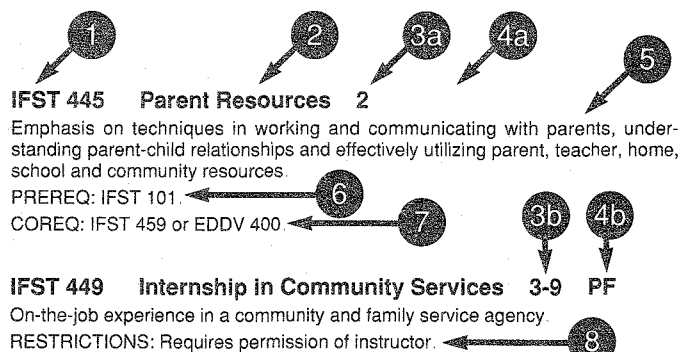




UNIVERSITY OF DELAWARE

1991-92 COURSE LISTINGS

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
GERM	German
GREK	Greek
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

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Accounting

ACCT 207 Accounting I 3

An introduction to financial accounting. Topics: the accounting cycle, merchandise accounting, accounting procedures for cash, receivable, 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: ACCT 207.

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: BUAD 260 or ACCT 260.

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: ACCT 208, ACCT 260.

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: ACCT 207.

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: ACCT 207, ACCT 208.

RESTRICTIONS: Requires Junior status.

ACCT 316 Intermediate Accounting II 3

Continuation of ACCT 315. 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: ACCT 315.

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: ACCT 208

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: ACCT 350.

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 413 Income Tax Accounting 3

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

PREREQ: ACCT 208.

RESTRICTIONS: Requires a grade of "C" or better in ACCT 315 and ACCT 316.

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: ACCT 413.

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: ACCT 316.

RESTRICTIONS: Requires a grade of "C" or better in ACCT 315 and ACCT 316.

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: ACCT 316.

ACCT 466 Independent Study 1-6

ACCT 551 Financial Accounting 3

A survey of the techniques and methodology used in preparing accounting reports for information users external to the firm.

ACCT 552 Managerial Accounting 3

A study of management uses of accounting information, including an emphasis on cost-volume-profit analysis; product costing including standard cost techniques; budgeting, profit planning and control; relevant cost analysis with a special reference to capital budgeting and inventory decision; and performance measurement concepts.

PREREQ: ACCT 551.

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: ACCT 413 or comparable undergraduate accounting course.

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: ACCT 551.

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: ACCT 302.

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: ACCT 327, STAT 201 and STAT 202.

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: ACCT 316.

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: ACCT 327.

ACCT 813 Advanced Federal Tax Accounting 3

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

PREREQ: ACCT 413.

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: ACCT 417.

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: ACCT 316.

ACCT 840 Contemporary Issues in Accounting 3

Selected problems of current interest to the accounting profession.

PREREQ: ACCT 316 and ACCT 327.

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 AFSC 100. 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 AFSC 200. 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 AFSC 310. 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 AFSC 410. Focuses on role and function of the professional officer in a democratic society; the socialization processes, prevailing public attitude and value orientations associated with military service; principal requisites for maintaining national security forces; and the military justice system. Continued emphasis on oral and written communication skills.

Agricultural Education

AGED 366 Independent Study 1-6

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

AGEG 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: AGEG 111, AGEG 218.

AGEG 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 PLSC 603.

PREREQ: PLSC 204.

AGEG 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: AGEG 328 or CIEG 331.

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 101 Introduction to American Civilization I 3

Interdisciplinary approach to cultural and social change based upon a broad spectrum of source materials ranging from journals and letters to novels and films.

AMST 102 Introduction to American Civilization II 3

Same approach as AMST 101 but applied to a different set of issues and problems. Often team taught by professors from various departments.

AMST 278 Historic Cultures of the Middle Atlantic Region 3

See ANTH 278 for course description.

AMST 301 The Worker in American Life 3

See HIST 301 for course description.

AMST 303 American Intellectual History 3

See HIST 303 for course description.

AMST 304 American Intellectual History 3

See HIST 304 for course description.

AMST 310 Community Studies 3

Seminar, based on materials from various disciplines, relating individual communities to American culture and society. Particular communities may vary each time the course is offered.

RESTRICTIONS: Requires permission of instructor.

AMST 314 Introduction to Folklore and Folklife 3

See ENGL 314 for course description.

AMST 316 Introduction to Material Culture Studies 3

See ANTH 316 for course description.

AMST 317 American Philosophy 3

See PHIL 317 for course description.

AMST 319 Revolutionary America 3

See HIST 319 for course description.

AMST 322 The City in American Culture 3

See ANTH 322 for course description.

AMST 327 Early American Society 3

See HIST 327 for course description.

AMST 328 American Industrial Society from 1815 to the Present 3

See HIST 328 for course description.

AMST 340 Historical Archaeology 3

See ANTH 340 for course description.

AMST 343 Cultural Issues in American Literature 3

Study of broad cultural issues (e.g., capitalism, conservation) as those issues have found expression through American literature. May be cross-listed with ENGL 343.

AMST 344 Black American Literature I 3

See ENGL 344 for course description.

AMST 345 Black American Literature II 3

See ENGL 345 for course description.

AMST 360 Humanities Colloquium 3

See ARSC 360 for course description.

AMST 366 Independent Study 1-6

AMST 368 Literature and Science 3

See ENGL 368 for course description.

AMST 370 Historical Archaeology of the Eastern United States 3

See ANTH 379 for course description.

AMST 380 Western Landscapes of America 3

See GEOG 380 for course description.

AMST 389 American Technology 3

See HIST 389 for course description.

AMST 398 Film and Modern American Culture 3

See ENGL 398 for course description.

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

See MSST 403 for course description.

AMST 410 Profile of an Era 3

Examination of American experience during a particular time period. The period may vary each time the course is offered, as may the materials examined: literature, music, history, art and architecture, philosophy and material artifacts.

AMST 441 Studies in American Literature 3

See ENGL 441 for course description.

AMST 454 Vernacular Architecture 3

See HIST 454 for course description.

AMST 466 Independent Study 1-6

AMST 480 Seminar 3

See ENGL 480 for course description.

AMST 601 American Studies Seminar 3

Study of a delimited area of American civilization utilizing interdisciplinary techniques.

Animal Science

ANSC 101 Introduction to Animal Science 3

Common life processes of selected members of the animal kingdom. Similarities and differences in the manner in which domestic animals meet the problems of living.

COREQ: ANSC 111.

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: ANSC 101.

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: ANSC 101 and ANSC 140.

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, legal issues. Supplemented with field trips. May be cross-listed with FREC 270 and/or PLSC 270.

ANSC 300 Principles of Animal and Plant Genetics 3

See PLSC 300 for course description.

ANSC 301 Dairy Technology 3

Study of milk constituents, manufactured products, by-products, their role in human nutrition and contemporary processes and analyses used in the dairy industry. May be cross-listed with FOSC 301.

RESTRICTIONS: Offered in Spring of odd-numbered years.

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 FOSC 305 for course description.

ANSC 306 Food Science Laboratory 1

See FOSC 306 for course description.

ANSC 310 Animal and Plant Genetics Laboratory 1

See PLSC 310 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: ANSC 140.

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: ANSC 140.

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: ANSC 140.

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: ANSC 101 and ANSC 251.

RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 409 Food Processing I 4

See FOSC 409 for course description.

ANSC 410 Food Processing II 4

See FOSC 410 for course description.

ANSC 417 Beef Cattle and Sheep Production 3

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

PREREQ: ANSC 101 and ANSC 251.

RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 418 Swine Production 3

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

PREREQ: ANSC 101 and ANSC 251.

RESTRICTIONS: Offered in Spring of even-numbered years.

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: ANSC 140 and ANSC 251.

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: ANSC 101 and ANSC 140.

ANSC 428 Food Chemistry 4

See FOSC 428 for course description.

ANSC 429 Food Analysis 4

See FOSC 429 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: BISC 371.

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: ANSC 345.

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: ANSC 345 or BISC 306.

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: ANSC 251.

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: BISC 301, and ANSC 300 or PLSC 300 or ENTO 300.

ANSC 609 Comparative Vertebrate Histology 4

See BISC 618 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 NTDT 624.

PREREQ: ANSC 452 or NTDT 309, and CHEM 214.

RESTRICTIONS: Offered in Spring of odd-numbered years.

ANSC 630 Trace Minerals and Vitamins 3

See NTDT 630 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: ANSC 332 or ANSC 633.

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: ANSC 332, ANSC 431 and ANSC 635.

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: ANSC 431 or BISC 371.

ANSC 639 Food Microbiology 4

See FOSC 639 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: ANSC 345 or ANSC 441.

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: ANSC 345.

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 NTDT 654.

PREREQ: ANSC 452 or NTDT 400 and CHEM 214.

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: BISC 301, and ANSC 300 or PLSC 300 or ENTO 300.

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: CHEM 527, and ANSC 300 or PLSC 300.

RESTRICTIONS: Concurrent enrollment in ANSC 871 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: ANSC 870.

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 ANTH 102 or ANTH 104 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 ANTH 103 or ANTH 104 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 ANTH 102 and ANTH 103 not granted if ANTH 104 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 223 Society, Politics and Health Care 3

See CSCC 243 for course description.

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. Childrearing customs and life cycles in cross-cultural perspective. Cultural influences on motivation and cognition.

ANTH 242 Society and the Health Professions 3

See CSCC 242 for course description.

ANTH 251 Introduction to the Primitive 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 271 Introduction to Medical Anthropology 3

See CSCC 271 for course description.

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 AMST 278 and/or HIST 278.

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.

RESTRICTIONS: Requires a 3.0 GPA or better.

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 WOMS 305.

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 AMST 316 and/or HIST 316.

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 AMST 322 and/or HIST 322.

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; 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. May be cross-listed with AMST 340.

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 363 Women in Cross-Cultural Perspective 3

See WOMS 363 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 AMST 370 and/or HIST 379.

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 ARSC 390 for description.

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.

RESTRICTIONS: Requires a GPA of 3.0 or higher.

ANTH 401 The Idea of Race 3

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

RESTRICTIONS: Requires permission of instructor.

ANTH 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: ANTH 103.

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 465 Philosophy of Social Science 3

See PHIL 454 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.

RESTRICTIONS: Requires a GPA of 3.0 or higher.

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: ANTH 103.

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.

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: 3.5-week course.

ARSC 294 Honors Short Course: Multicultural 1

Approved topics are: The Eastern Mind - Glimpses Through Modern and Ancient Writings from India; The Battered, the Put-Down and the Rejected; and Myth and Expression. Course counts toward the three-credit multicultural requirement.

RESTRICTIONS: 3.5-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 ENGL 316.

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. Same course as ENGL 360, HIST 360, AMST 360, ANTH 360, ARTH 360, CMLT 360, FLLT 360, PHIL 360.

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 ARSC 390 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

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. COREQ: ART 110.

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 122 Introduction to Figurative Illustration 3

Basic figure drawing with the study of both nude and clothed figures. Emphasis on use of the figure in illustration.

PREREQ: ART 110.

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.

RESTRICTIONS: Requires completion of foundation requirements.

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 239 Monoprinting 3

Introduction to oil-based and water-based processes of the monotype and monoprint with collage as applied to individual expression.

ART 240 Printmaking I: Etching 3

Introduction to the visual development of individual concepts and images through the techniques and processes of intaglio etching, including relief, viscosity and multiple-plate color printing.

PREREQ: ART 112.

ART 241 Printmaking I: Silkscreen 3

Introduction to production of images through the basic techniques and application to visual designs and concepts executed through the process of silkscreening with emphasis on positive, negative and photographic stencils.

PREREQ: ART 112.

ART 242 Papermaking as an Art Form 3

Introduction to Western and Eastern papermaking processes, as well as cast paper techniques, as applied to individual expression.

