographical materials in the historical study of the visual arts.

RESTRICTIONS: Offered every Fall semester.

ARTH 860 Reading and Research 1-9 PF

Readings and conferences on an approved subject under faculty direction.

RESTRICTIONS: Requires permission of Department Chair. Open to Art History Ph.D. students only.

ARTH 869 Master's Thesis 1-6**ARTH 969 Doctoral Dissertation 1-12 PF**

Black American Studies

BAMS 110 Introduction to Black American Studies 3

Assesses the status of Black America in the modern technological order through an examination of the major spheres of institutional life, including employment, education politics, criminal justice and the military.

BAMS 134 History of Africa 3

See HIST134 for course description.

BAMS 204 Urban Communities 3

See SOCI204 for course description.

BAMS 205 Contemporary Afro-American Issues 3

The impact of important issues involving Black American people in contemporary American society. Critical theoretical analyses of trends that affect programs of the Black community.

BAMS 206 Survey of Afro-American Culture 3

Historic and contemporary aspects of Black American culture. A multi-faceted approach utilizing resources from history, folklore, religion and sociology.

BAMS 210 African Civilizations and World History 3

African social, economic and cultural contributions to the whole of human civilization in antiquity, medieval, renaissance and modern times.

BAMS 212 Afro-Caribbean Life and Culture 3

Study of Afro-Caribbean life and culture. Examines African cultural background, the pre-Columbian presence of Blacks in the New World, and social and cultural variations among Black peoples living in selected societies.

BAMS 293 Honors Short Course 1

See ARSC293 for course description.

BAMS 296 Honors Forum 1

See ARSC296 for course description.

BAMS 298 Race, Ethnicity and Culture 1 PF

See WOMS298 for course description.

BAMS 304 History of Black America to the Civil War 3

Black historical impact on American life and culture to the Civil War.

May be cross-listed 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 cross-listed with HIST326.

BAMS 307 Black Thought and Philosophy 3

Readings and discussions of Black philosophies, ideologies and concepts as reflected in the thought of significant Black figures.

May be cross-listed with PHIL307.

PREREQ: PHIL201.

BAMS 308 Delaware Black History 3

A survey course in Delaware Black history. The Black American in Delaware from colonial times to recent developments.

PREREQ: HIST205.

BAMS 309 History of Black Nationalism 3

Origins, developments and historical outlook of the growth of Black nationalism, its impact, scope and limitations.

PREREQ: BAMS304 and BAMS306.

BAMS 312 Institutions and Race 3

Centers around the multidisciplinary approach to the study of institutions and race. Offers a broad perspective on the relationship of various institutions that serve the public, scientific theory and institutional racism.

BAMS 313 Black American Literature I 3

See ENGL344 for course description.

BAMS 320 History of Afro-American Art 3

Review and study of major artistic movements and works by Afro-American artists from the early American colonial times to the Harlem renaissance era to the present.

May be cross-listed with ARTH321.

RESTRICTIONS: ARTH150 recommended.

BAMS 324 Afro-American Music 3

Historical analysis of origins and development of the Black musical experience in America. Contributions of Afro-American music studied by examining the function and meaning of the music, its idioms and characteristics, and its growth and development.

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 communications.

BAMS 331 History of Caribbean I 3

See HIST331 for course description.

BAMS 332 History of Caribbean II 3

See HIST332 for course description.

BAMS 355 Race, Class and Crime 3

See CRJU355 for course description.

BAMS 360 Methodology and Black American Studies 3

Research methods, techniques and data-collecting as applied to the Afro-American experience.

BAMS 361 Race, Power and Social Conflict 3

See SOCI361 for course description.

BAMS 395 Pan Africanism 3

See HIST395 for course description.

BAMS 415 Race, Class and Gender 3

See SOCI415 for course description.

BAMS 432 Psychological Perspectives on the Black American 3

See PSYC416 for course description.

BAMS 433 Economic Development and Black America 3

Problems and causes of economic disparity, alternative goals and strategy for the economic development of Black America.

PREREQ: ECON152.

BAMS 434 Politics and Black America 3

Historical examination and review of the Black presence in the American political process. The emergence and thrust for Black participation in the political arena.

PREREQ: POSC105.

BAMS 440 Topics in Black American Studies 3

Analysis of important themes in the study of Afro-American life and history. Themes may vary each time the course is offered.

RESTRICTIONS: Open to Juniors and Seniors only.

BAMS 620 Third World: Problems and Issues 3

Problems and issues of the Third World; limitation and scope of Afro-American impact on the Third World.

BAMS 625 Curriculum Materials and Methods in Afro-American Studies 3

Curriculum laboratory to familiarize prospective and practicing teachers with trends, methods, materials and strategies for teaching Afro-American studies.

RESTRICTIONS: Requires permission of instructor.

BAMS 630 Counseling in the Black Community 3

Basic foundation in understanding the dynamics and effects society has on the Black personality as related to the counseling process.

RESTRICTIONS: Requires permission of instructor.

BAMS 650 Black Community Studies 3

Investigation and analysis of various topics and developments of interest and significance to the Black community. Topics vary.

RESTRICTIONS: May be repeated for credit when topics vary.

BAMS 660 Research and Black American Studies 1-6

PREREQ: Advanced students.

Biological Sciences

BISC 100 Freshman Seminar 1 PF

Five to seven carefully selected primary journal articles analyzed in discussion format. Emphasis on development of a sophisticated appreciation of the experimental frontier in an important area of modern biological research by examination of both classical and current papers.

RESTRICTIONS: Open to Freshman majors by faculty invitation only.

BISC 103 General Biology 3

The nature of science and biology as a science, origin of life, and structure and function of cells and multicellular organisms.

RESTRICTIONS: Open to non-majors only.

BISC 104 Neurobiology of the Brain 3

Survey of modern knowledge about neurons and their organization into functional circuits.

RESTRICTIONS: Open to non-majors only.

BISC 105 Human Heredity and Development 3

Heredity and human affairs; pedigree analysis; physical and chemical basis of heredity; heredity and environment; radiation and mutation; heredity and diseases; and birth defects.

RESTRICTIONS: Open to non-majors only.

BISC 106 Elementary Human Physiology 3

The structure and function of 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 108 Molecular Bases of Human Disease 4

Human diseases such as AIDS, cancer, hemophilia and sickle cell anemia explained through their molecular bases as learned on the nucleic acid and protein levels.

RESTRICTIONS: Open to non-majors only.

BISC 110 Viruses, Genes and Cancer 3

Recent advances in biology at the cellular and subcellular levels of organization, techniques used in modern biology, and implications for society.

RESTRICTIONS: Open to non-majors only.

BISC 113 General Biology Laboratory 1

Structure and function of cells, and selected experiments dealing with the physiology of plants and animals.

COREQ: BISC103.

BISC 115 Human Heredity and Development Laboratory 1

Laboratory exercises dealing with probability, selection, karyotyping and pedigrees of humans.

COREQ: BISC105.

BISC 116 Elementary Human Physiology Laboratory 1

Selected experiments in physiology that demonstrate some of the concepts developed in BISC106, and a study of human anatomy.

COREQ: BISC106.

BISC 117 Elementary Evolutionary Ecology Laboratory 1

Laboratory exercises to complement the subject matter of BISC107.

COREQ: BISC107.

RESTRICTIONS: Open to non-majors only.

BISC 152 Biology of Human Sexuality 3

Discusses human sexual differentiation plus the anatomy and physiology of reproduction by considering the pertinent areas of genetics, cytology, embryology, endocrinology, immunology and physiology. Topics include genetic sex, gonadal sex, phenotypic sex, hormonal sex and behavioral sex.

RESTRICTIONS: Open to non-majors only.

BISC 171 Microbiology in Modern Society 3

Microbial activities and their effect on society and individuals.

RESTRICTIONS: Open to non-majors only.

BISC 179 Viruses and Human Diseases 3

The role of viruses in human diseases. An examination of diseases of viral origin. Topics covered include a description of animal viruses and their mode of replication, pathogenesis of viral diseases, epidemiology, symptoms, treatment and prevention.

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

Biology of cells, including both structure and function. The perpetuation of life: cell division, genetics and development. Lastly, the origin and diversity of life. Laboratory focuses on experimentation, data analysis and an introduction to diversity.

COREQ: CHEM101, CHEM103, CHEM105 or CHEM111.

RESTRICTIONS: Non majors may not take both BISC103 and BISC207 to fulfill the group D requirement in Arts and Science.

BISC 208 Introductory Biology II 4

The physiology of multicellular organisms: fungi, plants and animals. The biology of populations, including behavior, evolution and ecology. Laboratory deals with diversity, structure, function and behavior, and using representatives of the major phyla.

PREREQ: BISC207.

COREQ: CHEM102, CHEM104, CHEM106 or CHEM112.

BISC 301 Molecular Biology of the Cell 4

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 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 303 Genetic and Evolutionary Biology 4

The physical and chemical basis of heredity, the nature and mechanisms of gene action, genes in populations, speciation. Laboratory included.

PREREQ: BISC207 and one semester of organic chemistry.

BISC 305 Cell Biology 4

Cell biology covers the fundamental concepts of cytology and cell physiology and the basic approaches of experimental cell sciences.

PREREQ: BISC207, BISC208, CHEM103 and CHEM104.

BISC 306 General Physiology 4

Principles underlying function of organisms at the organ system level; ionic composition and regulation, respiration, circulation, nutritive metabolism, excretion and neuromuscular activity. Lab included.

PREREQ: BISC208 and two semesters of chemistry.

BISC 311 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: BISC 207 and one semester of Organic Chemistry.

RESTRICTIONS: Chemical Engineering Majors only.

BISC 312 General Ecology Laboratory 1

Laboratory and field exercises demonstrating basic ecological principles and quantitative techniques. Emphasis on population and community phenomena. Natural habitats studied include local fields, forests and streams.

COREQ: BISC302.

BISC 321 Environmental Biology 3

Basic ecological principles with major emphasis on the effect of man-caused environmental alterations on populations, communities and ecosystems.

BISC 324 Invertebrate Zoology 4

Structure and function, life cycles, phylogenetic relationships and ecology of the major invertebrate phyla.

PREREQ: BISC207 and BISC208.

BISC 326 Honors: General Physiology Discussion 1

Discussion of selected topics in physiology with emphasis on experimental evidence.

COREQ: BISC306.

BISC 330 Biology of Vision 3

An integrative approach to the study of vision. Topics are the physics of light, the biochemistry of visual pigments, the electrophysiology of the visual pathway, the psychophysics of visual perception and robotic vision. Emphasis on an interdisciplinary approach to the subject.

PREREQ: BISC207 and BISC208.

BISC 365 Studies in Literary Genres, Types and Movements 3

See ENGL365 for course description.

BISC 366 Independent Study 1-6

BISC 371 Introduction to Microbiology 4

Major groups of microorganisms (algae, protozoa, fungi and bacteria) are studied. Emphasis on the physiology, metabolism, diversity and interactions between and among each group. Lastly, bacteria and their interactions with humans. Lab included.

PREREQ: BISC207 and BISC208.

BISC 390 Honors Colloquium 3

See ARSC390 for course description.

BISC 405 Vertebrate Embryology 4

Morphological and epigenetic processes leading to the establishment of the vertebrate body plan; the role of the nervous system during embryogenesis. Experiments and observations on living and non-living embryos.

PREREQ: BISC207 or BISC208.

BISC 406 Human Physiology 3

Physiology of the basic organ systems of humans.

PREREQ: BISC207 or BISC208, and CHEM101, CHEM103, CHEM105 or CHEM111.

BISC 408 Mammalian Histology 4

Microscopic organization, identification and functional anatomy of mammalian organ systems and tissues.

PREREQ: BISC207 or BISC208.

BISC 412 Marine Ecology 4

Advanced treatment of selected topics in marine ecology, laboratory included.

PREREQ: BISC302 and BISC324.

BISC 416 Human Anatomy and Physiology Laboratory 1

Laboratory exercises to illustrate basic human anatomy and physiology at the organ system level.

COREQ: BISC406.

BISC 422 Teaching Experience 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 440 Natural History of Plants 4

Observations of plants over time to document their behavior. Individual field projects. Attention to temporal and spatial patterns of growth, leaf production, flowering, fruiting and leaf senescence, both within individuals and within populations. Review of evolutionary theory as it relates to plants.

RESTRICTIONS: Requires permission of instructor.

BISC 442 Vertebrate Morphology 4

The evolutionary history of vertebrates from a structural and functional viewpoint. Laboratory includes vertebrate dissection.

PREREQ: BISC207 or BISC208.

BISC 444 Cooperative Education: Work Experience 1-9 PF

Supervised off-campus work experience that integrates academic learning with practical experience. Co-op placements range from research and laboratory positions to actual field work.

RESTRICTIONS: Not for major credit. Faculty sponsorship and application to Co-op Program required.

BISC 450 Proseminar in Environmental Science 3

See GEOG450 for course description.

BISC 466 Independent Study 1-6

BISC 471 Introductory Immunology 3

The biological basis of adaptive immunity including participating cells, cellular interactions, counted mechanisms and immunopathologies.

PREREQ: BISC207, BISC208, BISC301 or BISC305, BISC371.

BISC 472 Principles of Infectious Diseases 3

Etiology, pathology, immunology and epidemiology of selected bacterial, viral and parasitic diseases. The impact of disease on human affairs is considered.

PREREQ: BISC 371.

RESTRICTIONS: BISC301 recommended in addition to prerequisite.

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: BISC207 and BISC208.

COREQ: BISC493.

RESTRICTIONS: BISC303 recommended in addition to Prerequisites. Offered in Spring of odd-numbered years.

BISC 493 Human and Mammalian Cytogenetics Laboratory 3

Teaches chromosome analyses in both clinical and research labs using modern techniques. Trains students to obtain preparations from human and experimental animals by culture methods and direct processing. Current banding techniques, microscopic analysis, karyotyping, tissue culture, microphotography and special cytochemical procedures. Preparation for the Certification Examination in Cytogenetics.

COREQ: BISC492.

BISC 494 Experimental Ecology 3

"Hands-on" experience with techniques of modern experimental ecology. Emphasis on individual research projects in local natural habitats to expose students to experimental design, sampling techniques and data interpretation.

PREREQ: BISC302.

RESTRICTIONS: For biology majors. Requires consent of instructor.

BISC 495 Evolution 3

Present status of the theory of biological evolution and its implications in the different areas of biology.

PREREQ: BISC207 or BISC208.

BISC 498 Topics in Biology 3

In this multisection course, topics may vary from section to section. Information about each section is available in the Life and Health Sciences Office prior to registration.

May be cross-listed with CSCC498.

PREREQ: BISC207 and BISC208 (or two BISC100-level courses).

RESTRICTIONS: Requires Junior or Senior status. May be taken more than once but only three credits can count towards the major.

BISC 499 Computers in Biological Research 4

Survey of current topics in biological research utilizing computers. Topics include data acquisition, analysis, interpretation, image analysis and modeling of biological phenomena. Student development of software to solve specific problems in biological research.

PREREQ: BISC207, BISC208.

RESTRICTIONS: Requires consent of 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. Laboratory course (average 12-15 hours/week) with one hour/week lecture.

PREREQ: BISC301 or Biochemistry.

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: CHEM527 or CHEM642 or BISC303.

BISC 603 Nucleoprotein Interactions 3

Nucleoprotein binding and gene expression: regulatory proteins; topoisomerases, polymerases and other nucleic acid enzymes; chromatin and nuclear structure; promoters, consensus sequences and sequence-specific DNA-binding proteins in eukaryotic transcriptional regulation; ribonucleoprotein particles and ribosomes.

PREREQ: BISC301 and BISC303, or Biochemistry.

BISC 604 Recombinant DNA Laboratory 4 PF

Introduces techniques of gene cloning, amplification, manipulation and expression in *Escherichia coli* and *Bacillus subtilis*.

PREREQ: BISC301 and BISC653.

RESTRICTIONS: Biochemistry recommended. Senior or graduate status required. Offered in Winter Session.

BISC 605 Advanced Mammalian Physiology 4

Systemic mammalian physiology: neuromuscular, nervous and cardiovascular systems.

PREREQ: BISC306.

BISC 606 Advanced Mammalian Physiology 4

Continuation of BISC605. Systemic mammalian physiology: respiratory, renal, gastrointestinal, and reproductive systems and metabolism.

PREREQ: BISC605.

BISC 608 Genetic Toxicology 2

Chemical mutagenesis and carcinogenesis at the cellular and molecular level. Human genetic monitoring for chemical exposure. Mutagenic risk assessment.

PREREQ: BISC303 or Biochemistry.

BISC 610 General Endocrinology 3

Coordination and regulation of normal body processes and functions by the secretory products of the endocrine glands. Primary emphasis on vertebrates.

PREREQ: BISC306 or BISC406.

RESTRICTIONS: Biochemistry recommended.

BISC 612 Marine Ecology 4

Selected topics in marine ecology, laboratory included.

PREREQ: BISC302 or BISC324.

BISC 617 Laboratory Techniques for Electron Microscopy 3

Techniques of electron microscopic study of mammalian tissues, including fixation, embedding, ultrathin sectioning, staining, observation and interpretation.

RESTRICTIONS: Requires permission of instructor.

BISC 618 Comparative Vertebrate Histology 4

Structure and functional relationships of microscopic anatomy of organ systems and tissues of mammals and birds. Introduction to pathohistology of diseased tissues. Laboratory utilizes prepared slides, microscope video projection, microfiche and other audiovisual aids for recognition and identification of tissues.

May be cross-listed with ANSC609.

RESTRICTIONS: Offered in Fall of odd-numbered years.

BISC 623 Parasitology 3

Helminths, protozoa and arthropods parasitizing vertebrates. Ecology of selected diseases, physiology of representative parasites, reactions of host to parasite.

BISC 626 Neuroscience I 4

Structure and function of the sense organs, nervous system and motor systems in relation to integrated behavior.

May be cross-listed with PSYC626.

PREREQ: BISC306 or BISC406, PSYC314 or BISC314, and PSYC310 or PSYC312.

BISC 627 Neuroscience II 4

Further study of the structure and function of the nervous system with emphasis on correlations between electrophysiology and behavior.

May be cross-listed with PSYC627.

PREREQ: BISC306 or BISC406, PSYC310 or PSYC312, and PSYC314 or BISC314.

BISC 630 Ichthyology 4

Biology of fishes including structure and function, reproduction, development, behavior, geographic distribution and systematics.

PREREQ: A Physiology course.

BISC 637 Population Ecology 3

Theoretical and experimental aspects of single species growth and multispecies interactions.

PREREQ: BISC302.

BISC 640 Natural History of Plants 4

Observations of plants over time to document their behavior. Individual field projects. Attention to temporal and spatial patterns of growth, leaf production, flowering, fruiting, and leaf senescence, both within individuals and within populations. Review of evolutionary theory as it relates to plants.

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: BISC371.

BISC 649 Physiology of Flowering Plants 3

Life processes of flowering plants and the influence of the environment on them, examined at each major developmental stage through the life cycle.

PREREQ: BISC207, BISC208 and biochemistry.

RESTRICTIONS: BISC301 recommended.

BISC 650 Bacterial Physiology 3

Survey of bacterial physiology in which representative biochemical processes are examined. Emphasis on the significance of individual reactions to the overall activities of the bacterial cell.

PREREQ: BISC371.

BISC 653 Recent Advances in Molecular Biology 2

Recent technical and conceptual advances in molecular biology and biotechnology. Gene amplification and analysis. Sequencing of nucleic acids, gene cloning and expression. In vitro manipulation of cloned genes, directed and transposon mutagenesis. Control of gene expression in Prokaryotic and Eukaryotic cells.

PREREQ: BISC301.

BISC 654 Biochemical Genetics 3

Emphasis on operon theory, feedback mechanisms, control of cell division, mutagenesis, isolation of RNA, somatic cell genetics, gene amplification, lysogeny, restriction and modification, and ribosome structure and function.

PREREQ: BISC303 or Biochemistry.

BISC 658 Developmental Genetics 3

How genes control the development of organisms. Emphasis on the regulation of developmental genes and on application of recombinant DNA techniques (gene cloning, etc.) to this problem. Examples include genes in sporulating bacteria, *Drosophila*, chick, mouse and man.

PREREQ: BISC303.

BISC 660 Environmental Physiology 3

Biochemical and morphological adaptive responses of animals to environmental factors; adjustments to changes in salinity, temperature, oxygen, etc. at the level of the whole organism, organ system and cell.

PREREQ: BISC306.

BISC 661 Biology of Striated Muscle 3

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

PREREQ: BISC306 or BISC406.

BISC 670 Immunobiology Laboratory 1

Preparation of antigens and antiserum; antibody analysis by precipitation, agglutination, complement fixation and other serological techniques.

COREQ: BISC671.

BISC 671 Immunobiology 3

The biological significance of adaptive immunity; cell responses, nature of antigens, antibodies and their interactions in vertebrates.

PREREQ: BISC207 and Organic Chemistry.

BISC 672 Neuroimmunology 3

Examines reciprocal communication between the nervous and immune systems. Analyzes the influence of humoral (neurotransmitters and neuromodulators) and neural (neuroanatomical pathways) factors on components comprising the immune system; and the influence of humoral factors (immunoregulators, released by immune system cells) on the central nervous system.

PREREQ: BISC471, BISC670, or BISC671; and BISC306 or BISC406.

BISC 673 Topics in Immunogenetics 3

In-depth discussion of a number of topics in immunogenetics, e.g., genetics of the immunoglobulin molecule, genetics of the cellular immune response, genetic basis of human immunological diseases.

PREREQ: Course in Immunology.

RESTRICTIONS: With instructor's permission, may be repeated once for credit.

BISC 675 Cardiopulmonary Physiology 3

The physiology and biophysics of the mammalian heart, lungs and circulation including gaseous exchange and transport between the circulating medium and the external environment.

PREREQ: A physiology course at or above the 300 level.

COREQ: BISC676.

RESTRICTIONS: Corequisite applies to Biology majors only.

BISC 676 Cardiopulmonary Seminar 1

Mammalian cardiopulmonary physiology.

COREQ: BISC675.

BISC 679 Virology 3

Molecular biology of animal viruses. Virus structure and organization; mechanisms of penetration, replication, maturation and transformation.

PREREQ: BISC301 or Biochemistry.

BISC 680 Vertebrate Natural History 4

Biology of vertebrate organisms dealing specifically with adaptations to the environment, morphology, physiology and taxonomy.

PREREQ: BISC302.

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, multifactorial inheritance and the genetics of cancer.

PREREQ: BISC303.

BISC 694 Experimental Ecology 3

Provides "hands-on" experience with techniques of modern experimental ecology. Emphasis on individual research projects in local natural habitats which expose students to experimental design, sampling techniques and data interpretation.

PREREQ: BISC302.

RESTRICTIONS: Requires permission of instructor. For biology majors.

BISC 696 Vertebrate Reproduction 3

Neural, neuroendocrine and endocrine mechanisms regulating vertebrate reproduction. Integration of environmental information in timing reproductive processes.

PREREQ: BISC306.

BISC 697 Reproduction Techniques 6

Experimental techniques used in laboratory investigations of the physiology and endocrinology of vertebrate reproduction.

PREREQ: BISC696.

BISC 698 Comparative Endocrinology 3

Functional evolution of hormone systems throughout the animal kingdom. Chemical integration of physiological processes regulating day-to-day and season-to-season adaptations of organisms to environmental changes.

PREREQ: BISC306 or BISC406.

RESTRICTIONS: Biochemistry recommended.

BISC 699 Computers in Biological Research 4

Survey of current topics in biological research utilizing computers. Topics include data acquisition, analysis, interpretation, image analysis and modeling of biological phenomena. Student development of software to solve specific problems in biological research.

PREREQ: BISC207 and BISC208.

RESTRICTIONS: Requires consent of instructor.

BISC 801 Seminar in Ecology 2

Critical examination of selected topics in ecology, through evaluation of relevant literature. Students prepare seminars on topics provided each semester.

RESTRICTIONS: Requires permission of instructor.

BISC 802 Cell and Genetic Systems 1 PF

Critical evaluation of selected topics in cell and genetic systems through presentations given by researchers from both inside and outside the University community.

RESTRICTIONS: Requires permission of instructor.

BISC 806 Advances in Physiology 2

Colloquium and special studies on a selected aspect of animal physiology.

RESTRICTIONS: May be repeated for up to 10 credits when topics vary. Offered only in Spring.

BISC 810 Advanced Endocrinology 2

Selected topics pertaining to hormonal function.

BISC 868 Research 1-12

BISC 869 Master's Thesis 1-6

BISC 969 Doctoral Dissertation 1-12 PF

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 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: ECON151.

BUAD 302 Marketing Research 3

Focus 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: STAT202, BUAD301, and BUAD230 or BUAD260 or ACCT260.

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: MATH230, STAT202, and BUAD230 or BUAD260 or ACCT260.

BUAD 309 Management and Organizational Behavior 3

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

BUAD 341 Environment of Multinational Corporations 3

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

May be cross-listed with ECON341 and/or POSC341.

PREREQ: ECON152.

RESTRICTIONS: Counts as a BUAD elective for students receiving a degree in Business Administration. Credit for BUAD/ECON/POSC341 given only once.

BUAD 346 Analysis of Operations Problems 3

Intensive treatment of topics covered in BUAD306 to include the investigation and development of the decision making process in an operations environment. Emphasis on practical applications.

PREREQ: BUAD306.

BUAD 366 Independent Study 1-6

BUAD 382 International Business Management 3

Decision-making in the management of multinational business organizations. Problems involving constraints of government environment and organization structures. Evaluation of international business practices.

BUAD 385 Administrative Theory 3

Concepts of administration at the individual, group and organizational level of analysis. Emphasis on organizational level of analysis with topics including job design, organization structure and design, and inter- and intra-organizational processes.

PREREQ: BUAD309.

BUAD 391 Seminar on International Management 3

Seminar on selected topics in international management. Combines lectures and visits to local organizations. Research paper typically required.

PREREQ: BUAD309.

RESTRICTIONS: Taught abroad. Counts as BUAD elective for BSBA candidates.

BUAD 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 a BUAD elective for BSBA candidates.

BUAD 420 Industrial Relations 3

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

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).

BUAD 428 Management Systems 3

Concepts of general systems theory, with applications to analysis of management systems, work flows and information flows. Design and analysis of sociotechnical systems, project and program management.

PREREQ: BUAD309.

BUAD 429 Seminar on Organizations 3

Topical seminar on such management issues as organizational socialization, work motivation, and organization-environment relations. Development of an individual research project is stressed.

PREREQ: BUAD309.

BUAD 441 Business Policy 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 or accounting.

BUAD 442 New Venture Planning 3

Entrepreneurship and entrepreneurial activities studied through lecture and case-work. Business knowledge applied to the development of business plans for new ventures of the students' choosing.

PREREQ: BUAD301, BUAD306, BUAD309, and FINC311.

BUAD 444 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.

RESTRICTIONS: Requires Senior status in Business Administration or Accounting.

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.

BUAD 447 Operations Management Strategy 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.

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, ACCT261.

RESTRICTIONS: Requires Senior status. Not open to students who have taken BUEC431.

BUAD 466 Independent Study 1-6

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 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 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.

BUAD 830 Decision Support Systems 3

Design and implementation of management information systems. Examination of decision support end user models including optimization and expert systems.

PREREQ: STAT555.

BUAD 840 Social, Ethical, Legal and Political Environment of the Firm 3

Statutory and regulatory environment of the firm, corporation law, social responsibility of the corporation and liability of corporate officers and directors.

BUAD 841 International Business Management 3

Development of business strategies for the multinational business organization. Emphasis on dealing with international governmental constraints and organization structures. Projects focusing on the assessment of the business environment in specific countries.

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 to them and prepare formal presentations of their findings.

RESTRICTIONS: Requires 24 MBA credits.

BUAD 860 Operations Administration 3

In-depth analysis of the major problems encountered in managing the operations function of an enterprise. Development of appropriate decision processes for solving these problems, with emphasis on the application of economic principles and analytical techniques.

PREREQ: BUAD830.

BUAD 863 Special Topics in Operations Management 3

Covers various topics in operations management at all levels of the firm. Individual inquiry stressed.

PREREQ: BUAD860.

BUAD 870 Organizational Behavior and Administration 3

A study of the formal systems of the managerial process. Emphasis on the rational synthesis of research and concepts on administrative management and organizational behavior, including decisions regarding organizational structure, process and reward systems.

PREREQ: STAT555.

BUAD 873 Systems Behavior and Implementation 3

Advances student's understanding of the behavior of individuals and the role of information in organizations. Emphasis on information processing by individuals, groups, and the organization, and empirically derived knowledge in the areas of organization, change, conflict and performance.

PREREQ: BUAD830 and BUAD870.

BUAD 874 Special Topics in Administration 3

Examines selected topics in organizational theory, behavior, or information systems.

PREREQ: BUAD873.

BUAD 875 Human Resource Administration 3

Thorough inspection of the behavior of personnel in primarily larger-scale organizations. Focuses on the individual and small group programs of morale, productivity, cooperation and managerial leadership, linking these to the more traditional personnel management concepts.

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 880 Marketing Administration 3

Covers the decisions of marketing administrators, their implementation and the functions of the marketing sub-system of the business enterprise. Emphasis on management practices that impinge upon product, price, promotion and physical distribution decisions, and the system of business enterprises that evolves to satisfy needs of industrial and ultimate consumers.

PREREQ: ECON152.

BUAD 881 Marketing Research 3

Helps current and future business managers make intelligent use of marketing information for decision making. Reading of text and research projects are used to provide an understanding of the marketing research process.

PREREQ: STAT555 and BUAD880.

BUAD 884 Special Topics in Marketing 3

Examines selected current marketing topics: e.g.: strategy development, opportunity assessment, modeling and marketing programming. Individual inquiry is stressed.

PREREQ: BUAD880.

BUAD 890 Corporate Strategy 3

Functions and responsibilities of general managers and problems affecting the total organization; top management's role in determining objectives and strategies for future directions, and determining approaches to their implementation. Students integrate concepts learned in functional courses and recommend action. Analysis of cases, lectures, readings and discussion of current concepts, and individual studies of specific company policies.

PREREQ: FINC850, BUAD860, BUAD870 and BUAD880.

Business and Economics

BUEC 325 Modern Business Computing 3

Use of higher level contemporary computing languages to structure solutions to business problems. Prototyping applications of systems.

PREREQ: BUAD260.

BUEC 330 Systems Analysis and Implementation 3

Provides a conceptual basis for the analysis of business information problems and the design and implementation of systems to solve those problems. Considers alternative methodologies for analyzing, designing and implementing management information systems.

BUEC 366 Independent Study 1-6**BUEC 430 Information Planning and Data Management 3**

Emphasis on applying a systems approach to planning information requirements for an organization. Considers both theoretical and practical data base methodologies.

PREREQ: BUEC330 and BUEC325.

BUEC 431 Decision Support Systems 3

The process of 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: BUEC430.

RESTRICTIONS: MI/DSS minors must take BUEC432 as a corequisite.

BUEC 432 Systems Development 3

Capstone course in the Business and Economics MI/DSS minor. Emphasis on applying the concepts of project management to real management information problems.

PREREQ: BUEC430.

RESTRICTIONS: MI/DSS minors must take BUEC431 as a corequisite.

BUEC 466 Independent Study 1-6

Chemical Engineering

CHEG 009 Chemical Engineering Freshman Seminar 0 PF

Defines chemical engineering and presents predictions of the future of the profession in research and development.

CHEG 112 Introduction to Chemical Engineering 3

Development of quantitative models for physical systems using a combination of conservation principles and carefully focused experimental data. Stresses the conservation of matter and energy.

COREQ: MATH242.

CHEG 166 Special Problem 1-3

RESTRICTIONS: Course will not count toward graduation in Chemical Engineering.

CHEG 231 Chemical Engineering Thermodynamics 3

The first law energy balance; the entropy balance; thermodynamic constitutive equations for gases and liquids; thermodynamic cycles and energy conversion; and stability.

PREREQ: CHEG112.

COREQ: CHEM443 and MATH243.

CHEG 266 Special Problem 1-3

RESTRICTIONS: Course will not count toward graduation in Chemical Engineering.

CHEG 325 Chemical Engineering Thermodynamics 3

A continuation of CHEG231. The thermodynamics of mixtures; phase and chemical equilibrium.

PREREQ: 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: 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: MATH302 and CHEG231.

CHEG 342 Heat and Mass Transfer 3

Theory of heat transfer in flow and nonflow systems. Fundamentals of mass transfer. Empirical correlations for transfer in free and forced convection; and application to process engineering problems.

PREREQ: CHEG341.

CHEG 345 Chemical Engineering Laboratory I 3

Laboratory studies demonstrating the principles of fluid mechanics, heat transfer, mass transfer and thermodynamics. Emphasis on correlation of experimental results and on written and oral presentation.

PREREQ: CHEG325 and CHEG341.

COREQ: CHEG342.

CHEG 366 Independent Study 1-6

CHEG 401 Chemical Process Dynamics and Control 3

Analysis of transients in chemical processing equipment and chemical reactors. Frequency response analysis, state variable, representation and design of linear control systems.

PREREQ: MATH302, CHEG332 and CHEG443.

CHEG 432 Chemical Process Analysis 3

A study of the principles and techniques used to develop a process design. Skills are developed by considering process synthesis case studies.

PREREQ: CHEG332 and CHEG443.

COREQ: CHEG401.

CHEG 443 Mass Transfer Operations 3

Application of chemical engineering fundamentals to the design of mass transfer processes for separation and purification. Examples in design of distillation, absorption and extraction equipment.

PREREQ: CHEG325 and CHEG342.

CHEG 445 Chemical Engineering Laboratory II 3

Intensive laboratory experiments illustrate the application of chemical and physical principles to industrial processes. Expands upon CHEG332 and CHEG443. Technical report writing emphasized.

PREREQ: CHEG332, CHEG342 and CHEG345.

COREQ: CHEG443.

CHEG 466 Independent Study 1-6

CHEG 468 Research 1-9

CHEG 473 Chemical Engineering Projects 2

Experimental, theoretical and literature studies of chemical engineering problems.

CHEG 474 Chemical Engineering Projects 4

A continuation of CHEG473.

CHEG 595 Patent Law for Engineers and Scientists 3

Methods of protecting intellectual property. Patents, trademarks, copyrights, trade secrets and unfair methods of competition, including analyses of significant court decisions in each area. Directed to innovators in all fields interested in legal protection of their ideas.

CHEG 601 Structure and Properties of Polymer Materials 3

See MASC601 for course description.

CHEG 602 Polymer Process Analysis and Design 3

Development of the tools of continuum mechanics necessary for the quantitative description of viscoelastic media. Use of principles of chemical kinetics, fluid and continuum mechanics and heat and mass transfer to describe the production and processing of polymeric materials.

PREREQ: CHEG342.

CHEG 603 Polymerization Reaction Engineering 3

Introduction to polymer chemistry and reactor design with emphasis on mechanisms and kinetics of polymerization, macromolecular structure, and the influence of reactor geometry and process conditions on polymer properties.

PREREQ: CHEM444.

CHEG 604 Introduction to Polymer Science and Engineering II 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.

PREREQ: CHEG603.

CHEG 605 Multiphase Fluid Mechanics 3

Presents topics in fluid dynamics of practical importance in the chemical process industries, emphasizing two-phase flow and other advanced topics. Covers two-phase gas-liquid and solid-liquid flow, compressible flow, turbulence, non-Newtonian flow and prime movers.

PREREQ: CHEG341 or other introductory course in fluid mechanics.

CHEG 606 Introduction to Catalysis 3

Industrial catalytic reactions, mechanisms, kinetics and phase behavior. Theory of catalysis from solutions to non-uniform surfaces.

PREREQ: CHEM331, CHEM443, CHEM444 and CHEG332.

CHEG 610 Industrial and Engineering Chemistry 3

Investigation of the role of chemistry and engineering in important industrial processes. Emphasis on innovations in chemical processing routes based on the interplay between chemistry and engineering. Flowsheeting of specific routes. Permission of instructor required.

CHEG 612 Applied Process Heat Transfer 3

Principles of heat transfer by conduction, convection and radiation illustrated through the case study approach. Emphasis on analyzing heat balance and heat transfer equations with their proper boundary conditions.

PREREQ: CHEG342.

CHEG 615 Special Topics in Mixing 3

Introduces basic principles of fluid dynamics, rheology and turbulence that dictate the mixing behavior required to implement a desired process result. Agitation in vessels and pipeline and viscous mixing discussed. Emphasis on recent research on the effects of mixing on chemical reactions.

CHEG 616 Chemistry and Physics of Surfaces and Interfaces 3

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

CHEG 620 Biochemical Engineering 3

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

CHEG 635 Air Pollution and Its Control 3

See CHEG635 for course description.

CHEG 650 Biomedical Engineering I 3

Application of engineering concepts and techniques to problems in biomedicine. Mass transfer and chemical reactions in the body, drug distribution, kidney and other organ physiology, and artificial organs.

PREREQ: Upper division or graduate standing in engineering or equivalent.

CHEG 691 Technical Project Management 3

The organization, planning, and control of technical projects. Emphasis on the application of quantitative techniques of management, critical path analysis, linear programming, stochastic decision making, risk analysis and forecasting.

RESTRICTIONS: Requires permission of instructor.

CHEG 801 Process Control and Dynamics 3

Extension of SISO control concepts to MIMO systems appropriate to the chemical industry. Direct synthesis methods, internal model reference control, robust control and control in stochastic systems.

PREREQ: Undergraduate control course.

CHEG 825 Chemical Engineering Thermodynamics 3

Applications of classical and molecular thermodynamics to industrial problems in chemical and phase equilibrium. Topics include nonideal solutions, high pressure systems, complex reaction equilibria, generalized correlations and equations of state.

PREREQ: CHEG325 and CHEM444.

CHEG 826 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 mathematical methods to the solution of chemical engineering problems. The use of ordinary and partial differential equations and of difference equations in fluid flow, heat transfer, diffusion and other unit operations.

PREREQ: CHEG443 and MATH302.

CHEG 828 Statistical Thermodynamics 2-3

A discussion of the concepts of classical statistical mechanics, with special emphasis on applications, thermodynamic modelling and physical properties correlations.

CHEG 830 Fluid Mechanics 3

Use of field equations of motion and a variety of constitutive assumptions to solve problems involving both laminar and turbulent flows. Emphasizes polymer processing, fluids transport and boundary layer theory.

PREREQ: Undergraduate study in fluid mechanics or transport phenomena.

CHEG 835 Applied Chemical Kinetics 3

The application of modern methods and recent experimental data to the design of chemical reaction equipment.

PREREQ: Requires undergraduate reaction engineering and physical chemistry.

CHEG 836 Applied Chemical Kinetics 3

Topics in chemical reaction engineering, applied kinetics and industrial catalysis.

PREREQ: CHEG835.

CHEG 863 Diffusional Operations 3

Advanced coverage of the latest theoretical and experimental studies in several fields involving mass transfer. These fields include humidification, absorption, extraction, distillation, ion exchange and adsorption.

PREREQ: CHEM444.

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 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 one three-hour laboratory per week that introduces basic experiments in general chemistry.

RESTRICTIONS: One year of high school chemistry recommended; high school algebra or concurrent enrollment in 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 one three-hour lab per week 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, equilibria and energy relationships. Includes one three-hour laboratory per week.

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 of CHEM103. Includes one three-hour laboratory per week that is a continuation of the laboratory experience begun in CHEM103.

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 5

Nuclear chemistry, periodicity, structure and bonding, classes of reactions, stoichiometry, solution chemistry, chemical equilibria and electrochemistry. Includes one three-hour laboratory per week.

COREQ: MATH010.

RESTRICTIONS: For nursing majors who will continue with CHEM106. High school algebra required in lieu of Corequisites; 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. 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, equilibrium, reaction kinetics and the important classes of substances.

PREREQ: One semester of college chemistry.

COREQ: CHEM119, and MATH115 or higher math course.

RESTRICTIONS: For chemistry and chemical engineering students. One year of high school chemistry accepted in lieu of Prerequisite. Only one course among CHEM101, CHEM103, CHEM105 and CHEM111 can count toward graduation.

CHEM 112 General Chemistry 3

A continuation of CHEM111.

PREREQ: CHEM103 or CHEM111.

COREQ: CHEM120.

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

CHEM 119 Quantitative Chemistry I 2

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

PREREQ: One semester of college chemistry.

COREQ: CHEM111 and MATH115.

RESTRICTIONS: One year of high school chemistry accepted in lieu of Prereq.

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.

COREQ: CHEM112.

CHEM 166 Special Problem 1-3 PF

CHEM 213 Elementary Organic Chemistry 4

Fundamentals of organic chemistry. Includes one three-hour laboratory per week 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 metabolic interrelationships.

PREREQ: CHEM213.

CHEM 216 Elementary Biochemistry Laboratory 1

Principal classes of biomolecules and their metabolic interrelationships.

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 310 Computers in Chemistry 3

Introduction to computers, programming and typical applications of computers in chemistry. Applications include data analysis, numerical methods, curve-fitting, chemical structure coding and the use of chemical data bases.

PREREQ: MATH242 and CHEM120 or CHEM220 and CHEM221.

CHEM 321 Organic Chemistry 4

First half of a two-semester survey of the structure, synthesis, and reactions of organic compounds. Includes one three-hour laboratory per week that introduces the basic laboratory techniques of organic chemistry.

PREREQ: CHEM104.

RESTRICTIONS: Not for B.S. credit in chemistry. CHEM321 and CHEM331 cannot both be counted toward graduation.

CHEM 322 Organic Chemistry 4

Second half of a two-semester survey of the structure, synthesis and reactions of organic compounds. Includes one three-hour laboratory per week that introduces the basic laboratory techniques of organic chemistry.

PREREQ: CHEM321.

RESTRICTIONS: Not for B.S. credit in chemistry. 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 and chemical engineering majors and any other students desiring fuller treatment than in CHEM321. CHEM321 and CHEM331 cannot both be counted toward graduation.

CHEM 332 Organic Chemistry 3

Major classes and reactions of organic compounds, emphasizing stereochemistry, reaction mechanisms and synthetic methods.

PREREQ: CHEM331.

COREQ: CHEM334.

RESTRICTIONS: For chemistry and chemical engineering majors and any other students desiring fuller treatment than in CHEM322. CHEM322 and CHEM332 cannot both be counted toward graduation.

CHEM 333 Organic Chemistry Majors Laboratory I 1-2

The theory and practice of basic techniques of laboratory work with organic compounds, including separation methods and instrumental methods of analysis and identification.

PREREQ: CHEM104, or preferably CHEM112, or CHEM120.

COREQ: CHEM331.

RESTRICTIONS: Registration for two credits involves both a lecture period and a laboratory period each week.

CHEM 334 Organic Chemistry Majors Laboratory II 2

Continuation of CHEM333. Two lab periods each week.

PREREQ: CHEM333.

COREQ: CHEM332.

CHEM 342 Introduction to Biochemistry 3

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

PREREQ: CHEM331.

CHEM 350 Chemistry in a Foreign Language 1 PF

Chemical topics, generally of an introductory nature, presented in a foreign language.

PREREQ: CHEM104.

RESTRICTIONS: CHEM112 recommended. Requires proficiency at the intermediate, 107 or higher, level of the language used to teach the course. Taught entirely in the foreign language. May be repeated for credit when languages are different.

CHEM 365 Seminar 1 PF

CHEM 366 Independent Study 1-3 PF

CHEM 418 Introductory Physical Chemistry 3

Less rigorous than CHEM443-444. Kinetics and mechanisms of reactions; chemical thermodynamics; states of matter; phase and chemical equilibria; colligative properties of solutions; and atomic and molecular structure.

PREREQ: General Chemistry and Calculus (MATH221 and MATH222 or MATH241).

RESTRICTIONS: Course acceptable for B.A. but not B.S. degree in chemistry. CHEM418 and CHEM443 cannot both be counted toward graduation.

CHEM 419 Introductory Physical Chemistry 3

Continuation of CHEM418.

PREREQ: CHEM418.

RESTRICTIONS: CHEM419 and CHEM444 cannot both be counted toward graduation.

CHEM 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 3

Application of the principles and methods of mathematics and physics to the quantitative study of chemical problems.

PREREQ: CHEM120 or CHEM220 and CHEM221, MATH242 (MATH243 recommended), PHYS208 (recommended) or PHYS202.

RESTRICTIONS: CHEM418 and CHEM443 cannot both be counted toward graduation.

CHEM 444 Physical Chemistry 3

Continuation of CHEM443.

PREREQ: CHEM120 or CHEM220 and CHEM221, MATH242 (MATH243 recommended), PHYS208 (recommended) and PHYS202.

RESTRICTIONS: CHEM419 and CHEM444 cannot both be counted toward graduation.

CHEM 445 Physical Chemistry Laboratory 1

Physical methods for studying properties of matter.

PREREQ: CHEM120 or CHEM220 and CHEM221.

RESTRICTIONS: To be taken concurrently with or subsequent to CHEM443 and CHEM444, or CHEM418 or CHEM419.

CHEM 446 Physical Chemistry Laboratory 1

Continuation of CHEM445.

PREREQ: CHEM120 or CHEM220 and CHEM221.

CHEM 457 Inorganic Chemistry 3

Basic theoretical concepts of inorganic chemistry with emphasis on structure, bonding and reactions.

PREREQ: CHEM418 or CHEM443, and CHEM112.

CHEM 458 Inorganic Chemistry Laboratory 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 staff.

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

CHEM 527 Introductory Biochemistry 3

A one-semester survey of the fundamentals of biochemistry.

PREREQ: CHEM322 or CHEM332.

RESTRICTIONS: For undergraduate majors in biology and chemistry, graduate students in agriculture, biology, nutrition, marine sciences and engineering not using biochemistry professionally. BISC103 or BISC207 strongly recommended.

CHEM 610 History of Chemistry 3

A survey of the development of chemistry. Use made of the UNIDEL Collection of Rare Books in the History of Chemistry.

PREREQ: General Chemistry.

CHEM 620 Analytical Spectroscopy 3

Experimental aspects of electronic and vibrational spectroscopy. Linear and nonlinear optics; photon counting; Fourier transformation; and topics from the current literature.

PREREQ: CHEM437 and CHEM438.

CHEM 621 Chemical Separations 2

Fundamental description of chemical separations. Zone broadening and separation efficiency; and chemistry of separations. Application of fundamental principles to chromatography, electrophoresis, field-flow fractionation and newly emerging techniques.

PREREQ: CHEM437 and CHEM438.

CHEM 622 Electroanalytical Chemistry 3

Analytical applications of electrochemistry: dynamic and steady-state methods of potentiometry, coulometry, voltammetry, and ancillary techniques.

RESTRICTIONS: Requires Senior or graduate status in chemistry. Offered in Fall of even-numbered years.

CHEM 623 Chemometrics 2

Provides chemists with an introduction to modern methods of reducing and analyzing chemical data using computers. Covers probability and simple statistics, optimization methods, pattern recognition, factor analysis, regression, time series analysis of chemical data and data transformation methods.

PREREQ: CHEM437.

CHEM 624 Interpretation of Mass Spectra 1

Molecular ions and elemental composition from precise mass and isotopic ratios. Fragmentation mechanisms and the correlations of electron ionization mass spectra with molecular structure.

RESTRICTIONS: Requires Junior, Senior or graduate status in chemistry/biochemistry.

CHEM 625 Chemical Ionization Mass Spectrometry 1

Analytical applications of ion/molecule reactions. Mechanisms and thermochemical kinetics of gaseous ionic reactions. Correlations of spectra with molecular structure. Atmospheric pressure ionization mass spectrometry.

RESTRICTIONS: Requires Junior, Senior or graduate status in chemistry/biochemistry.

CHEM 626 Instrumental Methods in Mass Spectrometry 2

Experimental techniques in analytical mass spectrometry: ionization methods mass analyzers, tandem mass spectrometry, coupled chromatographic methods and applications.

RESTRICTIONS: Requires Senior or graduate status in chemistry.

CHEM 627 Practical Mass Spectrometry 1

Instrumentation and experiments in gas chromatography/mass spectrometry.

RESTRICTIONS: Requires permission of instructor. CHEM624 recommended as Coreq. or Prereq.

CHEM 633 Advanced Organic Chemistry: Physical 3

Stereochemistry and reactivity of organic compounds; and reaction mechanisms, structure and bonding.

PREREQ: CHEM332.

CHEM 634 Advanced Organic Chemistry: Synthesis and Reactivity 3

Reactions of organic compounds, with emphasis on synthetic methods.

PREREQ: CHEM332.

CHEM 641 Biochemistry 3

Structure and function of proteins, enzymes and coenzymes; carbohydrate metabolism and its regulation; and citric acid cycle.

PREREQ: CHEM322 or CHEM332.

CHEM 642 Biochemistry 3

Intermediary metabolism of lipids, amino acids, purines and pyrimidines; nucleic acid chemistry; protein and nucleic acid synthesis; molecular basis of genetic regulation; and selected topics.

PREREQ: CHEM641.

CHEM 643 Intermediary Metabolism 3

General principles of intermediary metabolism with emphasis on biosynthetic pathways of amino acids, nucleotides, coenzymes, antibiotics and toxic secondary metabolites.

PREREQ: CHEM642.

CHEM 644 Mechanisms of Enzyme Catalysis 3

Detailed chemical mechanism of enzyme catalysis for several representatives. Emphasis on kinetic and physical organic methods.

PREREQ: CHEM641.

CHEM 645 Mechanisms of Enzyme Regulation 3

Mechanisms of regulation of enzymes are considered with emphasis on models for allosteric regulation, role of association-dissociation reactions and enzyme-catalyzed covalent modification. Modern experimentation approaches are discussed with examples taken from the recent literature.

PREREQ: CHEM641.

CHEM 647 Biochemical Evolution 3

The origins and evolution of life as reconstructed from geochemical, biochemical and genetic evidence.

PREREQ: CHEM642 or CHEM527.

CHEM 648 Membrane Biochemistry 3

Recent advances in the structure and function of biomembranes and related model systems, with particular reference to molecular and physiochemical mechanisms.

PREREQ: CHEM527 or CHEM641.

CHEM 649 Protein Biochemistry 3

Addresses the current level of understanding of protein structure, stability and reactions, both in vitro and in vivo. Readings in textbook and reference literature, lectures and case studies.

PREREQ: CHEM641.

CHEM 651 Advanced Inorganic Chemistry I 3

Inorganic chemistry: application of the principles of structure and reactivity, examples from compounds of both the representative elements and the transition metals.

PREREQ: CHEM444 and CHEM457.

CHEM 652 Organometallic Chemistry 3

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

PREREQ: CHEM444 and CHEM457.

CHEM 654 Advanced Inorganic Chemistry II 3

A group theoretical approach to structure and bonding in inorganic compounds.

PREREQ: CHEM444 and CHEM457.

CHEM 655 Marine Inorganic Chemistry 3

See MAST850 for course description.

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 Spectroscopy 3

Application of quantum theory to the interpretation of absorption and emission spectra in terms of atomic and molecular properties.

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 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 and coordination compounds.

PREREQ: CHEM651.

RESTRICTIONS: May be repeated for credit when topics vary.

CHEM 855 Marine Inorganic Chemistry 3

See MAST850 for course description.

CHEM 865 Seminar 0 PF**CHEM 868 Research 1-9****CHEM 869 Master's Thesis 1-6****CHEM 871 Statistical Thermodynamics 3**

Applications of statistical mechanics to chemical problems.

RESTRICTIONS: Requires permission of instructor.

CHEM 874 Special Topics in Physical Chemistry 1-3

RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.

CHEM 969 Doctoral Dissertation 1-12 PF

Chinese

CHIN 105 Chinese I - Elementary 4

Introduction to the Chinese language and development of speaking, listening, reading and writing skills through the use of basic texts. Language laboratory as needed.

CHIN 106 Chinese II - Elementary/Intermediate 4

Completion of basic Chinese. Increasing mastery of the basic skills of speaking, listening, reading and writing.

PREREQ: CHIN105.

CHIN 107 Chinese III - Intermediate 4

Review of grammar, continued practice in speaking and writing, reading texts of average difficulty.

PREREQ: CHIN106.

RESTRICTIONS: Satisfies the Arts and Science foreign language requirement.

Civil Engineering

CIEG 125 Introduction to Civil Engineering 2

An overview of civil engineering disciplines, including structural, environmental, ocean, geotechnical and water resources engineering. Addresses physical principles, numerical analysis and elementary design problems in each area. Emphasis on computer use. Develops introductory level computer programming and software application (text processing, spreadsheet, plotting) skills.

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 Strength of Materials 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.

CIEG 213 Materials Laboratory 1

Experiments in mechanics of materials, complementing the content of CIEG212. Emphasis on behavior of steel, aluminum, concrete and timber in civil engineering systems.

COREQ: CIEG212.

CIEG 223 Surveying 3

Surveying instruments and their use, differential leveling, traverses, route surveying, triangulation and field astronomy. Also includes computer methods for area, cut/fill, grade elevations and other processing of survey data.

PREREQ: MATH115, MATH221 or MATH241.

CIEG 301 Analysis of Structures 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.

COREQ: MATH302.

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 331 Introduction to Environmental Engineering 3

Interactions within the environment and associated engineering problems. Discussion of air, water supply, wastewater treatment, solid wastes and their effect on the environment.

PREREQ: CHEM103 and MATH242.

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 381 Civil Engineering Analysis 3

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

PREREQ: MATH302.

CIEG 401 Introduction to the Finite Element Method 3

Discussion of approximate solution procedures: finite difference method, weighted residual methods and variational methods. Development of approximate solutions using the finite element method. Application to one- and two-dimensional problems in applied mechanics. Discussion of numerical methods and computer programming techniques applicable to finite element analyses.

PREREQ: CIEG381.

CIEG 402 Steel Design 3

Design of metal structures; connections, tension members, columns, and beams with and without lateral support.

PREREQ: CIEG301.

CIEG 403 Concrete Design 3

Reinforced concrete structures; ultimate strength design; and related topics.

PREREQ: CIEG301.

CIEG 404 Prestressed Concrete Design 3

Behavior, analysis and design of prestressed concrete structures. Covers flexure, shear, axial load, bond anchorage design and construction considerations for pretensioned and post-tensioned concrete.

PREREQ: CIEG403.

CIEG 405 Matrix Structural Analysis 3

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

PREREQ: CIEG301.

CIEG 406 Structural Materials 3

Specification, evaluation and testing of materials commonly used in structural engineering. Emphasis on concrete, concrete admixtures, epoxies, wood and metals.

PREREQ: CIEG212, CIEG213, and MASC302.

CIEG 411 Structural Dynamics Design 3

Design of structures (buildings, bridges, dams, foundation piles and offshore platforms) for dynamic loadings (severe wind force, ocean wave force, strong earthquake excitations, machine vibrations, and general impulse and time dependent forces and motions). Determination of realistic dynamic loadings and application of design concepts.

PREREQ: CIEG311 and MATH302.

CIEG 415 Reliability Design in Civil Engineering 3

Reliability analysis of civil engineering systems, using concepts and methods of probability and statistics to supplement the engineer's judgment when addressing uncertainty in design. Topics include elements of probability and statistics, measure of reliability, time to failure, reliability bounds, confidence of reliability and Monte Carlo simulation.

CIEG 416 Random Vibration 3

Elementary characterization of random dynamic loads on structures using concepts of statistics and probability. Statistics of structural response and safety of structures.

PREREQ: CIEG311 and MATH302.

CIEG 417 Advanced Structural Analyses 3

Nonlinear vs. linear beam analyses. Nonlinear beam bending equations. Structures with composite cross-section. Structures subjected to mechanical and thermal loads, beams to bending and torsion. Superposition principle. Analysis of problems that partially separate from base. Generalized functions. Method of initial parameters. Influence line method.

PREREQ: CIEG212 and MATH302.

CIEG 418 Continuously Supported Structures 3

Analytical properties of various elastic, viscoelastic and elasto-plastic foundation models for describing the base response. Embedded rods subjected to axial forces, torsion and temperature changes. Glued lap joints, long riveted joints and threaded connections. Continuously supported beams and plates. Problems in geophysics and composite materials.

PREREQ: CIEG212 and MATH302.

CIEG 420 Soil Mechanics 4

Soil properties, soil-water interaction, soil stresses, two-dimensional flow, soil compressibility, shear strength and lateral earth pressures.

PREREQ: CIEG212 and MECH305.

CIEG 421 Foundations and Substructures 3

Design of earth dams, embankments, retaining structures, cofferdams, footings, caissons and piles. Numerical methods, combining soil mechanics and structural analysis.

PREREQ: CIEG420.

CIEG 422 Earth Structures Engineering 3

Properties of soils and methods to determine 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: CIEG420.

CIEG 431 Water Supply Engineering 3

Water quality criteria and monitoring, development of water resources, design of water collection and distribution systems, design of water treatment works, economics of water supply engineering, treatment of water works sludge and advanced water purification technology.

PREREQ: CIEG331 and MECH305.

CIEG 432 Wastewater Engineering 3

Source and character of wastes; design and operation of wastewater treatment facilities; ultimate disposal of wastewater residues and considerations of discharge criteria, and economic and regulatory aspects.

PREREQ: CIEG331.

CIEG 433 Hazardous Waste Management 3

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

PREREQ: CIEG331.

CIEG 435 Industrial Wastes Management 3

Covers industrial survey and treatment technologies for liquid, solid and gaseous wastes. Emphasis on the applications and design of physical-chemical and biological treatment processes. Particulate removal from industrial emission sources. Resource recovery and reuse presented as an important option for the management of industrial wastes.

CIEG 437 Water and Wastewater Quality 3

Principles and applications of analysis of solids, organic load, dissolved oxygen, disinfectants, nutrients, trace metals, trace organic compounds and microorganisms. Lecture and laboratory.

PREREQ: CIEG331.

CIEG 441 Hydrology 3

The fundamentals of climatology, meteorology and geophysics; their relation to surface water and groundwater; rainfall runoff characteristics; nature and control of floods; evaporation control; management of ponded water; seepage; and percolation and groundwater flow.

COREQ: MECH305.

CIEG 442 Hydraulic Engineering 3

Application of the principles of fluid mechanics to flow in pipelines, open channels, sediment transport, drainage, hydraulic structure and hydraulic models.

PREREQ: MECH305.

CIEG 452 Transportation Facilities Design 3

Theoretical concepts of general transportation demand, supply and flow analysis. Planning and design of multi-modal transportation facilities including streets and highways, railways and guideways, airports, and harbors and ports. Engineering, social and economic evaluation of alternative design schemes for simple case studies and existing transportation facilities.

PREREQ: CIEG351.

CIEG 453 Traffic Engineering 3

Essential elements of traffic engineering including road users characteristics, vehicle kinematics and roadway and geometric design; traffic engineering studies and analysis such as highway capacity concepts, statistical accident studies and origin-destination studies; other elements such as traffic control devices and signal systems coordination.

PREREQ: CIEG351.

CIEG 454 Urban Transportation Planning 3

Characteristics of urban travel demand, travel demand forecasting models, urban transportation modes and their characteristics, urban transportation planning processes and issues, evaluation of plans, economic analysis, transportation financing, transportation policy and regulations, and urban transportation systems management.

PREREQ: CIEG351.

CIEG 459 Railroad Engineering 3

Evolution and analysis of railroad track design and components, ballast and sub-grade, rail axial forces, expansion joints, anchors, and track buckling and preventive measures. Response of tracks to moving loads, track transition problems and track tests. Review of track standards. Movies on maintenance and construction.

PREREQ: CIEG212.

CIEG 461 Senior Design Project 3

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 466 Independent Study 1-6**CIEG 471 Introduction to Coastal Engineering 3**

Problems of design in the ocean and coastal environment. Mechanics of wave motion, tides and storm surge, littoral processes, wave forces on structures and design of coastal structures. Includes observations of hydraulic model tests in the Ocean Engineering Laboratory.

PREREQ: MECH305.

CIEG 482 Systems Design and Operation 3

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

CIEG 486 Engineering Management 3

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

CIEG 601 Introduction to the Finite Element Method 3

Discussion of approximate solution procedures: finite difference method, weighted 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 604 Prestressed Concrete Design 3

Behavior, analysis and design of prestressed concrete structures. Covers flexure, shear, axial load, bond anchorage design and construction considerations for pretensioned and post-tensioned concrete.

PREREQ: CIEG403.

CIEG 605 Matrix Structural Analysis 3

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

PREREQ: CIEG301.

CIEG 606 Structural Materials 3

Specification, evaluation and testing of materials commonly used in structural engineering. Emphasis on concrete, concrete admixtures, epoxies, wood and metals.

PREREQ: CIEG212, CIEG213 and MASC302.

CIEG 611 Structural Dynamics Design 3

Design of structures (buildings, bridges, dams, foundation piles and offshore platforms) for dynamic loadings (severe wind force, ocean wave force, strong earthquake excitations, machine vibrations, and general impulse and time dependent forces and motions). Determination of realistic dynamic loadings and application of design concepts.

CIEG 615 Reliability Design in Civil Engineering 3

Reliability analysis of civil engineering systems using concepts and methods of probability and statistics to supplement the engineer's judgment when addressing uncertainty in design. Topics include elements of probability and statistics, measure of reliability, time to failure, reliability bounds, confidence of reliability and Monte Carlo simulation.

CIEG 616 Random Vibration 3

Elementary characterization of random dynamic loads of structures using concepts of statistics and probability. Statistics of structural response and safety of structures.

May be cross-listed with MEEG626.

PREREQ: CIEG311 and MATH302.

CIEG 617 Advanced Structural Analyses 3

Nonlinear vs. linear beam analyses. Nonlinear beam bending equations. Structures with composite cross-section. Structures subjected to mechanical and thermal loads, beams to bending and torsion. Superposition principle. Analysis of problems that partially separate from base. Generalized functions. Method of initial parameters. Influence line method.

PREREQ: CIEG212 and MATH302.

CIEG 618 Continuously Supported Structures 3

Analytical properties of various elastic, viscoelastic and elasto-plastic foundation models for describing the base response. Embedded rods subjected to axial forces, torsion and temperature changes. Glued lap joints, long riveted joints and threaded connections. Continuously supported beams and plates. Problems in geophysics and composite materials.

PREREQ: CIEG212 and MATH302.

CIEG 620 Soil Mechanics II 3

Behavior of cohesionless and cohesive soils; failure theories and lateral earth pressures; stresses within earth mass; steady-state flow through porous media; consolidation and time rate settlement; shear strength of cohesive soils.

PREREQ: CIEG420.

CIEG 621 Foundation Engineering 3

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

PREREQ: CIEG421.

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: CIEG420.

CIEG 623 Soil Mechanics Lab 3

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

PREREQ: CIEG420.

CIEG 624 Soil Dynamics 3

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

PREREQ: CIEG420.

CIEG 631 Water Quality and Pollution Control 3

Covers water and its impurities, water quality criteria and monitoring, transport and transformation of chemicals in the aquatic environment, stream sanitation, ecological aspects of impoundments and eutrophication processes, groundwater systems, decontamination of subsurface water systems, land application of wastewater and current topics in water pollution.

CIEG 632 Chemical Aspects of Environmental Engineering 3

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

CIEG 634 Physical Aspects of Environmental Engineering 3

Particle size characterization; particle diffusion, sedimentation and flocculation; surface tension; adsorption; and electrodouble layer theory.

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.

May be cross-listed with CHEG635.

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: CIEG331.

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: CIEG331.

CIEG 639 Hydromechanics 3

Kinematics and dynamics of incompressible fluids with emphasis on engineering problems in the hydraulic and hydrologic environment. Governing equations, solutions for laminar, creeping and porous media flows. Turbulence, boundary layers, potential flows, water waves, and stratified and rotating systems.

PREREQ: MECH305.

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 cross-listed 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 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 659 Railroad Engineering 3

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

PREREQ: CIEG212.

CIEG 671 Introduction to Ocean Engineering 3

Acquaints the engineer with the problems of design in the ocean. Water waves and tides, wave forces on structures, corrosion and fouling, coastal structures and littoral processes.

PREREQ: MECH305.

CIEG 672 Water Wave Mechanics 4

Primary emphasis on linear water wave theory and its applications. Shoaling, refraction and diffraction of waves as well as wave forces. Finite amplitude waves. Laboratory experiments to verify the theoretical developments.

PREREQ: MECH305.

CIEG 678 Transport and Mixing Processes 3

Application of hydrodynamics to mixing and transport processes in the water environment.

PREREQ: CIEG672.

CIEG 679 Sediment Transport Mechanics 3

Mechanics and mathematical modelling of sediment transport in unidirectional and oscillatory flow; sediment properties, initiation of sediment movement, bed-load and suspended load transport rates, formation of bed forms and flow resistance, erosion and deposition in the vicinity of structures, and practical applications.

PREREQ: MECH305.

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 681 Water Wave Spectra 3

Concepts of amplitude and energy spectra, covariances and cross-spectra; linear response functions; use of the Fast Fourier Transform for ocean engineering applications including analysis of one-dimensional and directional spectra, probability of ocean waves and wave forces.

RESTRICTIONS: Requires permission of instructor.

CIEG 682 Nearshore Hydrodynamics 3

The mechanics of waves and currents in the nearshore zone: wave breaking, surf zone dynamics, cross- and long-shore currents, turbulence and bottom boundary layers, infra-gravity and edge waves and nearshore modelling.

PREREQ: CIEG672 and CIEG639.

CIEG 683 Probabilistic Engineering Analysis 3

Operational techniques, derived distributions and expectations are used to develop random models to analyze and design in a random environment. Applications may span topics in mechanics, stream and reservoir flows and technologic decision making and management.

CIEG 691 Groundwater Hydrology 3

A quantitative analysis of groundwater in the hydrologic cycle. Topics include groundwater movement, Darcy's law, mathematical formulation of groundwater problems, groundwater pollution, salt water intrusion, well hydraulics and unsaturated flow.

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 laboratories).

PREREQ: CIEG401.

CIEG 802 Advanced Steel Design 3

Application of ultimate and elastic design procedures to continuous beams and frames, composite members, statically indeterminate trusses and arches. Projects and special topics focus attention to the basis and limitations of codes and specifications for steel structures.

PREREQ: CIEG402.

CIEG 803 Advanced Concrete Design 3

Application of ultimate strength design procedures to continuous beams and frames, composite members, slabs and arches. Projects and special topics focus attention to the basis and limitations of codes and specifications for concrete structures.

PREREQ: CIEG403.

CIEG 811 Advanced Structural Dynamics Design 3

Linear and nonlinear dynamic analysis of multiple degree of freedom systems subjected to earthquake, wind and impact loadings; the use of analysis results in design. Computer analysis of complex structural systems; distributed, consistent and lumped mass models; wave propagation; random excitations; and structural control.

PREREQ: CIEG611.

CIEG 816 Analytical Structural Dynamics 3

Derivation of dynamic differential equations for rods, beams and plates. Boundary and initial conditions. Vibration and impact problems. Analysis of dynamic problems using integral equations. Variational methods in structural dynamics. Hamilton's principle and Lagrange equations. Approximate methods of analysis. Wave propagation in beams and plates.

PREREQ: CIEG411 or CIEG611.

CIEG 817 Stability of Structures 3

Structural instability phenomena caused by static and dynamic loads. Stability analyses of structures by equilibrium, energy and dynamic methods. Conservative and non-conservative problems. Elastic and non-elastic buckling of beams, frames and arches caused by mechanical and thermal loads. Buckling of continuously supported beams and in plates and shells. Delamination buckling in composites.

PREREQ: CIEG212 and MATH302.

CIEG 820 Inelastic Behavior of Geomaterials 3

Introduces constitutive laws and numerical methods used to characterize the stress-strain-time behavior of geomaterials. Correlation between laboratory experiments and 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: CIEG420, CIEG601.

RESTRICTIONS: CIEG620 is highly recommended as a Prereq.

CIEG 831 Theory of Water Treatment 3

Application of physical, chemical and engineering techniques to water treatment processes: aeration, coagulation, sedimentation, filtration and disinfection. Advanced purification methods including adsorption and demineralization processes.

PREREQ: CIEG632 and CIEG634.

CIEG 832 Theory of Wastewater Treatment 3

Composition of wastes; physical, chemical and biological methods of wastewater treatment; treatment and disposal of sludges produced at wastewater treatment plants.

PREREQ: CIEG636.

CIEG 833 Fate of Pollutants in the Environment 3

Study of processes affecting the distribution of inorganic and organic pollutants in the environment. Equilibrium and kinetics of exchange among soil, water, sediment, air and biota. Photolysis, hydrolysis, oxidation, reduction and complexation of chemicals. Models used to describe fate of chemicals.

PREREQ: CIEG632 and CIEG634.

CIEG 842 Design of Water and Wastewater Treatment Systems 3

Presents design implementation and unit operation of water and wastewater treatment processes. Whenever possible, utilizes computer modelling and computer-aided design principles.

COREQ: CIEG831 and CIEG832.

CIEG 865 Civil Engineering Seminar 1**CIEG 868 Research 1-6****CIEG 869 Master's Thesis 1-6**

An independent investigation under supervision of a member of the civil engineering graduate faculty.

CIEG 870 Offshore Design 3

Naval hydrodynamics, behavior of submerged and floating bodies, and ship waves. Tsunamis and harbor response.

PREREQ: CIEG672 and CIEG639.

CIEG 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 891 Mechanics of Fluids in Porous Media 3

Physical and mathematical description of flow through porous media; conservation of mass, energy and momentum; Darcy's law; general equations of single and multiphase flow, partially saturated flow, heat and mass transfer, hydrodynamic dispersion, deformation of porous media, elastic, plastic and viscous behavior of actual material and applications to engineering problems.

CIEG 969 Doctoral Dissertation 1-12 PF

Computer and Information Science

CISC 100 Introduction to Digital Computer Programming 1-3

Introductory programming concepts, with emphasis on development of technical proficiency. Problem definition, algorithms, flowcharting, programming and debugging are illustrated by suitable programming problems.

RESTRICTIONS: Number or credit hours taken requires permission of instructor; provides means for giving credit for introductory courses taken at other schools.

CISC 105 General Computer Science 3

Information structures, machine structure, principles of computation and algorithmic processes. Practical exercises in programming.

RESTRICTIONS: Does not count toward graduation if taken after CISC180 or CISC181.

CISC 106 General Computer Science for Engineers 3

Information structures, machine structures, principles of computation and algorithmic processes. Numerical methods and applications from engineering and the physical sciences.

CISC 135 Topics: Programming Language 2

Learning and using a second programming language, with an emphasis on style. Each section will deal with one language: possibilities include ADA, C, COBOL, FORTRAN, LISP or MODULA-2.

PREREQ: CISC100, CISC105, CISC106, CISC180, EGGG125 or BUAD230.

RESTRICTIONS: A section of CISC135 in a language and another course in which that language is taught cannot both be counted toward graduation. Forbidden combinations: CISC105 and CISC135 - Pascal; CISC106 and CISC135 - Fortran; CISC180 and CISC135 - Lisp; CISC181 and CISC135 - C and C++.

CISC 180 Introduction to Computer Science I 3

Structure and interpretation of computer programs. Procedural and data abstractions: iteration, recursion, sequences and trees. Assignment and state, object-oriented programming, semantic models, rudiments of algorithm analysis and classical numerical algorithms.

COREQ: MATH115, MATH171 OR MATH241.

RESTRICTIONS: Prior programming experience.

CISC 181 Introduction to Computer Science II 3

More procedural and data abstractions. Program modules, arrays, pointers, specification, representation, implementation and testing. Application to the design of large software systems.

PREREQ: CISC180.

COREQ: MATH210 or MATH241.

CISC 200 Introduction to Information Processing 3

File generation, storage, maintenance and manipulation. Information retrieval. Designs for batch and interactive computing systems. Languages for file management. Use of program libraries.

PREREQ: CISC105.

CISC 220 Data Structures 3

Review of data type abstraction, recursion, arrays, stacks, queues, multiple stacks and linked lists. Emphasis on dynamic storage management, garbage collection, trees, graphs, tables, sorting and searching.

PREREQ: CISC181.

COREQ: MATH210 or MATH242.

CISC 260 Machine Organization and Microcomputers 3

Introduction to the basics of machine organization. Programming tools and techniques at the machine and assembly levels. Assembly language programming.

PREREQ: CISC181.

RESTRICTIONS: CISC220 recommended as a Prerequisite.

CISC 300 Introduction to Scientific Computation 3

Use of computers for solution of problems in science and engineering. Introduction to numerical and elementary statistical methods. Error analysis.

PREREQ: CISC105 and MATH243.

RESTRICTIONS: Open to non-CISC major only.

CISC 310 Logic and Programming 3

Propositional and predicate logic languages and proof methods; their use in specifying and verifying properties and correctness of programs; and the use of these techniques for constructing good programs.

PREREQ: CISC220 and MATH315.

CISC 320 Algorithms and Advanced Programming 3

Design and analysis of algorithms; worst-case/average-case analysis, proof techniques for correctness and performance of graph algorithms, control abstractions (divide and conquer, greedy method, branch and bound); NP-hard and NP-complete problems.

PREREQ: CISC310 and MATH315.

CISC 360 Computer Architecture 3

Principles and techniques used in the architecture of digital computers. Machine elements and their interrelation. Stack machines and other computer architectures.

PREREQ: ELEG202 and CISC260.

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: CISC260.

RESTRICTIONS: CISC360 recommended as a Prerequisite.

CISC 366 Independent Study 1-6

CISC 410 Introduction to Numerical Analysis and Algorithmic Computation 3

See MATH426 for course description.

CISC 411 Algorithmic and Numerical Solution of Differential Equations 3

See MATH428 for course description.

CISC 466 Independent Study 1-6

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 CISC310.

CISC 473 Computer Science Projects 3

Experimental, theoretical and literature studies of computer science problems.

RESTRICTIONS: Open to majors only. Requires permission of instructor. May be taken twice for credit when topics vary.

CISC 480 Computers and the Mind 3

Application of the computational paradigm to the cognitive sciences. Tentative answers to questions like the following: Is the computer in some important sense a model of the mind? Is there a general concept of cognition independent of its realization in man or machine?

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.

CISC 603 Program Verification 3

Structured design, specification and verification of programs. Proof rules.

PREREQ: CISC310.

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: CISC310.

CISC 609 Topics in Theoretical Computer Science 3

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

PREREQ: CISC601.

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: CISC320 and MATH315.

CISC 623 Applied Symbolic Computation 3

Introduction to one or more computer algebra systems, algebraic computation applied to problems in applied mathematics, and individual student projects using symbolic computation to solve a problem from student's own discipline. May be cross-listed with MATH613.

CISC 626 Simulation of Continuous Systems 3

Computer simulation of systems described in terms of differential equations. Study and use of continuous system simulation languages, analog and hybrid computers.

PREREQ: MATH243 and CISC220.

RESTRICTIONS: MATH302 is recommended as a Prerequisite.

CISC 627 Simulation of Discrete Systems 3

Modeling and computer simulation of systems characterized by stochastic discrete events. Study and use of discrete system simulation languages.

PREREQ: CISC220.

RESTRICTIONS: CISC360 and CISC361 are recommended as Prerequisites.

CISC 629 Topics in Scientific and Algebraic Computation 3

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

CISC 633 Introduction to Computer Instruction 3

See EDST633 for course description.

CISC 635 Advanced Computer-Based Programming 3

See EDST635 for course description.

CISC 637 Database Systems 3

Physical and logical organization of databases. Data retrieval languages, relational database languages, security and integrity, concurrency, distributed databases.

PREREQ: CISC220 and CISC310.

CISC 640 Computer Graphics 3

Computer graphics technology, two- and three-dimensional systems, graphics software systems, modelling and object hierarchy, and animation.

PREREQ: CISC410; CISC320 or CISC621.

CISC 649 Topics in Computer Applications 3

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

RESTRICTIONS: Requires permission of instructor.

CISC 650 Computer Networks 3

Introduction to local area and long haul computer communication networks. Analysis, design and implementation of network protocols.

PREREQ: CISC360; CISC361 or CISC663.

CISC 659 Topics in Communications, Distributed Computing and Networks 3

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

PREREQ: CISC650.

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.

CISC 663 Operating Systems 3

Comparison and analysis of strategies for the management of memory, processors, I/O devices and file systems.

PREREQ: CISC260.

RESTRICTIONS: Not open to students with credit for CISC361.

CISC 670 Programming Languages 3

Selection, use and implementation of appropriate language(s) for given problems. Syntax, semantics, pragmatics, parameter passing and abstract data types.

PREREQ: CISC310.

RESTRICTIONS: CISC320 is recommended as a Prerequisite.

CISC 672 Advanced Compiler Construction 3

Advanced design and implementation of programming language translators. Emphasis on parsing methods, run-time, storage management techniques, code generation and optimization.

PREREQ: CISC320 and CISC601 recommended.

RESTRICTIONS: Undergraduates must obtain instructor's permission.

CISC 679 Topics in Architecture and Software Systems 3

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

PREREQ: CISC662 and CISC663.

CISC 681 Artificial Intelligence 3

Programming techniques for problems not amenable to algorithmic solutions. Problem formulating search strategies, state spaces, applications of logic, knowledge representation, planning and application areas.

PREREQ: CISC220 and CISC310.

CISC 689 Topics: Artificial Intelligence 3

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

PREREQ: CISC681.

CISC 801 Recursive Function Theory 3

Advanced abstract computability (or recursive function) theory with emphasis on the tools underpinning research in the area. Topics include universal programming systems, complexity results, oracular computations and quantifier hierarchies, classification of algorithmically enumerable sets, machine self-reference and priority arguments.