ART 243 Printmaking I: Lithography 3

Introduction to basic printmaking techniques as they apply to lithography and their application to the visual development of individual concepts and images.

PREREQ: ART 112.

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 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: Etching, Silkscreen or Lithography with Photographic Processes 3

Intermediate study of the development of multiple images involved in etching, silkscreen, lithography or their photographic processes or woodcut.

PREREQ: ART 240, ART 241, ART 242, or ART 243.

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, 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.

PREREQ: ART 303.

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.

PREREQ: ART 402.

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.

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 1-6**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 ARTC 681 and/or ARTH 681.

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

See ARTC 680 for course description.

ART 685 Color Mixing and Matching 3

See ARTC 685 for course description.

ART 688 Studio Materials and Techniques of Painting I 3

See ARTC 688 for course description.

ART 689 Studio Materials and Techniques of Painting II 3

See ARTC 689 for course description.

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

See ARTC 690 for course description.

ART 869 Master's Thesis 1-6

Art Conservation

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: ARTC 615.

RESTRICTIONS: Full-time fellowship students only.

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: ARTC 670.

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: ARTC 670 and ARTC 671.

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: ARTC 670, ARTC 671 and ARTC 672.

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 ARTH 680.

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. 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 and egg tempera from about 1500 B.C. to A.D. 1500. Major topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research. May be cross-listed with ART 688 and/or ARTH 688.

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: ca. 1600-1990. 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 ARTH 689.

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 ARTH 690.

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: ARTC 865.

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: ARTC 864.

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: ARTC 864 and ARTC 865.

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: ARTC 865 and ARTC 868.

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: ARTC 869.

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

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 and monuments.

ARTH 151 Myth, Religion and Art 3

Myths, legends and symbols of the classical world and their expression in art. The Bible and other Christian literature as sources of religious imagery.

ARTH 152 Design and Expression in the Visual Arts 3

Use of form, material, color and space in the creation of aesthetic and emotional impact in the arts. Considers painting, sculpture and architecture.

ARTH 153 Introduction to Art History I 3

Evolution of art, in its historical context, from the prehistoric periods through ancient Egypt, Greece, Rome, the Early Christian period and the Middle Ages.

ARTH 154 Introduction to Art History II 3

Evolution of art, in its historical context, from the Renaissance through the Baroque, Rococo, Romantic and Modern eras.

ARTH 161 Art in East and West 3

Comparison and contrast of works of art typical of Eastern and Western traditions and the exploration of them, emphasizing such themes as nature, man and the divine, world of the prince, imperial art, priestly art, art of the urban bourgeoisie and public and private art.

ARTH 162 History of Architecture 3

Presents an approach to architecture and elements of architectural design, followed by a survey of architectural history from Egyptian and Mesopotamian through Greek, Roman, Medieval, Renaissance and Baroque to Modern. Considers climate, materials, religion, politics and technology as they influence style.

ARTH 207 Origins of Art 3

Art from the Old Stone Age to the end of the Bronze Age in Greece. The art of prehistory, Sumer, Babylon, the Hittites, Persia and Old, Middle and New Kingdom Egypt.

ARTH 208 Greek and Roman Art 3

Art from the rise of Greece to the fall of Rome. Periods covered include Archaic, Classical and Hellenistic Greece; and Republican and Imperial Rome.

ARTH 209 Early Medieval Art A.D. 200-1000 3

Painting, sculpture and architecture in Europe and the Near East, from the earliest Christian art to the emergence of the medieval artistic tradition, including Byzantine, Anglo-Saxon and Carolingian art.

ARTH 210 Later Medieval Art 1000-1400 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 modern European art.

ARTH 211 Early Renaissance Art 3

Fifteenth-century Italian art with its fourteenth-century precursors. Emphasis on such artists as Giotto, Donatello, Masaccio, Botticelli, Brunelleschi and Alberti.

ARTH 212 High Renaissance and Mannerist Art 3

Sixteenth-century art in Italy and the spread of Mannerism in France and Spain. Emphasis on such artists as Leonardo da Vinci, Raphael, Michelangelo, Bramante, Titian, Tintoretto and El Greco.

ARTH 214 Baroque Art 3

Painting, sculpture and architecture in Europe during the seventeenth century. Emphasis on major figures such as Caravaggio, Rembrandt, Rubens, Poussin and Bernini.

ARTH 215 Art of the Eighteenth Century 3

Major trends in eighteenth-century European painting and sculpture from the age of Rococo to the era of the French Revolution.

ARTH 216 American Art 3

Architecture, sculpture, painting and the decorative arts in the United States from the founding of the colonies to the present. Field trip to The Winterthur Museum.

PREREQ: ARTH 150.

RESTRICTIONS: Sophomore status accepted in lieu of Prerequisite.

ARTH 313 Art of the Northern Renaissance 3

Painting, sculpture and graphics during the 14th, 15th and 16th centuries in northern Europe, principally in the Netherlands, Germany and France.

ARTH 315 Modern Art I: Nineteenth Century 3

Significant 19th-century European movements, such as Neoclassicism, Romanticism, Realism, Impressionism and Symbolism, and the major artists who were connected with them.

ARTH 316 Modern Art II: Twentieth Century 3

Major developments and transformations in painting and sculpture from 1900 to the present. Fauvism, Cubism, Futurism, Dada, Surrealism, Abstract Expressionism, Pop Art, Minimal Art and contemporary styles and theories.

ARTH 317 Renaissance and Baroque Architecture: 1400-1750 3

Buildings and cities of Europe studied in the context of aesthetic, social, religious and intellectual movements of the period. Focus on Italy and the spread of the style to other countries.

ARTH 320 Painting in the United States from the Colonies to World War I 3

Style and iconography in American painting, emphasizing relationships with literature, theology, economics and social conditions.

ARTH 323 Modern Architecture I: 1750-1900 3

Aesthetic and technological developments of architecture, interior design and the planned environment, from the break from the Renaissance tradition to Art Nouveau and the rise of the skyscraper.

ARTH 324 Modern Architecture II: The Twentieth Century 3

Aesthetic and technological developments in architecture, interior design and the planned environment, from the early work of Frank Lloyd Wright to the diverse tendencies of the last third of the 20th century.

ARTH 339 Art and Architecture of Central 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 ARSC 360 for course description.

ARTH 366 Independent Study 1-6**ARTH 370 History of Photography 3**

History and aesthetics of photography from the beginnings to the present. Emphasis on photography as artistic expression.

PREREQ: ARTH 216 or ARTH 316.

ARTH 380 Asian Art 3

Painting, sculpture and architecture in the Far East, especially in China, Japan and India.

ARTH 401 Literature, Theory and Methods of Art History 3

Writings on art history and aesthetics from ancient to modern times. Major theories and methods from 1800 to present. Practical application of art historical methods in written assignments.

RESTRICTIONS: To be taken in the Junior year.

ARTH 402 Seminar in the History of Art 3

Special areas or particular artists, for advanced undergraduates.

RESTRICTIONS: May be repeated for credit when topics vary.

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

See MSST 403 for course description.

ARTH 405 Seminar in Ancient Art 3

Topic of study may change with each time of offering.

PREREQ: ARTH 207 or ARTH 208.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 406 Seminar in Medieval Art 3

Topic of study may change with each time of offering.

PREREQ: ARTH 209 or ARTH 210.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 407 Seminar in Italian Renaissance Art 3

Topic of study may change with each time of offering.

PREREQ: ARTH 211 or ARTH 212.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 409 Seminar in Baroque Art 3

Topic of study may change with each time of offering.

PREREQ: ARTH 214.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 410 Seminar in Eighteenth-Century Art 3

Topic of study may change with each time of offering.

PREREQ: ARTH 214 or ARTH 215 or ARTH 315.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 411 Seminar in Modern Art 3

Topic of study may change with each time of offering.

PREREQ: ARTH 315 or ARTH 316.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 412 Seminar in American Art 3

Topic of study may change with each time of offering.

PREREQ: ARTH 216.

RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 466 Independent Study 1-6**ARTH 483 Seminar in Nineteenth-Century Photography 3**

Aspects of history and aesthetics of 19th-century photography. Topic of study may change with each time of offering.

PREREQ: ARTH 315 or ARTH 370.

RESTRICTIONS: Offered in the Fall of odd-numbered years. May be repeated for credit when topics vary.

ARTH 484 Seminar in Twentieth-Century Photography 3

Aspects of history and aesthetics of 20th-century photography. Topic of study may change with each time of offering.

PREREQ: ARTH 316 or ARTH 370.

RESTRICTIONS: Offered in the Fall of even-numbered years. May be repeated for credit when topics vary.

ARTH 610 Studies in Greek and Roman Art 3

Ancient art from the 6th century B.C. to the fall of the Roman Empire. Topic of study may change with each time of offering.

PREREQ: ARTH 207 or ARTH 208.

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 620 Studies in Medieval Art 3

Various aspects of the arts of Europe in the period 500 to 1400 A.D. Topic of study may change with each time of offering.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 625 Studies in Northern Renaissance Art 3

The arts in Northern Europe from 1300-1600. Topic of study may change with each time of offering.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 630 Studies in Italian Renaissance Art 3

Italian art from 1300-1600. Topic of study may change with each time of offering.
 PREREQ: ARTH 211 or ARTH 212.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 635 Studies in Seventeenth-Century Art 3

Baroque art in Europe. Topic of study may change with each time of offering.
 PREREQ: ARTH 214.
 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: ARTH 214 or ARTH 215.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 642 Studies in Nineteenth-Century Art 3

Art in Europe from 1800-1900. Topic of study may change with each time of offering.
 PREREQ: ARTH 315.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 644 Studies in Twentieth-Century Art 3

Art in Europe, with some reference to American art, from 1900 to the present. Topic of study may change with each time of offering.
 PREREQ: ARTH 316.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 646 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 early phases of modern sculpture.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 649 Studies in American Architecture of the Colonial and Early Federal Periods 3

Architecture in the American colonies from the anonymous buildings of the late 17th century to the designs of Thomas Jefferson in the early 19th century. Field trips.
 PREREQ: ARTH 216.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 650 Studies in Nineteenth-Century American Architecture 3

The Greek, Gothic, Egyptian and Oriental "revivals"; and High Victorian Style and its culmination in the "Age of Elegance." Topic of study may change with each time of offering.
 PREREQ: ARTH 216.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 655 Twentieth-Century American Art 3

Major painters, sculptors and architects and the movements with which they were associated. The artist in American culture.
 PREREQ: ARTH 216 or ARTH 316.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 657 Survey of African Art 3

See ANTH 657 for course description.

ARTH 665 Studies in English Art and Architecture 3

The art of England, emphasizing the period from the late Middle Ages through the end of the 19th century. Topic of study may change with each time of offering.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 670 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.
 PREREQ: ARTH 150 or one course in art history since 1400.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 671 Connoisseurship of the Decorative Art in America I 3

See EAMC 671 for course description.

ARTH 672 Connoisseurship of the Decorative Arts in America II 3

See EAMC 672 for course description.

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

See ARTC 680 for course description.

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

See ART 681 for course description.

ARTH 683 Seminar in Nineteenth-Century Photography 3

Aspects of history and aesthetics of 19th-century photography. Topic of study may change with each time of offering.
 PREREQ: ARTH 315 or ARTH 370.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 684 Seminar in Twentieth-Century Photography 3

Aspects of history and aesthetics of 20th-century photography. Topic of study may change with each time of offering.
 PREREQ: ARTH 316 or ARTH 370.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 688 Studio Materials and Techniques of Painting I 3

See ARTC 688 for course description.

ARTH 689 Studio Materials and Techniques of Painting II 3

See ARTC 689 for course description.

ARTH 690 Studio in the Materials and Techniques of Print-making I 3

See ARTC 690 for course description.