PREREQ: CISC601.

CISC 805 Theory of Machine Learning 3

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

PREREQ: CISC601.

CISC 809 Advanced Topics in Theoretical Computer Science 3

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

PREREQ: CISC601.

CISC 821 Algebraic Algorithms 3

Representations and algorithms for computation with symbolic mathematical expressions. Expression simplification, arithmetic, equation solving in domains including the integers, rational numbers, polynomials, power series and matrices.

PREREQ: CISC621 or MATH650.

RESTRICTIONS: Students should have taken an undergraduate linear algebra course.

CISC 822 Algebraic Algorithms 3

Algorithms for exact symbolic computation with integers of arbitrary size, polynomials, matrices, fields of quotients and modular domains. Key algorithmic problems: GCD, factorization and solution of equations. Key issues: correctness, cost analysis and system design. Key techniques: Chinese remaindering, Hensel lifting and Transforms (FFT).

PREREQ: CISC621 or CISC623 (preferably both).

RESTRICTIONS: Offered in alternate years. MATH450 or MATH650 recommended as Prerequisites.

CISC 829 Advanced Topics in Scientific and Algebraic Computation 3

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

CISC 849 Advanced Topics in Computer Applications 3

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

RESTRICTIONS: Requires permission of instructor.

CISC 851 Systems Modeling 3

Probabilistic and stochastic modeling. Discrete and continuous parameter Markov chains. Introduction to queueing theory. Open and closed queueing networks. Applications to computer systems and networks.

PREREQ: CISC360.

CISC 852 Computer Network Performance 3

Performance analysis of local area, wide area and interconnected networks. Queueing delay models, ARQ retransmission strategies, multi-access communication, routing, flow control, congestion control, and network reliability and availability.

PREREQ: CISC650.

CISC 853 Network Management 3

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

PREREQ: CISC650.

CISC 854 Local Area Networks 3

LAN protocols, topologies, transmission media, standards, design and selection, management and current research.

PREREQ: CISC650.

CISC 856 Upper Layer Protocols 3

Principles and techniques employed in the transport, session, presentation and application layers of the ISO Reference Model and the DoD TCP/IP protocol suite. Examples: ASN.1, X.400, X.500, FTAM and Virtual terminal.

PREREQ: CISC650.

CISC 857 Interconnection of Networks 3

Overview of WAN, LAN and MAN technologies; internetworking technologies: design of bridges, routers and gateways; internetworking protocols (e.g., TCP/IP); routing in internetworks; internetwork performance issues; interoperability: issues, solutions and limitations; and review of applications supported across the internetworked environments.

PREREQ: CISC650.

CISC 859 Advanced Topics in Communications, Distributed Computing Networks 3

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

PREREQ: CISC650.

CISC 868 Research 1-6

Upper-level graduate research oriented toward a student's potential master's thesis or Ph.D. dissertation.

CISC 869 Master's Thesis 1-6**CISC 879 Advanced Topics in Architecture and Software Systems 3**

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

PREREQ: CISC662 or CISC663.

CISC 881 Knowledge-Based Systems 3

Architecture of knowledge-based systems, development and application of knowledge bases in systems for expert performance in specialized domains. Knowledge sources, rule-based inference, uncertainty of facts and explanation of reasoning.

PREREQ: CISC681.

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 884 Knowledge Representation 3

Representation of knowledge in computers, common-sense knowledge, implementation methods: semantic nets, structured objects, logic, and production systems; specialized problems: representation of beliefs, temporal events and naive-physics concepts.

PREREQ: CISC681.

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 889 Advanced Topics in Artificial Intelligence 3

Contents vary to coincide with the interests of students and current 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 969 Doctoral Dissertation 1-12 PF

Comparative Literature

CMLT 202 Biblical and Classical Literature 3

See ENGL202 for course description.

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 cross-listed 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 cross-listed with ENGL212.

PREREQ: ENGL110.

CMLT 217 Introduction to Film 3

See ENGL217 for course description.

CMLT 218 Introduction to Drama 3

See ENGL208 for course description.

CMLT 219 Introduction to the Novel 3

See ENGL209 for course description.

CMLT 293 Honors Short Course 1

See ARSC293 for course description.

CMLT 311 Twentieth-Century Literature I 3

Major writers of the first half of the century. Non-English language works in translation. May be cross-listed with FLLT311.

PREREQ: ENGL110.

CMLT 312 Twentieth-Century Literature II 3

Major writers since World War II. Non-English language works in translation. May be cross-listed with FLLT312.

PREREQ: ENGL110.

CMLT 314 Introduction to Folklore and Folklife 3

See ENGL314 for course description.

CMLT 316 Classical Mythology 3

See FLLT316 for course description.

CMLT 317 Film History 3

See ENGL317 for course description.

CMLT 318 Studies in Film 3

See ENGL318 for course description.

CMLT 320 Varying Authors and Genres 3

See FLLT320 for course description.

CMLT 321 Introduction to Medieval Literature 3

See ENGL321 for course description.

CMLT 322 Topics: Classical Literature in Translation 3

See FLLT322 for course description.

CMLT 330 Varying Authors, Themes and Movements 3

See FLLT330 for course description.

CMLT 341 Theatre/Drama: Classic/Medieval 3

See THEA341 for course description.

CMLT 342 Theatre/Drama: Renaissance to 1700 3

See THEA342 for course description.

CMLT 343 Theatre/Drama: 1700 to 1900 3

See THEA343 for course description.

CMLT 344 Theatre/Drama: 1900 to Present 3

See THEA344 for course description.

CMLT 360 Humanities Colloquium 3

See ARSC360 for course description.

CMLT 365 Studies in Literary Genres, Types and Movements 3

See ENGL365 for course description.

CMLT 366 Independent Study 1-3

CMLT 390 Honors Colloquium 3

See ARSC390 for course description.

CMLT 460 Humanities Colloquium 3

See ARSC460 for course description.

CMLT 465 Studies in Literature Genres, Types and Movements 3

See ENGL365 for course description.

CMLT 466 Independent Study 1-3

CMLT 480 Seminar 3

See ENGL480 for course description.

CMLT 484 Literary Criticism and Theory 3

See ENGL484 for course description.

CMLT 660 Humanities Colloquium 3

See ARSC660 for course description.

COMM 255 Fundamentals of Communication 3

Introduction to theories in communication with applications. Developing, analyzing and critiquing communication in different settings.

RESTRICTIONS: Not open to Seniors. Not open to communication majors.

COMM 256 Principles of Communication Theory 3

Introduction to theories and research in communication with survey of the areas of the field.

RESTRICTIONS: Open to communication and communication interest majors only.

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 301 Introduction to Communication Inquiry 3

The conceptual bases of research methodology: formulating questions, designing, conducting and analyzing research.

PREREQ: COMM256.

RESTRICTIONS: Open to communication interest majors only.

COMM 309 Introduction to Public Relations 3

The role of public relations in various settings, including corporations, nonprofit organizations and educational institutions. Tactics and strategies for writing news releases, designing a public relations campaign and working with the media.

PREREQ: ENGL307 and COMM245.

COMM 311 Communication Techniques 3

A technical approach to the research, organization, compilation and production stages of public relations communications including radio, television, in- and out-of-house publications (newsletters, annual reports, correspondence and news releases) and advertising design.

PREREQ: COMM309.

COMM 312 Oral Communication in Business 3

Provides a variety of oral communication skills needed for public presentations, use of visual aids in speeches and extemporaneous speaking. Consists primarily of structured and critiqued student performances.

RESTRICTIONS: Not open to communication and communication interest majors.

COMM 325 Television Production 3

Television as a mass communication media. Background, programming, production and studio procedures. Educational television, broadcasting and closed circuit. Laboratory observation and practices.

COMM 330 Communication and Social Behavior 3

An introduction to verbal and nonverbal communication including perceptual processes, symbol systems, communicative functions and patterns, and cultural contexts.

COMM 350 Public Speaking 3

Analyzes and applies theory and research in public speaking. Develops skills in preparation, presentation and evaluation of speeches. Includes classroom performances.

COMM 356 Small Group Communication 3

Examines basic group processes, structures and functions. Emphasizes both theory and practical applications.

RESTRICTIONS: Requires permission of instructor.

COMM 361 Interpersonal Communication 3

Focus on dyadic relationships as created, maintained and modified through verbal and nonverbal interaction.

COMM 365 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.

PREREQ: COMM245

COMM 366 Independent Study 1-3

Communication

COMM 200 Introduction to Human Communication Systems 3

An analysis of human communication systems emphasizing the communication strategies used to relate, inform, persuade and manage conflict in personal, non-personal and male/female relationships.

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 The Development of Verbal Communication 3

Investigation of the physiological, linguistic, psychological and social bases of verbal communication. Application of these insights to communicative disorders and to educational and family settings.

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.

PREREQ: COMM245.

COMM 388 TV Production Practicum 3 PF

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

PREREQ: COMM325.

COMM 409 Public Relations 3

Problems and practices of public relations using case study illustrations. Focus on assessment of program design and development.

PREREQ: COMM309.

COMM 413 Public Relations Management 3

Introduction to management tools of the public relations practitioner beyond specific case studies. Discussion of management approaches solely within confines of PR area. Topics: budgeting, managing human resources, approach/philosophy of PR program, charting trends and problems of assessment.

PREREQ: COMM309.

COMM 417 Communication and the Management of Conflict 3

Analysis of communication and the conflict process in an interpersonal setting. Emphasis on the structure of conflict interaction and on the skills of assessing and intervening in conflict situations.

RESTRICTIONS: Open to communication majors only.

COMM 418 Topics in Mass Communication 3

Topics vary from semester to semester and include current directions in mass communication theory and research, cable television, radio and TV regulations, public policy.

PREREQ: COMM245.

RESTRICTIONS: Open to communication majors only. May be repeated three times for credit when topics vary.

COMM 421 Intercultural Communication: Applications in International Contexts 3

Students critically assess current intercultural communication theory and apply that theory to practical situations in various international contexts.

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

COMM 424 Media Message Analysis 3

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

PREREQ: COMM245.

RESTRICTIONS: Open to Communication majors only. Requires permission of instructor.

COMM 435 Advanced TV Production and Direction 3

Analysis and synthesis of the production, planning and videotaping of TV programs; news and public affairs, drama, variety and instructional programming.

PREREQ: COMM325.

COMM 438 Speech and Language in Human Behavior 3

Theories of speech and language. Psycholinguistic approaches to problems of meaning, different types of texts, models of language use and acquisition and language and cognition.

RESTRICTIONS: Open to communication majors only.

COMM 440 Topics in Interpersonal and Organizational Communication 3

Significant research, theories and literature in communication, research design and theory building.

May be cross-listed with WOMS440.

RESTRICTIONS: May be repeated three times for credit when topics vary. Open to communication majors only.

COMM 450 Mass Communication Effects 3

Examines the history and nature of research on the effects of the mass media, particularly television, in such areas as attitude change, socialization, role modeling and sex and violence.

PREREQ: COMM245.

RESTRICTIONS: Open to communication majors only. Requires permission of instructor.

COMM 452 Communication, Power and Values 3

How influence is created and resisted through communication in personal relations, public relations and advertising; personal values, persuasive strategies and ethics in exercising and resisting social power.

RESTRICTIONS: Open to communication majors only.

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.

RESTRICTIONS: Open to communication majors only.

COMM 455 Symbolism in Organizations 3

Analyzes the use and arrangement of physical space; the socialization of new members and outsiders; the use of myths, metaphors, language and other ways of symbolically representing the organization; and the role of creativity in organizations and managerial style.

RESTRICTIONS: Open to communication majors only.

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.

RESTRICTIONS: Open to communication majors only.

COMM 464 Internship 1-6 PF

Practical, on-the-job training in the student's field of interest: i.e., intercultural, interpersonal, mass media, public relations or organizational communication.

RESTRICTIONS: Requires permission of instructor; COMM major with Junior or Senior status, a 2.75 GPA, and a 2.75 GPA in COMM.

COMM 466 Independent Study 1-3

COMM 485 Analysis of Verbal Communication 3

Surveys models of conversational analysis of human interaction in different settings such as everyday social encounters, educational contexts, organizational settings. Emphasis on message construction and interpretation.

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 3

Problems and practices of public relations using case study illustrations. Focus on assessment of program design and development.

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

Introduction to management tools of the public relations practitioner beyond specific case studies. Discussion of management approaches solely within confines of PR area. Topics: budgeting, managing human resources, approach/philosophy of PR program, charting trends and problems of assessment.

COMM 617 Communication and the Management of Conflict 3

Analysis of communication and the conflict process in an interpersonal setting. Emphasis on the structure of conflict interaction and on the skills of assessing and intervening in conflict situations.

COMM 618 Topics in Mass Communication 3

Topics vary from semester to semester and include 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 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 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 638 Speech and Language in Human Behavior 3

Theories of speech and language. Psycholinguistic approaches to problems of meaning, different types of texts, models of language use and acquisition and language and cognition.

COMM 640 Topics in Interpersonal and Organizational Communication 3

Significant research, theories and literature in communication, research design and theory building.

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

COMM 650 Mass Communication Effects 3

Examines the history and nature of research on the effects of the mass media, particularly television, in such areas as attitude change, socialization, role modeling and sex and violence.

COMM 652 Communication, Power and Values 3

How influence is created and resisted through communication in personal relations, public relations and advertising; persuasive strategies and ethics in exercising and resisting social power.

COMM 655 Symbolism in Organizations 3

Analyzes the use and arrangement of physical space; the socialization of new members and outsiders; the use of myths, metaphors, language and other ways of symbolically representing the organization; and the role of creativity in organizations and managerial style.

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 664 Internship 1-6

Provides the student with practical, on-the-job training in the field of his or her interest, i.e., intercultural, 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 Verbal Communication 3

Surveys models of conversational analysis and assesses human interaction in different settings (e.g., everyday social encounters, educational contexts, organizational settings, etc.) using these models. Emphasis on message construction and interpretation in interpersonal communication.

COMM 869 Master's Thesis 1-6

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 of the 1950s through the 1980s that contributed to the increased use of illicit drugs.

CRJU 134 Great Crimes 3

Examines the realities of securing justice in light of crimes that have generated intense interest and critical analysis (Lindbergh kidnapping, Rosenberg spy case, etc.) Using the case study method, contracts made and comparisons drawn among changing legal norms, investigative techniques and public attitudes toward crime.

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 1990s. 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 304 Criminology 3

See SOCI304 for course description.

CRJU 313 The Study of Murder 3

An historical and contemporary analysis of criminal homicide, examining the nature and extent of murder, including those related to assassination and war.

CRJU 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 330 Population, Law and Society 3

See SOCI330 for course description.

CRJU 332 Criminal Violence in America 3

General overview of various aspects of criminal violence. In-depth analysis of child abuse, rape, domestic violence and black-on-black homicide.

CRJU 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.

PREREQ: CRJU201.

RESTRICTIONS: Junior and senior majors only.

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

See SOCI345 for course description.

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 cross-listed with PSYC346.

CRJU 347 The Jury: Guilty or Not Guilty 3

Observations of actual criminal and civil trials, mock jury deliberations of trials; lectures on jury research; films; and meetings with judges, prosecutors and defense attorneys.

COREQ: PSYC347.

RESTRICTIONS: Requires permission of instructor.

CRJU 348 Theories of Social Work Practice 3

See SOCI348 for course description.

CRJU 350 Women and Criminal Justice 3

Reviews historical and contemporary explanations for women's participation in crime and evaluates these explanations in light of current research. Other topics include treatment of women offenders by judicial and correctional systems, women as victims of crime and women as criminal justice personnel.

May be cross-listed with WOMS350.

CRJU 355 Race, Class and Crime 3

Examines contemporary patterns of race, class and crime through historical interconnections of social, political and economic processes. Addresses the impact of race and class on the arrest, conviction and sentencing of offenders.

May be cross-listed with BAMS355.

CRJU 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 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 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

See SOCI428 for course description.

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 446 Judging the Jury 3

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

CRJU 448 Community-Based Treatment 3

See SOCI448 for course description.

CRJU 450 Prisoners and the Law 3

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

CRJU 455 The Ecology of Crime 3

Examines the structure of urban areas and the way in which the arrangement and organization of urban areas influence the spatial distribution of crime and the behavior of offenders in urban spaces.

May be cross-listed with GEOG441.

CRJU 456 Lawyers and Society 3

See SOCI456 for course description.

CRJU 457 Criminal Evidence 3

The study of the laws of evidence and how they are used in the criminal courts and their effect on the administration of justice.

CRJU 460 Criminal Justice Policy 3

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

CRJU 466 Independent Study 1-6

CRJU 490 Drug Abuse Research Seminar 3

A concentrated examination of contemporary efforts in the areas of drug abuse legislation, enforcement and research, and how these combine to influence prevention, treatment and control strategies.

PREREQ: SOCI301.

CRJU 495 Field Experience in Criminal Justice 4 PF

Practicum involving actual field experience in a criminal justice agency; e.g., law enforcement, courts or correctional agencies. Emphasis on relating the field experience to academic work.

May be cross-listed with SOCI495.

RESTRICTIONS: Requires permission of instructor.

Center for Science and Culture

CSCC 206 Introduction to Science, Technology and Society 3

Introduces scientific and technological concepts in historical perspective; includes social as well as natural science and a discussion of the social context of science and technology. Interdisciplinary and team taught.

May be cross-listed with PHIL206.

CSCC 229 Nature of Science 3

Introduction to the nature of the scientific enterprise. Uses both theoretical discussion and detailed example to illuminate how science helps us to understand the world. Topics include scientific method, the role of theory, controversies in science and the relationship between science and culture.

PREREQ: Any two science courses or one science course and PHIL205.

CSCC 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.

May be cross-listed with WOMS233.

CSCC 241 Ethical Issues in Health Care 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.

May be cross-listed with PHIL241.

CSCC 242 Society and the Health Professions 3

Interdisciplinary course on the historical development and character of professional institutions in health care. Material on Asian, European and Latin American societies used for comparison to the health professions in America. May be cross-listed with SOCI242.

CSCC 243 Society, Politics and Health Care 3

An interdisciplinary study of the political, social, economic and humanistic issues of health care delivery. May be cross-listed with SOCI243.

CSCC 245 Ethical Issues in Scientific Research 3

An interdisciplinary approach to ethical issues arising in scientific research, covering both life and physical sciences. May be cross-listed with PHIL245.

CSCC 246 Philosophical Perspectives of Medicine 3

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

CSCC 248 Magic, Science and Religion 3

How are magic, science and religion related to each other as systems of thought and practice? How do they vary from one civilization to another? How have their relationships evolved in our own society?

CSCC 250 Engineering Ethics 3

See PHIL250 for course description.

CSCC 271 Introduction to Medical Anthropology 3

Survey of research on the relationships between traditional and modern medicine in Asian, African and Latin American cultures, including research on the evolution of infectious diseases and their effect on the historical development of Asian, African and American Indian civilizations.

CSCC 310 Sociology of Health Care 3

See SOCI310 for course description.

CSCC 311 Hospitals 3

See SOCI311 for course description.

CSCC 330 Varying Authors, Themes and Movements 3

See FLIT330 for course description.

CSCC 341 Ethics of Engineering Profession 1

See PHIL341 for course description.

CSCC 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. May be cross-listed with SOCI355.

CSCC 356 Individual Studies, Science, Technology and Society 1-3

Opportunity for student to work closely with a particular professor specializing in one of the humanities or social science disciplines dealing with science and technology.

CSCC 365 Studies in Literary Genres, Types and Movements 3

See ENGL365 for course description.

CSCC 366 Independent Study 1-6

CSCC 368 Literature and Science 3

See ENGL368 for course description.

CSCC 369 Literature and Medicine 3

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

CSCC 382 History of Western Medicine 3

Social and cultural forces that have influenced the development of modern medicine. May be cross-listed with HIST382.
PREREQ: HIST101 and HIST102

CSCC 385 History of Biological Ideas 3

Historical analysis of the major intellectual and scientific concepts of biology. Developments since the mid-19th century that had a direct relationship to modern medical education, infectious diseases and social biology. May be cross-listed with HIST385.

CSCC 389 Topics in Women and Health Issues 3

See WOMS389 for course description.

CSCC 411 Seminar in American History 3

See HIST411 for course description.

CSCC 444 Medical Ethics 3

See PHIL444 for course description.

CSCC 498 Topics in Biology 3

See BISC498 for course description.

CSCC 647 Philosophy of Technology 3

See PHIL647 for course description.

Early American Culture

EAMC 602 Material Life in Early America 3

American domestic environments and decorative arts within social and economic context of 17th and 18th centuries. Critically assesses how objects contributed to the study of everyday life in colonial America.

RESTRICTIONS: Requires permission of instructor.

EAMC 603 History of Furniture in America 3

American furniture from the colonial era to the Civil War. Considers European design sources and stylistic influences. Introduction to bibliography, research tools and methods, familiarization with major classes of objects, analysis of formal and functional changes over time, region and economic level.

RESTRICTIONS: Requires permission of instructor.

EAMC 604 History of Nineteenth-Century American Interiors 3

Introduction to domestic interiors with emphasis on household technology, interior design, decorative arts and furnishings. Touches on some of the social, political, economic and technological forces that shaped the built environment. May be cross-listed with MSST604.

May be cross-listed with MSST604.

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 cross-listed with HIST605, MSST605 and/or URAF611.

RESTRICTIONS: Requires permission of instructor.

EAMC 606 Issues in American Material Culture 3

Studies major themes in American material culture of the 17th, 18th or 19th centuries. Topics will vary from year to year. May be cross-listed with HIST606 and/or MSST606.

May be cross-listed with HIST606 and/or MSST606.

RESTRICTIONS: Requires permission of instructor.

EAMC 671 Connoisseurship of the Decorative Arts in America I 3

Three to five subjects within the decorative arts, not including furniture, 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 672 Connoisseurship of the Decorative Arts in America II 3

Three to five subjects within the decorative arts, not including furniture, 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 801 Introduction to Decorative Arts in America to 1850 3

Development of decorative arts, painting and architecture in America. Principles of connoisseurship and studies of American and imported objects of art. Collections of the Winterthur Museum.

May be cross-listed with ARTH801.

RESTRICTIONS: Requires permission of instructor.

EAMC 869 Master's Thesis 3

Economics

ECON 100 Economic Issues and Policies 3

Takes a nontechnical approach to basic economics. Applies economic concepts to contemporary issues, problems and policies. Covers both macro and micro topics.

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

ECON 151 Introduction to Microeconomics 3

Introduces supply and demand concepts with basic economic graphs. Examines models of perfect and imperfect competition and the determination of product price and quantities. Covers current microeconomic issues such as the effect of government regulation and environmental problems.

COREQ: MATH114 or MATH115.

ECON 152 Introduction to Macroeconomics 3

Analyzes the determinants of unemployment, inflation, national income, and policy issues relating to how the government alters unemployment and inflation through control of government spending, taxes and the money supply.

PREREQ: ECON151.

ECON 251 Managerial Economics 3

Applies economic theory to business and managerial decision making. Includes analysis of consumer demand, theory of production and supply and the effects of different market structures and pricing strategies.

PREREQ: ECON151 and STAT201.

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

ECON 300 Intermediate Microeconomic Theory 3

Price determination and income distribution in a market economy; the behavior of firms and industry under conditions of pure and imperfect competition.

PREREQ: ECON151.

RESTRICTIONS: Credit can be earned for only one among ECON251, ECON300 or ECON301. BS majors must take ECON 301, ECON300 cannot be used to satisfy economic BS major requirements.

ECON 301 Quantitative Microeconomic Theory 3

Uses calculus to study price determination and income distribution in a market economy; and the behavior of firms and industry under conditions of pure and imperfect competition.

PREREQ: ECON151 and MATH221.

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

ECON 302 Money, Credit and Banking 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; theoretical problem of short-run fluctuations and secular growth.

PREREQ: ECON302.

ECON 305 Capitalism and Socialism: Comparative Economic Systems 3

Theoretical and empirical comparison of economic systems' use of the market mechanism to allocate resources. Emphasis on the consequences of industrial democracy and governmental efforts to improve the decisions of corporations in Western Europe and Japan.

PREREQ: ECON151.

ECON 306 Public Choice 3

Uses rational choice principles of maximization and competition to analyze political behavior. Covers candidates' competition for votes, the "public good" problem, paradoxes of voting, the political business cycle, legislative decision making and vote trading and theories of bureaucracy.

May be cross-listed with POSC306.

PREREQ: ECON151 and POSC105.

ECON 311 Economic Growth and Development Policy 3

Surveys policy issues related to economic growth and development. Special emphasis on problems of developing countries.

PREREQ: ECON151 and ECON152.

RESTRICTIONS: ECON 311 and ECON 411 cannot both count for degree credit.

ECON 315 Economic History of Colonial America 3

Simple economic theory 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, creation of the Constitution, colonial growth, foreign trade, education and witchcraft.

PREREQ: ECON151 and ECON152.

ECON 316 American Economic History 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: ECON152.

ECON 318 Economic History of France 3

Development of French economic policy from Roman to modern times. Emphasis on origins and influence of the Catholic Church, Colbert, the French Revolution and centralization of economic policy in France.

PREREQ: ECON151.

RESTRICTIONS: Requires permission of instructor. Offered only during Winter Session in France.

ECON 332 Public Finance and Fiscal Policy 3

Microeconomic and macroeconomic analysis of public expenditure, borrowing and taxation. Introduction to stabilization, efficiency and distributional features of public finance.

PREREQ: ECON151.

RESTRICTIONS: ECON 332 and ECON 433 cannot both count for degree credit.

ECON 340 International Economic Relations 3

Theory, problems and policy in international trade and finance with emphasis on developments since World War II.

PREREQ: ECON151 and ECON152.

RESTRICTIONS: ECON 340 and ECON 443 cannot both count for degree credit.

ECON 341 Environment of Multinational Corporations 3

See BUAD341 for course description.

ECON 348 Industrial Policies of France 3

Comparison of economic policies in France and the U.S. Emphasis on merger, antitrust, regulation and international trade policies. Includes a review of the economic theory of the firm.

PREREQ: ECON151.

RESTRICTIONS: Requires permission of instructor. Offered only during Winter Session in France.

ECON 360 Government and 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.

RESTRICTIONS: ECON 360 and ECON 461 cannot both count for degree credit. ECON 360 and ECON 463 cannot both count for degree credit.

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: ECON 381 and ECON 483 cannot both count for degree credit.

ECON 393 Urban Economics 3

Economic problems and issues affecting modern urban society.

PREREQ: ECON151.

ECON 403 History of Economic Thought 3

Development of economic analysis as a systematic discipline from mercantilist writers forward. Theories of resource allocation emphasized, with selected reference to topics in trade, money and welfare.

PREREQ: ECON300 or ECON301.

ECON 405 The Planned Economies 3

Theoretical and empirical comparison of market and centrally planned economic systems. The United States and the Soviet Union are studied.

PREREQ: ECON300 or ECON301, and MATH230.

ECON 406 Economics of Uncertainty 3

Investigates impact of cost information on the behavior of individuals and markets. Topics include decision making under risk and uncertainty, insurance, consumer-employer search behavior, product liability, industrial safety, futures markets and problems of contract enforcement.

PREREQ: ECON300 or ECON301, and MATH221 and STAT202.

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.

PREREQ: ECON300 or ECON301.

ECON 411 Economics of Growth and Development 3

Theoretical and empirical analysis of models of growth and development. Emphasizes the use of economic analysis to evaluate public policies in underdeveloped countries.

PREREQ: ECON300 or ECON301, and ECON303.

RESTRICTIONS: ECON 311 and ECON 411 cannot both count for degree credit.

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 STAT202.

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 Introduction to Econometrics 3

Uses statistical methods, especially multiple regression, to quantify economic models, including situations when the assumptions of classical statistics do not hold.

PREREQ: MATH221, STAT202 and ECON152.

ECON 423 Econometric Applications 3

Class discussion and research in advanced economic statistics and applied econometrics.

PREREQ: ECON422.

ECON 426 Introduction to Mathematical Economics 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: ECON300 or ECON301, and MATH221.

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 the energy environmental problems, the negative income tax, urban finances and the national debt.

PREREQ: ECON300 or ECON301.

RESTRICTIONS: ECON 332 and ECON 433 cannot both count for degree credit.

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.

RESTRICTIONS: ECON 340 and ECON 443 cannot both count for degree credit.

ECON 461 Industrial Organization and Antitrust Policy 3

Describes and analyses markets in terms of structure, methods of competition and social performance, particularly oligopolistic and differential competition. Stresses entrepreneurship, innovation and government competition policy, particularly antitrust.

PREREQ: ECON300 or ECON301, and STAT202 and MATH221.

RESTRICTIONS: ECON 360 and ECON 461 cannot both count for degree credit.

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: ECON300 or ECON301, and MATH221.

RESTRICTIONS: ECON 360 and ECON 463 cannot both count for degree credit.

ECON 466 Independent Study 1-6**ECON 475 Economics of Natural Resources 3**

Studies the allocation of natural resources. Applies theory to the problem of misallocations caused by open-access, common property and multiple use, under both free and controlled economies.

PREREQ: ECON300 or ECON301.

ECON 477 Benefit-Cost Analysis 3

Studies the proper way to plan, undertake and interpret a benefit-cost analysis. Emphasizes methods of choosing a proper discount rate and handling such problems of income distribution, unemployment, risk and uncertainty, externalities and measurement of nonmarket benefits and costs.

PREREQ: ECON300 or ECON301.

ECON 483 Labor Economics 3

Analyzes economic models of labor market topics - sex and race discrimination, determination of wages and fringe benefits, labor unions, individual and firm investments in education and training, geographical mobility, labor supply, and professional sports.

PREREQ: ECON300 or ECON301.

ECON 551 Managerial Economics 3

Applied microeconomic theory for the manager. Moderately rigorous analysis of models of consumer and firm behavior especially under conditions of constraint, uncertainty and market imperfection. Emphasizes economics with significance for decision making in the business community.

PREREQ: MATH221.

ECON 552 Macroeconomic Environment of the Firm 3

Concerns understanding the forces that determine the level and composition of income in the United States economy. Topics covered include monetary, fiscal and debt management policies and the role of the United States in the world economy.

ECON 668 Research 1-3**ECON 670 Applied Policy Analysis 3**

See MAST672 for course description.

ECON 671 Microeconomics for Economic Education 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 Instruction in Economic Education.

ECON 672 Macroeconomics for Economic Education 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 Instruction in Economic Education.

ECON 673 Curriculum Strategies for Elementary Economic Education 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 Instruction in Economic Education.

ECON 674 Curriculum Strategies for Secondary Economic Education 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 Instruction in Economic Education.

ECON 675 Economics of Natural Resources 3

See MAST675 for course description.

ECON 676 Environmental Economics 3

See MAST676 for course description.

ECON 678 Monetary and International Trade Theories for Economic Education 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 Instruction in Economic Education.

ECON 679 Contemporary Issues for Economic Education 3

Emphasizes contemporary economic issues, problems and controversies.

RESTRICTIONS: Requires enrollment in Master of Instruction in Economic Education.

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 income, employment and the price level; the behavior of these variables within both the neoclassical and income-expenditure framework; and the fiscal and monetary policy implications of these alternative theoretical approaches.

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: STAT202 or STAT555.

ECON 822 Econometric Theory 3

Applies and modifies statistical techniques to economic data; presents the essentials of econometric theory.

PREREQ: STAT201.

ECON 823 Seminar in Econometrics 3

Class discussion and research in advanced economic statistics and applied econometrics.

PREREQ: ECON822.

ECON 827 Advanced Production Economics 3

See FREC827 for course description.

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: ECON300 or ECON301, or ECON801.

ECON 842 International Finance and Development 3

Continues ECON841. Covers foreign exchange markets, balance of payments, exchange rate systems and international economic policy.

PREREQ: ECON802 or ECON303.

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: ECON300, ECON301 or ECON551.

ECON 868 Research 1-9

ECON 869 Master's Thesis 1-6

ECON 875 Advanced Fishery Economics 3

See MAST875 for course description.

ECON 877 Advanced Benefit-Cost Analysis 3

Concentrates on the identification and measurement of the benefits and costs of both market and non-market activities. Applies benefit-cost principles to realistic problems.

PREREQ: ECON801 or ECON551.

COREQ: ECON801 or ECON551.

ECON 890 Colloquium: Economics Seminar Series 0 PF

Regularly-scheduled lectures by faculty and visiting researchers providing exposure to current research in economics.

ECON 894 Applied Regional Modeling 3

Uses quantitative methods to forecast regional economic phenomena. Methods include regional export base, shift-share, input-output and econometric models. Emphasizes policy simulations.

PREREQ: ECON822.

Educational Development

EDDV 205 Children's Literature 3

Survey of literature for 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.

EDDV 220 Introduction to the Teaching of Reading 3

Explores dimensions of reading; approaches to, and materials for teaching and testing reading; and reading instruction of diverse learners.

EDDV 300 Perspectives in Educational Research 1 PF

Seminar introduces current research topics and methods in the field of education. Students survey current research in education, clarify their own interests and abilities and are introduced to faculty mentors.

RESTRICTIONS: Offered only in Fall. Requires 28-30 credit hours and a GPA of 3.25 or higher.

EDDV 305 Elementary Curriculum: Language Arts 3

Focuses on the nature, acquisition and development of oral and written language. Explores appropriate instructional strategies and resources for use with elementary school children. Includes field experience in classrooms.

PREREQ: EDDV220.

EDDV 306 Emerging Literacy: Young Children Learn to Read and Write 3

The nature, acquisition and development of literacy in children to age six. Explores appropriate instructional strategies and resources for use with young children. Field experience in Kindergarten.

PREREQ: EDDV220, IFST222 and IFST224.

EDDV 307 Teaching Language and Literature 3

Investigation of current information on how children develop language abilities and knowledge of literature in classroom contexts. Focuses on the integration of language arts areas (literature, writing, speaking, listening and reading) into a program which teaches strategies in a meaningful context. Practicum component.

EDDV 320 Elementary Curriculum: Reading 3

Focuses on methods and materials for developing literacy from Kindergarten to grade 8. Includes Practicum in developmental reading instruction.

PREREQ: EDDV220.

RESTRICTIONS: For elementary education majors.

EDDV 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: MATH252.

EDDV 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: MATH251, MATH221 and MATH230.

RESTRICTIONS: Requires permission of advisor.

EDDV 341 Elementary Curriculum: Science 3

An 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.

EDDV 346 Elementary Curriculum: Social Studies 3

An 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.

PREREQ: HIST102, HIST205 or HIST206 GEOG102, GEOG120 or GEOG203.

EDDV 366 Independent Study 1-6**EDDV 370 Helping Relationships 1 PF**

The study of those roles in society that require some form of effective interpersonal functioning. Introduction to the core dimensions of helpful relationships: empathy, respect, genuineness and concreteness. Practice in communicating those levels of the core dimensions that are facilitative to interpersonal functioning.

EDDV 371 Personal Growth Seminar 1 PF

Small, semi-structured, discussion-oriented seminar. Participants explore their own motivations, values and feelings and share these feelings and perceptions with other seminar members. An educational, growth-oriented experience, not to be confused with group therapy, which is usually problem-oriented.

RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.

EDDV 372 Counseling Theories 3

Examination of selected counseling theories from a theoretical, personal, functional and philosophical point of view.

EDDV 373 Psychology of Human Relationships 3

Psychological 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.

EDDV 374 Experiential Education 3

Field experiences in human service professions combined with a seminar emphasizing personal learning skills. Seminar utilizes field experiences of students for skill development in specific areas then applied to field experience evaluation.

RESTRICTIONS: Requires permission of instructor.

EDDV 400 Student Teaching 3-12 PF

Full-time extended student teaching experience in public elementary and secondary schools. Students are under the guidance and supervision of the cooperating teacher in the classroom and a University of Delaware supervisor.

EDDV 403 Literature for Adolescents 3

Evaluation of classic and contemporary reading materials and their application to the junior-senior high school curriculum. Study of criteria, methods and tools for selection of books. Techniques for developing and promoting reading.

EDDV 422 Literacy in Content Areas 3

Provides a framework for simultaneously developing content area objectives and literacy through instructional attention to text analysis, activating prior knowledge, developing vocabulary and comprehension and organization of text information. Instructional strategies presented focus on developing students' independence in learning through utilization of all communication processes: reading, writing, speaking and listening.

PREREQ: EDDV307 and EDDV320.

RESTRICTIONS: Requires permission of instructor.

EDDV 443 Teaching Science in Middle School 3

An 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.

EDDV 466 Independent Study 1-6**EDDV 541 Environmental Resources 3**

Focuses on air and water quality, proper waste disposal and soil conservation using government and private resources. Provides teachers with background information and activities. Creates opportunities for teachers to become active participants in programs from different disciplines, age levels and locations.

RESTRICTIONS: Includes presentations of outdoor teaching units and field trips suitable for class visits.

EDDV 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.

EDDV 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.

EDDV 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.

EDDV 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.

EDDV 605 School Curriculum: Language Arts 3

Focuses on the nature, acquisition and development of oral and written language. Examines curriculum materials and instructional strategies appropriate for use with elementary and middle school students.

EDDV 607 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.

EDDV 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.

EDDV 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.

EDDV 621 Developmental Reading Instruction 3

Presentation of reading theories and research as a basis for understanding and evaluating prevalent and newly proposed techniques for developmental reading instruction and assessment. Practical application of that knowledge in generating successful classroom implementation of reading practices critically selected as appropriate for pupils, curriculum and school setting.

PREREQ: EDDV620.

EDDV 622 Teaching Reading in Content Areas 3

Focuses on instructional strategies to help students learn from content area texts. Includes attention to assessment, text analysis, classroom organization and developing students' independence in reading and remembering text information through improving their vocabularies, text comprehension and study processes.

EDDV 624 Developmental Reading and the Role of the Reading Consultant 3

Laboratory course to prepare students to serve as reading consultants. Teaching experience in the Reading Center is required along with visitations to different schools to see firsthand how reading consultants operate. The course provides opportunity to study and compare remedial and developmental reading programs.

PREREQ: EDDV620 or EDDV621, and EDDV626.

EDDV 625 Introduction to the Diagnosis and Correction of Reading Disabilities 3

A basic course for teachers and related professionals. Measurement of reading; factors related to reading disability; methods and materials for correction of problems.

PREREQ: EDDV620 or EDDV621.

EDDV 626 Analysis of Reading: Practicum 3

A practicum, diagnostic course which reviews recent theories of reading and research related to assessment of reading skills and measures of reading achievement. Emphasis on informal approaches to evaluating reading, particularly informal reading inventories. Requires supervised administration of reading measures and preparation of diagnostic reports.

PREREQ: EDDV625.

EDDV 627 Advanced Analysis of Reading: Practicum 3

A practicum, diagnostic course which reviews recent theories and developments related to correlates of reading disabilities including intelligence, cognition, perception, linguistic development and social/emotional adjustment. Requires supervised administration of measures of reading and related areas and preparation of diagnostic reports.

PREREQ: EDDV626.

EDDV 628 Remedial Reading Techniques 3

A laboratory course demonstrating corrective and remedial procedures. Opportunity provided for practice in application of specific psychological, pedagogical and psychotherapeutic techniques used with typical problem cases. Often requires practicum work with children at off-campus sites.

PREREQ: EDDV626.

EDDV 634 Topics in Elementary School Math 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.

EDDV 635 Teaching Mathematics in Lower Elementary School 3

Acquaints students with historic and recent information from theory and research on teaching and learning mathematics in grades 1-4, and will engage students in methods and materials for instruction that such information suggests.

PREREQ: EDDV634 or MATH252.

RESTRICTIONS: Grade of C or better in EDDV634 or MATH252.

EDDV 636 Teaching Mathematics in Upper Elementary School 3

Acquaints students with historic and recent information from theory and research on teaching and learning mathematics in grades 4-8, and engages students in methods and materials for instruction that such information suggests.

PREREQ: EDDV634 or MATH252.

RESTRICTIONS: Grade of C or better in EDDV634 or MATH 252.

EDDV 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.

EDDV 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.

EDDV 642 Topics in Science Education 3

In-depth study of a major problem in science education. Problems to be studied will vary with each offering.

RESTRICTIONS: May be repeated for credit when topics vary.

EDDV 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.

EDDV 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.

EDDV 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.

EDDV 650 Foundations of Occupational Education 3

Examines the historical and philosophical development of occupational education, provisions of federal legislation and the range of activities and instruction provided by various program areas.

EDDV 651 Organization, Administration and Supervision of Occupational Education 3

A study of the practices, procedures and techniques of concern to those who would organize, manage or coordinate occupational education programs. Examines the nature and function of administration and supervision in occupational education with a view to the improvement of programs.

EDDV 652 Contemporary Issues in Occupational Education 3

Seminars for individual and group analysis and discussion of the various innovations, trends, problems and issues in occupational education. Prominent individuals in occupational education at the state, regional and national levels serve as guest speakers to help analyze and clarify important problems.

EDDV 653 Introduction to Career Education 3

Philosophy of career education, development of the movement, federal career education legislation, state plans and local implementation programs. A study of problems related to operation of career education programs.

EDDV 654 Individual Instructional Systems 3

Concepts of individualized instruction emphasizing techniques for determining student difference, prescribing and utilizing instructional strategies with computer applications.

EDDV 660 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.

EDDV 664 Field Study in Vocational Education 3

Supervised investigations in the field of vocational education pursued on a small-group basis. Experimental work, follow-up and case studies, surveys and other projects selected for their contribution to the local and/or state levels.

EDDV 669 Professional Seminar 1

Introduction to the research, professional standards and ethical issues in counseling and student personnel administration.

RESTRICTIONS: Requires permission of instructor.

EDDV 670 Student Development in Higher Education 3

Studies in development of motivation and personality trends in late adolescence and young adulthood in the context of higher education institutions. Designed for college counselors and student personnel administrators who deal with student development/institutional impact interactions.

RESTRICTIONS: Requires permission of instructor.

EDDV 671 Introduction to Student Personnel 3

The history, philosophy, purposes, problems, issues and professional ethics of the college student personnel profession.

EDDV 672 Issues in Higher Education 3

Study of the purposes and problems of American higher education. Current issues analyzed, particularly with regard to the impact of college on the student.

EDDV 673 Student Personnel Management 3

Study of the theories and principles of management in student personnel administration. Emphasizes the role and function of the student personnel worker.

EDDV 674 Theories of Counseling 3

Theories and techniques used in counseling of individuals with personal, social, vocational and educational problems.

RESTRICTIONS: Requires permission of instructor.

EDDV 675 Using Tests in Counseling 3

Basic concepts in the use of tests and inventories in the counseling of adolescents and adults. Emphasis on higher education settings. Selection and interpretation of commonly used instruments. Ethical issues and special problems in interpretation. May be cross-listed with PSYC665.

RESTRICTIONS: Requires permission of instructor.

EDDV 676 Prepracticum in Counseling 2

Improves accuracy of interpersonal perception, listening and empathy building skills and basic counseling techniques. Laboratory sessions emphasize role playing and practice in counseling.

RESTRICTIONS: Requires permission of instructor.

EDDV 677 Group Counseling 3

An explanation of group work and group counseling in the higher education as well as the school setting. Emphasis on theoretical foundations of group work and group skill training.

RESTRICTIONS: Designed for counselors, and college and school counseling majors.

EDDV 678 Career Development Theory 3

A 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.

EDDV 681 Program Design for Adults 3

Program planning, development and evaluation for adult and continuing education programs. Including diagnosis of client needs; effective system of planning, development and evaluation for adult education programs; program scheduling; and budget and resource planning.

EDDV 683 School Business Management 3

A study of the financial and business aspects of school administration.

EDDV 684 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.

EDDV 686 Legal Issues for School Managers 3

Legal problems affecting school management including tort and contractual liability, pupil personnel law, employee negotiations, Delaware school law and recent court decisions.

EDDV 687 Human Resource Management 3

Considers the ways in which organizations accommodate and utilize their human resources as it focuses on personnel management functions such as selection, maintenance and development.

EDDV 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 and middle school principal.

EDDV 690 Administration of Secondary Schools 3

A study of administrative practices and procedures in secondary school with emphasis on the junior and senior high school administrator.

EDDV 691 Administration of Middle Schools 3

Studies administrative practices and procedures in the middle school with emphasis on the middle school principal.

EDDV 692 Introduction to Leadership 3

Studies current research and applications of leadership research to educational administration. Includes some history of leadership studies. Focuses on the application of research in instructional leadership, leadership styles and the development of leadership skills.

EDDV 693 Supervision: Purposes and Effects 3

Investigates research in teaching/learning; the teaching occupation and school structures which shape the purposes and effects of supervision and evaluation in school settings. Particular attention given to the Delaware appraisal process.

EDDV 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.

EDDV 697 Design and Development of School Curriculum 3

Theory and practice of curriculum design and development. Specific areas include nature and structure of theory, role of theory in designing and developing school curricula, principles and procedures essential to analysis and solution of curriculum problems.

EDDV 800 Research Colloquium in Education Development 1-3

Analysis of research in education currently underway at the University of Delaware and at other institutions, including doctoral dissertations.

RESTRICTIONS: Open only to Ph.D. and advanced master's students. May be repeated for a total of three credit hours when topics vary.

EDDV 801 Seminar: Child Discourse and Education 3

Examination of child discourse, such as children's narrative and conversational skills, from the earliest period of language development through the middle school years. Investigation of the literature on oral language development among children from different sociocultural backgrounds. Focus on the relationship between discourse development and children's abilities to engage in oral language and literacy activities in the classroom.

RESTRICTIONS: Open only to Ph.D. and advanced master's students.

EDDV 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 to Ph.D. and advanced master's students.

EDDV 821 Seminar: Reading 3

Studies significant research in reading, to train and supervise students in the methodology of reading research and to plan needed research in reading.

PREREQ: EDDV620 and EDDV621.

RESTRICTIONS: May be repeated for credit when topics vary. Open to Ph.D. and advanced master's students.

EDDV 822 Social Foundations of Literacy 3

Explores social and cultural factors which influence children's acquisition and use of literacy. Issues relating to variations in expectations for literacy behavior in community and school contexts are considered. Relations between discourse patterns and literacy learning will be addressed.

RESTRICTIONS: Open to Ph.D. and advanced master's students.

EDDV 826 Research Theory Applied to Reading Curricula 3

Reviews selected theories/models of the reading processes along with research related to major areas of reading such as decoding, comprehension and study skills. Examines representative curriculum materials in reading to determine how well they reflect recent developments. Implications drawn for developing improved curricula.

RESTRICTIONS: Open to Ph.D. and advanced master's students.

EDDV 834 Development of Mathematical Thinking 3

Study of how mathematical thinking develops in children. Consideration of major research paradigms and research findings on mathematical thinking in children ages 3-15. Focuses on naturally emerging mathematics reasoning abilities and their relationships to school expectations and acquisitions.

EDDV 835 Past and Current Issues in Mathematics Education 3

Identifies and discusses continuing issues in mathematics education. Examines major historical themes that have shaped current theories and research. Analyzes past and current instructional programs.

EDDV 836 Problem Solving in Mathematics 3

A study of problem solving heuristics as they might be applied to the learning of mathematical concepts. Includes a review of the literature and examination of kindergarten through grade 12. Examines curriculum materials that might be employed to develop productive student problem-solving skills.

EDDV 843 Proseminar in Science Education 3

Covers critical issues in curriculum, research on learning or research on teaching.

RESTRICTIONS: Topics vary and may be repeated for credit.

EDDV 845 Seminar in Social Studies Education 3

Covers 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.

EDDV 850 Qualitative Research and Evaluation Designs in Educational Settings 3

Considers a variety of descriptive, nonexperimental research and evaluation designs appropriate for investigating questions in educational settings. Discusses theoretical bases for using these design; procedures for implementation and data analysis; and issues of reliability, validity and generalizability.

EDDV 851 Practicum in Qualitative Research 3

Provides practical information and 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, and ethnics and style in qualitative research reporting.

PREREQ: EDDV850.

EDDV 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.

EDDV 861 Curriculum Development and Evaluation 3

Major curriculum theories and their relationships to planning, implementation and evaluation of school programs. Application of curriculum theory to current practice through the analysis of historical and current curriculum issues. Consideration of strategies for effecting curriculum change.

EDDV 864 Fieldwork in Student Personnel 3

Supervised fieldwork experience in a specialized area of student personnel administration.

RESTRICTIONS: Requires permission of instructor.

EDDV 869 Master's Thesis 1-6**EDDV 871 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: Requires permission of instructor.

EDDV 872 Advanced Practicum in College Counseling 3

Counseling practicum with emphasis on case conceptualizations and intervention strategies.

RESTRICTIONS: Requires permission of instructor.

EDDV 880 Internship in Education: (Area Defined) 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 percentage of time spent in internship.

EDDV 881 Study in Educational Administration 3-9

Guided individual study of significant educational problems, usually involving participation in a major school improvement demonstration or research project as a partial substitute for the administrative internship.

RESTRICTIONS: Requires permission of department.

EDDV 883 Administration of Adult and Continuing Education Programs 3

The organization, supervision and implementation of continuing education programs for postsecondary participants in formal and informal training, degree or nondegree programs for industry, community agencies, schools and colleges.

EDDV 888 Educational Planning and Budgeting 3

Uses literature in the field and concrete case studies for practical illustration. Emphasis on the linkage between effective strategic planning and budgeting.

EDDV 890 Leadership: Theory and Research 3

A study of theories and research relating to leadership and management style. The fundamental principles of leadership as viewed from the fields of philosophy, sociology, psychology and applied behavioral science discussed. Emphasis on the analysis of personal style.

RESTRICTIONS: Open to students in Educational Leadership Doctoral Program

EDDV 891 Management Applications Research 3

Consumer-oriented course in educational research primarily intended for school administrators. Focuses on the use of research findings for educational decision making, offers historical and philosophical background in educational research and develops competencies in research interpretation for specific policy topics.

RESTRICTIONS: Open to students in Educational Leadership Doctoral Program

EDDV 892 Educational Data Systems 3

Applications of data processing and computer technology to problems of statistical reporting, pupil scheduling, school plant and enrollment projection, community analysis and information retrieval systems.

RESTRICTIONS: Open to students in Educational Leadership Doctoral Program.

EDDV 893 Seminar in Advanced Supervision 3

A seminar dealing with recent changes in education, particularly those that extend planning and supervisory functions.

RESTRICTIONS: Open to students in Educational Leadership Doctoral Program.

EDDV 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 to students in Educational Leadership Doctoral Program; other applicants require permission of instructor

EDDV 895 Improved Strategies 3

Focuses on philosophies of change, assessing the need for change in an educational setting, the educational leader as an agent of change and an analysis of numerous approaches that have been successful in improving instructional programs.

RESTRICTIONS: Open to students in Educational Leadership Doctoral Program

EDDV 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 to students in Educational Leadership Doctoral Program

EDDV 898 Educational Leadership Institute 3-6

Reading and discussion of emerging theories and problems of educational leadership including current issues related to planning, policy development, leadership, personnel, budget, supervision, instructional improvement, school law, change strategies and decision making.

RESTRICTIONS: Open to students in Educational Leadership Doctoral Program

EDDV 969 Doctoral Dissertation 1-12 PF

Educational Studies

EDST 011 College Intensive Literacy 3 RP

A remedial course for college students with deficiencies in reading, spelling and handwriting. Also suitable for students learning to read and write in English as a second language.

EDST 102 SkillMod: 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.

EDST 103 SkillMod: 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.

EDST 104 SkillMod: 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.

EDST 105 SkillMod: Problem Solving 1 PF

Teaches problem-solving strategies for college courses in chemistry, physics, economics, engineering, etc. Students learn methods for decomposing problems into manageable components and for using example problems strategically. Students apply these techniques to courses they are currently taking.

EDST 147 Historical Foundations of Education 3

Interpretation of the character of American education as it has developed from European roots into current times; and analysis of purposes and pedagogical practices at all levels of schooling placed in a social context. Particular attention to educational reform of the 20th century.

EDST 201 Education and Society 3

Acquaints students with ideas, people and goals that have shaped American schooling. The failures and successes of recurring efforts to reform the system illustrate the limits and strengths of the modern, comprehensive high school in this pluralistic society.

EDST 202 Human Development and Educational Practice 3

The implications of the psychology of human development for educational practice in the elementary school. Lectures, discussions, tutoring, laboratory exercises and classroom observations.

May be cross-listed with PSYC202.

EDST 230 Introduction to Exceptional Children 3

Historical and philosophical bases 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.

EDST 242 Topics: Philosophy of Education 3

See PHIL242 for course description.

EDST 258 Sociological Foundations of Education 3

Sociological theory and research as it bears on an understanding of the educational process. Sociological explanations of the relation between school and society and the development of student motivational and behavioral patterns.

EDST 290 History of Women and Education 3

The development of women's formal schooling and informal educative influences, consequences of male dominance upon women's ability to gain equality in American society, and women's progress towards career enhancement in a society ambivalent about the role of women.

May be cross-listed with HIST290 and/or WOMS290.

EDST 304 Educational Psychology - Social Aspects 3

Focuses on social psychological aspects of schooling. Specific topics include: teacher beliefs, biases and expectations, student attitudes toward schools and teachers, adolescent values, interpersonal relations and self-concept, motivation and affect, psychological processes underlying classroom management, and student variability and exceptional students.

May be cross-listed with PSYC304.

EDST 305 Educational Psychology - Cognitive Aspects 3

Focuses on student learning (memory, learning, problem solving, transfer and metacognition), teaching processes (methodology, models of instruction, assessment and grading), and teacher cognition. Other topics include cognitive development, and measurement and statistics.

May be cross-listed with PSYC305.

EDST 340 Philosophical Foundations of Education 3

Ethical questions in teaching, especially those concerned with punishment, intellectual freedom, equal treatment of students and professionalism. Consideration of both the nature of ethical inquiry and alternative possibilities for character education in the public schools.

RESTRICTIONS: EDS majors and senior ETE majors.

EDST 366 Independent Study 1-6**EDST 376 Education Practicum 1-3 PF**

Field-based internship in a school working as an assistant with a professional teacher, including tutoring, small-group instruction, grading of instructional materials and limited whole-group instruction.

RESTRICTIONS: For first and second year students.

EDST 390 Instructional Strategies and Individual Differences 3

Strategies for elementary school teaching, including classroom management and models of teaching. Emphasis on provisions for students with special needs.

EDST 391 Honors Colloquium 3

See ARSC390 for course description.

EDST 420 Reading in the Content Areas 1

Overview of reading comprehension issues at the middle and high school levels based primarily upon task analyses of content-area materials (math, social studies and science). Students will apply current theories of reading comprehension to texts in their areas of interest.

EDST 431 Applied Behavior Analysis 3

Application of principles of behavior analysis in educational settings with non-handicapped and mildly handicapped children. Students select and systematically apply procedures based on scientifically derived principles or achieve specific behavioral objectives in teaching new behavior and in increasing, decreasing or maintaining existing behavior.

EDST 432 Curriculum for School-Age Exceptional Children 3

Examination of instructional techniques and curriculum materials associated with the mildly handicapping conditions of mental retardation, learning disabilities and emotional problems of school-aged children. Assumption of the interrelatedness of exceptionalities is presented.

EDST 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.

EDST 461 Measurement Theory and Techniques for Classroom Teachers 3

Principles and techniques appropriate for norm- and criterion-referenced measurement including test construction, evaluation and interpretation.

EDST 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 cross-listed with LING462 and/or PSYC462.

EDST 465 Model OAS 3

See POSC465 for course description.

EDST 466 Independent Study 1-6**EDST 469 Research Project/Internship 3**

Research and/or field experience under supervision.

EDST 475 Senior Seminar in Education 3

Opportunity to present and/or defend EDST469 research or internship activities and place these activities in the broader context of educational study.

PREREQ: EDST469.

EDST 476 Bilingualism and Language 3

Bilingualism and the role of language in thinking. The linguistic, psychological and social experiences of the bilingual. The influences of first language on second language learning. The role of bilingualism in education and methods of bilingual instruction. May be cross-listed with LING476.

EDST 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 cross-listed with ENGL477 and/or LING477.

EDST 521 Manual Communication I 3

A brief overview of deafness for those who may be considering professional careers in serving the hearing impaired and for others who may be interested in a general knowledge of deafness. The course includes basic signs commonly used by the hearing impaired.

EDST 522 Manual Communication II 3

A brief overview of deafness for those who may be considering professional careers in serving the hearing impaired and for others who may be interested in a general knowledge of deafness. The course includes advanced and idiomatic signs commonly used by the hearing impaired.

PREREQ: EDST521.

EDST 523 Manual Communication III 3

In-depth use of manual communication for interpreting and translating for hearing impaired people in various situations of life. Orientation to deafness, finger spelling, basic signs, and a visit to the Sterck School (Delaware's state school for the deaf).

PREREQ: EDST522.

EDST 524 Intensive Literacy Instruction 3

Training in the methods of teaching reading, writing and spelling developed in the Reading Study Center, College of Education. The program is called Intensive Literacy, and is useful for beginners, remedials and students learning English as a second language.

EDST 607 Educational Research Procedures 3

An introduction to quantitative methods in education through study of educational research procedures; for example, measurement, evaluation, experimental and quasi-experimental design, internal and external validity.

EDST 618 Special Services in the Schools 3

Explores roles and functions of psychologists, counselors and special educators in the schools. Study of school organization, professional standards, history of special services, legal and ethical issues and current issues pertaining to special education in the state and nation.

EDST 620 Issues in College Teaching 3

Explores issues and techniques related to effective undergraduate instruction.

EDST 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: EDST678, EDST681.

RESTRICTIONS: Requires at least two other special education courses in addition to Prerequisites.

EDST 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: EDST678, EDST681, EDST624.

RESTRICTIONS: Requires at least two other special education courses in addition to Prerequisites.

EDST 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: EDST678, EDST681, EDST624.

RESTRICTIONS: Requires at least two other special education courses in addition to Prerequisites.

EDST 627 Models of Instruction 2-3

Study of alternative models of instruction as applied to differing instructional objectives, content and settings.

EDST 629 Psychology of Teaching 3

A study of the research on teacher characteristics, teaching style and method, and teaching teaching.

EDST 630 The Psychology of Curriculum 3

Review of research literature in the developmental psychology of logical, mathematical, physical, biological and social concepts found in elementary and secondary curricula.

PREREQ: EDST607.

EDST 633 Introduction to Computer Instruction 3

Introduction to the field of computer-based instruction, including instructional theory and design, hardware and software systems, artificial intelligence techniques, author languages and the politics and sociology of educational technology. May be cross-listed with CISC633.

EDST 634 Instructional Design of Computer-Based Education 3

Relates concepts and research in educational psychology to the development of instructional materials using the computer medium. Includes strengths and limitations of computers in meeting certain instructional needs and techniques for effective computer-based educational delivery.

PREREQ: Introductory course in Instructional Design.

EDST 635 Advanced Computer-Based Programming 3

Advanced topics in programming educational materials including control, graphics, calculations, response analysis and data structures. Extensive experience in a single programming language appropriate to the special needs of educators. May be cross-listed with CISC635.

PREREQ: Introductory programming course in the language of the section taught.

EDST 636 Advanced Educational Psychology 3

Study of research and theory in educational psychology and their application to instruction and schooling.

EDST 640 Philosophy of Education 3

Study of the philosophical assumptions basic to, and expressed in, American education; application of philosophy to the clarification of professional problems; and construction of a personal philosophy of education.

RESTRICTIONS: Not open to students with credit in EDST340.

EDST 641 Social Philosophy and Education 3

Study of the ideological assumptions of Conservatism, Liberalism, Marxism and the New Left and their expression in American education; and application of social philosophy to the clarification of professional problems.

EDST 642 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: EDST230 or EDST697.

RESTRICTIONS: Designed for students in the Special Education Technology specialization.

EDST 643 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: EDST642, EDST679.

RESTRICTIONS: Designed for students in the Special Education Technology specialization.

EDST 644 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: EDST642.

RESTRICTIONS: Designed for students in the Special Education Technology specialization.

EDST 645 Assistive Technology for Computer Access and Environmental Control 3

Focuses on the use of technology and assistive devices to remove barriers to the education of persons with disabilities, especially in elementary, secondary and post-secondary school settings. Topics include principles of human-machine interface, alternate control interfaces, environmental control systems, and assessment and prescription strategies.

PREREQ: EDST642.

RESTRICTIONS: Designed for students in the Special Education Technology specialization.

EDST 646 Technology in Vocational Education and Rehabilitation 3

Focuses on the use of technology to improve the employability and vocational productivity of individuals with disabilities. Topics include assessment of an individual's vocational strengths and weaknesses in relation to job demands, vocational technology applications and worksite modifications.

PREREQ: EDST642, EDST650.

RESTRICTIONS: Designed for students in the Special Education Technology specialization.

EDST 647 History of Education in American Culture 3

Historical foundations upon which to base judgments about American education.

EDST 651 School-based Family Issues and Intervention 3

Provides an ecological view of children in families and the relationships between those families and the school system. Topics for study will be the family as system, differing family shapes in contemporary society, implications of ethnicity for the family/school interface, special families in special circumstances and models of intervention.

EDST 656 School Counseling Services 3

Detailed study of the function of school counselors with emphasis on coordinating techniques, curriculum and materials used by teachers, parents and counselors to promote social and emotional development of children.

EDST 659 Advanced Counseling Techniques 3

Provides students the opportunity to extend and expand skills learned in the Counseling Skills Laboratory course. Focuses on therapeutic procedures applied to treatment of problems faced by children and adolescent clients, including skills in assessment, treatment planning, evaluating outcomes and termination. Attention will be given also to specific treatment strategies.

PREREQ: EDST663 and EDDV674.

EDST 660 Applied Educational Measurement 3

Examines elementary statistical methods commonly used in educational measurement and evaluation, measurement principles (reliability, validity) and procedures for test selection. Students receive practice in administering vocational and/or psychoeducational tests, applying computer-assisted interpretation programs and report writing. Assessment instruments for handicapped students critiqued.

EDST 663 Counseling Skills Lab for Counselors and Psychologists 3

Characteristics of the helping relationship will be discussed. Students observe, participate in and critique a variety of role playing exercises designed to prepare them for the practicum experiences in the field. Interviewing skills related to a variety of counseling approaches are modeled and rehearsed.

PREREQ: EDST654.

EDST 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 be able to answer realistic research questions. Topics include descriptive statistics, regression, exploratory data analysis and hypothesis testing.

EDST 668 Social Perspectives on Careers and Counseling 3

Examines major theories of career development within the context of research about human development, occupational requirements and opportunities, and changing work and family roles. Examines both psychological and socioeconomic factors affecting career development as well as particular problems facing the handicapped, women, minorities and other special groups.

EDST 669 Practicum in a School Setting 1-3

Supervised counseling and guidance experiences in a school setting.

PREREQ: EDST618, EDST660, EDST663, EDST656, EDST651, EDDV674 and EDST677.

RESTRICTIONS: Requires contractual arrangement with University and on-site supervisor.

EDST 671 Practicum in School Psychology 3-6

Closely supervised experiences in various 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.

EDST 672 Consultation and Intervention 3

Surveys the major theoretical approaches and research related to consultation and intervention involving the school-age child. Provides skills in consultation and intervention techniques employed by school psychologists and other professionals working with teachers, parents and administrators.

EDST 673 Seminar in Transitional Issues 3

Provides an in-depth overview of research and practices related to transition for youth with mild/moderate/severe disabilities. Adult service systems, model secondary programs, the transitional planning process and current issues related to effective transitional practices will be examined.

EDST 674 Secondary and Vocational Practices in Special Education 3

Introduction and review of current issues and practices in secondary and vocational education as they relate to the education of the handicapped. Focuses on secondary level special education programs and practices, including career preparation, curriculum development and vocational training.

EDST 675 Language Acquisition 4

Examines the factors which distinguish human language from animal communication as well as the development of many facets of language (semantics, syntax and phonology). Main emphasis on how children in the first three years acquire language.

May be cross-listed with LING675 and/or PSYC675.

EDST 676 Bilingualism and Language 3

Bilingualism and the role of language in thinking. The linguistic, psychological and social experiences of the bilingual. The influences of first language on second language learning. The role of bilingualism in education and methods of bilingual instruction.

May be cross-listed with LING676.

EDST 677 The Structure of English 3

Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish).

May be cross-listed with ENGL677 and/or LING677.

EDST 678 Theories of the Exceptional Child 3

Review and discussion of major models and theories that attempt to explain the causation of, and variations in, behavior such as the three mildly handicapping conditions: mental retardation, learning disabilities and behavior disorders. Emphasis on the grouping of theories in such a way as to de-emphasize a categorical position in special education.

PREREQ: EDST230 or EDST697.

EDST 679 Methods of Instructing Exceptional Children and Youth 3

Presents techniques and materials associated with modifying academic and social behaviors of mildly handicapping conditions. The effectiveness of procedures associated with curriculums designed for categories of learning disabilities, mental retardation and social and emotional maladjustment are assumed to be approximately the same across categories.

PREREQ: EDST230 or EDST697.

EDST 680 Educational Diagnosis 3

Current 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.

EDST 681 Techniques for Behavior Change 3

Study and implementation of principles of behavior that may be employed in normalizing deviant behavior. Includes assumptions underlying behavior modification techniques, principles in experimental analysis of behavior and the application of these to educational, hospital and residential settings.

EDST 682 Research in Special Education 3

Review of applied behavior analytic research as it relates to the educational problems of exceptional children. Basic experimental designs and their more common variations. Opportunities for executing research projects employing single case experimental designs. Explores issues relating to applied behavior analytic research.

PREREQ: EDST681.

COREQ: EDST607.

EDST 683 Curriculum and Methods for Teaching the Gifted Child 3

Focuses on the development of appropriate activities for gifted children. Acquaints students with the theoretical models in use to guide the development and selection of curriculum and methodology for use with gifted and talented children. Practicum experiences included.

PREREQ: EDST679.

EDST 684 Educational Diagnosis II 3

Continuation of EDST680 Educational Diagnosis. Tests used by teachers and educational diagnosticians with exceptional children; the latest aptitude, achievement and specialty tests are discussed, with students administering the latter two types of instruments.

EDST 685 Counseling Parents of the Exceptional Child 3

Examination of a number of strategies, techniques and methods for teachers to employ in parent-teacher interactions with the ultimate goal of involving parents in the education of their exceptional child, including those handicapped and gifted.

EDST 686 Programming for Gifted Children 3

Focuses on the identification of gifted and talented children and the development of programs to meet their needs.

EDST 687 Interpretation and Testing of the Exceptional Child 3

Testing procedures include the more esoteric tests that are administered in educational settings. Tests from areas such as the gifted and learning disabilities would be discussed and administered. Major emphasis on interpretation of test protocol for placement and programming purposes.

PREREQ: EDST680.

EDST 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.

EDST 690 Vocational Assessment of Exceptional Students 3

Strategies for assessing the vocational interests, aptitudes and job skills of special education students. Teaches use of vocational assessment instruments in developing IEP objectives, vocational training objectives and individual transition plans. Measurement theory, theory of career choice, commercial assessment tools, job analysis and curriculum-based assessment.

EDST 691 Internship in School Counseling 3-6

On-site experiences in school counseling and guidance.

RESTRICTIONS: Requires completion of all coursework for School Counseling Masters Program. Requires contractual arrangement with University and on-site supervisor.

EDST 692 Social Skills Training for Children 3

Presents a critical examination of methods that have been proposed to teach social skills to children and youth in both classroom and clinical setting. Presents a model for understanding social competence and a rationale for including social skill training in school curricula.

May be cross-listed with PSYC692.

EDST 697 Education of Exceptional Children 3

The philosophical and research bases for education of exceptional children. Analysis of past and present pedagogical practices.

EDST 808 Internship in Education 3-9

On-the-job experience in one specific area of education (i.e., administration, counseling, media center, etc.) in which such internships are required as a part of graduate degree programs and/or approved certification programs.

RESTRICTIONS: Requires permission of department. Credit during any semester varies according to the percentage of time spent in internship. May be repeated for up to nine credits.

EDST 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, WISC-R, WPPSI, WAIS-R, and K-ABC.

May be cross-listed with PSYC817.

RESTRICTIONS: Requires permission of instructor.

EDST 820 Cognition and Instruction I 3

Current approaches to cognitive analysis of school subjects. Topics include theory and research in perception, memory and information processing; and the analysis of models and tasks for school subject matters.

RESTRICTIONS: Requires Ph.D. status in Educational Studies.

EDST 821 Cognition and Instruction II 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: Requires Ph.D. status in Educational Studies.

EDST 823 Applied Human 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.

EDST 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.

EDST 832 Nature of Human Intelligence 3

Definition and measurement of human intelligence; common variables related to intelligence (heredity, culture, creativity, achievement and problem solving); psychometric structure; development; artificial intelligence; and manipulation of intelligence.

EDST 836 Instruction and Learning 3

In-depth study of theories of learning and instruction. Emphasis on review of experimental research relevant to the theories and the applications of these theories to educational practice.

RESTRICTIONS: Requires permission of instructor.

EDST 837 Seminar in Human Development 3

See PSYC804 for course description.

EDST 840 Research Colloquium in Education 1-3

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.

EDST 843 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 EDST875, Introduction to Educational Policy.

EDST 845 Regression Models in Education 3

The use of regression models in education. Topics include simple and multiple regression, regression models for limited dependent variables and path analysis models.

EDST 848 Seminar in Language Development 3

Covers aspects of semantic, syntactic and phonological development through an examination of current research and theory in the field. Treats the educational implications of language development.

May be cross-listed with LING848.

EDST 849 Seminar in Language Comprehension and the Acquisition of Knowledge 3

Theory and research on the acquisition of knowledge through written instruction and their implications for a technology of written instruction.

EDST 850 Childhood Psychopathology 3

Survey of various developmental and behavioral disorders in childhood. Seminar will examine the issues of diagnosis and treatment from theoretical perspectives. Special emphasis on current major psychological research. May be cross-listed with PSYC845.

RESTRICTIONS: Requires permission of instructor.

EDST 851 Psychological Assessment of Children 3

Intellectual and personality assessment of children. Offers extensive experience in administering, interpreting and integrating psychological tests, as well as training in report writing and the development of treatment prescriptions.

RESTRICTIONS: Requires permission of instructor.

EDST 861 Introduction to Statistical Inference 3

Quantitative analysis topics include describing univariate and bivariate data distributions, calculating and interpreting useful summary statistics, the logic of least squares estimation, the rudiments of probability theory, selected probability models and their interrelationships, the logic of null hypothesis testing, interval estimation and selected inferential techniques.

RESTRICTIONS: Requires admission to doctoral program.

EDST 862 Principles of Experimental Design and Educational Measurement 3

Continuation of EDS861. Topics include planned and post-hoc comparisons, multifactor analysis of variance, internal and external validity, quasi-experimental designs, analysis of covariance, Latin squares and incomplete designs.

RESTRICTIONS: Requires admission to doctoral program.

EDST 863 Principles of Educational Evaluation 3

Introduction to the major concepts in educational evaluation as well as its logic, politics, economics, history and future. Focus on both quantitative and qualitative models.

EDST 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.

EDST 869 Master's Thesis 1-6

EDST 871 Topics in Research Methodology 3

Concerns the substantive applications of research and evaluation to education problems and is taught in a rotating manner. Possible topics include history and sociology of testing, visual and graphical display of data, models of educational stratification and problems of educational evaluation.

EDST 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 a conceptual overview of generalizability theory. The remaining class sessions will emphasize item response theory.

EDST 874 Introduction to Multivariate Data Analysis in Education 3

Topics covered are factor analysis, discriminant analysis and multivariate analysis of variance. Emphasis on applications and the use of computer packages.

PREREQ: EDST861.

EDST 875 Introduction to Educational Policy 3

Survey of the origins, nature and impact of the major state and federal educational policies of the past 20 years. What do officials seek when they frame policies; what in fact happens when innovations take hold; and how do we explain the frequent discrepancies between intentions and results?

EDST 876 Structural Models in Education 3

Concerns the statistical modeling of latent variables arising in educational settings. Topics include model specification, identification, estimation and testing. Considers structural models in single and multiple groups, structured means analysis and structural analysis of categorical and other non-normal data.

EDST 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: EDS678, EDST679, EDST680 and EDST681.

EDST 880 Seminar in Special Education 3

Sources, results of research and a critical examination of selected investigations in special education. Guided practice in summarizing and conducting research in the education of exceptional children.

PREREQ: EDST607, EDST678, EDST679, EDST680, EDST681 and EDST682.

EDST 968 Research 3-9

To be used by doctoral students engaged in completing requirements for the doctoral portfolio.

EDST 969 Doctoral Dissertation 1-12 PF

Education

EDUC 500 Topics: In-Service Education 1-6 PF

Review and analysis of research and/or practices of a specific topic. Topics and format will vary depending on the needs of the participants.

RESTRICTIONS: Not intended for students enrolled in a degree program.

Engineering Graphics and General

EGGG 132 Engineering Graphics and Analysis 2

Fundamental concepts of multiview projection drawing and application of drawing conventions. Includes sectional views, dimensioning, pictorial representation, fastener specifications and drawings for various engineering disciplines. Computer applications include data structure for computer modeling, plotting routines for computer drawing and an introduction to CAD principles.

COREQ: MATH241

RESTRICTIONS: Additional coreq: a programming language.

EGGG 300 Dean's Scholar Seminar 1 PF

Seminar examines ideas that are not regular course work and that are not closely related to students' disciplines. Topics reflect values that civic and community leaders should know.

RESTRICTIONS: Requires an invitation to participate.

EGGG 392 Graphic Simulation and Analysis 3

Advanced topics in applied descriptive geometry as related to mining, drainage and surveying. Development of nomographs, analysis for empirical functions, graphic Fourier analysis of typical transient disturbances and graphic solutions of ordinary differential equations.

PREREQ: MATH302.

EGGG 432 Principles of Computer-Aided Drawing 3

Concepts of computer graphics as related to CAD systems. Underlying procedure and algorithms for hidden line/surface treatment, animation, rendering and graphics standards. Modeling transformations for projection drawings and definition of curves, surfaces and solids. Emphasis on implementation of concepts through application programming.

PREREQ: MATH243 and CISC106.

RESTRICTIONS: Requires knowledge of FORTRAN.

Engineering Technology

EGTE 103 Land and Water Management 2

Rainfall, run-off, erosion control, water quality, irrigation and drainage.

COREQ: EGTE113.

RESTRICTIONS: Open to nonmajors only.

EGTE 105 Power and Machinery 4

Principles of operation, selection and management of power and machinery units used in agricultural crop production.

RESTRICTIONS: Open to nonmajors only.

EGTE 107 Welding and Metals 2

Arc welding, gas welding, soldering, sheet metal layout and fabrication, and properties of metals.

RESTRICTIONS: Taught during first half of Fall semester.

EGTE 108 Utilities 2

Domestic water supply and waste disposal, house wiring, heating systems, and carpentry and masonry practices.

RESTRICTIONS: Taught during second half of Fall semester.

EGTE 109 Technical Drafting 2

Basic principles of technical drawing, including sketching, use of drafting equipment, orthographic projection, pictorial drawing and architectural plans.

EGTE 111 Computer Applications in Engineering Technology 3

A foundation course in the application of engineering principles and modern technology in agriculture and industry. Emphasis on problem solving and elementary Fortran programming.

EGTE 113 Land Surveying 2

Principles and application of distance measurement, leveling, mapping, area measurement and earth volume measurement to soil and water conservation, landscaping and construction.

EGTE 165 Freshman Seminar 1 PF

Career opportunities in agricultural engineering, AET curriculum information, undergraduate research opportunities, professional concepts and organizations, and faculty and student presentations.

EGTE 209 Introduction to Computer-Aided Drafting 2

Use of computer for drafting. Design layout, two-dimensional and isometric drafting, subassembly, macros, sectioning, transformation. Use of drafting plotter and interaction with other plot programs.

PREREQ: EGTE109.

EGTE 218 Fundamentals of Hydraulic Systems 4

Fluid properties, fluids at rest, fundamentals of fluid flow, distribution systems, fluid power systems in agricultural and industrial machines.

PREREQ: EGTE111.

EGTE 244 Electricity for Engineering Technology 4

Electrical power systems for buildings, including distribution equipment, motor selection and lighting planning. Laboratory emphasizes control logic and electro-mechanical devices.

EGTE 306 Cost Estimating 2

Building components, billing of materials and cost estimating using cost of materials plus labor system.

RESTRICTIONS: Offered only in Winter Session.

EGTE 307 Building Construction 1

Practical building experience with emphasis on light frame construction.

RESTRICTIONS: Offered only in Winter Session.

EGTE 309 Three Dimensional Computer Aided Drafting 2

The creation and modification of three dimensional models for use in computer aided drafting. Allows student to create a visual solid model of an object to be drafted and then create two dimensional take-offs for plotting. Covers methods of rotation, sectioning and coloring for best viewing angles and output.

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.

COREQ: MATH222 or MATH242.

EGTE 321 Storm Water Management 4

Hydrology for small (urban/suburban/rural) watersheds. Fundamentals of open channel hydraulics; design of culverts, spillways, vegetated waterways and detention basins.

PREREQ: EGTE111 and EGTE218.

EGTE 328 Waste Management Systems 3

Properties of agricultural, food processing and industrial wastes. Wastewater treatment, sludge management and waste utilization.

PREREQ: CHEM104.