ARTH 801 Introduction to Decorative Arts in America to 1850 3

See EAMC 801 for course description.

ARTH 811 Studies in American Painting Before 1800 3

Puritan aesthetic. Colonial American Rococo, and painting in the Early Republic.
 PREREQ: ARTH 320.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 812 Studies in American Painting: 1800-1875 3

Neoclassicism and Romanticism; the grand style, landscape, portraiture and genre painting.
 PREREQ: ARTH 320.
 RESTRICTIONS: May be repeated for credit when topics vary.

ARTH 813 Research Problems in American Architecture Before 1830 3

PREREQ: ARTH 649.

ARTH 814 Research Problems in Nineteenth-Century American Architecture 3

PREREQ: ARTH 650.

ARTH 815 Research Seminar in Ancient Art 3

ARTH 818 Research Seminar in Medieval Art 3

ARTH 821 Research Seminar in Renaissance Art 3

ARTH 838 Research Seminar in Nineteenth- and Twentieth-Century Art 3

ARTH 850 Bibliography and Research Methods in Art History 0 PF

Techniques of scholarly research and bibliographical resources in the historical study of the visual arts.

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 HIST 134 for course description.

BAMS 204 Urban Communities 3

See SOCI 204 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 ARSC 293 for course description.

BAMS 296 Honors Forum 1

See ARSC 296 for course description.

BAMS 298 Race, Ethnicity and Culture 1 PF

See WOMS 298 for course description.

BAMS 304 History of Black America to the Civil War 3

Black historical impact on American life and culture from the beginning to the Civil War. May be cross-listed with HIST 325.

PREREQ: BAMS 110.

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 HIST 326.

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 PHIL 307.

PREREQ: PHIL 201.

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: HIST 205.

BAMS 309 History of Black Nationalism 3

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

PREREQ: BAMS 304 and BAMS 306.

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 ENGL 344 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.

RESTRICTIONS: ARTH 150 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 355 Race, Class and Crime 3

See CRJU 355 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 SOCI 361 for course description.

BAMS 395 Pan Africanism 3

See HIST 395 for course description.

BAMS 415 Race, Class and Gender 3

See SOCI 415 for course description.

BAMS 432 Psychological Perspectives on the Black American 3

See PSYC 416 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: ECON 152.

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: POSC 105.

BAMS 440 Themes 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 are 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: BISC 103.

BISC 115 Human Heredity and Development Laboratory 1

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

COREQ: BISC 105.

BISC 116 Elementary Human Physiology Laboratory 1

Selected experiments in physiology that demonstrate some of the concepts developed in BISC 106, and a study of human anatomy.

COREQ: BISC 106.

BISC 117 Elementary Evolutionary Ecology Laboratory 1

Laboratory exercises to compliment the subject matter of BISC 107.

COREQ: BISC 107.

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: CHEM 101, CHEM 103, CHEM 105, or CHEM 111.

RESTRICTIONS: Non majors may not take both BISC 103 and BISC 207 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, using representatives of the major phyla.

PREREQ: BISC 207.

COREQ: CHEM 102, CHEM 104, CHEM 106, or CHEM 112.

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 and recombinant DNA.

PREREQ: BISC 207 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: BISC 208.

BISC 303 Genetic and Evolutionary Biology 4

The physical and chemical basis of heredity; the nature and mechanisms of gene action; and genes in populations: speciation. Lab included.
PREREQ: BISC 207 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: BISC 207, BISC 208, CHEM 103 and CHEM 104.

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: BISC 208 and two semesters of chemistry.

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: BISC 302.

BISC 314 Brain and Behavior 3

See PSYC 314 for course description.

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: BISC 207 and BISC 208.

BISC 326 Honors: General Physiology Discussion 1

Discussion of selected topics in physiology with emphasis on experimental evidence.
COREQ: BISC 306.

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: BISC 207 and BISC 208.

BISC 365 Studies in Literary Genres, Types and Movements 3

See ENGL 365 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: BISC 207 and BISC 208.

BISC 390 Honors Colloquium 3

See ARSC 390 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: BISC 207 or BISC 208.

BISC 406 Human Physiology 3

Physiology of the basic organ systems of humans.
PREREQ: BISC 207 or BISC 208, and CHEM 101, CHEM 103, CHEM 105 and CHEM 111.

BISC 408 Mammalian Histology 4

Microscopic organization, identification and functional anatomy of mammalian organ systems and tissues.
PREREQ: BISC 207 or BISC 208 plus two additional core courses.

BISC 412 Marine Ecology 4

Advanced treatment of selected topics in marine ecology, laboratory included.
PREREQ: BISC 302 and BISC 324.

BISC 416 Human Anatomy and Physiology Laboratory 1

Laboratory exercises to illustrate basic human anatomy and physiology at the organ system level.
COREQ: BISC 406.

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.

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: BISC 207 or BISC 208.

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 466 Independent Study 1-6

BISC 471 Introductory Immunology 3

The biological significance of adaptive immunity including lymphatic tissues, cells and cellular responses, antigen-antibody interactions and immunopathologies.
PREREQ: BISC 207, BISC 301 or BISC 371, and organic chemistry.

BISC 472 Principles of Infectious Diseases 3

Etiology, pathology, immunology and epidemiology of selected bacterial, viral and parasitic diseases. Classic works on infectious disease read and the impact of disease on human affairs considered.
PREREQ: BISC 371 and organic chemistry.

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: BISC 207 and BISC 208.
COREQ: BISC 493.

RESTRICTIONS: BISC 303 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.
PREREQ: BISC 492.
COREQ: BISC 492.

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: BISC 302.
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: BISC 207 or BISC 208.

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 CISC 498.

PREREQ: BISC 207 and BISC 208 (or two BISC 100-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: BISC 207, BISC 208.

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: BISC 301 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: CHEM 527 or CHEM 642 or BISC 303.

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: BISC 301 and BISC 303, 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: BISC 301 and BISC 653.

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: BISC 306.

BISC 606 Advanced Mammalian Physiology 4

Continuation of BISC 605. Systemic mammalian physiology: respiratory, renal, gastrointestinal, and reproductive systems and metabolism.

PREREQ: BISC 605.

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: BISC 303 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: BISC 306 or BISC 406.

RESTRICTIONS: Biochemistry recommended.

BISC 612 Marine Ecology 4

Selected topics in marine ecology, laboratory included.

PREREQ: BISC 302 or BISC 324.

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 histopathology of diseased tissues. Laboratory utilizes prepared slides, microscope video projection, microfiche and other audiovisual aids for recognition and identification of tissues and lesions. May be cross-listed with ANSC 609.

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 PSYC 626.

PREREQ: BISC 306, BISC 406, PSYC 314, BISC 314, PSYC 310, or PSYC 312.

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 PSYC 627.

PREREQ: BISC 306, BISC 406, PSYC 310, PSYC 312, PSYC 314, or BISC 314.

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: BISC 302.

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: BISC 371.

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: BISC 207, BISC 208 and biochemistry.

RESTRICTIONS: BISC 301 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: BISC 371.

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: BISC 301.

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: BISC 303 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: BISC 303.

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: BISC 306.

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: BISC 306, BISC 406.

BISC 670 Immunobiology Laboratory 1

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

COREQ: BISC 671.

BISC 671 Immunobiology 3

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

PREREQ: BISC 207 and Organic Chemistry.

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: BISC 676.

RESTRICTIONS: Corequisite applies to Biology majors only

BISC 676 Cardiopulmonary Seminar 1

Mammalian cardiopulmonary physiology.

COREQ: BISC 675.

BISC 679 Virology 3

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

PREREQ: BISC 301 or Biochemistry.

BISC 680 Vertebrate Natural History 4

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

PREREQ: BISC 302.

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: BISC 303.

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: BISC 302.

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: BISC 306.

BISC 697 Reproduction Techniques 6

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

PREREQ: BISC 696.

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: BISC 306 or BISC 406.

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: BISC 207 and BISC 208.

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 BUAD 030 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: ECON 151.

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: STAT 202, BUAD 301, and BUAD 230 or BUAD 260 or ACCT 260.

BUAD 303 Special Topics in Marketing 3

Content varies from semester to semester. Topics covered may include such contemporary issues as consumerism and public policy or advanced marketing research.

PREREQ: BUAD 301.

RESTRICTIONS: May be repeated to a maximum of nine credits when topics vary.

BUAD 306 Operations Management 3

Analysis of major problems faced by operations managers at different levels of management. Topics covered include product and process design, design of physical facilities, production and inventory control, and quality control. Application of quantitative models to operations decisions.

PREREQ: MATH 230, STAT 202, and BUAD 230 or BUAD 260 or ACCT 260.

BUAD 307 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 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 310 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: BUAD 309.

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 ECON 341 and/or POSC 341.

PREREQ: ECON 152.

RESTRICTIONS: Counts as a BUAD elective for students receiving a degree in Business Administration. Credit for BUAD/ECON/POSC 341 given only once.

BUAD 346 Analysis of Operations Problems 3

Intensive treatment of topics and techniques covered in BUAD 306 to include conditions of uncertainty and computer-based algorithms and heuristics.

PREREQ: BUAD 306.

BUAD 366 Independent Study 1-6**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: BUAD 309.

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

BUAD 393 Seminar on International Marketing Management 3

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

PREREQ: BUAD 301.

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: BUAD 306.

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

BUAD 420 Industrial Relations 3

Management-labor relationships; personnel management, communications and collective bargaining.

RESTRICTIONS: Not open to students who have taken BUAD 421.

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).

RESTRICTIONS: Not open to students who have taken BUAD 420.

BUAD 428 Management Systems 3

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

PREREQ: BUAD 310.

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: BUAD 428.

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: BUAD 301, BUAD 306, BUAD 309, 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: BUAD 301, BUAD 306, BUAD 309, and FINC311.

BUAD 444 Small Business Management 3

Principles of managing a small business and relevant differences in approach between large and small companies. The commitments of an entrepreneur and the required attitude. Factors in balancing partnerships for talents and personalities. The functions of accounting, finance, marketing, personnel and production forecast for the small business manager.

RESTRICTIONS: Requires Senior status in Business Administration or Accounting.

BUAD 446 Operations Planning and Control 3

Quantitative methods of the design and implementation of systems to manage production and inventories in a variety of organizations. Topics include forecasting, master production planning, master production schedule, inventory management, material requirements planning, and production activity control.

PREREQ: BUAD 306.

BUAD 447 Operations Management Strategy 3

Strategic issues in operations management. Emphasis is on the design and use of quality control systems and development of operations policies.

PREREQ: BUAD 306.

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, manpower planning and control.

PREREQ: BUAD 301.

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: BUAD 301.

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: BUAD 301.

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: BUAD 301.

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: BUAD 301.

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: STAT 555.

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: BUAD 830.

BUAD 863 Special Topics in Operations Management 3

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

PREREQ: BUAD 860.

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: STAT 555.

BUAD 873 Systems Behavior and Implementation 3

Advances student's understanding of the behavior of individuals and the role of information in organizations. Particular emphasis on empirically derived knowledge and its implications in the areas of power, change, conflict and performance in relation to information systems implementation.

PREREQ: BUAD 830 and BUAD 870.

BUAD 874 Special Topics in Administration 3

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

PREREQ: BUAD 873.

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: ECON 152.

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: STAT 555 and BUAD 880.

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: BUAD 880.

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, BUAD 860, BUAD 870 and BUAD 880.

Business and Economics

BUEC 300 Dean's Scholar Seminar 1 PF

Critical investigation and discussion of timely issues beyond those examined in the courses of the College.

RESTRICTIONS: Restricted to Dean's Scholars in the College of Business and Economics or discretion of the instructor.

BUEC 325 Modern Business Computing 3

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

PREREQ: BUAD 260.