EGTE 331 Mechanical Power Units 4

Theory and operation of internal combustion engines. Analysis of engine and power transmission components. Design of power units and components. Design and selection of mechanical and hydraulic power transmission systems using computer techniques.

PREREQ: EGTE111, EGTE218 and EGTE311.

EGTE 344 Electronics and Microprocessors 3

Survey course with emphasis on fundamental electronic concepts and devices. A logical progression is made from semiconductors through microprocessors. Topics include diodes, transistors, SCT's triacs, digital logic, number systems, flip flops, shift registers, counters, memory chips, microprocessors, assembly language programming, A/D conversion and data communications.

PREREQ: EGTE244.

EGTE 365 Junior Seminar 1

Invited speakers, faculty presentations, and oral and written reports required for enrolled students on selected topics in agricultural engineering.

EGTE 366 Independent Study 1-3

EGTE 401 Introduction to Quality Control 2

Introduction to the SPC charting system and control charts for attributes. Reliability and ISO 9000 (the new European Common Market System) is included. An algebraic and computer approach to statistics, probability, process control, process capability and acceptable quality levels are explored.

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.

EGTE 417 Project Management 2

Basic procedures for finding the limiting sequence of events, constructing a flow network describing the project steps, and project planning and control for optimum scheduling. Project analysis using Critical Path Method (CPM), Project Evaluation and Review Technique (PERT) and linear programming.

PREREQ: EGTE111.

RESTRICTIONS: Only offered in Winter Session.

EGTE 421 Soil and Water Management Systems 4

Saturated and unsaturated flow, evapotranspiration, groundwater, soil compaction, theory and design of irrigation system, theory and design of surface and subsurface drainage systems, soil erosion, design of runoff and erosion control systems.

PREREQ: EGTE321, PLSC204 or permission of instructor.

EGTE 431 Machine Systems for Agriculture 4

Introduction to soil mechanics and traction. Theory and operation of agricultural machinery and mechanisms. Analysis of machine system performance. Economic analysis of machinery systems using computer techniques.

PREREQ: EGTE331.

EGTE 435 Machinery Design and Development 3

Fundamental requirements and relationships of agricultural machinery components, analysis of forces involved, design of machines and components, and field testing procedures.

PREREQ: EGTE218 and General Physics.

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: EGTE111.

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.

EGTE 454 Rural and Light Industrial Buildings 4

Analysis, design, materials and construction of rural and light industrial buildings.

PREREQ: EGTE111 and EGTE209.

EGTE 456 Fundamentals of HVAC 3

Heating, ventilating and air conditioning of rural and light industrial 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: EGTE311.

EGTE 466 Independent Study 1-3**EGTE 621 Soil and Water Management Systems 4**

Saturated and unsaturated flow, evapotranspiration, groundwater, soil compaction, theory and design of irrigation system, theory and design of surface and subsurface drainage systems, soil erosion, design of run-off and erosion control systems.

PREREQ: EGTE321, PLSC204 or permission of instructor.

Electrical Engineering

ELEG 202 Introduction to Digital Systems 4

A unified overview of the interrelationship among the digital representation and processing of information, the analysis and design of combinational and sequential digital networks and the application of stored program information processors.

PREREQ: MATH242.

ELEG 205 Linear Circuit Theory I 4

Laws of the electric circuit, analysis of DC and AC circuits, network equations and network theorems.

PREREQ: MATH242 and PHYS207.

ELEG 210 Introduction to Combinational Logic 2

Boolean algebra and its application to logic gates. Simplification of switching functions. Gate level logic design and design with MSI and LSI.

ELEG 211 Introduction to Sequential Circuits 2

Analysis and design of asynchronous sequential logics, synchronous sequential machines and algorithmic state machines.

PREREQ: ELEG210.

ELEG 220 Microprocessor-Based Systems I 2

Introduction to small computing machines, architecture organization and programming.

PREREQ: ELEG211 and CISC181.

ELEG 221 Microprocessor-Based Systems II 2

Extension of the concepts of ELEG220 with emphasis on I/O, interrupt systems and interfacing.

PREREQ: ELEG220.

ELEG 302 Materials Science for Electrical Engineering Students 4

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: CHEM103, MATH243 and PHYS208.

ELEG 305 Signal Processing I 3

Covers continuous and discrete time signals and systems at the introductory level. Introduces Z, Laplace and Fourier transforms and uses these to solve difference and differential equations arising from circuit theory and signal processing. Presents theory of linear and causal systems.

PREREQ: ELEG205 and MATH342.

ELEG 306 Signal Processing II 4

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. Laboratory experiments test theory on actual signals, such as speech, music and images.

PREREQ: ELEG305.

ELEG 309 Electronic Circuit Analysis I 4

Introduction to physical principles of solid state electronic devices. Quantitative study of elementary circuits including biasing, linear power amplifiers, low-frequency small signal analysis, multiple transistor circuits and feedback.

PREREQ: ELEG205.

ELEG 310 Random Signals and Noise 3

Introduction to the statistical and spectral representations of random signals used in statistical communication theory. The mathematical techniques of probability theory and generalized harmonic analysis developed and applied to electrical noise and the design of optimum systems.

PREREQ: ELEG305.

ELEG 312 Electronic Circuit Analysis II 4

Low-frequency and high-frequency response of 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 314 Electronics and Instrumentation 4

Steady state circuit analysis, diode, power supplies and filters. Rotating machinery. Integrated circuits, operational amplifiers, A to D converters and digital building blocks with applications to informational handling.

PREREQ: PHYS208 and MATH302.

RESTRICTIONS: Not for major credit.

ELEG 320 Field Theory I 3

Study of theory and problems in electrostatic and magnetostatic fields. Maxwell's equations.

PREREQ: PHYS208, MATH342 and ELEG205.

ELEG 323 Digital System Design I 3

Languages for the description, simulation and design of digital systems. Laboratory activities center on the realization of minicomputers or microcomputers and the application and support of such computers as constructs in digital systems.

PREREQ: ELEG221.

ELEG 340 Solid State Electronics 3

Introduction to the concepts necessary to establish electronic phenomena in solids. Application to electronic devices such as diodes, transistors, FETS and integrated circuits. Emphasis on the reduction of the physical device to a circuit model.

PREREQ: PHYS208, ELEG302, MATH342 and ELEG309.

ELEG 366 Independent Study 1-6**ELEG 403 Communication Systems Engineering 3**

Review of signal theory, Fourier transforms, linear and time-invariant systems; review of probability and random signals; information theory, source entropy, channel capacity; baseband data transmission, modulation, noise in analog systems and digital carrier modulation.

PREREQ: ELEG306.

ELEG 412 Introduction to Power System Analysis 4

Analysis of steady state and transient response of medium to high voltage power distribution systems. Circuit modeling of power system components, symmetrical components, power factor correction, fault current prediction and three-phase circuit analysis.

PREREQ: ELEG320.

ELEG 413 Field Theory II 4

Electrodynamics based on Maxwell's equations. Energy storage and flow in electromagnetic fields. Transmission lines, waves and radiating systems.

PREREQ: ELEG320.

ELEG 414 Electrical Machines, Motors and Generators 4

Study of rotating electrical machines (both AC and DC) motors and generators with special emphasis on physical principles underlying machine dynamics. Equivalent circuits and equations for predicting machine response derived and analyzed and application considerations discussed.

PREREQ: ELEG320.

ELEG 417 Feedback Control Systems 3

Analysis of servomechanisms and other closed loop systems.
PREREQ: ELEG305.

ELEG 420 Electronic Circuit Design 4

Design with and application of operational amplifiers using integrated circuit units. Design of discrete element clamping and clipping circuits, logic circuits, multivibrators, etc. Analysis and simulation of digital integrated circuits. Laboratory studies involve extensive use of analog and digital computers.
PREREQ: ELEG312.

ELEG 422 Digital System Design II 3

Advanced microprocessor architecture, bus structures and I/O control.
PREREQ: ELEG323.

ELEG 433 Energy Systems 3

Study of basic principles underlying systems for distribution and utilization of electric power. Consideration of load scheduling, polyphase systems, faults and stability, and power system economics.
PREREQ: ELEG309 and ELEG320.

ELEG 466 Independent Study 1-6**ELEG 618 Modern Control Engineering 3**

A study of electrical and non-electrical control systems with emphasis on their physical response, including mathematical analysis.
PREREQ: ELEG417.

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 623 Electrical Properties of Matter I 3

Covers certain concepts of ELEG340 at a more advanced level while expanding on material aspects of the solid state. Emphasis on the structure, properties and preparation of solids useful in electronic as well as magnetic application. May be cross-listed with MASC623.
PREREQ: ELEG320 and ELEG340.

ELEG 626 Integrated Circuits 3

Design and fabrication principles for semiconductor devices and integrated circuits. Fundamentals of integrated circuit layout. Techniques for epitaxial growth, ion-implantation methods. Thermal characteristics. Economic factors.

ELEG 629 Digital Structures 3

Boolean algebra and propositional calculus as applied to combinational and sequential systems, register transfer and arithmetic operations, finite-state automata and other theoretical concepts of information processing. Examples from structural and logical organization of general and special purpose computers.
RESTRICTIONS: Primarily for non-majors. Requires programming experience.

ELEG 631 Digital Signal Processing 3

Theory of discrete-time signals and systems with emphasis on the frequency domain description of digital filtering and discrete spectrum analysis, fast Fourier transform, z-transform, digital filter design, relationship to analog signal processing.
PREREQ: ELEG305.

ELEG 633 Image Processing 3

Review of concepts of linear systems and spectral analysis, human visual response, scanning and display of images, Fourier optics, image enhancement and feature extraction, design of digital filters for image processing, 2D fast Fourier transform algorithms and computed tomography. May be cross-listed with MAST633.
RESTRICTIONS: Requires permission of instructor.

ELEG 640 Opto-electronics 3

Study of the generation, transformation and applications of coherent optical waves. Introduction to engineering optics. Laser theory; optical wave propagation, modulation and detection; holography; opto-electronic systems and related engineering applications. May be cross-listed with MAST640.

ELEG 642 Special Topics in Electrooptics 3

Optical storage system, laser beam scanning systems, optical fiber transmission characteristics. Fiber optical communication and other advanced systems.
PREREQ: ELEG640.

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 661 Materials and Devices Seminar 1 PF

Lectures and discussions by faculty and students on specialized topics in materials and devices.

ELEG 662 Digital Systems Seminar 1 PF

Lectures and discussions by faculty and students on specialized topics in digital systems.

ELEG 663 Signal Processing Seminar 1 PF

Lectures and discussions by faculty and students on specialized topics in signal processing.

ELEG 664 VLSI Systems 3

Study of VLSI devices, systems built with VLSI, MOS design rules and limitations of VLSI systems. Project required.
PREREQ: ELEG221 and ELEG340.

ELEG 681 Remote Sensing of Environment 3

See MAST681 for course description.

ELEG 819 Advanced Topics in Communications 3

Topics discussed from the following areas vary from year to year: information theory; estimation and detection; nonlinear systems with random inputs; optimum modulation and demodulation; and digital communications systems.

ELEG 853 Integrated Optics 3

Discusses 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 and optical detectors. Includes applications of optical integrated circuits.
PREREQ: ELEG320 and ELEG340.

ELEG 855 Microwave Devices and Circuits 3

Describes principles of device operation and circuit characteristics for the microwave FET, IMPATT, TRAPPATT, Gunn diode, varactor diode, p-i-n diode, tunnel diode and bipolar transistor. Covers both wave guide circuits and microwave integrated circuits.
PREREQ: ELEG320 and ELEG340.

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 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 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 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

Influential epic, dramatic and lyric literature from Biblical and Greco-Roman cultures. May be cross-listed with CMLT202 and/or FLLT202.
PREREQ: ENGL110.

ENGL 204 Great American Writers 3

Representative masterworks of the 19th and 20th centuries.
PREREQ: ENGL110.
RESTRICTIONS: Not for major credit.

ENGL 205 Great English Writers I 3

Poetry and prose by great writers of English literature to the 18th century.
PREREQ: ENGL110.

ENGL 206 Great English Writers II 3

Poetry and prose by great writers of English literature from the 18th through the 20th centuries.
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 cross-listed with CMLT218.
PREREQ: ENGL110.

ENGL 209 Introduction to the Novel 3

Representative masterworks of fiction, emphasizing those of Europe and America. May be cross-listed with CMLT219.
PREREQ: ENGL110.

ENGL 210 Short Story 3

Study of the 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

See CMLT207 for course description.

ENGL 212 Great Writers of the Western World II: 1650-1950 3

See CMLT208 for course description.

ENGL 214 Literature and Gender 3

Specific concepts of gender in society, as manifested in the literature of writers of both sexes. May be cross-listed with WOMS214.
PREREQ: ENGL110.

ENGL 217 Introduction to Film 3

Filmmakers' uses of the eclectic elements of film literature, theatre, graphic arts, dance, music, etc., in order to create an artful unity. Emphasis on ways of developing methods of evaluating film art. May be cross-listed with CMLT217.
PREREQ: ENGL110.

ENGL 260 Humanities Colloquium 3

See ARSC260 for description.
PREREQ: ENGL110.

ENGL 300 Introduction to Literary and Cultural Study 3

Principles and problems of literary interpretation, with an emphasis on language and meaning, metaphor, narrative and the roles of gender, race and politics in textual understanding.
PREREQ: ENGL202, ENGL205 and ENGL206.
RESTRICTIONS: Any two of the three Prerequisites acceptable.

ENGL 301 Problems in Composition 3

Expository writing, with related studies in grammar, diction and rhetoric.
PREREQ: ENGL110.
RESTRICTIONS: Not for major credit.

ENGL 302 Advanced Composition 3

Expository writing in a variety of forms, with emphasis on literary analysis.
PREREQ: ENGL110.

ENGL 304 Poetry Writing 3

Practice in writing a variety of verse forms.
PREREQ: ENGL110.
RESTRICTIONS: Final enrollment set after first class and submission of student portfolios.

ENGL 305 Fiction Writing 3

Practice in writing the short story.
PREREQ: ENGL110.
RESTRICTIONS: Final enrollment set after first class and submission of student portfolios.

ENGL 307 News Writing and Editing 3

News sources; news gathering; interviewing; feature writing; libel problems and ethics.
PREREQ: ENGL110.
RESTRICTIONS: Minimum grade of B required for Prerequisite. Counts toward English major only as part of journalism concentration.

ENGL 308 Reporter's Practicum 3

Supplements ENGL307 with reporting and writing experience on the student newspaper.
PREREQ: ENGL307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 309 Feature and Magazine Writing 3

All aspects of the newspaper feature article: developing ideas, doing research, interviewing and writing. Also some attention to magazine feature writing and marketing feature articles.
PREREQ: ENGL307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 310 Copy Editing and Layout 3

Newspaper copy editing, headline writing and layout, with emphasis on practical experience. Explores improvement or updating of news stories by rewriting.
PREREQ: ENGL307.
RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 312 Written Communications in Business 3

Examines the role of written communication in corporate decision making. Students write memos, letters, proposals and reports that simulate on-the-job communication tasks, and are encouraged to use materials from their fields of specialization.
PREREQ: ENGL110.
RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.

ENGL 313 Editing the Literary Magazine 3

Students follow entire production process for the University's literary magazine. Early weeks devoted to reading and discussing essays, aimed toward defining the genre and establishing criteria for selecting student creative work to be included in the magazine.
PREREQ: ENGL110.

ENGL 314 Introduction to Folklore and Folklife 3

Traditional forms of folklore with emphasis on modern folklore as it functions in contemporary societies. May be cross-listed with CMLT314.
PREREQ: ENGL110.

ENGL 315 Ballad and Folksong 3

English-language ballad and folksong tradition in America. Consideration of oral, literary, historical and sociocultural aspects of the Anglo-Scots-Irish and Afro-American heritages.

PREREQ: ENGL110.

ENGL 316 Peer Tutoring/Advanced Composition 3

See ARSC316 for course description.

ENGL 317 Film History 3

Chronological survey of world film history. In odd-numbered years, ENGL317 deals with American films; in even-numbered years, with foreign films. Both terms may be taken for credit.

May be cross-listed with CMLT317.

PREREQ: ENGL110.

ENGL 318 Studies in Film 3

Special topics such as film genres, major directors and Soviet cinema. Variable content.

May be cross-listed with CMLT318 and/or WOMS318.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 321 Introduction to Medieval Literature 3

Selected English and European writings in translation, read as literature and cultural history.

May be cross-listed with CMLT321.

PREREQ: ENGL110.

ENGL 322 Chaucer 3

Troilus and Criseyde, The Canterbury Tales (in part), and some of the shorter poems.

PREREQ: ENGL110.

ENGL 324 Shakespeare 3

Representative histories, comedies and tragedies.

PREREQ: ENGL110.

ENGL 325 Sixteenth-Century Poetry and Prose 3

Study of selected writings of English authors of the 16th century, with an emphasis on the works of Sidney, Spenser and Wyatt.

PREREQ: ENGL110.

ENGL 326 Seventeenth-Century Prose and Poetry 3

History of poetry and prose exclusive of Milton.

PREREQ: ENGL110.

ENGL 327 English Bible 3

The King James version as literature.

PREREQ: ENGL110.

ENGL 328 Milton 3

Study of Paradise Lost and selected other poetry and prose by this author.

PREREQ: ENGL110.

ENGL 331 The Age of Satire 3

Dryden, Pope, Swift and their contemporaries.

PREREQ: ENGL110.

ENGL 334 The Early Romantics 3

The poetry and prose of Blake, Coleridge, Wordsworth and their associates. Some attention to the roots in German Romanticism and the connections with the later Romantics.

PREREQ: ENGL110.

ENGL 335 The Later Romantics 3

Poetry and prose of Byron, Shelley, Keats and their associates.

PREREQ: ENGL110.

ENGL 336 Victorian Poetry 3

Tennyson, Browning, Arnold and their contemporaries.

PREREQ: ENGL110.

ENGL 337 Victorian Prose 3

Carlyle, Ruskin, Arnold and their contemporaries.

PREREQ: ENGL110.

ENGL 338 Victorian Fiction 3

Focuses on important novels of the nineteenth century in Britain. Authors include Dickens, the Brontës, Eliot, Hardy and their contemporaries.

May be cross-listed with WOMS337.

PREREQ: ENGL110.

ENGL 339 Twentieth-Century British Literature 3

PREREQ: ENGL110.

ENGL 340 American Literature to the Civil War 3

PREREQ: ENGL110.

ENGL 341 American Literature: Civil War to World War II 3

PREREQ: ENGL110.

ENGL 342 American Literature Since World War II 3

PREREQ: ENGL110.

ENGL 344 Black American Literature I 3

Literature by Black American writers from the 18th century to the Harlem renaissance.

May be cross-listed with BAMS313.

PREREQ: ENGL110.

ENGL 345 Black American Literature II 3

Literature by Black American writers from the Harlem renaissance to the present.

PREREQ: ENGL110.

ENGL 351 Introduction to Irish Literature 3

Critical and historical survey of major modern Irish writing. Yeats, Synge, Joyce and Beckett emphasized, and some general historic and cultural background included.

PREREQ: ENGL110.

ENGL 355 King Arthur in Literature 3

Study of the historical background and literary treatments of Arthurian characters and themes in English literature.

PREREQ: ENGL110.

ENGL 360 Humanities Colloquium 3

See ARSC360 for course description.

May be cross-listed with PHIL360.

ENGL 365 Studies in Literary Genres, Types and Movements 3

Particular areas or writers to be announced.

May be cross-listed with BISC365, CMLT365 and/or CSCC365.

PREREQ: ENGL110.

RESTRICTIONS: Not for major credit.

ENGL 366 Independent Study 1-6

ENGL 368 Literature and Science 3

Comparative examination of literature and science in several important philosophical, methodological, cultural and social aspects, including the study of elementary philosophy and history of science and theory and history of literature and the analysis of individual scientific and literary texts.

May be cross-listed with CSCC368.

PREREQ: ENGL110.

ENGL 369 Literature and Medicine 3

See CSCC369 for course description.

ENGL 371 Studies in Fiction 3

Special topics in the novel and short story. Topics may emphasize an author or authors, a type or types of fiction, a period or theme. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 372 Studies in Drama 3

Special topics in an author or authors, a type or types of drama, a period or theme. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 373 Studies in Poetry 3

Special topics in a poet or poets, a type or movement, a period or theme. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 380 Women Writers 3

Works of English and American women writers such as Emily Dickinson, Jane Austen, the Brontes, George Eliot, Virginia Woolf and Gwendolyn Brooks. May be cross-listed with WOMS380.

PREREQ: ENGL110.

ENGL 381 Women in Literature 3

Survey of both traditional and neglected images of women in literature, with topics such as sexual symbolism, women in male-centered society, women in nature and female metaphors.

May be cross-listed with WOMS381.

PREREQ: ENGL110.

ENGL 382 Studies in Multicultural Literature in English 3

Topics in multicultural literature in English from Africa and other non-European societies or in themes of colonialism or cross-cultural relations as represented in literature. Variable content.

May be cross-listed with WOMS382.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 383 Teaching Composition in Secondary Schools 3

Study of current composition theory, with emphasis on the relationship between theory and classroom practices in the secondary schools.

PREREQ: ENGL110.

ENGL 384 Teaching English in Secondary School 3

Approaches to the teaching of grammar, composition and literature. Includes treatment of aims, materials, unit organization, evaluation and teaching techniques.

PREREQ: ENGL110.

ENGL 385 Studies in Literary Criticism and Theory 3

Studies in selected topics in literary criticism and critical theory, e.g., narrative theory and the novel, semiotics and literary criticism and feminist criticism. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 390 Introduction to the English Language 3

General introduction to the study of the English language, with emphasis on modern linguistic approaches.

May be cross-listed with LING390.

ENGL 391 Honors Colloquium 3

See ARSC390 for description.

PREREQ: ENGL110.

ENGL 398 Film and Modern American Culture 3

Survey of the main themes in American culture from the Jazz Age through the Cold War as reflected in feature film and popular literature.

May be cross-listed with HIST398.

PREREQ: ENGL110.

ENGL 404 Poetry Writing Workshop 3

PREREQ: ENGL304.

RESTRICTIONS: Requires permission of instructor. Final enrollment set after first class and submission of student portfolios. May be repeated once for credit.

ENGL 405 Prose Writing Workshop 3

PREREQ: ENGL305.

RESTRICTIONS: Requires permission of instructor. Final enrollment set after first class and submission of student portfolios. May be repeated once for credit.

ENGL 407 Advanced Reporting 1-3

Selected projects in reporting issues in depth.

PREREQ: ENGL307.

RESTRICTIONS: Maximum of three credits for any registration with no more than six credits toward graduation. Counts toward English major only as part of journalism concentration.

ENGL 409 Topics in Journalism 3

Special studies and writing in selected kinds of journalism (opinion writing, science journalism) or in an aspect of the profession (history of American journalism, ethics of journalism). Variable content.

PREREQ: ENGL307.

RESTRICTIONS: May be repeated once for credit.

ENGL 410 Technical Writing 3

Selected problems in business communications, the preparation of reports and technical editing.

PREREQ: ENGL110.

RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.

ENGL 411 Rhetoric for Business and Technical Writers 3

Study of rhetorical theories and strategies within the context of business and technical skills.

PREREQ: ENGL312 or ENGL410.

RESTRICTIONS: Open only to English majors. Counts toward English major only as part of the concentration in business and technical writing.

ENGL 412 Business and Technical Publication 3

Advanced instruction in the production of business publications and technical documents; team projects provide practical experience in preparing instruction manuals, research proposals, formal reports, brochures and newsletters.

PREREQ: ENGL411.

RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing.

ENGL 413 Topics in Technical Writing 3

Special studies and writing in selected kinds of business and technical communication (e.g., computer software documentation) or in an aspect of business and technical communication profession (e.g., ethics of business and technical communication). Variable content.

PREREQ: ENGL312 or ENGL410.

RESTRICTIONS: Counts toward English major only as part of the concentration in business and technical writing. May be repeated for credit when topics vary.

ENGL 414 Technical Editing 3

Practical work and study of the editorial procedures essential in editing technical publications and documentation.

PREREQ: ENGL312 or ENGL410.

ENGL 417 Film Theory and Criticism 3

Specialized course emphasizing methods of film criticism and survey of major theories of film.

PREREQ: ENGL110.

RESTRICTIONS: For film concentrators and advanced film students.

ENGL 421 Studies in Medieval 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.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 424 Studies in Shakespeare 3

Special topics in the plays and/or the sonnets. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 425 Studies in the Renaissance 3

Special studies in such topics as Women in Renaissance Literature; Humanism, Shakespeare, and Popular Culture; and the Puritan Rebellion. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 431 Studies in Restoration and Eighteenth-Century Literature 3

Study of selected topics in Restoration and 18th-century literature and culture, e.g., the epistolary novel, Restoration and 18th-century drama, and women in 18th-century literature. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 434 Studies in Nineteenth-Century Literature 3

Special topics in an author or authors (Wordsworth, Shelley, Bronte, Dickens, Tennyson, etc.), a genre, a type (such as confessional literature) or an idea (such as the Imagination). Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 439 Studies in Modern/Contemporary Literature 3

Study of selected topics in 20th-century British, American and world literature, e.g., the contemporary epic novel, modernism, colonial writing and politics. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 441 Studies in American Literature 3

Special topics, ranging from the beginnings to contemporary American literature; may include studies in a single author or authors (e.g., the detective stories of Poe) or period and genre studies (e.g., the Harlem Renaissance or the humor of the old southwest). Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 460 Humanities Colloquium 3

See ARSC460 for description.

PREREQ: ENGL110.

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: ENGL312 or ENGL410.

ENGL 465 Studies in Literature Genres, Types and Movements 3

Particular areas or writers to be announced.

May be cross-listed with CMLT465 and/or WOMS465.

PREREQ: ENGL110.

ENGL 466 Independent Study 1-6

ENGL 471 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. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 472 Studies in the Drama 3

Special topics in an author or authors, a type or types of drama, a period or theme. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 473 Studies in Poetry 3

Special topics in a poet or poets, a type or movement, a period or theme. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 477 The Structure of English 3

See EDST477 for course description.

ENGL 480 Seminar 3

Intensive 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 cross-listed with CMLT480 and/or WOMS480.

ENGL 481 Seminar in Teaching English 3 PF

Seminar to accompany student teaching in secondary school English. Deals with classroom management, teaching techniques and other professional issues.

PREREQ: ENGL110.

RESTRICTIONS: Open only to student teachers in English.

ENGL 484 Literary Criticism and Theory 3

Study of problems in textual interpretation and aesthetics from the ancient world through the present, with attention to both the principal movements in critical theory and the social and philosophical contexts of interpretation.

May be cross-listed with CMLT484.

PREREQ: ENGL300.

ENGL 485 Studies in Literary Criticism and Theory 3

Study of selected topics in literary criticism and critical theory, e.g., narrative theory and the novel, semiotics and literary criticism, and feminist criticism. Variable content.

PREREQ: ENGL110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 494 History of the English Language 3

The development of Modern English with emphasis on changes in sounds, inflections, spelling and vocabulary.

PREREQ: ENGL110.

ENGL 604 Poetry Writing Workshop 3

Intensive practice in verse composition. Group discussions and individual conferences. Wide reference to professional poems as models. Emphasis on student competence in traditional prosody as well as exploring freer forms.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 621 Studies in Medieval Culture 3

Variable content. Study of selected texts in Old and Middle English literature as well as continental literature (in English translations).

RESTRICTIONS: For graduate students with little or no medieval literature and culture background.

ENGL 624 Studies in Shakespeare 3

Variable content. Study of selected plays and poetry of Shakespeare as well as the writings of other Renaissance dramatists.

RESTRICTIONS: For graduate students with little or no Shakespeare background. May be repeated once for credit when topics vary.

ENGL 625 Studies in the Renaissance 3

Variable content. Study of selected poetry, prose, and drama of the English Renaissance (excluding Shakespeare) as well as texts of selected continental writers (in English translation).

RESTRICTIONS: For graduate students with little or no Renaissance literature and culture background. May be repeated once for credit when topics vary.

ENGL 631 Studies in Eighteenth-Century Literature 3

Variable content. Study of selected poetry, prose and drama of the English Restoration and eighteenth century, as well as continental writings (in English translations).

RESTRICTIONS: For graduate students with little or no Restoration and 18th-century literature background. May be repeated once for credit when topics vary.

ENGL 634 Studies in Nineteenth-Century Literature 3

Variable content. Study of selected texts of the Romantic and Victorian periods in England, as well as related continental writings (in English translation).

RESTRICTIONS: For graduate students with little or no 19th-century English literature background. May be repeated once for credit when topics vary.

ENGL 639 Studies in Modern/Contemporary Literature 3

Variable content. 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: For graduate students with little or no 20th-century English and American literature background. May be repeated for credit when topics vary.

ENGL 641 Studies in American Literature 3

Variable content. Study of selected poetry, prose and drama of America from the colonial period through the early twentieth century. May survey American literature and culture.

RESTRICTIONS: For graduate students with little or no American literature background. May be repeated for credit when topics vary.

ENGL 651 Irish Literature: Genre and Period Studies 3

Intensive study of a single genre or a well-defined period of Irish literature. Examples include the background of Irish literature, the Irish short story, Irish drama and Irish poetry. Variable content.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 665 Studies in Literary Genres, Types and Movements 3

Particular areas or writers to be announced.

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. Variable content.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 672 Studies in the Drama 3

Special topics in an author or authors, a type or types of drama, a period or theme. Variable content.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 673 Studies in Poetry 3

Special topics in a poet or poets, a type or movement, a period or theme. Variable content.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 677 The Structure of English 3

See EDST677 for course description.

ENGL 680 Seminar 3**ENGL 684 Literary Criticism and Theory 3**

Study of the principal movements in Western literary interpretation and aesthetics from the ancient world through the present. Emphasis on the social and philosophical contexts of interpretation.

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

The development of Modern English with emphasis on changes in sounds, inflections, spelling and vocabulary.

ENGL 801 Old English 3

A study of the English language before 1100, and of selected readings from Old English literature.

May be cross-listed with LING801.

ENGL 803 Middle English 3

A study of the English language between 1100 and 1400, and of selected readings from Middle English poetry and prose.

May be cross-listed with LING803.

ENGL 804 Seminar: Chaucer 3**ENGL 808 Seminar in Medieval and Renaissance Drama 3**

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 809 Seminar: The Age of Elizabeth 3

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 810 Seminar: Shakespeare 3

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 811 Seminar: Elizabethan and Jacobean Drama 3

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 815 Seminar: Seventeenth-Century Literature 3

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 816 Seminar: Milton 3

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 820 Seminar: The Age of Dryden 3**ENGL 829 Seminar: English Neo-Classicism 3**

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 833 Seminar: English Romanticism 3

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 839 Seminar: Victorian Studies 3

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 841 Seminar: Modern British Fiction 3

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 844 Seminar: Special Topics in American Literature 3

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 846 Seminar: Special Topics in English Literature 3

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 850 Seminar: Colonial American Literature 3

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 851 Seminar: American Romanticism 3

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 852 Seminar: American Realism and Naturalism 3

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 853 Seminar: Modern American Literature 3

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 869 Master's Thesis 1-6**ENGL 873 Methods of Research 3**

A course in bibliography, textual problems, editing and the use of modern research tools.

ENGL 884 Seminar in Literary Theory and Criticism 3

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 890 Studies in Linguistics 3

See LING890 for course description.

ENGL 969 Doctoral Dissertation 1-12 PF

Entomology

ENTO 105 Insects in Our World 3

Insects and their relatives. Principles of insect control as interrelated with ecology and behavior. Recognition of the various insect orders stressed. Small insect collection may be required.

ENTO 201 Wildlife Conservation and Ecology 3

Natural history of North American wildlife; general principles of ecology; ecological and sociological problems and solutions in wildlife conservation.

RESTRICTIONS: Should precede BISC302.

ENTO 205 Elements of Entomology 3

Lives of insects, emphasizing interactions with humans. Basic insect identification, structure and function, behavior, ecology, evolution, pest control and impact on human society, history and culture.

ENTO 214 Apiology and Apiculture 2

Scientific study of the life of honey bees, including their biology, behavior and communication; and introduction to techniques of culturing and managing honey bees for honey production and crop pollination.

ENTO 224 Apiology and Apiculture Laboratory 1

Laboratory and field course to complement topics in ENTO214. Bee identification and culture; and hive management. Work with bees in an apiary to develop confidence in keeping bee colonies.

PREREQ: ENTO214.

COREQ: ENTO214.

ENTO 300 Principles of Animal and Plant Genetics 3

See PLSC300 for course description.

ENTO 305 Entomology Laboratory 2

Insect structure, physiology, behavior, taxonomy, evolution and ecology studied through field trips, dissection and experiments. Insect collection (with identification to orders) required.

PREREQ: ENTO205.

COREQ: ENTO205.

ENTO 310 Animal and Plant Genetics Laboratory 1

See PLSC310 for course description.

ENTO 318 Taxonomy of Birds 2

Classification of birds. Identification by sight and sound. Emphasis on orders of the world, North American families and species of the region. Indoor labs with one hour of lecture and field trips.

ENTO 325 Wildlife Management 3

Introduction to solving wildlife management problems. Development of management plans with consideration of habitat, human and animal population components.

PREREQ: At least one of the following: BISC302, BISC321 or ENTO201.

ENTO 366 Independent Study 1-6

ENTO 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: ENTO305.

ENTO 406 Insect Identification - Taxonomy 3

Lecture and laboratory course in the collection, preservation and classification of common insect families.

PREREQ: ENTO305.

ENTO 408 Field Taxonomy 2

The collection, classification, preservation and curation of insects. An insect collection is required.

PREREQ: ENTO406.

COREQ: ENTO406.

ENTO 410 Ecology of Arthropod Vectors and Parasites 2

Introduction to the ecological relationships among arthropod vector species, disease-causing organisms they transmit and plant or animal species affected by vectored organisms. Effects of direct parasitism and various types of vectored parasitism in epidemiology of plant and animal diseases.

PREREQ: ENTO105 or ENTO205.

ENTO 411 Economic Entomology 3

Principles of managing insect populations to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human populations. Diagnostic recognition, control and habits of major economic pest species.

PREREQ: ENTO205.

ENTO 418 Avian Biology 2

Birds as adaptive complexes. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction.

PREREQ: BISC208.

RESTRICTIONS: Requires Junior status.

ENTO 425 Mammalogy 3

Mammal biology: evolution, feeding, homeostasis, communication and reproduction. Natural history and identification of taxa. Field trips.

PREREQ: ANSC134 or BISC207, and BISC208.

RESTRICTIONS: Requires Junior status.

ENTO 430 Close-Up Nature Photography 3

Introduction to the principles of close-up and ultra close-up photography of natural history subjects. Lens and electronic flash systems for biological photography, plus field and indoor techniques. In-class analysis of assigned student slides.

RESTRICTIONS: Requires permission of instructor.

ENTO 464 Entomology Field Experience 1-3 PF

Career-related work experience and exploration of potential occupations related to entomology or ecology. Student works with a faculty member to arrange for supervised (usually part-time) employment at a discipline-related site such as a research laboratory, pest control firm, museum, pesticide company or nature center.

RESTRICTIONS: Maximum of six credits may count toward B.S. degree, three credits toward major.

ENTO 465 Seminar 1

Development and presentation of a talk on an aspect of a class-selected theme. Presentation in the format of a scientific symposium. Proper selection, design, production and use of visual aids.

RESTRICTIONS: Requires Senior status.

ENTO 466 Independent Study 1-6

ENTO 468 Research 1-6

ENTO 501 Natural History for Teachers 3

Background knowledge, methods and materials for teaching basic concepts of ecology, environmental problems and field natural history, particularly as applicable to Delaware. Includes outdoor studies in field, forest, stream and estuarine environments.

ENTO 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: ENTO305.

ENTO 602 Larval Taxonomy 3

Lecture-laboratory course treating the collection, preservation and classification of the immature stages of common holometabolous insect families.

PREREQ: ENTO305.

ENTO 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: ENTO305.

ENTO 606 Insect Identification - Taxonomy 3

Lecture and laboratory course in the collection, preservation and classification of common insect families.

PREREQ: ENTO305.

ENTO 608 Field Taxonomy 2

The collection, classification, preservation and curation of insects. An insect collection is required.

PREREQ: ENTO606.

ENTO 611 Economic Entomology 3

Principles of managing insect populations to reduce losses caused by insects attacking our food, fiber, buildings, domestic animals and human populations. Diagnostic recognition, control and habits of major economic pest species.

PREREQ: ENTO205.

ENTO 613 Integrated Pest Management 3

Theory and practice of IPM, including ecological perspective, computer modeling and economic aspects, with case studies. Application of IPM primarily to insect control, with some discussion of plant pathogen and weed control.

PREREQ: ENTO305.

ENTO 614 Insect Ecology 3

The interaction of insects with their environment as it influences their distribution, abundance, life history and evolution. Emphasis on primary research literature.

PREREQ: BISC302 and ENTO305, or BISC637.

ENTO 615 Research Techniques in Ecology 3

Design and execution of ecological research using insects and plants as models. Execution of class and individually designed field projects.

PREREQ: BISC302.

ENTO 617 Field Natural History 1-3

An extended field trip or several shorter trips to natural and managed areas. Emphasis on identification and observation of biota, field notes, knowledge of natural habitats, ecological processes and wildlife conservation issues and practices. Individual projects.

RESTRICTIONS: Requires Junior status and consent of instructor. Credit depends on extent of travel; maximum of three credits allowed toward major.

ENTO 618 Avian Biology 2

Birds as adaptive complexes. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction.

PREREQ: BISC208.

ENTO 619 Principles of Biological Control of Insects 3

Historical, ecological and biological bases of biological control of pest insects and weeds. Consideration given to procedures and techniques (e.g., foreign exploration) and related aspects (e.g., insect pathology and insect resistance in crop plants).

PREREQ: ENTO305.

ENTO 620 Insect Ethology 3

Advanced treatment of selected topics in the ecology of insect behavior. Original research project required.

PREREQ: BISC302 and ENTO406 or ENTO606.

ENTO 622 Toxicology of Insecticides 3

Principles of insecticide toxicology. Classification, biochemical and physiological bases of toxic action, animal and plant metabolism, and environmental dynamics of insecticides.

ENTO 625 Mammalogy 3

Mammal biology: evolution, feeding, homeostasis, communication and reproduction. Natural history and identification of taxa. Field trips.

PREREQ: ANSC134 or BISC207, and BISC208.

RESTRICTIONS: Requires Junior status.

ENTO 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: ENTO305.

RESTRICTIONS: Requires Junior status.

ENTO 630 Close-Up Nature Photography 3

Introduction to the principles of close-up and ultra close-up photography of natural history subjects. Lens and electronic flash systems for biological photography, plus field and indoor techniques. In-class analysis of assigned student slides.

RESTRICTIONS: Requires permission of instructor.

ENTO 803 Writing Research Proposals 1

Conception, design and composition of M.S. and Ph.D. research proposals for professional granting agencies in the biological sciences.

ENTO 865 Seminar 1

Development and presentation of a talk on an aspect of a class-selected theme. Presentation in the format of a scientific symposium. Proper selection, design, production and use of visual aids. Assist with logistics of symposium organization.

RESTRICTIONS: Required of first-year graduate students.

ENTO 868 Research 1-9**ENTO 869 Master's Thesis 1-6****ENTO 888 Topics in Entomology and Applied Ecology 1 PF**

A seminar with lectures on a variety of topics related to entomology and wildlife biology.

Finance

FINC 201 Introduction to Investments 3

Principles and theory of investments. The nature and analysis of investments. Investment opportunities and management of investment portfolios.

RESTRICTIONS: Not open to Business Administration or Accounting degree candidates.

FINC 311 Business Finance 3

Management technique and information related to the financial function of business firms covering capital budgeting, working capital management, cost of capital, capital structure analysis, and short- and long-term financing.

PREREQ: ACCT208.

FINC 312 Problems in Financial Management 3

The role of the financial manager in the business firm. Analytical methods and procedures of financial management. Text and cases.

PREREQ: FINC311.

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 non-FINC professional elective for BSBA candidates.

FINC 407 Security Analysis 3

An analysis of components of security evaluation and the establishment of investment standards and policies.

PREREQ: FINC311.

FINC 412 The American Financial System 3

Analysis of financial institutions and economic impact of changing money flows upon the savings-investment process.

PREREQ: FINC311 and ECON302.

FINC 413 Finance Seminar: Special Topics 3

Topics vary by semester. Typically examines such areas as financial theory and practice, financial systems, markets and individual inquiry.

PREREQ: Six hours of finance courses.

RESTRICTIONS: May be repeated for credit when topics vary by non-finance majors.

FINC 414 Finance Seminar: Banking 3

Considers formation of banking policy and financial management of a commercial bank and similar institutions. Topics include funds management, liquidity and credit standards, lending operations, capital adequacy and the changing regulatory environment.

PREREQ: Six hours of finance including FINC412.

FINC 415 Finance Seminar: International Finance 3

Interrelationships between the international monetary environment and financial planning for the firm. Topics include exchange rates, currency restrictions, tax regulations, direct investment theory, capital budgeting, financing, risk management and working capital management.

PREREQ: ECON302 and six hours of finance.

FINC 416 Finance Seminar: Investments 3

Topics covered may include portfolio theory, stock and bond valuation and management of portfolios, market efficiency, futures, options and other related issues.

PREREQ: Six hours of finance including FINC407.

FINC 417 Finance Seminar: Real Estate 3

Introduction to real estate theory and management. Financing, evaluation and property management, as well as housing policy and government participation.

PREREQ: Six hours of finance including FINC412.

FINC 850 Financial Administration 3

An introduction to financial planning and evaluation of performance. Topics covered include funds allocation, capital budgeting, leverage, cost of capital structure, dividend policy and financial institutions.

PREREQ: ACCT551.

FINC 851 Corporate Financial Analysis 3

Central focus toward increasing decision skills in corporate finance by exposure to complex problems in working capital management, capital rationing under resource constraints and the optimal acquisition and management of capital. Applies financial theory as well as analytical and numerical techniques to the solution of problems and cases.

PREREQ: FINC850

FINC 852 Portfolio Management 3

Examines techniques of security analysis; theory and practice of portfolio management.

PREREQ: FINC850.

FINC 854 Special Topics in Finance 3

Examines selected current topics of interest in financial management, portfolio planning and evaluation, international finance and the operations of the financial systems. Individual inquiry is stressed.

PREREQ: Six hours of graduate work in finance.

FINC 855 Financial Institutions and Markets 3

Investigates the nature, purpose and management of American financial institutions and markets.

PREREQ: FINC850.

FINC 859 Seminar in Finance 3

Emphasis on research methodology, individual inquiry and communication of results. Involves student formal presentations of findings in their area of interest.

PREREQ: Six credit hours of FINC courses (850 or above).

RESTRICTIONS: Requires 24 M.B.A. credit hours.

Foreign Languages and Literatures

FLLT 105 Modern Language I - Elementary 4

Various modern languages outside normal departmental offerings, e.g., Arabic, Hebrew, Korean, Modern Greek. An introduction to the language and a development of speaking, listening, reading and writing skills through the use of basic texts. Language laboratory work as needed.

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: FLLT105.

FLLT 107 Modern Language III - Intermediate 4

Review of grammar, continued practice in speaking and writing, reading texts of average difficulty.

PREREQ: FLLT106.

RESTRICTIONS: Satisfies the foreign language requirement.

FLLT 202 Biblical and Classical Literature 3

See ENGL202 for course description.

FLLT 240 Research in Foreign Languages and Literatures 1-3

Seminar presents the wide range of research activities possible in the field of foreign languages and literatures and currently being pursued by faculty members in French, German, Italian, Russian, Spanish and Classics. Each week a different faculty member will explain his/her research interests and discuss them with the class.

FLLT 311 Twentieth-Century Literature I 3

See CMLT311 for course description.

FLLT 312 Twentieth-Century Literature II 3

See CMLT312 for course description.

FLLT 316 Classical Mythology 3

Cosmological myths and heroic sagas in the literature and art of Greece and Rome. The influence of the mythology in later art and literature.

May be cross-listed with CMLT316.

RESTRICTIONS: Open to Freshmen.

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; Castles, Queens and Troubadours (Women in Medieval Literature); and the European Postwar Novel.

May be cross-listed with CMLT320 and/or WOMS320.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 322 Topics: Classical Literature in Translation 3

Special topics in Greek and Roman culture and civilization. Particular areas and writers to be announced, e.g., ancient epic, ancient drama, Greek literature in translation.

May be cross-listed with CMLT322.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 324 Topics: French Literature in Translation 3

Study of the works of one or more outstanding authors or of a special theme. Course taught in English. Topics vary and are announced in registration booklet.

May be cross-listed with WOMS324.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 325 Topics: German Literature in Translation 3

Study of the works of one or more outstanding authors or of a special theme. Course taught in English.

May be cross-listed with WOMS325.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 326 Topics: Hispanic Literature in Translation 3

Study of the works of one or more outstanding authors or of a special theme. Course taught in English. Topics vary and are announced in registration booklet.

May be cross-listed 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. Course taught in English.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 328 Topics: Japanese Literature in Translation 3

Study of the works of one or more outstanding authors or of a special theme. Course taught in English.

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.

May be cross-listed with CMLT330, CSCC330 and/or WOMS330.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 360 Humanities Colloquium 3

See ARSC360 for course description.

FLLT 366 Independent Study 1-6**FLLT 375 Topics: Russian and Soviet Culture in Translation 3**

Special topics in Russian and Soviet culture. Course taught in English. Topics vary and are announced in registration booklet.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 403 Romance Language Lexicography 3

See LING403 for course description.

FLLT 421 Methods of Teaching Foreign Languages 3

Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science. Includes a two-hour practicum and 50 hours of observation in high school classrooms for future student teachers.

May be cross-listed with LING421.

FLLT 422 Language Syllabus Design 3

Study of approaches to language syllabus design and materials development including grammatically sequenced, situational, notional-functional and verbal strategy approaches. Simplification, standardization, textbook evaluation and adaptation, and design and implementation of learning units for second language, special purpose and bilingual learners.

May be cross-listed with LING422.

FLLT 424 Second Language Testing 3

See LING424 for course description.

FLLT 460 Humanities Colloquium 3

See ARSC460 for description.

FLLT 466 Independent Study 1-6**FLLT 620 Interactive Language Teaching 3**

See LING620 for course description.

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 cross-listed 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 verbal strategy approaches. Simplification, standardization, textbook evaluation and adaptation, and design and implementation of learning units for second-language, special purpose and bilingual learners.

May be cross-listed with LING622.

FLLT 623 Theoretical and Practical Issues in Foreign Language Pedagogy 3

Graduate assistants enrolled in this course will study current perspectives on foreign language instruction and have extensive hands-on experience with the implementation of effective language teaching strategies. Emphasis will be given to the enhancement of students' proficiency in class planning, syllabus design and materials preparation.

RESTRICTIONS: Graduate students only.

FLLT 624 Second Language Testing 3

See LING624 for course description.

FLLT 660 Humanities Colloquium 3

See ARSC660 for description.

FLLT 692 Weekend Short Course 1

Short weekend course in language, literature and/or civilization, or in professional studies. Topics vary.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 693 Weekend Short Course 2

Short weekend course in language, literature and/or civilization, or in professional studies. Topics vary.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 801 Professional Orientation 3

Provides students in foreign languages and literature with a general introduction to three topics relevant to their graduate career and subsequent employment: 1) research methods and tools; 2) approaches to the literary text; and 3) professional practices.

Food Science

FOSC 201 Food Principles 2

Principles of food selection and preparation as related to the chemical and physical properties of food. Includes the composition and structure of foods, functional properties of ingredients, and methods to maintain desirable quality (sensory and nutritional) attributes of food.

COREQ: FOSC211.

FOSC 211 Food Principles Laboratory 1

Chemical and physical composition of food and preparation studied in selected laboratory experiments. Food components examined include the sensory, nutritional and functional aspects of proteins, lipids and carbohydrates.

COREQ: FOSC201.

FOSC 265 Seminar on Food Science 1

Overview of world food supplies, sources of raw materials, broad compositional components of foods, overview of food safety and food processing methods. Introduction to career opportunities and orientation to the profession.

FOSC 301 Dairy Technology 3

See ANSC301 for course description.

FOSC 305 Food Science 2

Composition, structure and functional properties of food and fundamentals of commercial food processing, including thermal processing, freezing, dehydration and ionizing radiation.

May be cross-listed with ANSC305.

PREREQ: FOSC201, FOSC211 and CHEM213.

FOSC 306 Food Science Laboratory 1

Laboratory study of ingredient manipulation, food processing and preservation techniques including introductory food analytical quality measurements.

May be cross-listed with ANSC306.

COREQ: FOSC305.

FOSC 359 Topics in Food Science 1-3

Introduces topics in food science and technology which may include, in part, sensory evaluation, additives, enzymes and browning, biotechnology, food spoilage and safety, water activity, flavor chemistry, carbohydrates, irradiation, pigments, food regulators, packaging trends, artificial sweeteners, computer applications and processing operations.

FOSC 365 Seminar on Food Science 1

Focuses on food supplies in meeting specialized needs, new processing methods, introduction to analytical methods and computer application in food processing.

FOSC 366 Independent Study 1-6**FOSC 409 Food Processing I 4**

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

May be cross-listed with ANSC409.

PREREQ: FOSC428.

FOSC 410 Food Processing II 4

Covers preservation methods including drying, additives, asepsis, modified atmosphere storage, fermentation and irradiation; preparation (assembly) methods including emulsification, homogenization and extrusion; and food safety and sanitation including laws and regulations, and Good Manufacturing Practices.

May be cross-listed with ANSC410.

PREREQ: FOSC409 and FOSC428.

FOSC 428 Food Chemistry 4

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

May be cross-listed with ANSC428.

PREREQ: CHEM214 and CHEM321.

FOSC 429 Food Analysis 4

The application of instrumentation: UV/Vis, FT-IR and Fluorescence Spectrophotometry, Chromatography (TLC, LC, GC and HPLC), Electrophoresis, and Enzyme Assays for the determination of food constituents and additives. Official AOAC and AACC methods utilized.

May be cross-listed with ANSC429.

PREREQ: CHEM216.

FOSC 439 Food Microbiology 4

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

PREREQ: BISC371.

FOSC 445 Food Engineering Technology 4

Engineering fundamentals for processing of food materials, including applied thermodynamics and heat transfer principles and operations. May be cross-listed with EGTE445.

PREREQ: EGTE311, MATH 222, and PHYS201.

RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 446 Food Processing Engineering Technology 4

Selected unit operations of importance to the food processing industry including evaporation, dehydration and distillation. Emphasizes the role that properties of food take in constraining the application of classical unit operations analyses.

PREREQ: FOSC445.

RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 449 Food Biotechnology 4

Processes used in industrial fermentations and biotechnology: essential biochemical background of commercial microorganisms, use and genetics of starter cultures, design and control of fermentor systems, kinetics of growth and product recovery. Biotechnological production of alcohols and alcoholic beverages, organic acids, cultured dairy, vegetable and meat products, enzymes, vitamins and therapeutic compounds.

PREREQ: BISC371 or FOSC439.

FOSC 459 Topics in Food Science 3

In-depth studies on specific aspects of current food science research and application.

FOSC 464 Practicum in the Food Industry 2

Provides hands-on supervised field experience in research, processing equipment and methodology, product development and testing, and/or other activities in the food industry.

RESTRICTIONS: Offered Winter/Summer sessions only.

FOSC 466 Independent Study 1-6

FOSC 609 Food Processing I 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 and screening, mixing, filtration, centrifugation and crystallization; and preservation methods including fresh food storage, low temperature and high temperature methods.

FOSC 610 Food Processing II 4

Covers preservation methods including drying, additives, asepsis, modified atmosphere storage, fermentation and irradiation; preparation (assembly) methods including emulsification, homogenization and extrusion; and food safety and sanitation including laws and regulations, and good manufacturing practices.

PREREQ: FOSC609 and FOSC628.

FOSC 628 Food Chemistry 4

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

PREREQ: CHEM321 and CHEM214.

FOSC 629 Food Analysis 4

The application of instrumentation: UV/Vis, FT-IR and Fluorescence Spectrophotometry, Chromatography (TLC, LC, GC and HPLC), Electrophoresis, and Enzyme Assays for the determination of food constituents and additives. Official AOAC and AACC methods utilized.

PREREQ: CHEM216.

FOSC 630 Food Carbohydrates 3

Examination of simple and complex carbohydrates in food systems. Examines both the chemistry and structural implications of each carbohydrate class, as well as discussing their industrial and nutritional aspects. Special emphasis on simple sugars, artificial sweeteners, starch, pectin, gums and mucilages.

FOSC 639 Food Microbiology 4

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

May be cross-listed with ANSC639.

PREREQ: BISC371.

FOSC 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.

FOSC 646 Food Processing Engineering Technology 4

Selected unit operations of importance to the food processing industry including evaporation, dehydration and distillation. Emphasizes the role that properties of food take in constraining the application of classical unit operations analyses.

PREREQ: FOSC645.

RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 649 Food Biotechnology 4

Processes used in industrial fermentations and biotechnology: essential biochemical background of commercial microorganisms, use and genetics of starter cultures, design and control of fermentor systems, kinetics of growth and product recovery. Biotechnological production of alcohols and alcoholic beverages, organic acids, cultured dairy, vegetable and meat products, enzymes, vitamins and therapeutic compounds.

PREREQ: BISC371 or FOSC439.

FOSC 659 Topics in Food Science 2-6

In-depth studies on specific aspects of current food science research and application.

FOSC 665 Seminar 1-3 PF

FOSC 668 Research 1-6

FOSC 670 Modern Food Packaging 3

Covers modern techniques of food packaging, including critical issues associated with new food processing techniques and their packaging requirements. Typical topics are aseptic, modified-atmosphere and retort pouch packaging, as well as the relationship of the food chemistry to the packaging material.

FOSC 671 Package Product Interactions 3

Fundamentals of permeation along with the effect of structural order on permeation and the physicochemical nature of the penetrant. Principles and prediction of flavor sorption. Factors effecting shelf-life of packaged foods, shelf-life prediction and the extension of shelf-life by modified atmosphere techniques.

RESTRICTIONS: Requires permission of instructor.

FOSC 688 Research 1-6

FOSC 869 Master's Thesis 1-6

Food and Resource Economics

FREC 120 Elementary Agricultural Economics 3

Introduction to economic and management principles and their application to the production and marketing of agricultural products, economic growth and economic problems facing the agribusiness industry.

RESTRICTIONS: Not open to Juniors and Seniors.

FREC 125 Elementary Agricultural Economics: Applications 1

Analysis of producer behavior, output, profits and input demands; and evaluation of alternative capital investments.

PREREQ: FREC235.

COREQ: FREC120 and FREC235.

FREC 153 Agricultural Salesmanship 3

Principles and techniques of effective personal selling of agricultural products and services. Development of skills necessary to organize, deliver and refine sales presentations.

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 235 Introduction to Data Analysis 3

Introduction to microcomputers and their use to process and analyze data. Applications from agricultural economics.

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 FREC120 or ECON151.

FREC 270 Biotech: Science and Socioeconomic Issues 3

See ANSC270 for course description.

FREC 302 Management of Agribusiness Firms 3

Principles and practical problems of firm management (decision-making) and planning.

PREREQ: FREC120 or ECON151.

RESTRICTIONS: Not open to Freshmen or Sophmores except by permission of instructor.

FREC 312 Food Retailing and Wholesaling 3

Development and structural organization of the retail and wholesale sector of the food marketing industry. Analysis of current trends, practices and operating efficiencies.

FREC 350 Farm Management 3

Basis and conditions for agricultural production, farm planning and analysis, management of crop and annual production, investments and financial problems and management of labor.

PREREQ: FREC120 and FREC201 or ACCT207.

RESTRICTIONS: Designed for students without farm background.

FREC 366 Independent Study 1-6

FREC 403 Agricultural Production Economics 3

Economic principles applied to the operation of the firm with emphasis on resource allocation and production efficiency. Appraisal of analytical procedures and programming models used in the analysis and planning of a business.

PREREQ: FREC120 or ECON151.

FREC 404 Food Marketing 3

Systems approach to food marketing - farm, wholesale, retail and consumer level, supply and demand for food commodities, pricing, marketing cost, margins, functions, marketing power and its sources and institutional structure of food marketing.

FREC 405 Food Marketing Management 3

Management principles and their application to problems of firms engaged in food marketing.

FREC 406 Agricultural Policy 3

Agricultural policy formation, effects of policy on resource allocation and economics of alternative programs. Analysis of effects of various programs on producers, consumers and taxpayers.

PREREQ: FREC120 or ECON151.

FREC 408 Research Methods 3

Experimental design and plot plans, collection, analysis and presentation of data in agricultural and biological research.

FREC 410 International Agricultural Trade 3

The theory of international trade and agricultural trade policies. Relevance of agricultural trade to developed and less developed economies and recent issues on international agricultural trade.

PREREQ: FREC120 or ECON151.

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.

FREC 424 Resource Economics: Theory and Policy 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: FREC120 or ECON151.

FREC 427 Agricultural Finance 3

The application of principles and tools of finance to managerial problems in agriculture. A study of financial factors affecting agricultural firms.

PREREQ: FREC201 or ACCT207 and a statistics course.

FREC 429 Rural Economic Development Theory and Policy 3

Rural economic development in the United States; rural socioeconomic conditions; survey of economic principles regarding industrial location, economic growth, land use and public service provision; and rural development policies and programs.

PREREQ: FREC120 or ECON151.

FREC 435 Microcomputer Use in Agricultural Economics 3

Microcomputer systems and their use and application in contemporary agricultural economics problems.

PREREQ: FREC235.

FREC 441 Futures Markets in Agriculture 4

Analysis of commodity futures contracts, cash and futures price relationships, hedging and speculative theory.

PREREQ: FREC404.

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.

PREREQ: FREC120 or ECON151.

FREC 464 Agricultural Economics Field Experience 1-3

Supervised field work in farm management, food retailing management, agricultural wholesaling or processing management, natural resource analysis, rural development, agricultural policy analysis or related areas.

RESTRICTIONS: A maximum of three credits may be applied to the B.S. in Agriculture with a major of Agricultural Business Management or Food and Resource Economics.

FREC 465 Seminar 1

Oral and written reports in the subdisciplines of food and resource economics.

FREC 466 Independent Study 1-6

FREC 608 Research Methods 3

Experimental design and plot plans, collection, analysis and presentation of data in agricultural and biological research.

FREC 615 Advanced Prices and Statistics 3

Statistical tools used in agricultural economics research. Introduction to econometric specifications, estimation and interpretation.

PREREQ: FREC408.

FREC 801 Advanced Food Marketing 3

A study of the food industry structure, conduct and performance and its effect on pricing, supply and demand in the industry.

FREC 803 Production Economics 3

Economic theory applied to operation and planning of an enterprise, including factor demand and product supply aspects. Discussion of LP and production function models.

PREREQ: FREC608.

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 cross-listed with ORES806.

PREREQ: FREC608.

FREC 810 International Agricultural Trade Special Topics 3

Advance theory, issues and policies in international agricultural trade emphasizing international finance and agriculture, agricultural trade and development, empirical and methodological issues and international market modelling.

May be cross-listed 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 cross-listed with ECON827 and/or ORES827.

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 cross-listed with ORES834.

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. Language laboratory as needed.

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. Language laboratory as needed.

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 Prereq. Course satisfies Arts and Science foreign 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 Prereq.

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 Prereq. Course satisfies Arts and Science foreign language requirement.

FREN 200 Grammar and Composition 3

Intensive grammar review of all major verb tenses and grammatical concepts (such as object pronouns). Emphasis is on grammar improvement through reading and writing.

PREREQ: FREN107 or FREN112.

FREN 201 French Reading and Composition: Short Story 3

Reading and discussion of French short story. Frequent compositions. Grammar review where appropriate.

PREREQ: FREN200, or FREN107 OR FREN112 with a grade of A or A-.

RESTRICTIONS: Minimum grade of C required for Prerequisites.

FREN 202 French Reading and Composition: Theatre 3

Reading and discussion of some major works in French theatre. Frequent compositions. Grammar review where appropriate.

PREREQ: FREN200, or FREN107 or FREN112 with a grade of A or A-.

RESTRICTIONS: Minimum grade of C required for Prerequisites.

FREN 205 French Conversation 3

Practical use of French by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work.

PREREQ: FREN107 or FREN112 or one 200-level course.

RESTRICTIONS: Minimum grade of B required for Prerequisites.

FREN 206 Culture Through Conversation 3

Discussion of topics drawn from contemporary French life. Designed for students who wish to broaden their knowledge of French culture while improving their oral and aural language skills.

PREREQ: FREN107 or FREN112.

FREN 208 Contemporary France I 2-3

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 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: One 200-level course taught in the French language.

FREN 255 French Politics in the Press 3

Explores topics in contemporary French politics as expressed in the news media. Emphasis on current events related to the internal and external politics of France. Focus of study is the French press: newspapers and magazines printed in the French language.

PREREQ: Any 200-level course taught in the French language.

FREN 301 Introduction to French Literature: Prose 3

Selected readings, with discussion and analysis, of the various genres of prose fiction (contes, nouvelles, romans) and nonfiction (essais) from the middle ages to the present.

PREREQ: FREN201 or FREN202, 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 analyses, of the various genres of poetry (lyrical, epic, narrative) and theatre (comedy, tragedy, drama) from the middle ages to the present.

PREREQ: FREN201 or FREN202, and any 200-level course taught in the French language.

FREN 303 Intensive French Composition 3

Exercises and practice in composing correct and idiomatic French. May be taken in conjunction with FREN301 or FREN302.

PREREQ: Any two 200-level French courses.

FREN 304 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.

FREN 305 Advanced French Conversation 3

Focuses on current issues and is based primarily on French video cassettes.

PREREQ: FREN205 and any other 200-level course.

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: Course taught abroad only.

FREN 308 Contemporary France II 3

Discussion and study of issues related to contemporary cultural, political and social developments in France, including its place in today's European community.

PREREQ: Any two 200-level French courses taught in the French language.

RESTRICTIONS: Course taught abroad only. Taught in French.

FREN 310 French Civilization I 3

A study of French cultural history from Gaul to the French Revolution.

PREREQ: Any two 200-level French courses.

RESTRICTIONS: Course taught in French.

FREN 311 French Civilization II 3

A study of French cultural history from the French Revolution to 1945.

PREREQ: Any two 200-level French courses.

RESTRICTIONS: Course taught in French.

FREN 312 French Civilization III 3

Culture, customs and political and economic life in France since 1945.

PREREQ: Any two 200-level French courses.

FREN 350 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 401 Advanced French Grammar 3**

Selected problems in French grammar. Analysis of the French verb system.

PREREQ: Any two 300-level French courses.

FREN 402 Advanced French Composition 3

PREREQ: Any two 300-level French courses.

FREN 403 History and Evolution of the French Language 3

The development of the French language from Vulgar Latin through Old and Middle French to Modern French. Phonology, morphology and syntax, illustrated through selected texts.

PREREQ: Any two 300-level French courses.

FREN 406 Advanced French 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 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, Balzac, 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 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, Jacotet and Barthes.

PREREQ: Any two 300-level French literature courses.

FREN 455 Selected Authors, Works and Themes 3

Works of one or more outstanding authors or on a special theme.

PREREQ: Two 300-level French literature courses.

RESTRICTIONS: May be repeated for credit when topics vary.

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 603 History and Evolution of the French Language 3

The development of the French language from Vulgar Latin through Old and Middle French to Modern French. Phonology, morphology and syntax, illustrated through selected texts.

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, Balzac, 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 Chenier.

FREN 645 Nineteenth-Century French Novel 3

The novel from Romanticism to Naturalism. Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.

FREN 646 Nineteenth-Century French Poetry and Theatre 3

Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.

FREN 651 Twentieth-Century French Literature: The Age of Anxiety and the Absurd 3

Main trends from Gide, Celine and Malraux to Camus and Beckett, including Surrealism, Existentialism and the Theater of the Absurd.

FREN 652 Aspects of Contemporary French Literature 3

A study of contemporary French literature, including novels, plays, essays and poetry of such authors as Robbe-Grillet, Sarraute, Perec, Tournier, Duras, Ponge, Bonnefoy, Jacottet and Barthes.

FREN 655 Selected Authors, Works and Themes 3

Works of one or more outstanding authors or on a special theme.

RESTRICTIONS: May be repeated for credit when topics vary.

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. Variable content. Emphasizes preparation of seminar presentations and term paper.

RESTRICTIONS: May be repeated for credit when topics vary.

Geography

GEOG 101 Physical Geography 3

Influence of atmospheric processes and boundary conditions on the spatial distributions of climate, soils and vegetation, as well as on human activities at the surface of the earth.

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 120 World Regional Geography 3

An introduction to the geography of the Industrial World (the United States, the European Common Market and the Soviet Union), and the Third World (the Middle East, and South and East Asia). Emphasis on the economic 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 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 206 Physical Geography: Topography-Soils 3

Basic processes responsible for the development, modification, distribution and variety of landforms and soils.

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. Special problems of micrometeorology.

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 227 Historical Geography of Europe 3

Cultural and historical factors that have shaped the geographic patterns of modern Europe.

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

An 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 in Geography 4

Introduces and describes methods of practical digital computing for use in geographic research. Main topics include elementary FORTRAN programming and the utilization of library programs, particularly mapping packages.

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 270 Map Communication and Design 3

History, design and use of maps as tools for effective communication of geographic ideas.

GEOG 272 Map and Air Photo Interpretation 3

Analysis of maps, aerial photos and selected remote sensing techniques to interpret physical and cultural environments. Includes measurement of phenomena on air photos, photogrammetry and maps, and cartometrics.

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 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 330 Biogeography 3

Interactions among environmental, biological and cultural processes that have led to present landscapes. Field trip required.

GEOG 340 Behavioral Geography 3

Human behavior in large-scale environments. The psychological, physiological and cultural variables that mediate in human-environment relationships.

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 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: GEOG206, GEOL105 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 351 Urban Climatology 3

Emphasis on the modification of climate produced by cities. Discusses both theoretical and empirical approaches to the study of urban climates.

PREREQ: GEOG250 and GEOG255.

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 370 Production Cartography 3**

Design and construction of professional-quality maps using computer and photographic darkroom techniques. Emphasis on multi-color maps for publication.

PREREQ: GEOG270.

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.

GEOG 380 Western Landscapes of America 3

Major themes in the exploration, settlement and evolution of western cultural landscapes. Impact of the West upon landscape styles and culture of America.

GEOG 390 Honors Colloquium 3

See ARSC390 for description.

GEOG 412 Physical Climatology 4

Energy and moisture exchange between the atmosphere and land surface for characteristic natural and human-modified environments.

PREREQ: MATH241.

COREQ: GEOG250.

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 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 425 Internal Structure of the City 3

Theoretical and practical approaches to an understanding of changing land uses within urban areas.

PREREQ: GEOG325.

GEOG 430 Conservation Forest Ecosystems 3

Evaluation of human impact upon North American forests, concentrating on physical and biotic features that should be considered to maximize forest productivity.

PREREQ: GEOG230.

GEOG 440 Visual Landscapes 3

Social and behavioral science approaches to the study of human responsiveness to natural and urban visual environments. Implications for design, impact assessment and planning.

PREREQ: GEOG240 or GEOG340.

GEOG 441 The Ecology of Crime 3

See CRJU455 for course description.

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 448 Culture and Environment 3

Importance of attitudes toward nature in several cultural traditions. Processes in the formation of cultural landscapes, urban and rural. The city as a cultural-geographic environment.

GEOG 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.

May be cross-listed with BISC450 and/or GEOL450.

GEOG 451 Microclimatology 3

Introduction to instrumentation and techniques involved in microclimatic monitoring and sampling. Field observation programs carried out in varying environmental situations.

PREREQ: GEOG412.

GEOG 452 Seminar in Climatology 3

General theoretical and practical considerations of research in climatology.

RESTRICTIONS: Requires permission of instructor.

GEOG 453 Synoptic Climatology 3

Physical processes involved with development and transportation of weather systems, including relationships between upper atmospheric flow and surface weather phenomena, synoptic evaluation of air masses, synoptic techniques for environmental analysis.

PREREQ: GEOG220.

GEOG 455 Water Budget in Environmental Analysis 3

The development of the climatic water budget and its use in understanding problems in hydrology, agriculture, forestry, urban planning and the distribution of environmental systems. Evaluation of the influence of different human activities on the factors of the water budget.

GEOG 460 Women in International Development 3

See SOCI460 for course description.

GEOG 466 Independent Study 1-6

GEOG 469 Senior Research and Thesis 1-6

GEOG 470 Computer Cartography 4

Introduction to cartographic theory and computational methods necessary for drawing maps with the aid of a digital computer.

PREREQ: GEOG250.

GEOG 612 Physical Climatology 4

Energy and moisture exchange between the atmosphere and land surface for characteristic natural and human-modified environments.

PREREQ: MATH241.

COREQ: GEOG250.

GEOG 615 Urban and Regional Planning 3

See URAF615 for course description.

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 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 625 The Internal Structure of the City 3

Theoretical and practical approaches to an understanding of the changing land uses within urban areas.

PREREQ: GEOG325.

GEOG 630 Conservation Forest Ecosystems 3

Evaluation of the human impact upon North American forests, concentrating upon the physical and biotic features that should be considered to maximize forest productivity.

PREREQ: GEOG230.

GEOG 635 The Evolution of the American Urban Landscape 3

See URAF635 for course description.

GEOG 640 Visual Landscapes 3

Social and behavioral science approaches to the study of human responsiveness to natural and urban visual environments. Implications for design, impact assessment and planning.

PREREQ: GEOG240 or GEOG340.

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 648 Culture and Environment 3

Importance of attitudes toward nature in several cultural traditions. Processes in the formation of cultural landscapes, urban and rural. The city as a cultural-geographic environment.

GEOG 651 Microclimatology 3

Introduction to instrumentation and techniques involved in microclimatic monitoring and sampling. Field observation carried out in varying environmental situations.

PREREQ: GEOG412.

GEOG 652 Seminar in Climatology 3

General theoretical and practical considerations of research in climatology.

RESTRICTIONS: Requires permission of instructor.

GEOG 653 Synoptic Climatology 3

The physical processes involved with the development and transportation of weather systems. Selected topics include relationships between upper atmospheric flow and surface weather phenomena, synoptic evaluation of air masses and synoptic techniques for environmental analysis.

PREREQ: GEOG220.

GEOG 655 Water Budget in Environmental Analysis 3

The development of the climatic water budget and its use in understanding problems in hydrology, agriculture, forestry, urban planning and the distribution of environmental systems. Evaluation of the influence of different human activities on the factors of the water budget.

GEOG 657 Climate Dynamics 3

Investigation of the physical processes controlling global climate, starting with the earth-sun relationship and adding additional processes to increase complexity and realism. Extensive use of models to explore the importance of each process.

PREREQ: GEOG250 and MATH302.

GEOG 670 Computer Cartography 4

Introduction to cartographic theory and computational methods necessary for drawing maps with the aid of a digital computer.

PREREQ: GEOG250.

GEOG 681 Remote Sensing of Environment 3

See MAST681 for course description.

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 Thesis Research 1-9 PF

GEOG 869 Master's Thesis 1-6

GEOG 969 Doctoral Dissertation 1-12 PF

Geology

GEOL 105 General Geology 4

Principles and concepts of physical and historical geology and their importance and application in interpreting earth processes and events. Laboratory includes identification of earth materials and use and application of topographic and geologic maps.

GEOL 106 General Geology 4

Application of classical geologic principles in light of recent discoveries, the study of significant geologic processes that provide new bases for the interpretation of earth history. Laboratory includes study of earth history as interpreted from rocks, fossils and geologic maps.

GEOL 107 General Geology 4

Principles of physical and historical geology and their application in interpreting earth processes and the history of the earth. Laboratory covers identification of earth materials including fossils and the interpretation of topographic and geologic maps.

RESTRICTIONS: For majors in geology, other sciences and engineering. Only one course, GEOL105 or GEOL107, can count towards graduation.

GEOL 110 Evolution and Extinction 3

Origins, evolution and extinction of major groups of organisms as reflected by the earth's fossil record. Mass extinctions, both ancient and modern (anthropogenic). Humans' role in the global ecosystem.

RESTRICTIONS: For science and non-science majors.

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: For College of Education students only.

GEOL 144 Evolution and Earth History 3

History of the Earth and its biota: origin and extinction of major groups of organisms during the Earth's history.

GEOL 203 Mineralogy and Crystallography 3

Principles of crystallography and crystal growth, the properties of minerals, mineral occurrence and association, and systematic mineralogy. Identification including X-ray diffraction.

GEOL 204 Properties of Rocks and Minerals 4

Principles of crystal symmetry, techniques of polarized light microscopy, including mineral identification, and examination of thin sections. Petrophysics covering the acoustic, electrical and magnetic properties of rocks and minerals.

PREREQ: GEOL203.

GEOL 233 The Ice Ages and Human Chronology 3

Quaternary climatic fluctuations and the effects of continental glaciation. Evidence on theories of origin of the ice ages: major geomorphic forms produced, evolutionary crisis and extinction of the major mammals and the ascendancy of humans.

GEOL 234 Earth Resources and Ecology 3

The geologic origin and occurrence of fuels, metals, building and industrial minerals, and water; the geology, economics and politics of resource extraction and utilization; the disposal of wastes; mineral pollution; and the bearing capacity of the environment.

GEOL 235 Geology of the Solar System 3

The age, structure, chemistry and evolution of the planets, satellites, asteroids and meteorites of the solar system. Comparison of the geology of the Earth with that of the Moon, Mars, Mercury, Venus, Jupiter and other condensed bodies of the solar system.

GEOL 243 Rocks and Minerals 3

The major types of rocks and minerals, including their origin, distribution, crystalline form, chemistry, occurrence and identification. Mineral aesthetics. Gems and gemstones.

GEOL 245 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 man and their potential control.

GEOL 301 Systematic and Evolutionary Paleontology 3

Classification of fossils, organic evolution, paleoecology; and application to geologic principles.

PREREQ: GEOL107.

GEOL 303 Sedimentology 3

Texture, composition and provenance of sedimentary rocks. Sediment transport and deposition; major types of sedimentary environments. Paleoecology and biologic influences on sediment distribution and production.

PREREQ: GEOL204 and GEOL301.

GEOL 304 Stratigraphy 3

Description and correlation of rock units. Concepts of time and methods of absolute dating. Environments of deposition and modern/ancient analogs and facies analysis. Basin analysis. The stratigraphic code: time, time-rock, and rock units.

PREREQ: GEOL204, GEOL301 and GEOL303.

GEOL 305 Structural Geology 3

Major classes of rock structures and their origins. Descriptive, kinematic, and dynamic examination of rock structures. Geologic stress, strain and mechanisms of strain. Large-scale structural features of the crust. Orogenic belts.

PREREQ: GEOL107 and mathematics through trigonometry.

GEOL 366 Independent Study 1-3**GEOL 402 History of the Earth 3**

Integrative study of the history of the earth and its inhabitants. Evolution and interaction of the lithosphere, biosphere, oceans and atmosphere. Examination of the geologic record as a test for hypotheses about earth processes, including climatic change, paleoceanography and tectonics.

PREREQ: GEOL304.

GEOL 403 Regional Geology of North America 3

Stratigraphic, structural and petrologic features of the geologic provinces of North America. Generalized geologic evolution of each region. Major geologic features of selected other continents.

PREREQ: GEOL304.

GEOL 405 Introduction to Research 2

Undergraduate research carried out under the supervision of the staff. Written report required.

RESTRICTIONS: May be repeated once if project warrants it.

GEOL 407 Igneous and Metamorphic Petrology 3

Mineralogic, thermochemical and genetic principles of interpretation of crystalline rocks. Major variables governing generation and evolution of igneous and metamorphic conditions. Petrographic examination of representative rock suites.

GEOL 411 Quantitative Geomorphology 3

Analysis of geomorphic processes and landforms using a quantitative approach. Topics include fluvial processes and morphology, evolution and morphometry of drainage basins, slope development, coastal landforms and beach processes.

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.

GEOL 413 Fundamentals of Well Logging 3

Theory and interpretation of most commonly used geophysical logs; and description of logging tools, their uses and limitations. Emphasis on groundwater exploration and well development. Calculation and use of formation factor in determining water quality.

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.

GEOL 415 General Geomorphology 3

Description and classification of landforms, their relationships to geologic structures and processes, and their histories and rates of change.

GEOL 420 Petroleum Geology 3

The origin and distribution of the world's petroleum resources. Geological and geophysical techniques applied to the search for oil.

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.

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.

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: GEOL304.

GEOL 432 Recent Sedimentary Environments 3

Recent environments of deposition in the Delaware coastal area. Emphasis on field and laboratory techniques applied to sedimentation processes, the classification of sediments and their structures and sediment facies patterns.

RESTRICTIONS: Course taught at Lewes.

GEOL 434 The Geology of Coasts 3

Erosional, depositional and tectonic processes; morphology and classification, and geologic history of the coastal areas of the world.

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.

GEOL 450 Proseminar in Environmental Science 3

See GEOG450 for course description.

GEOL 451 Geophysical Field Methods 3

Applied course that investigates various methods of geophysical data collection in the field. Data sets to be gathered, reduced and analyzed include seismic reflection and refraction, gravity, magnetics and resistivity.

PREREQ: GEOL453 and GEOL454.