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: BUEC 330 and BUEC 325.

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: BUEC 430.

RESTRICTIONS: MI/DSS minors must take BUEC 432 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: BUEC 430.

RESTRICTIONS: MI/DSS minors must take BUEC 431 as a corequisite.

BUEC 466 Independent Study 1-6

Chemical Engineering

CHEG 009 Chemical Engineering Freshman Seminar 0 RP

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

CHEG 112 Introduction to Chemical Engineering 3

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

COREQ: MATH 242.

CHEG 166 Special Problem 1-3

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

CHEG 231 Chemical Engineering Thermodynamics 3

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

PREREQ: CHEG 112.

COREQ: CHEM 443 and MATH 243.

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 CHEG 231. The thermodynamics of mixtures; phase and chemical equilibrium.

PREREQ: CHEG 231.

CHEG 332 Chemical Engineering Kinetics 3

Systematic description of rates of homogeneous and heterogeneous chemical reactions of industrial importance. Application of these principles to analysis and design of chemical reactors.

PREREQ: CHEG 325 and CHEM 444

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: MATH 302 and CHEG 231.

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: CHEG 341.

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: CHEG 325 and CHEG 341.

COREQ: CHEG 342.

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: MATH 302, CHEG 332 and CHEG 443.

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: CHEG 332 and CHEG 443.

COREQ: CHEG 401.

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: CHEG 325 and CHEG 342.

CHEG 445 Chemical Engineering Laboratory II 3

Intensive laboratory experiments illustrate the application of chemical and physical principles to industrial processes. Expands upon CHEG 332 and CHEG 443. Technical report writing emphasized.

PREREQ: CHEG 332, CHEG 342 and CHEG 345.

COREQ: CHEG 443.

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 CHEG 473.

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 MASC 601 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: CHEG 342.

CHEG 603 Polymerization Reaction Engineering 3

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

PREREQ: CHEM 444.

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: CHEG 603.

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: CHEG 341 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: CHEM 331, CHEM 443, CHEM 444 and CHEG 332.

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: CHEG 342.

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 MASC 616.

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: CHEG 332 and CHEG 342.

CHEG 635 Air Pollution and Its Control 3

See CIEG 635 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: CHEG 325 and CHEM 444.

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: CHEG 325 and CHEM 444.

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: CHEG 443 and MATH 302.

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: CHEG 835.

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: CHEM 444.

CHEG 868 Research 1-9**CHEG 869 Master's Thesis 1-6**

Laboratory study of some phase of chemical engineering on which information is lacking, with the goals of contributing new data and theory. Although supervised, work will be independent in nature to encourage the development of initiative.

CHEG 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 MATH 010 or higher mathematics course strongly recommended. Only one course among CHEM 101, CHEM 103, CHEM 105 and CHEM 111 can count toward graduation.

CHEM 102 General Chemistry 4

A continuation of CHEM 101. Includes one three-hour lab per week that is a continuation of the laboratory experience begun in CHEM 101.

PREREQ: CHEM 101.

RESTRICTIONS: Only one course among CHEM 102, CHEM 104 and CHEM 112 can count toward graduation.

CHEM 103 General Chemistry 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: MATH 114 or higher

RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. One year of high school chemistry strongly recommended. Only one course among CHEM 101, CHEM 103, CHEM 105 and CHEM 111 can count toward graduation.

CHEM 104 General Chemistry 4

Continuation of CHEM 103. Includes one three-hour laboratory per week that is a continuation of the laboratory experience begun in CHEM 103.

PREREQ: CHEM 101, CHEM 103 or CHEM 105.

RESTRICTIONS: For majors in the physical and natural sciences, mathematics and engineering. Only one course among CHEM 102, CHEM 104 and CHEM 112 can count toward graduation.

CHEM 105 General Chemistry 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: MATH 010.

RESTRICTIONS: For nursing majors who will continue with CHEM 106. High school algebra required in lieu of Corequisites; one year of high school chemistry recommended. Only one course from among CHEM 101, CHEM 103, CHEM 105 and CHEM 111 can count toward graduation.

CHEM 106 Elementary Bioorganic Chemistry 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: CHEM 105.

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: CHEM 119, and MATH 115 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 CHEM 101, CHEM 103, CHEM 105 and CHEM 111 can count toward graduation.

CHEM 112 General Chemistry 3

A continuation of CHEM 111.

PREREQ: CHEM 103 or CHEM 111.

COREQ: CHEM 120.

RESTRICTIONS: For chemistry and chemical engineering students. Only one course among CHEM 102, CHEM 104 and CHEM 112 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: CHEM 111 and MATH 115.

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: CHEM 104 or CHEM 111.

COREQ: CHEM 112.

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: CHEM 102 or CHEM 104 or CHEM 105.

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: CHEM 213.

CHEM 216 Elementary Biochemistry Laboratory 1

Principal classes of biomolecules and their metabolic interrelationships.

PREREQ: CHEM 213.

COREQ: CHEM 214.

CHEM 220 Quantitative Analysis 3

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

PREREQ: CHEM 102, CHEM 104 or CHEM 105.

COREQ: CHEM 221.

CHEM 221 Quantitative Analysis Laboratory 1

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

PREREQ: CHEM 102, CHEM 104 or CHEM 105.

COREQ: CHEM 220.

CHEM 266 Special Problem 1-3 PF

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: MATH 242 and CHEM 120 or CHEM 220 and CHEM 221.

CHEM 321 Organic Chemistry 3

First half of a two-semester survey of organic compounds and their reactions.

PREREQ: CHEM 104.

COREQ: CHEM 325.

RESTRICTIONS: Not for B.S. credit in chemistry. CHEM 321 and CHEM 331 cannot both be counted toward graduation.

CHEM 322 Organic Chemistry 3

Second half of a two-semester survey of organic compounds and their reactions.

PREREQ: CHEM 321.

COREQ: CHEM 326.

RESTRICTIONS: Not for B.S. credit in chemistry. CHEM 322 and CHEM 332 cannot both be counted toward graduation.

CHEM 325 Organic Chemistry Laboratory 1

Introduction to basic laboratory techniques of organic chemistry.

COREQ: CHEM 321.

RESTRICTIONS: Not for B.S. credit. CHEM 325 and CHEM 333 cannot both be counted toward graduation.

CHEM 326 Organic Chemistry Laboratory 1

Introduction to basic laboratory techniques of organic chemistry.

PREREQ: CHEM 325.

COREQ: CHEM 322.

RESTRICTIONS: Not for B.S. credit

CHEM 331 Organic Chemistry 3

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

PREREQ: CHEM 104, CHEM 112 or CHEM 120.

COREQ: CHEM 333.

RESTRICTIONS: For chemistry and chemical engineering majors and any other students desiring fuller treatment than in CHEM 321. CHEM 321 and CHEM 331 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: CHEM 331.

COREQ: CHEM 334.

RESTRICTIONS: For chemistry and chemical engineering majors and any other students desiring fuller treatment than in CHEM 322. CHEM 322 and CHEM 332 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: CHEM 104, or preferably CHEM 112, or CHEM 120.

COREQ: CHEM 331.

RESTRICTIONS: Registration for two credits involves both a lecture period and a laboratory period each week. CHEM 325 and CHEM 333 cannot both be counted toward graduation.

CHEM 334 Organic Chemistry Majors Laboratory II 2

Continuation of CHEM 333. Two lab periods each week.

PREREQ: CHEM 333.

COREQ: CHEM 332.

RESTRICTIONS: CHEM 326 and CHEM 334 cannot both be counted toward graduation.

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: CHEM 331.

CHEM 350 Chemistry in a Foreign Language 1 PF

Chemical topics, generally of an introductory nature, presented in a foreign language.
PREREQ: CHEM 103 and CHEM 104.

RESTRICTIONS: CHEM 111 and CHEM 112 recommended. Requires proficiency at the intermediate, 107 or higher, level in language of the term. 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 CHEM 443-444. 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 (MATH 221 and MATH 222 or MATH 241).

RESTRICTIONS: Course acceptable for B.A. but not B.S. degree in chemistry. CHEM 418 and CHEM 443 cannot both be counted toward graduation.

CHEM 419 Introductory Physical Chemistry 3

Continuation of CHEM 418.

PREREQ: CHEM 418.

RESTRICTIONS: CHEM 419 and CHEM 444 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: CHEM 322 or CHEM 332.

COREQ: CHEM 418 or CHEM 443

CHEM 438 Instrumental Methods Laboratory 1

Application of spectroscopic, chromatographic and electroanalytical techniques to the solution of chemical problems.

PREREQ: CHEM 326 or CHEM 334.

COREQ: CHEM 445.

CHEM 443 Physical Chemistry 3

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

PREREQ: CHEM 120 or CHEM 220 and CHEM 221, MATH 242 (MATH 243 recommended), PHYS 208 (recommended) or PHYS 202.

RESTRICTIONS: CHEM 418 and CHEM 443 cannot both be counted toward graduation.

CHEM 444 Physical Chemistry 3

Continuation of CHEM 443

PREREQ: CHEM 120 or CHEM 220 and CHEM 221, MATH 242 (MATH 243 recommended), PHYS 208 (recommended) and PHYS 202.

RESTRICTIONS: CHEM 419 and CHEM 444 cannot both be counted toward graduation.

CHEM 445 Physical Chemistry Laboratory 1

Physical methods for studying properties of matter.

PREREQ: CHEM 120 or CHEM 220 and CHEM 221.

RESTRICTIONS: To be taken concurrently with or subsequent to CHEM 443 and CHEM 444, or CHEM 418 or CHEM 419.

CHEM 446 Physical Chemistry Laboratory 1

Continuation of CHEM 445

PREREQ: CHEM 120 or CHEM 220 and CHEM 221.

CHEM 457 Inorganic Chemistry 3

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

PREREQ: CHEM 418 or CHEM 443, and CHEM 112.

CHEM 458 Inorganic Chemistry Laboratory 1

Laboratory synthesis and characterization of inorganic and organometallic compounds and independent study.

COREQ: CHEM 457.

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: CHEM 322 or CHEM 332.

RESTRICTIONS: For undergraduate majors in biology and chemistry, graduate students in agriculture, biology, nutrition, marine sciences and engineering not using biochemistry professionally. Not for credit by chemistry majors. BISC 103 or BISC 207 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 non-linear optics; photon counting; Fourier transformation; and topics from the current literature.

PREREQ: CHEM 437 and CHEM 438.

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: CHEM 437 and CHEM 438.

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: CHEM 437.

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. CHEM 624 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: CHEM 332.

CHEM 634 Advanced Organic Chemistry: Synthesis and Reactivity 3

Reactions of organic compounds, with emphasis on synthetic methods.

PREREQ: CHEM 332.

CHEM 641 Biochemistry 3

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

PREREQ: CHEM 322 or CHEM 332.

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: CHEM 641.

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: CHEM 642.

CHEM 644 Mechanisms of Enzyme Catalysis 3

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

PREREQ: CHEM 641.

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: CHEM 641.

CHEM 647 Biochemical Evolution 3

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

PREREQ: CHEM 642 or CHEM 527.

CHEM 648 Membrane Biochemistry 3

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

PREREQ: CHEM 527 or CHEM 641.

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: CHEM 641.

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: CHEM 444 and CHEM 457.

CHEM 652 Physical Methods in Inorganic Chemistry 3

Physical methods, e.g., electronic, vibrational and nuclear resonance spectroscopic techniques; structure and bonding in inorganic compounds. Introduction to the principles of symmetry and group theory.

PREREQ: CHEM 444 and CHEM 457.

CHEM 654 Advanced Inorganic Chemistry II 3

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

PREREQ: CHEM 444 and CHEM 457.

CHEM 655 Marine Inorganic Chemistry 3

See MAST 850 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: CHEM 444.

CHEM 672 Spectroscopy 3

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

PREREQ: CHEM 671.