COREQ: GEOL453 and GEOL454.

GEOL 452 Plate Tectonics and Geophysics 3

Study of the fundamental theory of plate tectonics including historical development, kinematics and the morphology and structure of the major types of plate boundaries. Examination of the structure and processes occurring within the earth's interior.

GEOL 453 Elementary Geophysics I 3

Fundamental theory of seismology, ray theory, refraction and reflection of seismic waves. Seismic exploration techniques and interpretations. Heat flow measurements and data, and interpretations of the thermal history of the earth.

PREREQ: MATH242, PHYS201 and PHYS202.

GEOL 454 Elementary Geophysics II 3

Gravity and the shape of the earth, and theories of isostasy. Geomagnetism, magnetization of rocks and paleomagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging.

PREREQ: MATH242, PHYS201 and PHYS202.

GEOL 460 Field Geology in the Western States 3-6

Training and experience in geologic mapping and field methods. Map construction and interpretation; traverse, pace-and-compass, plane-table and aerial-photograph mapping in sedimentary and crystalline rocks. Rock description, stratigraphic analysis and correlation, structural methods, and Cordilleran geology.

PREREQ: GEOL304.

RESTRICTIONS: Three- and six-credit options require summary report.

GEOL 466 Independent Study 1-3

GEOL 603 Regional Geology of North America 3

Stratigraphic, structural and petrologic features of the geologic provinces of North America. Generalized geologic evolution of each region. Major geologic features of other selected continents.

GEOL 607 Igneous and Metamorphic Petrology 3

Mineralogic, thermochemical and genetic principles of interpretation of crystalline rocks. Major variables governing generation and evolution of igneous and metamorphic conditions. Petrographic examination of representative rock suites.

GEOL 609 Dynamic Processes in Sedimentation 3

Introduction to open channel hydraulics, wave theory and sediment transport. Origin and hydrodynamic interpretation of sedimentary structures and bedforms. Paleohydrology and digital simulation of sedimentary systems.

GEOL 611 Quantitative Geomorphology 3

An analysis of geomorphic processes and landforms using a quantitative approach. Topics include fluvial processes and morphology, evolution and morphometry of drainage basins, slope development, coastal landforms and beach processes.

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 613 Fundamentals of Well Logging 3

Theory and interpretation of most commonly used geophysical logs; description of logging tools; and their uses and limitations. Emphasis on groundwater exploration and well development; calculation and use of formation factor in determining water quality.

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 615 General Geomorphology 3

Description and classification of landforms, their relationships to geologic structures and processes, and their histories and rates of change.

GEOL 620 Petroleum Geology 3

The origin and distribution of the world's petroleum resources. Geological and geophysical techniques applied to the search for oil.

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 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.

May be cross-listed with MAST631.

GEOL 632 Recent Sedimentary Environments 3

Recent environments of deposition in the Delaware coastal area; emphasis on field and laboratory techniques applied to sedimentation processes, the classification of sediments and their structures, and sediment facies patterns.

May be cross-listed with MAST625.

RESTRICTIONS: Course taught at Lewes.

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 650 Clay Mineralogy 3

See MAST650 for course description.

GEOL 653 Elementary Geophysics I 3

Fundamental theory of seismology, ray theory, refraction and reflection of seismic waves. Seismic exploration techniques and interpretations. Heat flow measurements and data, and interpretations of the thermal history of the earth.

GEOL 654 Elementary Geophysics II 3

Gravity and the shape of the earth, theories of isostasy. Geomagnetism, magnetization of rocks and paleomagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging.

GEOL 657 Statistics for Earth Sciences 3

See STAT657 for course description.

GEOL 805 Petrology of Sedimentary Rocks 3

Genesis, classification, interpretation and significance of sedimentary rocks.

GEOL 806 Micropaleontology 3

Paleontology and paleoecology of major groups of microfossils with emphasis on Foraminifera and Ostracoda. Application of micropaleontology to stratigraphic problems, environmental analysis and paleoclimatic changes.

GEOL 811 Stratigraphy 3

The nature of geologic time and its record; the interpretation of the time relationships of rock masses.

GEOL 812 Geodynamics 1

Study of the dynamic processes within the earth, including studies in mountain building, rock mechanics and deformation, rifting, sedimentary basin formation, heat flow and mantle convection.

GEOL 813 Plate Tectonics 1

Study of the fundamental theory underlying modern geology and geophysics. Areas of interest addressed may include the historical development of plate tectonic theory, the kinematics and driving forces of plate motion and the geomorphology and structure of plate boundaries.

GEOL 814 Geochemical Stratigraphy 1

Studies in correlation and age assignment using chemical, elemental and isotopic analysis of sediments, rocks and fossils.

GEOL 815 Holocene Epoch Geomorphologies 1

Sedimentologic and stratigraphic principles applied to the determination of paleogeographies of historical and archaeological landscapes.

GEOL 816 Analytical Mineralogy 1

Use of such techniques as TEM, XRD, SEM, microprobe, and computer modeling and refinement in current mineralogical research, with examples.

GEOL 817 Impact Events and Stratigraphy 1

Impact cratering and shock metamorphism. Recognition of impact ejecta in the stratigraphic section based on shock metamorphic effects and geochemical anomalies. Possible correlations between major impact events and climatic changes, extinctions and geomagnetic reversals as recorded in the rock record.

GEOL 818 Topics in Paleobiology 1

Fields of active ("cutting edge") research in paleobiology; topics vary according to instructor preference.

GEOL 819 Tectonic Framework of North America 1

Major theories of the evolution of North America, and examination of the evidence for and against them.

GEOL 820 Topics in Geomorphology 1

Detailed analysis of the origin of specific landforms.

GEOL 821 Geology and Public Policy 1

Roles of geology and geologists in matters of public policy. Case histories and current events illustrating interactions of science and government.

GEOL 831 Tectonics of the World's Ocean Basins 3

Geologic evolution of the ocean basins; study of the geophysical parameters, dimension and processes of mid-ocean ridges, deep-sea trenches and continental margins; and deduction as to origin of ocean basin features.

GEOL 832 Coastal Seminar 1

Analysis of modern concepts of coastal research and their applications to studies of the evolution of coastal sedimentary environmental systems.

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**GEOL 872 Advanced Micropaleontology 3**

Taxonomy, morphology and biostratigraphy of selected phyla of microfossils. PREREQ: GEOL806.

GEOL 969 Doctoral Dissertation 1-12 PF

Greek

GREK 101 Elementary Greek I 3

Course for beginners.

GREK 102 Elementary Greek II 3

Completion of basic Greek.

PREREQ: GREK101.

GREK 213 Plato 3**GREK 214 Homer 3****GREK 366 Independent Study 1-3****GREK 466 Independent Study 1-3**

German

GRMN 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. Language laboratory as needed.

GRMN 106 German II - Elementary/Intermediate 4

Completion of basic German. Increasing mastery of the basic skills of speaking, listening, reading and writing.

PREREQ: GRMN105.

RESTRICTIONS: Two to three years of high school German acceptable in lieu of Prerequisite.

GRMN 107 German III - Intermediate 4

Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty.

PREREQ: GRMN106.

RESTRICTIONS: Four years of high school German acceptable in lieu of Prerequisite. Satisfies Arts and Science foreign language requirement.

GRMN 203 German Grammar Review 3

Systematic review of elementary and intermediate German grammar. Emphasis on grammar. Conversational practice.

PREREQ: GRMN107 or GRMN112.

GRMN 205 German Conversation 3

Practical use of German by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work.

PREREQ: GRMN107, GRMN112, or one 200-level course.

RESTRICTIONS: Prerequisites require minimum grade of B.

GRMN 206 Culture Through Conversation 3

Discussion of topics drawn from contemporary German life. Designed for students who wish to broaden their knowledge of German culture while improving their oral and aural language skills.

PREREQ: GRMN107 or GRMN112.

GRMN 207 Contemporary Austria I 2-3

An introduction to contemporary Austria, 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 208 Contemporary Germany I 2-3

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 Composition: Short Fiction 3

Reading and discussion of 20th-century German short stories and novellas. Several short compositions. Grammar review where appropriate.

PREREQ: GRMN203, GRMN205 or GRMN206.

GRMN 212 German Reading and Composition: Drama 3

Reading and discussion of some major 20th-century German plays. Several short compositions. Grammar review where appropriate.

PREREQ: GRMN203, GRMN205 or GRMN206.

GRMN 240 German Culture and Technology 3

Introduction to the language and conventions of technology, including a survey of the history, organization and social context of science and technology in Germany.

PREREQ: GRMN107.

GRMN 250 Introduction to Business German 3

Familiarizes students with characteristics of business German (vocabulary, terminology and syntactical patterns) and aspects of the German business community.

PREREQ: GRMN107, GRMN112 or GRMN118.

GRMN 255 German Politics in the Press 3

Explores topics in contemporary German politics as expressed in the news media. Emphasis on current events related to the internal and external politics of Germany. Focus is the German press: newspapers and magazines printed in the German language.

PREREQ: Any 200-level course taught in the German language.

GRMN 305 German Conversation and Composition 3

Discussion of current cultural, social and political topics in German-speaking countries. Vocabulary building, grammar exercises and frequent compositions.

PREREQ: One of GRMN203, GRMN205, GRMN206, GRMN211, GRMN212 or GRMN250.

GRMN 306 Practical Oral/Written Expression 3

Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral exposes, discussion of articles and videos, textual analysis and compositions.

PREREQ: Any two 200-level German courses conducted in German.

RESTRICTIONS: Taught abroad only.

GRMN 308 Contemporary Germany II 3

Discussion and study of issues related to contemporary cultural, political and social developments in Germany, including its place in today's European community.

PREREQ: Any two 200-level German courses taught in the German language.

RESTRICTIONS: Taught abroad only. Taught in German.

GRMN 311 Introduction to German Literature I 3

Masterpieces of poetry, narrative prose and drama from the 18th to the mid-19th century.

PREREQ: GRMN211 or GRMN212.

GRMN 312 Introduction to German Literature II 3

Masterpieces of poetry, narrative prose and drama from the mid-19th century to the present.

PREREQ: GRMN211 or GRMN212.

GRMN 325 German Civilization and Culture 3

A survey of the major cultural, social and political developments in Germany from the mid-18th century to the present.

RESTRICTIONS: GRMN211 or GRMN212.

GRMN 340 Focus on Genre: German Drama, Prose or Poetry 3

Introduces one of three major genres by examining a specific theme. The subject matter varies and will be announced in the registration booklet.

PREREQ: GRMN311 or GRMN312.

RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 355 Special Topics 3

Explores an area of special interest in German literature or culture studies. The subject matter varies and will be announced in the registration booklet.

PREREQ: GRMN311 or GRMN312.

RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 366 Independent Study 1-3

GRMN 404 History of the German Language 3

Evolution of the German language from its Indo-European origins through Old and Middle High German to New High German. Phonology, morphology and syntax, illustrated through selected texts.

PREREQ: Any two 300-level German courses.

GRMN 406 Advanced German Language 3

Grammatical structure and stylistics with special attention given to technical vocabulary and discourse, e.g., business, law, science and agriculture.

PREREQ: Any 300-level German course.

RESTRICTIONS: Taught abroad only.

GRMN 422 Age of Goethe 3

Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The importance of the Enlightenment, the Storm and Stress movement, the Classical period and early Romanticism.

PREREQ: Any two 300-level German courses.

GRMN 433 Nineteenth-Century German Literature 3

Studies major literary trends and figures (Heine, Buechner, Droste-Huelshoff, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of Romanticism to Naturalism.

PREREQ: Any two 300-level German courses.

GRMN 442 From Naturalism to Expressionism 3

Main literary currents from the 1880's to the 1920's. The drama from Hauptmann to Kaiser; the poetry of Hofmannsthal, Rilke, Lasker-Schueler, and others; narrative prose including Thomas Mann and Kafka.

PREREQ: Any two 300-level German courses.

GRMN 453 Contemporary German Literature 3

Major authors and literary movements from 1945 to the present. Works by Boell, Grass, Frisch, Duerrenmatt, Bachmann, Handke and Christa Wolf.

PREREQ: Any two 300-level German courses.

GRMN 455 Selected Authors, Works and Themes 3

Works of one or more outstanding authors or on a special theme.

PREREQ: Two 300-level German literature courses.

RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 462 Early German Literature 3

Representative authors and themes: 12th-17th centuries. "Courtly love" and "knighthood" (Minnesang, Das Nibelungenlied); "bourgeoisie vs. peasantry" during the Reformation (Sachs' Fastnachtspiele, Eulenspiegel); and the Baroque themes of "carpe diem" and "memento mori" (Grimmelshausen's Simplicissimus, Gryphius' plays, Baroque poetry).

PREREQ: Any 400-level German literature course.

GRMN 466 Independent Study 1-3

GRMN 533 German Readings for Ph.D. Candidates 3 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 604 History of the German Language 3

Evolution of the German language, its Indo-European origins through Old and Middle High German to New High German. Phonology, morphology and syntax, illustrated through selected texts.

GRMN 622 Age of Goethe 3

Major works by Lessing, Lenz, Goethe, Schiller and their contemporaries. The importance of the Enlightenment, the Storm and Stress movement, the Classical period and early Romanticism.

GRMN 633 Nineteenth-Century German Literature 3

A study of major literary trends and figures (Heine, Buechner, Droste-Huelshoff, Grillparzer, Hebbel, Keller, Stifter, Storm and Nietzsche) from the end of Romanticism to Naturalism.

GRMN 642 Naturalism to Expressionism 3

Main literary currents from the 1880's to the 1920's. The drama from Hauptmann to Kaiser; the poetry of Hofmannsthal, Rilke, Lasker-Schueler and others, and narrative prose including Thomas Mann and Kafka.

GRMN 653 Contemporary German Literature 3

Major authors and literary movements from 1945 to the present. Works by Boell, Grass, Frisch, Duerrenmatt, Bachmann, Handke and Christa Wolf.

GRMN 655 Selected Authors, Works and Themes 3

Works of one or more outstanding authors or on a special theme.

RESTRICTIONS: May be repeated for credit when topics vary.

GRMN 662 Early German Literature 3

Representative authors and themes: 12th-17th centuries "Courtly love" and "knighthood" (Minnesang, Das Nibelungenlied); "bourgeoisie vs. peasantry" during the Reformation (Sachs' Fastnachtspiele, Eulenspiegel); the Baroque themes of "carpe diem" and "memento more" (Grimmelshausen's Simplicissimus, Gryphius' plays, Baroque poetry).

GRMN 869 Master's Thesis 1-6

GRMN 875 Seminar: Topics in German Literature 3

Study of selected topics, authors and works in the various fields of German literature. Variable content. Emphasizes preparation of seminar presentations and term paper.

RESTRICTIONS: May be repeated for credit when topics vary.

History

HIST 101 Western Civilization to 1648 3

The principal political, social, economic and cultural developments in Western civilization from late antiquity (3rd century A.D.) to the middle of the 17th century.

HIST 102 Western Civilization: 1648 to the Present 3

The principal political, social, economic and cultural developments in Western civilization since the middle of the 17th century.

HIST 103 World History to 1648 3

Principal political, economic, cultural and social developments in world history from origins to 1648, relating the past to the present. Course gives equal weight to the history of Asia, Africa, the Americas and Europe.

HIST 104 World History: 1648 to the Present 3

Principal political, economic, cultural and social developments in world history from 1648 to the present, relating the past to the present. Course gives equal weight to the history of Asia, Africa, the Americas and Europe.

HIST 134 History of Africa 3

Introductory course on African history south of the Sahara, from the earliest times to 1914. Introduces major themes in African history; pre-colonial African political, social and economic institutions; diversity in African political organizations; slave trade and colonialism.

May be cross-listed with BAMS134.

HIST 135 Introduction to Latin American History 3

Introduction to Latin American history from the preconquest period to the present.

HIST 137 East Asian Civilization: China 3

A survey of major aspects of Chinese civilization, relating the past to the present.

HIST 138 East Asian Civilization: Japan 3

A survey of major aspects of Japanese civilization, relating the past to the present.

HIST 200 History and Government of Delaware 3

A survey of the history of Delaware and its present government, with special attention to the needs of social studies teachers.

HIST 205 United States History 3

An introductory survey of 17th-, 18th-, and 19th-century American history. Themes and approach vary with the instructor.

HIST 206 United States History 3

An introductory survey of American history since 1865. Themes and approach vary with the instructor.

HIST 208 Leaders of the Twentieth Century 3

Explores lives of men and women who dominated the stage of world events in the mid-20th century: e.g., Churchill, Gandhi, Indira Gandhi, Hirohito, Hitler, Golda Meir, Roosevelt, Stalin, Margaret Thatcher and Mao Tse-tung.

HIST 210 War and Society 3

Relationship between warfare, with its constantly mutating technology, and social change. Survey from replacement of the professional by the mass army to the contemporary substitution of machinery for soldiers.

HIST 241 History of Christianity to 1300 3

A survey of the evolution of Christianity from its origins to 1300.

HIST 245 Medieval Kings and Queens 3

An intensive examination, based on primary sources, of the deeds and lives of selected kings and queens of the Middle Ages, Byzantine rulers and the popes.

HIST 250 Roots of Contemporary Culture 3

Main developments in literature and the arts from the early 18th century to World War II from a social and historical perspective. Stresses the impact of social and political change on conceptions of the function of the arts.

HIST 260 Humanities Colloquium 3

See ARSC260 for description.

HIST 264 The 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.

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 278 Historic Cultures of the Middle Atlantic Region 3

See ANTH278 for course description.

HIST 280 Science and Civilization 3

Changing conception of the Universe and of humanity's place within it, as seen in ideas and institutions of science from ancient to modern times.

HIST 285 The Atomic Age 3

Development of nuclear science and technology and its effect on history since 1945. The armaments race, nuclear power and regulation.

HIST 286 Great Moments in Engineering 3

Relies primarily on the case study method to explore significant engineering successes and failures since the development of the steam engine. No technical expertise required.

HIST 290 History of Women and Education 3

See EDST290 for course description.

HIST 293 Honors Short Course 1

See ARSC293 for course description.

May be cross-listed with WOMS293.

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 cross-listed with WOMS300.

HIST 301 The Worker in American Life 3

Survey of the major historical transformations affecting the lives of American working people and their social, political, economic and cultural responses to these changes. Special attention given to how workers' world view and the nature of work have evolved over the course of American history.

HIST 302 The World in Our Time 3

An examination of current events within the context of historical forces.

May be cross-listed with WOMS302.

HIST 303 American Intellectual History 3

The development of principal patterns of American religious, social and scientific thought before 1865.

HIST 304 American Intellectual History 3

The development of principal patterns of American religious, social and scientific thought after 1865.

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 U.S. 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 the U.S. political economy.

HIST 313 Early Twentieth-Century America 3

The rise of big business and the ways that farmers, labor leaders, socialists and middle-class reformers responded to the new industrialism.

HIST 314 Twentieth-Century America 3

Causes and consequences of American intervention in the two world wars, and the social, political and economic history of the U.S. during the years between the wars.

HIST 315 Postwar America: The United States Since 1945 3

A social, intellectual and political history of the United States from the death of Franklin D. Roosevelt to the resignation of Richard M. Nixon. Topics covered are the origins of the cold war, Truman-mania, McCarthyism, the 1950's, JFK and LBJ, and Nixon and Watergate.

HIST 316 Introduction to Material Culture Studies 3

See ANTH316 for course description.

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 320 The New Nation, 1787 to 1800 3

Study of the Constitutional Convention, its goals, compromises and opponents. Explores the political discussion over ratification of the Constitution, the continued presence of unresolved economic and social crises, and the rise of an opposition to the Federalists from the ranks of American society.

HIST 321 Civil War and Reconstruction 3

Sectional conflict and the struggle between rival nationalisms in mid-19th-century United States.

HIST 322 The City in American Culture 3

See ANTH322 for course description.

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 325 History of Black America to the Civil War 3

See BAMS304 for course description.

HIST 326 History of Black America Since the Civil War 3

See BAMS306 for course description.

HIST 327 American Labor Before Industrialization 3

The lives of American people in their everyday surroundings from settlement through the early stages of industrialization. Emphasis on the analysis of visual materials. Topics include work and leisure, gender roles, social organization, public rituals and class values.

HIST 328 American Industrial Society from 1815 to the 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 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 cross-listed 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 cross-listed with BAMS332.

HIST 333 The Age of Confucius 3

Study of ancient Chinese philosophers and their ideas with emphasis on the reading of Chinese classics in English translation. Comparisons with Western intellectual traditions encouraged.

HIST 334 History of Mexico 3

A survey of Mexican history from the 15th century to the present.

HIST 335 History of Colonial Latin America 3

Introduces students to issues in colonial Latin American history, from pre-Columbian times through the wars of independence from Spain in the 1830's.

HIST 337 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 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.

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 Europe in the Reformation Era: 1517-1648 3

Religion in the realms of thought and action during the rise of "modern" Western civilization: the scientific revolution, the Reformation, the Counter-Reformation and their impact on the behavior and perceptions of men by 1650.

HIST 346 Age of Louis XIV 3

The culture, society and politics of 17th-century France, centered upon the biography of Louis XIV. Emphasis on growth of absolute monarchy in France and the implications for all of Europe.

HIST 347 The French Revolution and Napoleon 3

Emphasis on personalities in the Revolution - Louis XIV, Robespierre and Napoleon - and the clash of social forces.

HIST 350 Europe in the Nineteenth Century 3

History of European civilization from the end of the Napoleonic wars to World War I. Topics include Romanticism and realism; the Industrial Revolution; the clash of religion and science; the development of nationalism, socialism and imperialism; and the coming of World War I.

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, course focuses on the host country.

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 in 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. Reading from Hegel, Marx, Kierkegaard, Nietzsche and Thomas Mann.

HIST 357 Russian History to 1801 3

Political, socioeconomic and cultural developments in Russia to 1801. Russian trends and developments.

HIST 358 Russian History: 1801-1917 3

Political, socioeconomic and cultural developments in Russia in the 19th century.

HIST 359 Soviet Russia: 1917-1990 3

Political, socioeconomic and cultural developments in the Soviet Union from 1917 to 1990.

HIST 360 Humanities Colloquium 3

See ARSC360 for course description.

HIST 361 European Business History: 1850-Present 3

Topics include the rise of the modern corporation; the relationships between business and government and business and labor; the role of business overseas, including the colonies and the present Third World; and comparison with the way business has operated in America, Japan and the Soviet Union.

HIST 364 Modern Germany: 1870-1945 3

German political, socioeconomic and cultural history from Bismarck to Hitler.

HIST 366 Independent Study 1-6

HIST 373 Modern Ireland: 1534-Present 3

Anglo-Irish relations, the emergence and victory of Irish nationalism and the historical roots and subsequent development of the Ulster problem.

HIST 374 History of England to 1715 3

Political, constitutional, social and economic development to 1715.

HIST 375 History of England: 1715 to the Present 3

Rise and decline of a global power; the transformation of an oligarchy into a democracy, and the consequences of industrialization and urbanization.

HIST 376 English Legal and Constitutional History 3

Surveys the history of English legal and constitutional development from the Saxons to the twentieth century. Emphasizes the major thematic developments in Anglo-American jurisprudence: the definition of executive powers, civil liberties, parliamentary privileges and functions, and key court decisions.

HIST 379 Historical Archaeology of the Eastern United States 3

See ANTH379 for course description.

HIST 381 Utopias 3

A critical examination of man's perennial interest in shaping the ideal society and forecasting events to come.

HIST 382 History of Western Medicine 3

See CSCC382 for course description.

HIST 383 History of Science and Medicine I 3

The maturation of scientific ideas and methodology from prehistory to the Renaissance and their application in medicine and technology.

HIST 384 History of Science and Medicine II 3

Development of science and medicine from the scientific revolution to the mid-20th century.

HIST 385 History of Biological Ideas 3

See CSCC385 for course description.

HIST 387 Technology in Western Civilization I 3

Examines the religious, aesthetic, military, political and economic origins of Western technology from prehistoric times to the Renaissance. Emphasis on the agricultural and urban revolutions, metallurgical discoveries, Greek and Roman engineering, diffusion of technology and the role of the Medieval Church.

HIST 388 Technology in Western Civilization II 3

Examines technology and society from the Renaissance to 1950. Emphasis on Renaissance engineers; the Industrial Revolution in England, Germany and the United States; the role of modern warfare in technological development; and the rise of a technical elite in society.

HIST 389 American Technology 3

The development of American technology and industry from the discovery of America to the present.

HIST 390 History of Modern Southeast Asia 3

Covers major social, cultural, political, economic and military developments in Southeast Asian history from approximately 1500 to the present, including ethnic groups, traditional civilizations, colonization, nationalism and communism, impact of the Pacific War, the "Vietnam Conflict," the Kampuchean Crisis and recent developments.

HIST 391 History of Modern China 3

The history of China since 1600, including the tradition of reform, Western impact, modernization, communism and China's role in the world today.

HIST 392 History of Modern Japan 3

The history of Japan since 1600, 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 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.

HIST 394 Africa Since 1960 3

Deals with current political, economic and social problems and progress found in Africa. Historical analysis of the emergence and development of these problems, issues and achievements. Links the present to the past for factual historical analysis.

HIST 395 Pan Africanism 3

Traces the rise, development and varied expressions of the drive towards the liberation and unity of black people on the continent (Africa) and in the diaspora. Covers liberation struggles in Africa and the Civil Rights movement in the United States.

May be cross-listed with BAMS395.

HIST 397 History of South Africa 3

Surveys the complex historical development of the 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 398 Film and Modern American Culture 3

See ENGL398 for course description.

HIST 403 History, Philosophy, Functions and Future of Museums 3

See MSST403 for course description.

HIST 409 Varieties of Modern Feminism 3

A reading and research seminar on selected aspects of the history of modern feminist thought and activity, with particular emphasis on the 20th-century United States.

May be cross-listed with WOMS409.

HIST 411 Seminar in American History 3

Topics vary. May include topics such as "History of the West," "History of the South," or "Ethnicity in American History."

May be cross-listed with CSCC411 and/or WOMS411.

HIST 416 The American Family 1608-1900 3

The changing shape and function of the American family and its relationship to Old World structure.

May be cross-listed with WOMS416.

HIST 430 Twentieth-Century Latin American Revolutions 3

Focuses on four 20th-century Latin American revolutions. Concentrates on the historical background and events of the Mexican, Guatemalan, Cuban and Nicaraguan revolutions.

HIST 440 Africa Under Colonial Rule 3

Introduces various Colonial policies of the European powers in Africa, emphasizing the comparisons and contrasts between these policies. Attention paid to the effect of Colonialism on Africa's economic, social and political development.

HIST 446 Industrial Revolution in Europe 3

The origins and spread of rapid, sustained economic growth since 1750.

HIST 449 Studies in Science, Technology and Medicine 3

Topics vary. May include topics such as "The American System," "History of Chemistry," or "History of Engineering."

HIST 453 History Through Media 1-6

Trains students to produce historical documentaries from archival photographs and sound recordings in the United States National Archives and other depositories.

HIST 454 Vernacular Architecture 3

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

May be cross-listed with ARTH454.

HIST 459 United States Urban History 3

The process of urbanization in America with special emphasis on the Philadelphia-Wilmington area.

HIST 460 Humanities Colloquium 3

See ARSC460 for description.

HIST 463 Historical Archaeology and the Public 3

See ANTH463 for course description.

HIST 464 Fieldwork in History 3

Selected students serve as interns on a few carefully chosen historical projects with organizations outside the University.

HIST 466 Independent Study 1-6

HIST 470 Studies in Ancient History 3

Topics vary. May include topics such as "Slavery in Antiquity," "The Archaeology of the Ancient World" or "The Greek City State."

HIST 471 Studies in Medieval History 3

Topics vary. May include topics such as "The Church in the Early Middle Ages," "The Church in the Central Middle Ages" and "Anglo-Norman England and Capetian France."

HIST 473 Studies in Early Modern European History 3

Topics vary. May include topics such as "Renaissance Humanism," or "Women in Europe, 1100-1600."

May be cross-listed with WOMS473.

HIST 474 Studies in English History 3

HIST 475 Seminar in Modern European History 3

Topics vary. May include topics such as "The Holocaust," "The Cold War" or "Hitler's Germany."

HIST 477 Studies in Latin American History 3

Topics vary. May include topics such as "History of Mexico," "History of the Caribbean" or "Slavery in the New World."

HIST 479 Studies in Asian History 3

Topics vary. May include topics such as "History of Southeast Asia," "20th-Century China" or "Japan in the 20th Century."

HIST 481 Studies in Military History 3

Selected topics in military history. Civil-military relations, the interrelationship of strategy and politics, the development of strategic theory, the impact of new weapons on military institutions.

HIST 483 Studies in Comparative History 3

Topics vary, but all compare some aspect of American with European history or Western with non-Western history.

HIST 491 Planning a Course of Instruction 3

Aims, course planning, instructional strategies, evaluation and selection of materials for teaching history and the social sciences in secondary schools.

HIST 493 Seminar: Problems in Teaching History and Social Sciences 3

Helps beginning teachers carry out planned instructional strategies, analyze their teaching behavior, evaluate the effectiveness of their instruction and modify their instructional plans based on their teaching experience.

HIST 601 United States Historiography 3

Introduces changing interpretations of United States history and examines the development of the American historical profession.

HIST 602 European Historiography 3

Introduces changing interpretations of various aspects of European history.

HIST 603 Historiography of Technology 3

Introduces major historiographic issues and examines the development of this subfield of history.

HIST 604 History and Philosophy 3

Survey of major historians from the Bible and Herodotus through the 19th century, together with some of the most influential philosophers of history.

HIST 605 History of Theories in Material Culture 3

See EAMC605 for course description.

HIST 606 Issues in American Material Culture 3

See EAMC606 for course description.

HIST 611 Seminar in American History 3

Topics vary. May include topics such as "History of the West," "History of the South" or "Ethnicity in American History."

HIST 616 The American Family 1608-1900 3

Seminar on the changing shape and function of the American family and its relationship to Old World structure.

HIST 621 Seminar on American Society and Culture before the Revolution 3

Reading seminar in American society and culture from the first settlements to the Revolution.

HIST 623 Age of the American Revolution 3

Reading seminar on political and constitutional changes from 1760 to 1790 but also the social and cultural history of that period.

HIST 625 U.S. Social and Cultural History: 1790-1860 3

Reading seminar on social and cultural change between 1790 and 1860, with emphasis on expansion of population into the West, sectionalism, the rise of urban and industrial revolutions, and reform

HIST 627 Antebellum America 3

Reading seminar on development of the modern political party system, the American presidency in transition, the transportation revolution, slavery, abolition reform and important changes in American society during the antebellum period.

HIST 629 U.S. Social and Cultural History: 1850-1929 3

Reading seminar on social and cultural developments in the United States in the period during which it became a mature industrial nation, from 1850-1929.

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 U.S. Political, Cultural and Economic History: 1860-Present 3

Reading seminar on major works of interpretation that illustrate the changing modes by which historians have viewed American political, economic and cultural past from the Civil War to present.

HIST 632 Making the American City 3

See URAF632 for course description.

HIST 633 The U.S. in the Twentieth Century 3

Reading seminar on 20th-century U.S. history.

HIST 635 The Evolution of the American Urban Landscape 3

See URAF635 for course description.

HIST 641 Technology and Civilization I 3

The religious, aesthetic, military, political and economic origins of Western technology from prehistoric times to the Renaissance and the interplay of technology and culture.

HIST 642 Technology and Civilization II 3

Technology and society from the Renaissance to 1950. An exploration of the impact of technology on culture while at the same time examining how culture shapes technology.

HIST 643 History of Science and Medicine 3

Scientific thought and practice from antiquity to 1620, with emphasis on relation of science to the cultures in which it is pursued: Egypt and Mesopotamia, Greece and Rome, the Islamic countries, the Middle Ages in Europe and the Renaissance.

HIST 644 History of Science and Medicine 3

Science in the West 1620-1950, beginning with the Scientific Revolution. The ties of science to culture, particularly technology, medicine and institutional configurations. Development of the major biological and physical sciences.

HIST 645 Things in History 3

The world of made things forms the basis for a seminar in the historical interpretation of artifacts. Each session of the class devoted to the handling, use, analysis and interpretation of a representative artifact.

May be cross-listed with MSST645.

HIST 646 Industrial Revolution of Europe 3

The origins and spread of rapid, sustained economic growth since 1750.

HIST 647 Social History of Medicine 3

The relationships of medicine and its allied health sciences to key social and political issues in the West over the last two hundred years.

HIST 648 American Science and Technology 3

The development of science and technology in America, from the Colonial Period to the 1950's.

HIST 649 Studies in Science, Technology and Medicine 3

Topics vary. May include topics such as "The American System," "History of Chemistry" or "History of Engineering."

HIST 650 Political Economy of the Modern United States 3

A reading seminar introducing the fields and historiographies of U.S. business history, business-government relations planning and modern political economy, from the late 19th century to the present.

HIST 652 Seminar in Historic Preservation 3

See URAF629 for course description.

HIST 653 History Through Media 1-6

Trains students to produce historical documentaries from archival photographs and sound recordings in the United States National Archives and other depositories.

HIST 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 cross-listed with ARTH654 and/or URAF654.

HIST 655 Archival Management I 3

Survey of the various types of archival institutions and practices, the principles of manuscript curatorship, the problems associated with huge archives generated by modern bureaucracies.

May be cross-listed with MSST655.

HIST 656 Archival Management II 3

Internship and paper.

May be cross-listed with MSST656.

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. May be cross-listed with MSST657.

HIST 658 Historical Editing 3

Background and principles of historical editing with emphasis on student projects in primary source material.

HIST 659 United States Urban History 3

The process of urbanization in America with special emphasis on the Philadelphia-Wilmington area.

HIST 660 Humanities Colloquium 3

See ARSC660 for description.

HIST 663 Historical Archaeology and the Public 3

See ANTH663 for course description.

HIST 671 Studies in Medieval History 3

Topics include the Church in the early Middle Ages, the Church in the Central Middle Ages, Anglo-Norman England and Capetian France.

HIST 673 Studies in Early Modern European History 3

Topics vary. May include such topics as "Renaissance Humanism," "Women in Europe, 1100-1600" or "Rome and Religion."

HIST 674 Studies in English History 3**HIST 675 Seminar in Modern European History 3**

Topics vary. May include topics such as "The Holocaust," "The Cold War" or "Hitler's Germany."

HIST 679 Studies in Asian History 3

Topics vary. May include topics such as "History of Southeast Asia," "20th-Century China" or "Japan in the 20th Century."

HIST 681 Studies in Military History 3

Selected topics in military history. Civil-military relations, the interrelationship of strategy and politics, the development of strategic theories and the impact of new weapons on military institutions.

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 803 Research and Writing Seminar: America to 1860 3

Original research and writing on subjects in American history before 1860. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 804 Museum Internship 3

See MSST804 for course description.

HIST 805 Research and Writing Seminar: America 1860-Present 3

Original research and writing on subjects in American history after 1860. Evaluation of sources, interpretation of evidence and presentation of research papers. Emphasis on professional standards of criticism.

HIST 807 Research and Writing Seminar: Science, Technology and Medicine 3

Writing seminar on the history of science, technology and medicine.

HIST 809 Research and Writing Seminar: Studies in Comparative History 3

Topics vary, but all compare some aspect of American with European history or Western with non-Western history.

HIST 868 Research 1-9 PF**HIST 869 Master's Thesis 1-6****HIST 969 Doctoral Dissertation 1-12 PF**

Hotel, Restaurant and Institutional Management

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 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 320 Hotel, Restaurant and General Food Service Purchasing 3

Principles of purchasing food and beverage supplies for hotels, restaurants and general food service; and marketing selection principles, buying procedures, choice of supplier and receiving. Field trips to suppliers.

HRIM 366 Independent Study 1-6**HRIM 380 Management of Lodging Operations 3**

Management of front desk, housekeeping, maintenance, security and conference operations.

PREREQ: HRIM280.

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: NTD321.

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: ACCT208.

HRIM 466 Independent Study 1-6**HRIM 480 Human Relations in the Hospitality Industry 3**

Techniques and philosophies of personnel management as applied to various types of hospitality operations. Motivation, attitude formation and job satisfaction. Case studies related to theories of organizational behavior and industrial psychology.

HRIM 481 Marketing in the 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.

PREREQ: ACCT352.

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.

PREREQ: HRIM380.

HRIM 488 Hotel, Restaurant and Institutional Management Practicum I 4

Structured experience in a hospitality industry environment. At least 160 hours in planned activities associated with the management and operation of a subsystem of a hospitality property. A weekly on-campus seminar.

RESTRICTIONS: Requires proof of 800 hours paid work experience in the food service and lodging industry.

HRIM 489 Hotel, Restaurant and Institutional Management Practicum II 6

Structured experience in a hospitality industry environment. At least 250 hours in planned activities associated with the management and operation of a hospitality property. A weekly on-campus seminar.

PREREQ: HRIM488.

Human Resources

HURE 165 Seminar 1 PF**HURE 380 Materials and Approaches 3**

Identification and interrelation of basic concepts in the teaching of home economics, including history and philosophy. Examination and development of instructional resources.

HURE 401 Interdisciplinary Gerontology 3

Considers theoretical and practical approaches to the dimensions of aging. Emphasis on the provisions of material and human resources to meet the basic needs of food, shelter, clothing and income adequacy. Relevant community programs and government services will be studied.

HURE 601 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.

HURE 650 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.

Individual and Family Studies

IFST 101 Introduction to Community and Family Services 1

Broad overview of the many services available within the community and state to assist individuals and families in resolving major life concerns and problems. Insights into the human services profession by leaders in the field.

IFST 116 Exploring Retirement 1

Evaluation of biases in traditional attitudes toward aging and retirement; examination of mental and physical capabilities of senior citizens and how this influences redefining of occupational goals and leisure activities after retirement; and discussion of postretirement occupations, activities and adventures.

IFST 201 Life Span Development 3

Exploration and understanding of the social, emotional, cognitive and physical development of the individual from infancy through old age in the context of the family.

IFST 202 Foundations of Family Studies 3

Fundamental descriptions of family forms and issues as they affect individual families and cohorts in historical and contemporary perspective. Emphasis on multicultural diversity and social change in families.

IFST 221 Child Development 3

The study of social-emotional, cognitive and psycho-biological development in infancy, early and middle childhood. Emphasis on the child's development as it occurs in the family context. Directed observation in the University's Laboratory Preschool.

IFST 222 Early Childhood Curriculum I 2

Principles underlying values in and guidance of young children's play, creative activities and curriculum content. Selection and use of appropriate materials, with emphasis on preschool and kindergarten settings.

PREREQ: IFST221.

COREQ: IFST224.

IFST 224 Early Childhood Curriculum I: Practicum 2

Three-hour weekly practicum experience with a one-hour weekly discussion section. Gives students a realistic exposure to working with young children, with emphasis on preschool and kindergarten settings.

PREREQ: IFST221.

COREQ: IFST222.

IFST 230 Emerging Life Styles 3

Interdisciplinary approach to the processes stereotyping masculine and feminine behavior issues in women's and men's liberation; and an analysis of the present opportunity structure for individual choices.

IFST 235 Survey in Child and Family Services 3

Introduces the scope of human service agencies focusing on the needs of children and families.

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 238 Introduction to Human Sexuality 3

Exploration of historical, physiological and interpersonal aspects of sexuality. Explores factual information and discusses significance of this information for personal lives.

IFST 293 Honors Short Course 1

See ARSC293 for course description.

IFST 328 Introduction to the Research Process 3

Exposure to the research process through attending and critiquing research presentations, reading and reviewing scholarly papers, and development of a variety of research skills, such as instrument design, coding and data entry. Students' work will contribute to the development of a professional portfolio.

PREREQ: IFST201 and IFST202.

IFST 329 Adolescent Development 3

Physical, intellectual and 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.

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.

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.

PREREQ: IFST222 and IFST224.

RESTRICTIONS: Includes field experiences.

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.

IFST 347 Human Service Delivery Systems 3

Focuses on organizational and work related issues, including program development, networking, fund raising, administrative procedures and program evaluation. Basic skills required for the development, delivery and administration of a wide range of human service programs including preventive interventions for families and individuals.

IFST 364 Field Experiences in Individual and Family Studies 2-4

Provides opportunities to work/participate in human service agencies, business and industry, as well as formal and non-formal educational settings.

RESTRICTIONS: May be repeated for up to nine credit hours.

IFST 365 Seminar 1-3

IFST 366 Independent Study 1-12

IFST 381 Curriculum and Evaluation 3

Fundamental principles of curriculum development and evaluation as applied to all levels of home economics.

PREREQ: HURE380.

IFST 390 Honors Colloquium 3

Topics vary within the Individual and Family Studies content; often multidisciplinary. May be cross-listed with WOMS390.

IFST 401 Foundations of Human Sexuality 3

A multidisciplinary study of human sexuality focusing on the implications for individuals and for society of the biological, psychological and sociocultural determinants of human sexuality.

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.

IFST 405 Impact of Aging on the Family 3

Psychological, physical and financial impact of aging persons on younger family members; increased interdependence and dependence; and family adjustment, both positive and conflicting.

IFST 410 The Hospitalized Child 3

Organization and administration of programs for hospitalized children with emphasis on emotional needs of the children and their parents. Includes terminology and hospital procedures, directed observation and participation in a hospital setting.

PREREQ: IFST222 and IFST224.

IFST 422 Family Relationships 3

Interpersonal relationships and problems in courtship, marriage and the family in contemporary society.

PREREQ: IFST202.

IFST 426 Vocational Program Planning in Home Economics 3

Emphasis on career and vocational education and their implementation in home economics programs at the elementary, middle, junior and senior high, and adult levels.

IFST 428 Educational Research and Issues in Human Resources 3

Introduction to the research process through study of a problem identified by analysis of clinical experiences; an in-depth examination of selected current educational concerns.

RESTRICTIONS: Requires permission of instructor.

IFST 430 Teaching Family Life 3

Selection, presentation and evaluation of subject matter and materials essential to understanding relationships within the family. Emphasis on needs, interests and abilities of secondary school students.

May be cross-listed with WOMS430.

PREREQ: IFST221 and IFST422.

IFST 435 Early Childhood Programs for Children with Exceptionalities 4

Philosophy, organization and operation of programs for young children with exceptionalities; development and adaptation of curriculum, materials, facilities and equipment. Clinical experience with children and programs.

PREREQ: EDST230 and IFST340.

IFST 438 Leadership Development in Human Sexuality 3

Seminar/practicum for organizing and leading discussion groups in human sexuality. Trains group leaders to facilitate effective communication skills and responsible sexual decisions, integrating research and theories with individual and family life experiences.

PREREQ: IFST238 or 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 Parent Resources 2

Emphasis on techniques in working and communicating with parents, understanding parent-child relationships and effectively utilizing parent, teacher, home, school and community resources.

PREREQ: IFST101.

COREQ: IFST459 or EDDV400.

IFST 449 Internship in Community Services 3-9 PF

On-the-job experience in a community and family service agency.

RESTRICTIONS: Requires permission of instructor.

IFST 450 Technology in Early Childhood 3

Developmentally appropriate uses of technology in early childhood and early childhood special education. Operation of computers and adaptive devices, evaluation of software and curriculum development. Includes a practicum using technology in appropriate environments.

PREREQ: IFST222 and IFST224.

IFST 452 Assessment of Young Children 3

Focuses upon the issues in, and techniques of the assessment of physical, socio-emotional, behavioral and cognitive-intellectual development in children. Secondary emphasis on evaluation of test results, written reports, research in assessment and an analysis of remediation/teaching strategies.

May be cross-listed with PSYC460.

PREREQ: IFST221.

IFST 459 Child Development Practicum 1-9 PF

Supervised student teaching experience.

PREREQ: IFST435, IFST452 and IFST470.

RESTRICTIONS: Requires permission of instructor.

IFST 460 Women in International Development 3

See SOC1460 for course description.

IFST 463 Atypical Infant and Toddler 3

Sensory, motor, affective and psychosocial development in infancy and toddlerhood. Observation and participation with infants. Early diagnosis, assessment and treatment strategies for disabilities of the infant and toddler period.

PREREQ: IFST221 and IFST236.

IFST 465 Seminar 1-3 PF

IFST 466 Independent Study 1-12

IFST 470 Families and Children at Risk 3

Deals with social-emotional considerations of disabilities and risk factors upon the development of children and families over the life course. Includes information on family assessment and systems, changing demographics and at-risk families. Includes some clinical counseling skills.

PREREQ: IFST221 or PSYC325.

IFST 475 Topics in Individual and Family Studies 1-3

Selected topics focusing on current issues affecting families from an interdisciplinary and global perspective.

RESTRICTIONS: Prerequisites vary by topic and instructor.

IFST 480 IFST Senior Seminar 1-3

Discussion-oriented and problem-centered with emphasis on the role and contributions of the individual to the profession and society.

IFST 601 Development through the Lifespan 3

Exploration of all segments of the lifespan from a bio-psycho-social perspective. Special emphasis on research and theory concerning families and the lifecourse as contexts of development.

IFST 603 Basic Concepts in Gerontology 3

Theories and practices of gerontology with emphasis on their relationships to the elderly and their needs for the development of resources.

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 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 621 Family Studies 3

Critical analysis of selected topics and readings in family studies. Empirical and theoretical perspectives relevant to the study of family relationships, developmental issues and trends in family life.

IFST 630 Teaching of Family Life 3

Selection, presentation and evaluation of subject matter and materials basic to understanding relationships within the family. Emphasis on needs, interests and abilities of secondary school students.

IFST 637 Program Planning and Development 3

Foundations of program planning and development including models and rationales, methods, techniques and program assessment as they relate to the organization and administration of formal and non-formal educational programs as well as community programs.

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 Practices 3

Reviews foundations of curriculum and instruction as they relate to the origin and administration of educational programs in community and family agencies and institutions; curriculum development experiences for adult and adolescent learning with emphasis on concept and task analysis.

IFST 640 Preschool Administration 3

Organization and administration of programs for preschool children. Consideration of personnel, facilities, equipment and business management.

IFST 641 Infant Development and Stimulation 3-6

Cognitive, social, emotional and motor development from conception to two years, with implications for home and group care. Concurrent observation of infants required.

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 654 Statistical Methods in Individual and Family Studies 3

Presentation of and practice with statistical procedures for developmental and family studies designs such as simple linear regression, multiple regression, logistic response function, path analysis, discriminant analysis, categorical data analysis and factor analysis. Some basic procedures for nonparametric statistical analyses.

PREREQ: EDDV665.

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

Functions and principles of effective supervision in family agencies and educational and business settings; focuses on commonalities of skills, techniques and training.

IFST 658 Readings in Child Development 3

Emphasis on literature dealing with development of the young child.

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 designs.

IFST 663 Atypical Infant 3

Sensory, motor and psychosocial development in infancy. Observation and participation with infants. Early diagnosis and assessment of developmental disabilities.

IFST 665 Seminar 1-3

IFST 668 Research 1-6

IFST 669 Supervised Field Experience and Study 1-6

Supervised work with children and/or families in a community setting.

RESTRICTIONS: Credit may be distributed over more than one semester.

IFST 815 Research Issues and Designs 3

Examination of issues in design, sampling, measurement and analysis techniques applicable to research in family studies.

PREREQ: One graduate-level methods and design course.

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 Child and Family Theory 3

Analysis of theories of individual development, behavior and family life, and applications to research models. Emphasis on historical and philosophical influences on theory building, the functions of theories, the process of theory construction and critical comparisons of specific theoretical perspectives on children and families.

IFST 855 Family Processes 3

Advanced study of selected topics in family processes. Theory, research and interpretation of family interaction over the life course, emphasizing historical and contextual influences. Topics include intergenerational relationships; family communication, affiliation and support; stress, adaptation and coping; and conflict, power and violence.

IFST 860 Diversity in Family Structures 3

Analysis of family patterns in American society and in other cultures. Impact of socioeconomic, political and demographic change on family structures and kin relationships (including trends in marital status, parenthood, mortality rates); ethnic, racial and cultural variations; and historical and life course changes in family patterns.

IFST 865 Advanced Seminar in Family Studies 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 The Family and the Life Span 3

Theory, research and methodological issues in the study of individuals and families over the life span. Definitional issues; individual differences in normative and non-normative experiences; transitions and change; and sources of influence on development. Intensive study of topics illustrating the interaction of individual and family development.

IFST 880 Families and Institutions 3

Focuses on how the family interfaces with a range of institutions such as the legal system, social services, educational and health care systems. Discusses the effects of institutions on families and the influence of families on institutional policies and processes.

IFST 969 Doctoral Dissertation 1-12 PF

Italian

ITAL 101 Elementary Italian I 3

Introduction to the Italian language and development of speaking, listening, reading and writing skills through the use of basic texts. Language laboratory as needed.

ITAL 102 Elementary Italian II 3

Completion of basic Italian.
PREREQ: ITAL101 or ITAL105.

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. Language laboratory as needed.

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 Arts and Science foreign language requirement.

ITAL 111 Intermediate Italian I 3

Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing.

PREREQ: ITAL102 and ITAL106.

RESTRICTIONS: Three years of high school Italian acceptable in lieu of Prerequisite.

ITAL 112 Intermediate Italian II 3

Continued practice in speaking and writing, and reading texts of average difficulty, grammar review as needed.

PREREQ: ITAL111.

RESTRICTIONS: Four years of high school Italian acceptable in lieu of Prerequisite. Satisfies Arts and Science foreign language requirement.

ITAL 203 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.

ITAL 208 Contemporary Italy I 1-3

An introduction to contemporary Italy, its culture, its people, their way of life and the issues confronting them.

RESTRICTIONS: Taught abroad only, in both English and Italian. Not for major credit. Does not satisfy the language requirement.

ITAL 211 Italian Reading and Composition: Short Fiction 3

Reading and discussion of Italian short stories. Several short compositions. Grammar review where appropriate.

PREREQ: ITAL203, 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: ITAL203, 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: Any 200-level course conducted in Italian.

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 3

A survey of the major cultural, social and political developments in Italy from the 15th century to the present.

PREREQ: ITAL211 or ITAL212.

ITAL 355 Special Topics 3

Explores an area of special interest in Italian literature or cultural studies. Topics vary and will be announced in the registration booklet.

PREREQ: ITAL310 or ITAL311.

RESTRICTIONS: May be repeated for credit when topics vary.

ITAL 366 Independent Study 1-3

ITAL 401 Advanced Italian Grammar and 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 455 Selected Authors, Works and Themes 3

Works of one or more outstanding authors or on a special theme.

PREREQ: ITAL310 and ITAL311.

RESTRICTIONS: May be repeated for credit when topics vary.

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 655 Selected Authors, Works and Themes 3

Seminar on works of one or more outstanding authors or of a special theme.

RESTRICTIONS: May be repeated for credit when topics vary.

Japanese

JAPN 105 Japanese I - Elementary 4

Introduction to the Japanese language and development of speaking, listening, reading and writing skills through the use of basic texts. Language laboratory as needed.

JAPN 106 Japanese II - Elementary/Intermediate 4

Completion of basic Japanese. Increasing mastery of the basic skills of speaking, listening, reading and writing.

PREREQ: JAPN105.

RESTRICTIONS: Two to three years of high school Japanese acceptable in lieu of Prerequisite.

JAPN 107 Japanese III - Intermediate 4

Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty.

PREREQ: JAPN106.

RESTRICTIONS: Four years of high school Japanese acceptable in lieu of Prereq. Satisfies the Arts and Science foreign language requirement.

JAPN 205 Japanese Conversation 3

Practical use of Japanese by means of oral reports on a variety of topics including family, school, and work life. Emphasis on improvement of conversational skills for social situations which require different politeness levels, as well as grammatical and written competence.

PREREQ: JAPN107.

RESTRICTIONS: Prerequisite requires a minimum grade of B.

JAPN 206 Culture Through Conversation 3

Discussion of topics drawn from contemporary Japanese life. Designed for students who wish to broaden their knowledge of Japanese culture while improving their oral and aural language skills.

PREREQ: JAPN107.

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 240 Basic Technical Japanese 3

Introduction to technical Japanese vocabulary journal reading.

PREREQ: JAPN107.

JAPN 250 Introduction to Business Japanese 3

Familiarizes students with characteristics of business Japanese. Vocabulary, terminology, syntactical patterns and aspects of the Japanese business community.

PREREQ: JAPN107.

JAPN 305 Japanese Conversation and Composition 3

Discussion of current cultural, social and political topics in Japanese. Vocabulary building, grammar exercises and frequent compositions.

PREREQ: JAPN205.

JAPN 340 Technical Japanese II 3

Further study in the reading and writing of technical Japanese, including the translation of technical journal articles.

PREREQ: JAPN240.

JAPN 366 Independent Study 1-3

PREREQ: One 200-level Japanese course.

JAPN 466 Independent Study 1-3

PREREQ: One 300-level Japanese course.

Latin

LATN 100 Individualized Elementary Latin 1-6

Self-paced, computer-assisted individual study of fundamentals of Latin. No formal classroom component. Content identical to LATN101/102.

RESTRICTIONS: May be repeated for up to six credits. Maximum of six credits of LATN100, LATN101 or LATN102 may be counted toward graduation.

LATN 101 Elementary Latin I 3

Course for beginners.

LATN 102 Elementary Latin II 3

Completion of basic Latin.

PREREQ: LATN101.

RESTRICTIONS: One year of high school Latin acceptable in lieu of Prereq.

LATN 201 Roman Letters 3

The letter as a literary form in the Roman world. Readings from the letters of Cicero and Pliny.

PREREQ: LATN112.

LATN 202 Historians of the Republic 3

Selected readings from the works of Livy, Sallust and Cornelius Nepos.

PREREQ: LATN112.

LATN 213 Cicero 3

Readings in Cicero's orations and review of grammar and syntax.

PREREQ: LATN 102.

LATN 214 Vergil 3

Vergil's Aeneid. Review of grammar and readings in the poetry of Vergil.

PREREQ: LATN213.

LATN 301 Roman Drama 3

Readings in selected dramas of Plautus, Terence and Seneca.

PREREQ: LATN112.

LATN 302 Roman Didactic Poetry 3

Readings in Roman didactic poetry, such as Lucretius' De Rerum Natura.

PREREQ: LATN112.

LATN 303 Historians of the Empire 3

Selected readings from Tacitus, Suetonius and Ammianus.

PREREQ: LATN112.

LATN 321 Latin Prose Composition 1**LATN 322 Latin Prose Composition 1****LATN 366 Independent Study 1-3****LATN 401 Roman Elegiac Poetry 3**

Readings in the Roman love poetry of Catullus, Tibullus, Propertius and Ovid (Amores).

PREREQ: LATN112.

LATN 402 Roman Satire 3

Readings in selected satires of Horace, Persius, Petronius, Juvenal and Seneca.

PREREQ: LATN112.

LATN 403 Roman Lyric Poetry 3

Readings in the lyric poetry of Catullus and Horace.

PREREQ: LATN112.

LATN 404 Vergil 3

In-depth study of the Eclogues, Georgics and Aeneid of Vergil.

PREREQ: LATN112.

LATN 421 Advanced Latin Prose Composition 1**LATN 422 Advanced Latin Prose Composition 1****LATN 431 History of Latin Literature 1****LATN 432 History of Latin Literature 1****LATN 455 Selected Authors, Works and Themes 3**

Works of one or more outstanding authors or on a special theme.

PREREQ: Two 300-level Latin literature courses.

RESTRICTIONS: May be repeated for credit when topics vary.

LATN 466 Independent Study 1-3

LATN 597 Latin Readings for Ph.D. Candidates 1 RP

Supervised study of Latin for reading knowledge. Treatment of the fundamentals of grammar and syntax. Lecture/problem sessions supplemented by computerized instruction.

LATN 601 Roman Elegiac Poetry 3

Readings in the Roman love poetry of Catullus, Tibullus, Propertius and Ovid (Amores).

LATN 602 Roman Satire 3

Readings in selected satires of Horace, Persius, Petronius, Juvenal and Martial.

LATN 603 Roman Lyric Poetry 3

Readings in the lyric poetry of Catullus and Horace

LATN 604 Vergil 3

In-depth study of the Eclogues, Georgics and Aeneid of Vergil.

LATN 655 Selected Authors, Works and Themes 3

Works of one or more outstanding authors or on a special theme.

RESTRICTIONS: May be repeated for credit when topics vary.

Legal Studies

LEST 301 Introduction to Legal Studies 3

Introduces legal studies as a multidisciplinary field.

LEST 401 Senior Seminar 3

Culminates the legal studies minor by requiring an independent research project resulting in a term paper. Seminar provides guidance from professor and chance to share ideas and problems with fellow students.

Linguistics

LING 101 Introduction to Linguistics 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 105 Elementary Arabic I 3

Course for beginners.

RESTRICTIONS: Requires interview with instructor if Arabic has been studied elsewhere. Arabic courses may not be offered in the necessary sequence to satisfy the language requirement.

LING 106 Elementary Arabic II 3

Completion of basic course.

PREREQ: LING105.

RESTRICTIONS: Requires interview with instructor if Arabic has been studied elsewhere.

LING 107 Intermediate Arabic I 3

Emphasis on conversation and development of ability to read texts of average difficulty.

PREREQ: LING106.

RESTRICTIONS: Requires interview with instructor if Arabic has been studied elsewhere.

LING 108 Intermediate Arabic II 3

Completion of intermediate course.

PREREQ: LING107.

RESTRICTIONS: Requires interview with instructor if Arabic has been studied elsewhere.

LING 123 Elementary Hebrew I 3

Course for beginners.

LING 124 Elementary Hebrew II 3

Completion of basic course.

PREREQ: LING123.

RESTRICTIONS: Requires interview with instructor if Hebrew has been studied elsewhere.

LING 125 Intermediate Hebrew I 3

Emphasis on conversation and development of ability to read texts of average difficulty.

PREREQ: LING124.

RESTRICTIONS: Requires interview with instructor if Hebrew has been studied elsewhere.

LING 126 Intermediate Hebrew II 3

Completion of intermediate course.

PREREQ: LING125.

RESTRICTIONS: Requires interview with instructor if Hebrew has been studied elsewhere.

LING 130 American Sign Language I 3

Introduction to American Sign Language and to the deaf culture. Topics include WH-questions, yes/no questions, negations, the alphabet and a basic working vocabulary.

RESTRICTIONS: Requires interview with instructor if Sign Language has been studied elsewhere.

LING 131 American Sign Language II 3

Continuation of LING130.

PREREQ: LING130.

RESTRICTIONS: Requires interview with instructor if Sign Language has been studied elsewhere.

LING 132 American Sign Language III 3

Continuation of LING131.

PREREQ: LING131.

RESTRICTIONS: Requires interview with instructor if Sign Language has been studied elsewhere.

LING 133 American Sign Language IV 3

Continuation of LING132.

PREREQ: LING132.

RESTRICTIONS: Requires interview with instructor if Sign Language has been studied elsewhere.

LING 203 Languages of the World 3

Survey of the world's languages, examining a number of important phenomena from a wide range of languages. Phenomena are both structural (e.g., word order and agreement) and societal or psychological (How do multicultural societies choose a common language? What is the relation between language and thought?).

LING 222 Language and Gender 3

Explores various ways in which gender is reflected in language. Topics include sexism in language, 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 cross-listed 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

Topics vary and will be announced in registration booklet.

RESTRICTIONS: May be repeated for credit when topics vary

LING 270 Introduction to Cognitive Science 3

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

LING 301 Dictionaries 3

Lexicographical information on the use of dictionaries in research, teaching, translation, reading and other fields. Sociological and political importance of dictionaries. Introduction to planning and compiling dictionaries: technological developments such as computerization and the dictionary of the future.

LING 350 Cross-Language Equivalence 3

Focuses on the problem of expressing similar ideas and concepts in two or more languages by examining the linguistic factors that either inhibit or facilitate the transmission of a concept or idea from one language to another. Covers such topics as contrastive analysis and translation.

LING 366 Independent Study 1-3**LING 390 Introduction to the English Language 3**

See ENGL390 for course description.

LING 401 Historical Linguistics 3

Languages of the world, Indo-European languages, the comparative method and linguistic evolution.

PREREQ: Completion of two years of a college language course.

LING 402 Introduction to Descriptive Linguistics 3

Principles of phonemic and morphemic analysis and transcription. Introduction of current grammatical theories and models. Outline of major issues in contemporary linguistics.

LING 403 Romance Language Lexicography 3

Introduction to the place of the dictionary in learning, teaching and translating languages. Information concerning the planning, compiling and evaluating of dictionaries written in French, Spanish, Italian and Portuguese. History of Romance-language lexicography and its typology, including both monolingual and bilingual dictionaries.

May be cross-listed with FLLT403.

LING 404 Dynamics of Language Contact 3

Linguistic theory applied to the study of bilingualism. Major types of psycholinguistic and sociolinguistic research. The organization of language in the bilingual individual and in multilingual populations.

LING 405 Language Theory/Human Creativity 3

Major grammatical theories are evaluated in their capacity to serve as comprehensive statements of human linguistic creativity. Based on a distinction between functional and artifactual aspects of language, explores the range of creative processes involving language use.

LING 407 Phonology I 3

Basic introduction to phonology, concentrating on principles of articulatory phonetics, IPA transcription system, distinctive feature theory, segmental phonological analysis and the writing of phonological rules.

LING 409 Syntax I 3

Introduction to syntactic theory and analysis for advanced undergraduates. Emphasis on argumentation and analysis rather than on the fine points of syntactic theory.

PREREQ: LING402.

LING 411 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 variety of languages, focusing on language specific and universal phenomena.

PREREQ: LING407.

LING 417 Language Planning 3

Sociolinguistic study of the interaction between official and indigenous languages as well as the role of minority groups in national policy making. Highlights language as a cultural, political and social marker.

LING 421 Methods of Teaching Foreign Languages 3

See FLLT421 for course description.

LING 422 Language Syllabus Design 3

See FLLT422 for course description.

LING 423 Medieval Language of Love and Hate 3

Analysis of texts in terms of language rather than concepts. Strategies of language as the carrier of implicit and authentic meanings. Readings in English translation from Medieval Western European texts with comparison to other periods.

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.

May be cross-listed with FLLT424.

LING 425 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.

PREREQ: LING101.

LING 426 Theory and Techniques of Interpretation 3

Overview of the field of interpretation as a profession. The major divisions of simultaneous, consecutive and escort interpretation, special abilities and personal qualifications needed, type of equipment used, conference organization, occupational field in business and international organizations, professional associations and other related topics.

COREQ: LING427.

RESTRICTIONS: Requires successful completion of a series of proficiency and aptitude tests.

LING 427 Interpretation Practicum 3

Opportunity for individual practice in the language lab and with special interpretation equipment under conference conditions of the different types of interpretation and their variants presented in LING426.

COREQ: LING426.

RESTRICTIONS: Requires successful completion of a series of proficiency and aptitude tests.

LING 428 Theory and Techniques of Interpretation II 3

Continuation of LING426.

PREREQ: LING426.

COREQ: LING429.

RESTRICTIONS: Grade of B or higher required of Prerequisite.

LING 429 Interpretation Practicum II 3

Continuation of LING427.

PREREQ: LING427.

COREQ: LING428.

RESTRICTIONS: Grade of B or higher required of Prerequisite.

LING 430 Advanced Interpretation Seminar 1-3

Provides the opportunity for students who have already completed the 12-hour Interpretation Program (LING426, LING427, LING428 and LING429) to continue interpretation training at an advanced level and perfect their simultaneous and consecutive skills.

PREREQ: LING428 and LING429.

RESTRICTIONS: Grade of C or higher required of Prerequisites.

LING 431 Applied Spanish Linguistics 3

Application of linguistic theory to the study of Spanish structure (morphology/syntax), semantics, discourse and pragmatics. Special attention given to Spanish/English contrastive analysis and on resolving problems inherent in the teaching of Spanish.

PREREQ: Any 300-level Spanish course.

LING 432 Spanish Dialectology 3

Analyzes the phonological, morphological, lexical, syntactic and sociolinguistic phenomena of major Hispanic dialects. Special focus on U.S. varieties of Spanish, their interaction with English and the relevance of this for educational programs.

PREREQ: One course in Linguistics.

LING 440 Structure of French 3

Survey of the sound system of contemporary French, together with major grammatical elements, lexicon and derivational processes. Dialect variation in French-speaking countries, and the extension of French outside of France as a second language. Phonological and grammatical analyses of French.

PREREQ: LING101.

LING 450 Structure of Italian 3

Formal analysis of the phonology, morphology and syntax of contemporary Italian. Discussion of major dialects and regional variations of the standard language. Sociolinguistic profile of major contemporary Italian speech communities. PREREQ: LING101.

LING 452 Italian Dialectology 3

Discussion of the major dialects of Italian, their geographical locations, and their influence on and contribution to the formation of the standard Italian language. Students work with dialect atlases, delineate major isoglosses and analyze the stratification of dialects in contemporary Italy.

LING 462 Language Acquisition 4

See EDST462 for course description.

LING 466 Independent Study 1-3

LING 470 Structure of Chinese 3

Survey of the major structural features of Mandarin Chinese. Topics include phonology, compounding, aspect, word order, the ba and bei constructions, interrogative and negative sentences, coverbs and the serial verb construction.

LING 476 Bilingualism and Language 3

See EDST476 for course description.

LING 477 The Structure of English 3

See EDST477 for course description.

LING 480 Introduction to Sociolinguistics 3

Theories (e.g., variation theory), research and methods of analysis of the interrelationships of language and society. Particular attention paid to application of sociolinguistic research to the solution of educational problems of various groups.

LING 491 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, thematic roles). Some elements of formal semantics.

PREREQ: LING101.

LING 492 History of Linguistics 3

The history of linguistic thought from Panini through the 20th century. Emphasis on the continuity of trends and issues in the development of linguistic science.

LING 495 The Structure of Japanese 3

Formal analysis of the phonology, morphology and syntax of contemporary Japanese. Reading and discussion of theoretical analysis of Japanese syntax.

PREREQ: LING101.

LING 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.

LING 497 Sociolinguistics of English in Inner City 3

Application of sociolinguistic principles and research to the teaching of multicultural students in American educational systems. Topics include societal multilingualism, language attitudes, vernacular language education, diglossia, instructional methods for teaching English as a second dialect, and reactions of the educational community to Black English Vernacular.

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.

LING 499 Issues in Teaching LEP Students 3

Addresses theoretical and instructional issues related to teaching Limited English Proficient students. Topics include issues in bilingual education, theories of L2 acquisition, LEP educational models, integrating language and content instruction, documentation and assessment of LEP 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.

PREREQ: Completion of two years of a college language course.

LING 602 Introduction to Descriptive Linguistics 3

Principles of phonemic and morphemic analysis and transcription. Introduction of current grammatical theories and models. Outline of major issues in contemporary linguistics.

LING 604 Dynamics of Language Contact 3

Linguistic theory applied to the study of bilingualism. Major types of psycholinguistic and sociolinguistic research. The organization of language in the bilingual individual and in multilingual populations.

LING 605 Language Theory/Human Creativity 3

Major grammatical theories are evaluated in their capacity to serve as comprehensive statements of human linguistic creativity. Based on a distinction between functional and artifactual aspects of language, the class is led to explore the range of creative processes involving language use.

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 Government and Binding and to principles of universal grammar.

PREREQ: LING609.

LING 611 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 variety of languages, focusing on language specific and universal phenomena.

PREREQ: LING407.

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 620 Interactive Language Teaching 3

Fundamentals of interactive foreign language teaching with illustrations of classroom practice and development of appropriate materials and syllabi, discussion of testing and comparison with other teaching approaches. May be cross-listed with FLLT620.

LING 621 Methods of Teaching Foreign Languages 3

See FLLT621 for course description.

LING 622 Language Syllabus Design 3

See FLLT622 for course description.

LING 623 Medieval Language of Love and Hate 3

Analysis of texts in terms of language rather than concepts. Strategies of language as the carrier of implicit and authentic meanings. Readings in English translation from Medieval Western European texts with comparison to other periods.

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. Discrete point versus integrative or pragmatic measures. Practice in item construction and analysis.

May be cross-listed with FLLT624.

LING 625 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.

PREREQ: LING101.

LING 626 Theory and Techniques of Interpretation 3

Overview of the field of interpretation as a profession. The major divisions of simultaneous, consecutive and escort interpretation, special abilities and personal qualifications needed, type of equipment used, conference organization, occupational field in business and international organizations, professional associations and other related topics.

COREQ: LING627.

RESTRICTIONS: Requires successful completion of a series of proficiency and aptitude tests.

LING 627 Interpretation Practicum 3

Opportunity for individual practice in the language lab and with special interpretation equipment under conference conditions of the different types of interpretation and their variants presented in LING626.

COREQ: LING626.

RESTRICTIONS: Requires successful completion of a series of proficiency and aptitude tests.

LING 628 Theory and Techniques of Interpretation II 3

Continuation of LING626.

PREREQ: LING626.

COREQ: LING629.

RESTRICTIONS: Grade of B or higher required of Prerequisite.

LING 629 Interpretation Practicum II 3

Continuation of LING627.

PREREQ: LING627.

COREQ: LING628.

RESTRICTIONS: Grade of B or higher required of Prerequisite.

LING 630 Advanced Interpretation Seminar 1-3

Provides the opportunity for students who have already completed the 12-hour Interpretation Program (LING626, LING627, LING628 and LING629) to continue interpretation training at an advanced level and perfect their simultaneous and consecutive skills.

PREREQ: LING628 and LING629.

RESTRICTIONS: Grade of C or higher required of Prerequisites.

LING 631 Applied Spanish Linguistics 3

The application of linguistic theory to the study of Spanish structure (morphology/syntax), semantics, discourse and pragmatics. Special attention given to Spanish/English contrastive analysis and on resolving problems inherent in the teaching of Spanish.

PREREQ: Any 300-level Spanish course.

LING 632 Spanish Dialectology 3

Analyzes the phonological, morphological, lexical, syntactic and sociolinguistic phenomena of major Hispanic dialects. Special focus on U.S. varieties of Spanish, their interaction with English and the relevance of this for educational programs.

PREREQ: One course in Linguistics.

LING 640 Structure of French 3

Survey of the sound system of contemporary French, together with major grammatical elements, lexicon, derivational processes, dialect variation in French-speaking countries, and the extension of French outside of France as a second language. Students perform phonological and grammatical analyses of French.

LING 650 Structure of Italian 3

Formal analysis of the phonology, morphology and syntax of contemporary Italian. Discussion of major dialects and regional variations of the standard language. Sociolinguistic profile of major contemporary Italian speech communities.

PREREQ: One syntax and one phonology course.

LING 660 The Structure of German 3

Linguistic description of the phonology, morphology and syntax of contemporary German. Analysis of major regional and stylistic varieties of the spoken language, and exercises in transcription.

LING 670 Structure of Chinese 3

Survey of the major structural features of Mandarin Chinese. Topics include phonology, compounding, aspect, word order, the ba and bei constructions, interrogative and negative sentences, coverbs and the serial verb construction.

PREREQ: One syntax and one phonology course.

LING 675 Language Acquisition 4

See EDST675 for course description.

LING 676 Bilingualism and Language 3

See EDST676 for course description.

LING 677 The Structure of English 3

See EDST677 for course description.

LING 680 Introduction to Sociolinguistics 3

Theories (e.g., variation theory), research and methods of analysis of the interrelationships of language and society. Particular attention paid to application of sociolinguistic research to the solution of educational problems of various groups.

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.

PREREQ: LING101.

LING 692 Semantics II 3

A continuation of LING691. Focuses on such topics as formal semantics, including Montague grammar, the interface between semantics and pragmatics, negation, quantification, conjunction, etc.

PREREQ: LING691.

LING 693 Psycholinguistics of L2 Reading 3

Study of main models of L2 reading with an emphasis on developmental theory and on the psycholinguistic/cognitive dimensions of reading in a foreign/second language, from literacy to literature. Analysis of schemas, scripts, and constructivist and interactive models.

RESTRICTIONS: Open to Seniors with instructor's permission.

LING 695 The Structure of Japanese 3

Formal analysis of the phonology, morphology and syntax of contemporary Japanese. Reading and discussion of theoretical analysis of Japanese syntax.

LING 696 Psycholinguistics 3

Study of linguistic approaches to cognition. Issues in the relation of language to thought: universals, language acquisition and theories of syntactic and semantic processing.

PREREQ: LING101.

LING 697 Sociolinguistics of English in the Inner City 3

Application of sociolinguistic principles and research to the teaching of multicultural students in American educational systems. Topics include societal multilingualism, language attitudes, vernacular language education, diglossia, instructional methods for teaching English as a second dialect, and reactions of the educational community to Black English Vernacular.

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 Limited English Proficient Students 3

Addresses theoretical and instructional issues related to teaching Limited English Proficient (LEP) students. Topics include issues in bilingual education, theories of L2 acquisition, LEP educational models, integrating language and content instruction, documentation and assessment of LEP skills, and understanding cultural diversity.

LING 801 Old English 3

See ENGL801 for course description.

LING 803 Middle English 3

See ENGL803 for course description.

LING 804 Linguistic Principles of Translation 3

Translation as linguistic science rather than literary art. Contrastive analysis, stylistics and lexical problems such as neologisms and matching of levels of speech. Supervised work in translation of texts of various types. Relating conceptual construction of various linguistic theories (tagmemics, systemic linguistics, transformational-generative grammar, meaning-text model theory) to the realities of language translation.

LING 805 Discourse in Foreign Languages 3

Data taken from several languages and submitted to an analytical procedure that addresses tactical and interactional aspects as well as grammatical ones. Discussion of the pedagogical implications of this type of discourse analysis.

LING 806 Interference and Interlanguage 3

Study of the principles of contrastive analysis, error analysis and interlanguage theory as they apply to second-language learning. Topics include transfer, markedness theory and universals, fossilization, learning and production strategies. Special emphasis on data analysis.

LING 808 Lexicography and Lexicology 3

Seminar course in linguistic principles in the compilation of dictionaries. Theoretical contributions of different schools of linguistics to problems of lexicography and the contribution of working lexicographers to linguistic data. The relationship of lexicography to translation. A linguistic evaluation of lexicographical theory.

LING 820 Advanced Studies in Methodology 3

Discussion of current issues in second language acquisition and their impact on classroom methods. Design of experimental research on ESL/FL classroom activities. Formulation of principles for second language instruction.

LING 824 Seminar in Second Language Testing 3

Analysis of major issues in second language testing, including latent trait measurement, problems of ascertaining validity and calibrating items and interactive testing. Special emphasis on current research in oral/reading proficiency testing, the testing of small group work and on the introspective vs. the interactive testing research methods.

PREREQ: LING624.

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 848 Seminar in Language Development 3

See EDST848 for course description.

LING 850 Linguistics and Writing 3

Survey of writing systems. Problems of text structure.

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 880 Second Language Acquisition 3

A detailed analysis of current issues in second language acquisition based on extensive readings of research findings. Topics include monitor model, pidginization process, natural versus formal second language acquisition, and adult-versus-child acquisition.

LING 881 Soviet Psycholinguistics I 3

Study of the theories of Vygotsky, Luria, Leont'ev and others. Basic concepts in Soviet theory: activity, zone of proximal development and regulation.

LING 882 Soviet Psycholinguistics II 3

Advanced problems in Soviet theory of language learning. Non-Soviet extensions of the theory. Application of theory to second-language acquisition.

PREREQ: LING881.

LING 890 Studies in Linguistics 3

Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing. May be cross-listed with ENGL890.

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 MALS majors only.

MALS 603 The American Frontier: Fact and Fiction 3

Uses novels, films and more traditional sources of information to examine the role of the frontier in shaping American attitudes and values.

RESTRICTIONS: Open to MALS majors only.

MALS 605 China and the West 3

Survey of historical and cultural contacts between China and the West before the 19th century. Presents, among other topics, the old silk road, medieval Christian missions to China, Marco Polo, the Jesuits in Peking, introduction of Western learning into China and the Chinese vogue in the West during the 17th and 18th centuries.

RESTRICTIONS: Open to MALS majors only.

MALS 610 Force, Conflict and Change 3

From antiquity to the present, the use of force and the resolution of conflict have been among humanity's enduring preoccupations. Examines ideas about these issues, and associated questions such as the meaning of "heroism" and "just war."

RESTRICTIONS: Open to MALS 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 612 Moral Character: Values, Virtues, Responsibilities 3

Tests the hypothesis that lives are more meaningful in direct proportion to developed moral character. Addresses "What is a worthy life?" by exploring such concepts as self-knowledge, integrity, autonomy, courage, justice, work, love and community. Readings from philosophers and developmental psychologists.

RESTRICTIONS: Open to MALS majors only.

MALS 613 Latin American Experience 3

Examines recurring issues and problems in Latin America. The conflict between church and state, nationalism and a place in world affairs, tensions between the individual and society and the influence of the United States.

RESTRICTIONS: Open to majors only.

MALS 614 The French Revolution: Ideas, Interpretations and Dissent 3

Examines ways in which the French Revolution of 1789-1815, with all its complex events and movements, has been perceived and conceptualized by contemporaries, commentators and professional scholars. In-depth study of its literature to see how human beings invented concepts and interpretations to make sense of the French Revolution.

RESTRICTIONS: Open to MALS majors only.

MALS 615 Reason, Revolution and The Rights of Man 3

Examines eighteenth-century French and English movement away from Cartesian rationalism and towards a rejection of reason leading to romanticism and revolution and an application of reason leading to a discussion of civil and human rights.

RESTRICTIONS: Open to majors only.