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: CHEM 444.

CHEM 677 Chemical Thermodynamics 3

The elements of classical and statistical thermodynamics and their application to chemical problems.

PREREQ: CHEM 443.

CHEM 820 Special Topics in Analytical Chemistry 1-3

Advanced topics in analytical methods and techniques from the current literature.

PREREQ: CHEM 620, CHEM 621, CHEM 622 or CHEM 623.

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: CHEM 634.

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: CHEM 641.

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: CHEM 651.

RESTRICTIONS: May be repeated for credit when topics vary.

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: CHIN 105.

CHIN 107 Chinese III - Intermediate 4

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

PREREQ: CHIN 106.

RESTRICTIONS: Satisfies the Arts and Science foreign language requirement.

Civil Engineering

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: MATH 243.

CIEG 212 Strength of Materials 3

Principles of mechanics for rigid and deformable bodies, including relationships between stress and strain, plastic and elastic deformations. Emphasis on materials (and members) typical of civil engineering structures: metals, concrete and timber.

PREREQ: CIEG 211.

COREQ: CIEG 213.

CIEG 213 Materials Laboratory 1

Experiments in mechanics of materials, complementing the content of CIEG 212. Emphasis on behavior of steel, aluminum, concrete and timber in civil engineering systems.

COREQ: CIEG 212.

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: MATH 115, MATH 221 or MATH 241.

CIEG 301 Analysis of Structures 4

Design procedures and criteria. Moment, shear and axial force diagrams of statically determinate structures. Displacement, stress and stability analyses of structures using differential equations and the slope deflection method. Energy methods.

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: PHYS 207 and MATH 243.

CIEG 331 Introduction to Environmental Engineering 3

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

PREREQ: CHEM 103 and MATH 242.

CIEG 351 Transportation Engineering 3

Design of highways, railways, airports, waterways and pipelines, with consideration of their functions as a mode of transportation.

RESTRICTIONS: Requires junior status in 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: MATH 302.

CIEG 401 Computer Methods of Structural Analysis 3

Presentation of the fundamental principles of structural analysis formulated in the language of matrix algebra. Consideration of efficient means for analysis of complex structures, with reference to digital computer programs. Introduction to the finite element method of analysis for problems in structural mechanics.

PREREQ: CIEG 301 and CIEG 381.

CIEG 402 Steel Design 3

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

PREREQ: CIEG 301.

CIEG 403 Concrete Design 3

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

PREREQ: CIEG 301.

CIEG 404 Structural Engineering 3

Structural design with consideration of modern materials, structural form and function, and construction methods with emphasis on prestressed concrete. Selected special topics.

PREREQ: CIEG 403.

CIEG 414 Structural Dynamics Design 3

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

PREREQ: CIEG 311 and MATH 302.

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: CIEG 311 and MATH 302.

CIEG 417 Advanced Structural Analyses 3

Nonlinear vs linear beam analyses. Nonlinear beam equations, including temperature effects. Composite cross-sections. Solutions for structures subjected to mechanical and thermal loads. Analysis of problems that partially separate from base. Generalized functions. Method of initial parameters for solution of structural problems. Influence line method.

CIEG 418 Continuously Supported Structures 3

Analytical properties of various foundation models for describing the base response. Stress analysis of continuously supported beams and plates: rails in railroad track, concrete highway and airport pavements, floating ice plates, and foundation problems. Dynamic response and buckling of continuously supported structures. Geophysics problems.

PREREQ: CIEG 301.

CIEG 420 Soil Mechanics 4

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

PREREQ: CIEG 212 and MECH 305.

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: CIEG 420.

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.

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: CIEG 331 and MECH 305.

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.

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: MECH 305.

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: MECH 305.

CIEG 452 Transportation Facilities Design 3

Planning and design of transportation facilities for highways, intersections, traffic signals, parking, pedestrians, stations, modal interchanges, vehicle maintenance and downtown circulation systems.

PREREQ: CIEG 351.

CIEG 453 Traffic Engineering 3

Driver, vehicle, pedestrian characteristics; studies and the statistical treatment of data; accidents; roadway and intersection capacity; control devices and procedures; parking; and administration.

PREREQ: CIEG 351.

CIEG 454 Urban Transportation Planning 3

Urban travel demand characteristics, urban transportation modes and characteristics, planning process, urban travel demand forecast models, evaluation of modes, economic analysis, transportation financing, transportation policy and transportation systems management.

PREREQ: CIEG 351.

CIEG 459 Railroad Engineering 3

Evolution of railroad tracks for freight and rapid transit. Tie systems. Fasteners. Track stress analysis. Axial forces in the rails. Track buckling, rail pull apart, and preventive measures. Response of tracks to moving trains. Films on track maintenance and construction.

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: MECH 305.

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 Structural Model Analysis 3

Models for structural analysis and design in soil, concrete and metal. Determination of force and stress distribution, influence lines and limit behavior. Measurement techniques include photoelasticity, moiré and electric strain gauges.

CIEG 614 Structural Dynamics Design 3

Design of structures for dynamic loadings. Structures include buildings, bridges, dams, foundations piles and offshore platforms. Dynamic loadings include severe wind force, ocean wave force, strong earthquake excitations, machine vibrations and general impulse and time dependent forces and motions. Emphasis on determination of realistic dynamic loadings, on approximate design and on understanding 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 MEEG 626.

PREREQ: CIEG 311 and MATH 302.

CIEG 617 Advanced Structural Analyses 3

Nonlinear vs linear beam analyses. Nonlinear beam equations, including temperature effects. Composite cross-sections. Solutions for structures subjected to mechanical and thermal loads. Analysis of problems that partially separate from base. Generalized functions. Method of initial parameters for solution of structural problems. Influence line method.

CIEG 618 Continuously Supported Structures 3

Analytical properties of various foundation models for describing the base response. Stress analysis of continuously supported beams and plates: rails in railroad track, concrete highway and airport pavements, floating ice plates, foundation problems. Dynamic response and buckling of continuously supported structures. Geophysics problems.

PREREQ: CIEG 301.

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.

CIEG 623 Soil Mechanics Lab 3

Enhances knowledge of soil properties and behavior via a project. 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.

CIEG 632 Chemical Aspects of Environmental Engineering 3

Provides for the understanding of the chemical interactions in environmental systems and in laboratory analyses necessary to characterize properly the environmental interactions. Includes standard environmental engineering laboratory tests and lecture material as appropriate.

PREREQ: CIEG 331.

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 CHEG 635.

RESTRICTIONS: Requires upper division or graduate standing in engineering.

CIEG 636 Biological Aspects of Environmental Engineering 3

Application of biological and engineering concepts to wastewater treatment and water quality control.

PREREQ: CIEG 331.

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: MECH 305.

CIEG 650 Urban Transportation Systems 3

Planning, design and operation of urban transportation systems: network, right-of-way types, vehicle design, vehicle dynamic characteristics and motion, capacity scheduling, station, modal interface, capital and operating cost, and maintenance. Emphasis on public transportation modes. May be cross-listed with ORES 650.

RESTRICTIONS: Requires permission of instructor.

CIEG 652 Transportation Facility Design 3

Planning and design of transportation facilities; highways, intersections, traffic signal design, parking facilities, pedestrian facilities, stations, modal interchange facilities, vehicle maintenance facilities and downtown circulation systems.

RESTRICTIONS: Requires permission of instructor.

CIEG 654 Urban Transportation Planning 3

Urban travel demand characteristics, urban transportation modes and characteristics, planning process, urban travel demand forecast models, evaluation of modes, economic analysis transportation financing, transportation policy and transportation systems management.

RESTRICTIONS: Requires permission of instructor.

CIEG 659 Railroad Engineering 3

Evolution of railroad tracks for freight and rapid transit. Tie systems, fasteners, track stress analysis, axial forces in the rails, track buckling, rail pull apart and preventive measures. Response of tracks to moving trains. Films on track maintenance and construction.

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: MECH 305.

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: MECH 305.

CIEG 678 Transport and Mixing Processes 3

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

PREREQ: CIEG 672.

CIEG 679 Sediment Transport Mechanics 3

Mechanics and mathematical modeling 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: MECH 305.

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

Wave and wind-induced flows in the nearshore zone. Longshore and rip currents, edge waves and circulation cells. Current coupling with the bottom and beach sediments as affecting beach cusp and bar formation.

PREREQ: CIEG 672 and CIEG 639.

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 811 Structural Theory and Design 3

Application of limit design and elastic design procedures to continuous beams and frames, slabs, statically indeterminate trusses, arches, etc. Attention to the basis of and limitations of codes and specifications. Emphasis on steel structures.

CIEG 812 Structural Theory and Design 3

Application of limit design and elastic design procedures to continuous beams and frames, slabs, statically indeterminate trusses, arches, etc. Attention to the basis of and limitations of codes and specifications. Emphasis on reinforced and pre-stressed concrete.

CIEG 814 Advanced Structural Analysis 3

Study of classical and modern techniques for analysis of structural systems and elements: pre-stressed indeterminate structures; superposition of solutions in Green's functions; members curved in space; matrix transforms; cable suspension structures; slope deflection equations; application of difference equations to structural lattices; programming for use of digital computers; relaxation methods; and systems with time dependent loads.

PREREQ: CIEG 403.

CIEG 816 Advanced Structural Dynamics 3

Dynamic analysis of structural elements and systems leading to information useful in the design of buildings and structures subject to earthquakes, air blast and wind loads; bridges under strong impact loads and structural installations subject to ground-transmitted explosive waves. Analytic topics: matrix formulation of structural systems, model analysis, wave propagation, characterization of random excitation and response for linear systems.

PREREQ: CIEG 415.

CIEG 817 Stability of Structures 3

Structural instability phenomena caused by static and dynamic loads. Stability analyses of structures based on equilibrium method, energy method and dynamic methods. Conservative and non-conservative problems. Analysis of 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: MATH 302 and a course in Strength of Materials.

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: CIEG 632 and CIEG 634.

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: CIEG 636.

CIEG 842 Design of Water and Wastewater Treatment Systems 3

Criteria for the design of water and wastewater treatment systems, including equipment, units, plants, etc.

COREQ: CIEG 831 and CIEG 832.

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: CIEG 672 and CIEG 639.

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: CIEG 639, CIEG 672.

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.

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: CISC 100, CISC 105, CISC 106, CISC 180, EGGG 125 or BUAD 230.

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.

PREREQ: CISC 105.

RESTRICTIONS: Programming experience (BASIC, PASCAL or FORTRAN) acceptable in lieu of Prerequisite.

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: CISC 180.

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: CISC 105.

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: CISC 181.

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: CISC 181.

RESTRICTIONS: CISC 220 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: CISC 105 and MATH 243.

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; use of these techniques for constructing good programs.

PREREQ: CISC 220.

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: CISC 310 and MATH 315.

CISC 355 Computers, Ethics and Society 3

See CSCC 355 for course description.

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: ELEG 202 and CISC 260.

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: CISC 260.

RESTRICTIONS: CISC 360 recommended as a Prerequisite.

CISC 366 Independent Study 1-6

CISC 410 Introduction to Numerical Analysis and Algorithmic Computation 3

See MATH 426 for course description.

CISC 411 Algorithmic and Numerical Solution of Differential Equations 3

See MATH 428 for course description.

CISC 466 Independent Study 1-6

CISC 471 Compiler Design 3

Design and implementation of compilers. Use of automated compiler generation tools.

PREREQ: CISC 320.

RESTRICTIONS: CISC 260 recommended as a Prerequisite.

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: CISC 310.

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: CISC 310.

CISC 609 Topics in Theoretical Computer Science 3

Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC 601.

CISC 620 Seminumeric Computer Algorithms 3

Classical algorithms for multi-precision integer and polynomial arithmetic.
PREREQ: CISC 220 and MATH 315.

CISC 621 Algorithm Design and Analysis 3

Families of algorithms: sorting, graph, algebraic. Divide and conquer, greedy method, algebraic simplification and transformation, order analysis.
PREREQ: CISC 320 and MATH 315.

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 MATH 613.

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: MATH 243 and CISC 220.

RESTRICTIONS: MATH 302 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: CISC 220.

RESTRICTIONS: CISC 360 and CISC 361 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.
PREREQ: CISC 620.

CISC 633 Introduction to Computer Instruction 3

See EDST 633 for course description.

CISC 635 Advanced Computer-Based Programming 3

See EDST 635 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: CISC 220 and CISC 310.

CISC 640 Computer Graphics 3

Computer graphics technology, 2- and 3-dimensional systems, graphics software systems, modelling and object hierarchy, and animation.
PREREQ: CISC 410; CISC 320 or CISC 621.

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: CISC 360; CISC 361 or CISC 663.

CISC 659 Topics in Communications, Distributed Computing and Networks 3

Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC 650.

CISC 662 Computer Systems: Architecture 3

Recent advances in computer architecture and their impact on architectural design. Multicomputer and multiprocessor architectures. Parallel machines.
PREREQ: CISC 360.

CISC 663 Operating Systems 3

Comparison and analysis of strategies for the management of memory, processors, I/O devices and file systems.
PREREQ: CISC 260.

RESTRICTIONS: Not open to students with credit for CISC 361.

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: CISC 310.

RESTRICTIONS: CISC 320 is recommended as a Prerequisite.

CISC 672 Theory of Translators 3

Inference problems and compiler tools. Structural inference, attribute inference. Language/compiler specification and implementation for a special purpose language.
PREREQ: CISC 310.

RESTRICTIONS: Not open to students with credit for CISC 471.

CISC 679 Topics in Architecture and Software Systems 3

Contents will vary to coincide with the interests of students and current faculty.
PREREQ: CISC 662 and CISC 663.

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: CISC 220 and CISC 310.

CISC 689 Topics: Artificial Intelligence 3

Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC 681.

CISC 809 Advanced Topics in Theoretical Computer Science 3

Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC 601.

CISC 829 Advanced Topics in Scientific and Algebraic Computation 3

Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC 620.

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: CISC 360.

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: CISC 650.

CISC 854 Local Area Networks 3

LAN protocols, topologies, transmission media, standards, design and selection, management and current research.
PREREQ: CISC 650.

CISC 859 Advanced Topics in Communications, Distributed Computing Networks 3

Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC 650.

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: CISC 662 or CISC 663.

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: CISC 681.

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: CISC 681.

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: CISC 681 and CISC 882.

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: CISC 681.

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: CISC 681.

CISC 889 Advanced Topics in Artificial Intelligence 3

Contents vary to coincide with the interests of students and current faculty.
PREREQ: CISC 681.

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 ENGL 202 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 ENGL 211.

PREREQ: ENGL 110.

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 ENGL 212.

PREREQ: ENGL 110.

CMLT 217 Introduction to Film 3

See ENGL 217 for course description.

CMLT 218 Introduction to Drama 3

See ENGL 208 for course description.

CMLT 219 Introduction to the Novel 3

See ENGL 209 for course description.

CMLT 293 Honors Short Course 1

See ARSC 293 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 FLLT 311.

PREREQ: ENGL 110.

CMLT 312 Twentieth-Century Literature II 3

Major writers since World War II. Non-English language works in translation. May be cross-listed with FLLT 312.

PREREQ: ENGL 110.

CMLT 314 Introduction to Folklore and Folklife 3

See ENGL 314 for course description.

CMLT 316 Classical Mythology 3

See FLLT 316 for course description.

CMLT 317 Film History 3

See ENGL 317 for course description.

CMLT 318 Studies in Film 3

See ENGL 318 for course description.

CMLT 320 Varying Authors and Genres 3

See FLLT 320 for course description.

CMLT 321 Introduction to Medieval Literature 3

See ENGL 321 for course description.

CMLT 322 Topics: Classical Literature in Translation 3

See FLLT 322 for course description.

CMLT 330 Varying Authors, Themes and Movements 3

See FLLT 330 for course description.

CMLT 341 Theatre/Drama: Classic/Medieval 3

See THEA 341 for course description.

CMLT 342 Theatre/Drama: Renaissance-1700 3

See THEA 342 for course description.

CMLT 343 Theatre/Drama: 1700 to 1900 3

See THEA 343 for course description.

CMLT 344 Theatre/Drama: 1900 to Present 3

See THEA 344 for course description.

CMLT 360 Humanities Colloquium 3

See ARSC 360 for course description.

CMLT 365 Studies in Literary Genres, Types and Movements 3

See ENGL 365 for course description.

CMLT 366 Independent Study 1-3**CMLT 390 Honors Colloquium 3**

See ARSC 390 for course description.

CMLT 460 Humanities Colloquium 3

See ARSC 460 for course description.

CMLT 465 Studies in Literature Genres, Types and Movements 3

See ENGL 365 for course description.

CMLT 466 Independent Study 1-3

CMLT 480 Seminar 3

See ENGL 480 for course description.

CMLT 484 Literary Criticism and Theory 3

See ENGL 484 for course description.

CMLT 660 Humanities Colloquium 3

See ARSC 660 for course description.

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 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: COMM 256.

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: ENGL 307 and COMM 245.

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: COMM 309.

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 360 Oral Interpretation of Literature 3

Analysis of prose, poetry and dramatic literature. Experimentation with techniques used to interpret literature orally. Development of communication skills through group and individual readings.

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: COMM 245.

COMM 366 Independent Study 1-3

COMM 370 Theories of Mass Communication 3

An examination of the foundations and development of theories of mass communication. Specific areas of study include media, society and the individual, media violence, cultivation theory, personal influence, social learning theory, diffusion theory and general media effects.

PREREQ: COMM 245.

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: COMM 325.

COMM 409 Public Relations 3

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

PREREQ: COMM 309.

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: COMM 309.

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-TV regulations, public policy, etc.

PREREQ: COMM 245.

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 abroad 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: COMM 245.

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.

PREREQ: COMM 325.

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.

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: COMM 245.

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-TV regulations, public policy, etc.

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 and the administration of justice. Examines criminal activity, the police, the courts and corrections, as well as selected problems 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 1950's through the 1980's that contributed to the increased usage 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 1980s. 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 a rehabilitation program.

CRJU 303 Juvenile Delinquency 3

See SOCI 303 for course description.

CRJU 304 Criminology 3

See SOCI 304 for course description.

CRJU 313 The Study of Murder 3

A 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: CRJU 110.

CRJU 330 Population, Law and Society 3

See SOCI 330 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 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 SOCI 345 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 PSYC 346.

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; meetings with judges, prosecutors and defense attorneys.

COREQ: PSYC 347.

RESTRICTIONS: Requires permission of instructor.

CRJU 348 Theories of Social Work Practice 3

See SOCI 348 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 WOMS 350.

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 BAMS 355.

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 include basic administrative policy, budgetary matters and how to best work within a governmental bureaucracy are sample topics.

PREREQ: CRJU 110.

CRJU 425 Criminal Law and Social Policy 3

Probes the ways in which the criminal law affects a wide range of social groups: ethnic minorities, the poor, the affluent, men, women, students, consumers, laborers, soldiers and others.

CRJU 428 Corporate Crime 3

See SOCI 428 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 448 Community-Based Treatment 3

See SOCI 448 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 GEOG 441 and/or SOCI 455.

CRJU 456 Lawyers and Society 3

See SOCI 456 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 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: SOCI 301.

CRJU 495 Field Experience in Criminal Justice 4 PF

Practicum involving actual field experience in a criminal agency; e.g., law enforcement, courts or correctional agencies. Emphasis on relating the field experience to academic work. May be cross-listed with SOCI 495.

RESTRICTIONS: Requires permission of instructor.

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. Stresses preparing student to make own medical and obstetrical decisions and to critically evaluate claims concerning male/female differences. May be cross-listed with WOMS 233.

CSCC 241 Ethical and Moral Dimensions of 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 PHIL 241.

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 ANTH 242 and/or SOCI 242.

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 ANTH 223 and/or SOCI 243.

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 PHIL 245.

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 PHIL 246.

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 PHIL 250 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. May be cross-listed with ANTH 271.

CSCC 310 Sociology of Health Care 3

See SOCI 310 for course description.

CSCC 311 Hospitals 3

See SOCI 311 for course description.

CSCC 330 Varying Authors, Themes and Movements 3

See FLIT 330 for course description.

CSCC 341 Ethics of Engineering Profession 1

See PHIL 341 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 CISC 355 and/or SOCI 355.

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 ENGL 365 for course description.

CSCC 366 Independent Study 1-6

CSCC 368 Literature and Science 3

See ENGL 368 for course description.

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 PHIL 206.

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 ENGL 369.

CSCC 382 History of Western Medicine 3

Social and cultural forces that have influenced the development of modern medicine. May be cross-listed with HIST 382.

PREREQ: HIST 101 and HIST 102.

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 HIST 385.

CSCC 389 Topics in Women and Health Issues 3

See WOMS 389 for course description.

CSCC 411 Seminar in American History 3

See HIST 411 for course description.

CSCC 444 Medical Ethics 3

See PHIL 444 for course description.

CSCC 498 Topics in Biology 3

See BISC 498 for course description.

CSCC 647 Philosophy of Technology 3

See PHIL 647 for course description.

CSCC 807 Ethics and Health Care 3

See NURS 807 for course description.

Early American Culture

EAMC 601 American Social Environment: 1607-1850 3

Study of community and domestic life; regional and ethnic varieties; development of a national ideology. Critical examination of the major historiographical issues of methodology and interpretation. Introduction to basic quantification techniques and to primary visual and documentary sources. May be cross-listed with HIST 691.

RESTRICTIONS: Requires permission of instructor.

EAMC 602 Domestic Furnishings and Furniture in America: 1640-1740 3

Introduction to American domestic environments and decorative arts within the social and economic context of the 17th and early 18th centuries. Critically assesses current methodological and theoretical approaches to the study of material life. Intensive work with Winterthur collections.

RESTRICTIONS: Requires permission of instructor.

EAMC 603 Domestic Furnishings and Furniture in America: 1740-1840 3

Introduction to American domestic environments and decorative arts within the social and economic context of the 18th and early 19th centuries. Critically assesses current methodological and theoretical approaches to the study of material life. Intensive work with Winterthur collections.

RESTRICTIONS: Requires permission of instructor.

EAMC 604 Method and Theory, Nineteenth-Century Furniture 3

Emphasis on mass-produced furniture from 1850-1900. 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; and exploration of critical interpretive issues and strategies.

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 HIST 605 and/or MSST 605.

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. May be cross-listed with ARTH 671.

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. May be cross-listed with ARTH 672.

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. The collections of the Winterthur Museum. May be cross-listed with ARTH 801.

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 ECON 151 or ECON 152.

ECON 151 Introduction to Microeconomics 3

Supply and demand concepts introduced with basic graphical tools of economic analysis. Models of perfect and imperfect competition used to examine the determination of product price and quantities. Current microeconomic issues such as the effect of government regulation and environmental problems examined.

COREQ: MATH 114 or MATH 115.

ECON 152 Introduction to Macroeconomics 3

Topics analyzed include the determinants of unemployment, inflation and national income. Also analyzes policy issues relating to how the government can alter unemployment and inflation through control of government spending, taxes and the money supply. Special topics include wage and price controls, and international trade.

PREREQ: ECON 151.

ECON 251 Managerial Economics 3

Applications of 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: ECON 151 and STAT 201.

RESTRICTIONS: Credit cannot be earned for both ECON 300, ECON 301 and ECON 251.

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: ECON 151.

RESTRICTIONS: Credit cannot be earned for both ECON 330, ECON 301 and ECON 251.

ECON 301 Quantitative Microeconomic Theory 3

Price determination and income distribution in a market economy; and the behavior of firms and industry under conditions of pure and imperfect competition.

PREREQ: ECON 151 and MATH 221.

RESTRICTIONS: Credit cannot be earned for both ECON 300, ECON 301 and ECON 251.

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: ECON 152.

ECON 303 Intermediate Macroeconomic Theory 3

Determinants of national income and employment; theoretical problem of short-run fluctuations and secular growth.

PREREQ: ECON 302.

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: ECON 151.

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 POSC 306.

PREREQ: ECON 151 and POSC 105.

ECON 311 Economic Growth and Development Policy 3

A survey of policy issues related to economic growth and development. Special emphasis on problems of developing countries.

PREREQ: ECON 151 and ECON 152.

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: ECON 152.

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: ECON 151.

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: ECON 151.

ECON 340 International Economic Relations 3

Theory, problems and policy in international trade and finance with emphasis on developments since World War II.

PREREQ: ECON 151 and ECON 152.

ECON 341 Environment of Multinational Corporations 3

See BUAD 341 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: ECON 151.

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: ECON 151.

ECON 366 Independent Study 1-6

ECON 381 Economics of Human Resources 3

Introduction to the economic analysis of labor markets and of the family. Topics include labor supply and demand, human capital, labor market discrimination, the distribution of income and theories of fertility and family structure. Public policy applications stressed.

PREREQ: ECON 151.

ECON 393 Urban Economics 3

Economic problems and issues affecting modern urban society.

PREREQ: ECON 151.

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 the economics of trade, money and welfare.

PREREQ: ECON 300 or ECON 301.

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 the cases studied.

PREREQ: ECON 300 or ECON 301, and MATH 230.

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: ECON 300 or ECON 301, and MATH 221 and STAT 202.

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: ECON 300 or ECON 301.

ECON 411 Economics of Growth and Development 3

Theoretical and empirical analysis of economic models of growth and development. Emphasis on the use of economic analysis to evaluate public policies in underdeveloped countries.

PREREQ: ECON 300 or ECON 301, and ECON 303.

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: ECON 151, ECON 152 and STAT 202.

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. Also examines reasons for the slow recovery.

PREREQ: ECON 303.

ECON 422 Introduction to Econometrics 3

Use of statistical methods, especially multiple regression, to quantify economic models, including situations when the assumptions of classical statistics do not hold.

PREREQ: MATH 221, STAT 202 and ECON 152.

ECON 423 Econometric Applications 3

Class discussion and research in advanced economic statistics and applied econometrics.

PREREQ: ECON 422.

ECON 426 Introduction to Mathematical Economics 3

Use of 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: ECON 300 or ECON 301, and MATH 221.

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: ECON 303.

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 crisis, environmental problems, the negative income tax, urban financial problems and burdens of the national debt.

PREREQ: ECON 300 or ECON 301.

ECON 443 International Monetary Economics 3

Application of macroeconomic theory in an international context. Uses historical cases to analyze policy making under fixed and flexible exchange rate regimes. Develops alternative models of exchange rate dynamics. Problems and proposed reforms of the international monetary system discussed.

PREREQ: ECON 300 or ECON 301, and ECON 303.

ECON 461 Industrial Organization and Antitrust Policy 3

Description and theoretical analysis of markets in terms of structure, methods of competition and social performance, particularly oligopolistic and differential competition. Stresses entrepreneurship; innovation; and government competition policy, particularly antitrust.

PREREQ: ECON 300 or ECON 301, and STAT 202 and MATH 221.

ECON 463 The Economics of Regulation 3

Government regulation of industry with analysis of its economic rationale, pricing issues, firm incentives and multiproduct natural monopolies. Also discusses the positive theory of regulation and industry studies, with emphasis on efficiency and regulatory reform.

PREREQ: ECON 300 or ECON 301, and MATH 221.

ECON 466 Independent Study 1-6**ECON 475 Economics of Natural Resources 3**

Study of the allocation of natural resources of modern economies. Application of economic theory to the problem of misallocations caused by open-access, common property and multiple use, under both free and controlled economies.

PREREQ: ECON 300 or ECON 301.

ECON 477 Benefit-Cost Analysis 3

Study of the proper way to plan, undertake and interpret a benefit-cost analysis. Emphasis on 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: ECON 300 or ECON 301.

ECON 483 Labor Economics 3

Analysis and application of economic models relating to such labor market topics as sex and race discrimination, determination of wages and fringe benefits, labor unions, individual and firm investments in education and training, geographical mobility, labor supply (including welfare programs) and professional sports.

PREREQ: ECON 300 or ECON 301.

ECON 551 Managerial Economics 3

Applied microeconomic theory for the manager. Moderately rigorous development and analysis of models of consumer and firm behavior especially under conditions of constraint, uncertainty and market imperfection. Emphasis on the concepts and methods of economics having significance for decision making in the business community.

PREREQ: MATH 221.

ECON 552 Macroeconomic Environment of the Firm 3

Macroeconomic analysis. Concerned with understanding the forces that determine the level and composition of spending the income in the United States economy. Topics covered include monetary, fiscal and debt management policies of the United States and the role of the United States in the world economy.

ECON 668 Research 1-3**ECON 670 Applied Policy Analysis 3**

See MAST 672 for course description.

ECON 671 Microeconomics for Economic Education 3

Concept of supply and demand, theory of price determination in perfectly and imperfectly competitive markets and role of government in the economy. Emphasis on applications to economic issues such as regulation of industry, antitrust policy, problems of the environment and taxation.

RESTRICTIONS: Enrollment in Master of Instruction in Economic Education required.

ECON 672 Macroeconomics for Economic Education 3

Topics include national income accounting, theory of income determination, monetary and fiscal policies, budget deficits and surpluses, national debt.

RESTRICTIONS: Enrollment in Master of Instruction in Economic Education required.

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: Enrollment in Master of Instruction in Economic Education required.

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: Enrollment in Master of Instruction in Economic Education required.

ECON 675 Economics of Natural Resources 3

See MAST 675 for course description.

ECON 676 Environmental Economics 3

See MAST 676 for course description.

ECON 678 Monetary and International Trade Theories for Economic Education 3

How international trade affects the economy; theory and policy of free trade vs. protectionism; international cartels; international balance of trade and payments; economic role of the financial sector; and determinants of money supply/ monetary policy.

RESTRICTIONS: Enrollment in Master of Instruction in Economic Education required.

ECON 679 Contemporary Issues for Economic Education 3

Emphasis on microeconomic and/or macroeconomic analysis of contemporary economic issues, problems and controversies.

RESTRICTIONS: Enrollment in Master of Instruction in Economic Education required.

ECON 801 Microeconomic Theory 3

An intensive treatment of consumer behavior and market demand, production, costs and the theory of the firm; market structures and competition in open and closed markets under a variety of constraints and property rights; and general equilibrium theory and welfare economics.

ECON 802 Macroeconomic Theory 3

Key macroeconomic variables such as income, employment and the price level; the behavior of these variables within both the neoclassical and income-expenditure framework; fiscal and monetary policy implications of these alternative theoretical approaches.

ECON 815 Managerial Forecasting 3

Advanced treatment of several quantitative methods commonly used in forecasting within a business and economics environment including both casual and time series techniques. Emphasis on use and evaluation of techniques rather than their mathematical derivation. Microeconomic and macroeconomic theory is integrated with statistical techniques to provide meaningful forecasts of series such as prices, sales, inventories and costs.

PREREQ: STAT 202 or STAT 555.

ECON 822 Econometric Theory 3

Application and modification of statistical techniques to economic data; presentation of the essentials of econometric theory.

PREREQ: STAT 201.

ECON 823 Seminar in Econometrics 3

Class discussion and research in advanced economic statistics and applied econometrics.

PREREQ: ECON 822.

ECON 827 Advanced Production Economics 3

See FREC 827 for course description.

ECON 841 International Trade and Development 3

Covers such topics as the basis of exchange, trade policy, international factor movements and integration. Applications will focus on historical and current cases of economic development.

PREREQ: ECON 300 or ECON 301, or ECON 801.

ECON 842 International Finance and Development 3

Continuation of ECON 841. Covers such topics as foreign exchange market, balance of payments, exchange rate systems and international economic policy.

PREREQ: ECON 802 or ECON 303.

ECON 861 Industrial Organization and Antitrust Policies 3

Theoretical analysis and empirical description of 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; and discussion of government policies to promote competition, particularly antitrust.

PREREQ: ECON 300, ECON 301 or ECON 551.

ECON 868 Research 1-9

ECON 869 Master's Thesis 1-6

ECON 875 Advanced Fishery Economics 3

See MAST 875 for course description.

ECON 877 Advanced Benefit-Cost Analysis 3

Concentrates on the problems associated with the identification and measurement of the economic benefits and costs of both market and non-market activities. Emphasis on the application of benefit-cost principles to real istic problems.

PREREQ: ECON 801 or ECON 551.

COREQ: ECON 801 or ECON 551.

ECON 890 Colloquium: Economics Seminar Series 3

Regularly scheduled lectures by faculty and visiting researchers providing exposure to current research in economics.

ECON 894 Applied Regional Modeling 3

Quantitative methods for analyzing and forecasting regional economic phenomena are examined and applied. Methods include regional export base, shift-share, input-output and econometric models. Forecasting and policy simulations are emphasized.

PREREQ: ECON 822

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: EDDV 220.

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: EDDV 220, IFST 222 and IFST 224.

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, 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 6. Includes Practicum in developmental reading instruction.

PREREQ: EDDV 220.

RESTRICTIONS: For elementary education majors.

EDDV 322 Reading in Content Areas 3

Provides a framework for developing content area objectives through instructional attention to text readability, vocabulary development, levels of comprehension, patterns of organization, reasoning, prediction, assessment, questioning, classroom management and other reading strategies focused on pupil-text interaction.

PREREQ: EDDV 220.

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: MATH 252.

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: MATH 251, MATH 221, and MATH 230.

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: HIST 102, HIST 205 or HIST 206 GEOG 102, GEOG 120 or GEOG 203.

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 Workshop 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: EDDV 307 and EDDV 320.

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 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 base 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: EDDV 620.

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: EDDV 620 or EDDV 621, and EDDV 626.

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: EDDV 620 or EDDV 621.

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: EDDV 625.

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: EDDV 626.

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: EDDV 626.

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: EDDV 634 or MATH 252.

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: EDDV 634 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 649 Outdoor Experiential Education for Teachers and Recreators 3

See PHED 644 for course description.

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 PSYC 665.

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 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 685 School and Community Development 3

A consideration of the impact that school and community have on each other; the basis of desirable interrelationships between school and community. An action program, in keeping with the interests and needs of participants and their communities, should be the final outcome of the work.

EDDV 688 Human Relations for Administrators 3

Development of interpersonal skills for leadership roles through study and structured experiences in verbal and nonverbal communication, public relations, personal effectiveness, values, group dynamics, conference techniques, conflict and stress management and leadership training.

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 693 Supervision: Principles and Practices 3

Consideration is given to the functions of the teacher in the modern school, the role of leadership in improved teaching, organization for in-service study, morale among faculty members and techniques for making progress in improving the educational program.

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 695 Cases and Concepts in Education Administration 3

The treatment of cases in administration designed to involve the student in analysis of administrative situations. The exploration of concepts relevant to administrative development.

EDDV 696 Curriculum Design for School Administrators 3

Presents the school administrator's perspective on curriculum design and development.

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.

EDDV 804 Interrelationships Between Reading, Writing and Oral Language 3

Addresses current theory and research on the nature of reading and writing processes and the structure of written texts. Interrelationships between reading and writing explored by investigating cognitive and linguistic strategies employed by young readers and writers during their transactions with narrative and expository texts.

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.

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: EDDV 620 and EDDV 621.

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.

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 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 882 Qualitative Research and Evaluation Designs in Educational Settings 3

Considers a variety of descriptive, nonexperimental research and evaluation designs that are appropriate for investigating questions in educational settings. Theoretical bases for using these design, procedures of implementation and data analysis, and issues of reliability, validity and generalizability also discussed.

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 885 School Business Management 3

A study of the financial and business aspects of school administration.

EDDV 886 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 887 Personnel Management in Education 3

Focuses on the economic, political, legal, cultural, technological and human aspects of personnel administration policies, procedures, process and evaluative measures relative to selection, training, management, personnel security, registration and other personnel functions.

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 managerial ideologies, Weberian and neo-Weberian theory, behavioral theory, organizational networks and processes of organizational development.

RESTRICTIONS: Open to students in Educational Leadership Doctoral Program

EDDV 895 School Improvement Strategies 3

Focuses on philosophies of change, assessing the need for change in an educational setting, the educational leader as an agent of change and an analysis of numerous approaches that have been successful in improving instructional programs.

RESTRICTIONS: Open 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 PSYC 202.

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 Philosophy of Education 3

See PHIL 242 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. May be cross-listed with SOCI 258.

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 HIST 290 and/or WOMS 290.

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 PSYC 304.

EDST 305 Educational Psychology - Cognitive Aspects 3

Focuses on student learning (memory, learning, problem solving, transfer, 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 PSYC 305.

EDST 340 Philosophical Foundations of Education 3

Study of the philosophical assumptions underlying the policies and practices of contemporary American education; guided practice in using philosophical theory in solving professional problems; emphasis on building a personal philosophy of education.

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 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 area 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 LING 462 and/or PSYC 462.

EDST 465 Model OAS 3

See POSC 465 for course description.

EDST 466 Independent Study 1-6**EDST 469 Research Project/Internship 3-9**

Research and/or field experience under supervision.

EDST 475 Senior Seminar in Education 3

Opportunity to present and/or defend EDST 469 research or internship activities and place these activities in the broader context of educational study.

PREREQ: EDST 469.

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 LING 476.

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 ENGL 477 and/or LING 477.

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: EDST 521.

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: EDST 522.

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 621 Human Services Management 3

Methods of organizing a systematic community mental health system (including schools as primary prevention agencies) are explored. The DSM-III, crisis counseling, consultation, referral skills and issues in counseling minorities are discussed. Program development, accountability, ethical, legal and professional concerns are reviewed.

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: EDST 607.

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 CISC 633.

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 CISC 635.

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; construction of a personal philosophy of education.

RESTRICTIONS: Not open to students with credit in EDST 340.

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 647 History of Education in American Culture 3

Historical foundations upon which to base judgements about American education.

EDST 653 Vocational Psychology and Career Counseling 3

Examines theories of vocational development and career choice. Sources of occupational and educational information are reviewed and approaches to career counseling are demonstrated and critiqued. Attention given to the needs of special populations such as minorities, handicapped students and women.

EDST 654 Counseling Theory and Interviewing 3

A survey of the major theories of counseling focusing on affective, cognitive and behavioral fields. Significance of theories for interviewing practice is emphasized.

EDST 655 Approaches to Family Counseling 3

Surveys the major approaches to family counseling including Structural (Minuchin), Systems (Bowen), Strategic and Paradoxical (Haley; the Milan School), and Experiential-Humanistic (Satir).

PREREQ: EDST 654, EDST 663 and EDST 658.

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 658 Group Counseling Practices 3

Surveys the process and theories of group counseling. Stresses strategies for leading process groups, support groups, structured groups and group guidance activities in high schools, middle schools and elementary schools.

PREREQ: EDST 654 and EDST 663.

EDST 659 Advanced Counseling Techniques 3

Focuses on therapeutic procedures applied to treatment of problems faced by children, adolescents and families. Topics include divorce, substance abuse, depression, eating disorders and child abuse.

PREREQ: EDST 654 and EDST 663.

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 661 Professional Seminar I 1

Professional and research concerns related to counseling are examined.

EDST 663 Counseling Skills Lab for Counselors and Psychologists 3 PF

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: EDST 654.

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: EDST 618, EDST 653, EDST 654, EDST 658, EDST 660, EDST 663 and EDST 668.

COREQ: EDST 618, EDST 653, EDST 654, EDST 658, EDST 660, EDST 663 and EDST 668.

RESTRICTIONS: Requires contractual arrangement with University and on-site supervisor.

EDST 670 Internship in School Psychology 6-12

Supervised, on-the-job experience in school psychology. Clinical experience in the areas of mental retardations, learning disabilities, social and emotional maladjustment and other areas of exceptionality in the schools. At least one-half of internship based in school settings.

RESTRICTIONS: Requires permission of instructor.

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, phonology). Main emphasis on how children in the first three years acquire language. May be cross-listed with LING 675 and/or PSYC 675.

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 LING 676.

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 ENGL 677 and/or LING 677.

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, behavior disorders. Emphasis on the grouping of theories in such a way as to de-emphasize a categorical position in special education.

PREREQ: EDST 230 or EDST 697.

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: EDST 230 or EDST 697.

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: EDST 681.

COREQ: EDST 607.

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 of selection of curriculum and methodology for use with gifted and talented children. Practicum experiences included.

PREREQ: EDST 679.

EDST 684 Educational Diagnosis II 3

Continuation of EDST 680 Educational Diagnosis. Tests used by teachers and educational diagnosticians with exceptional children; the latest aptitude, achievement and speciality 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: EDST 680.

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 PSYC 692.

EDST 697 Education of Exceptional Children 3

The philosophical and research bases for education of exceptional children. Analysis of past and present pedagogical practices. Systematic observation of various special education situations.

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 PSYC 817.

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, and models for schooling.

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 PSYC 804 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 EDST 875, 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 LING 848.

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 PSYC 845.

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 857 Practicum in Agency Counseling 1-3

Supervised counseling experience in an agency setting. Individual, group and/or family counseling, assessing, consulting, case reporting and/or research skills are practiced.

PREREQ: EDST 654 and EDST 633.

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 EDST 861. 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, discriminate analysis and multivariate analysis of variance. Emphasis on applications and the use of computer packages.

PREREQ: EDST 861.

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: EDST 678, EDST 679, EDST 680 and EDST 681.

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: EDST 607, EDST 678, EDST 679, EDST 680, EDST 681 and EDST 682.

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 125 Introduction to Engineering 2-3

Elementary engineering problems, design and FORTRAN valuable to the student beginning an engineering program.

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: MATH 241.

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: MATH 302.

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: MATH 243, CISC 106.

RESTRICTIONS: Requires knowledge of FORTRAN.

Engineering Technology

EGTE 103 Land and Water Management 2

Rainfall, runoff, erosion control, water quality, irrigation and drainage.

COREQ: EGTE 113.

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: EGTE 109.

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: EGTE 111.

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, bill 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: EGTE 209.

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: MATH 222 or MATH 242.

EGTE 317 Statistical Quality Control 3

Using statistics for quality control in processing and manufacturing. Fundamentals of statistics, sampling and probability, control charts, reliability, quality costs, product liability, computers and quality control.

PREREQ: MATH 221 and EGTE 111.

EGTE 321 Storm Water Management 4

Hydrology for small (urban/suburban/rural) watersheds. Fundamentals of open channel hydraulics; design of culverts, spillways, vegetated waterways and detention basins.

PREREQ: EGTE 111 and EGTE 218.

EGTE 328 Agricultural Waste Management Systems 3

Properties of agricultural wastes, treatment techniques, waste systems and their management.

PREREQ: CHEM 104.

EGTE 335 Power and Machinery Management I 4

Fundamentals of operation, economic performance and selection of power and machinery units used in agricultural crop production with special emphasis on management.

PREREQ: EGTE 218.

COREQ: EGTE 311.

EGTE 336 Power and Machinery Management II 4

Continuation of EGTE 335.

PREREQ: EGTE 335.

EGTE 344 Electronics and Microprocessors 3

Basic electronic principles and components, logic elements, number systems, A/D and D/A converters, digital arithmetic, counters and multiplexers, memories, machine and assembly language programming, assemblers, I/O operations, interrupts, bus structures, data transmission, interfacing and peripheral devices.

PREREQ: EGTE 244.

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

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, breakeven 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: EGTE 311.

RESTRICTIONS: Only offered in Winter Session.

EGTE 423 Irrigation and Drainage 3

Soil-plant-water relationships, evapotranspiration, theory and design of sprinkler and drip irrigation systems and theory and design of surface and subsurface drainage systems.

PREREQ: PLSC 204 and EGTE 323.

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: EGTE 218 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: EGTE 111.

EGTE 441 Engineering Aspects of Agricultural Processes 4

Equipment and methods in agricultural processing, material handling, crop drying, process analysis and plant layout.

PREREQ: EGTE 218 and EGTE 311.

EGTE 443 Instrumentation 3

Selection, operating principles and application of physical and chemical devices for indicating, recording and controlling laboratory and field conditions or processes.

PREREQ: PHYS 202.

EGTE 454 Rural and Light Industrial Buildings 4

Orientation, design factors, materials and construction of rural and light industrial structures.

PREREQ: EGTE 111 and EGTE 209.

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: EGTE 311.

EGTE 466 Independent Study 1**EGTE 618 Comparative Vertebrate Histology 0-0**

See BISC 618 for course description.

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: MATH 242.

ELEG 205 Linear Circuit Theory I 4

Laws of the electric circuit, analysis of DC and AC circuits, network equations and network theorems.

PREREQ: MATH 242 and PHYS 207.

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: ELEG 210.

ELEG 220 Microprocessor-Based Systems I 2

Introduction to small computing machines, architecture organization and programming.

PREREQ: ELEG 211 and CISC 181.

ELEG 221 Microprocessor-Based Systems II 2

Extension of the concepts of ELEG 220 with emphasis on I/O, interrupt systems and interfacing.

PREREQ: ELEG 220.

ELEG 302 Material 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: CHEM 103, MATH 243 and PHYS 208.

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: ELEG 205 and MATH 342.

ELEG 306 Signal Processing II 4

Continues topics introduced in ELEG 305 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: ELEG 305.

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: ELEG 205.

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: ELEG 305.

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: ELEG 309.

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: PHYS 208 and MATH 302.

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: PHYS 208, MATH 342 and ELEG 205.

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: ELEG 221.

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: PHYS 208, ELEG 302, MATH 342 and ELEG 309.

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, digital carrier modulation.

PREREQ: ELEG 306 and ELEG 310.

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: ELEG 320.

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: ELEG 320.

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: ELEG 320.

ELEG 417 Feedback Control Systems 3

Analysis of servomechanisms and other closed loop systems.

PREREQ: ELEG 305

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: ELEG 312.

ELEG 422 Digital System Design II 3

Advanced microprocessor architecture, bus structures and I/O control.

PREREQ: ELEG 323.

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: ELEG 309 and ELEG 320.

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: ELEG 417.

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 ELEG 340 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 MASC 623.

PREREQ: ELEG 320 and ELEG 340.

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: ELEG 305.

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 MAST 633.

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 MAST 640.

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: ELEG 640.

ELEG 650 Semiconductor Device Design and Fabrication 3

Instruction in design and fabrication of simple bi-polar and MOS integrated circuits. Specific topics include semiconductor device and integrated circuit design, photolithographic mask design and fabrication, photolithography, N-diffusion and P-diffusion, P-MOS, metallization, and device and integrated circuit testing.

PREREQ: ELEG 340.

ELEG 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: ELEG 221 and ELEG 340.

ELEG 681 Remote Sensing of Environment 3

See MAST 681 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; 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: ELEG 320 and ELEG 340.

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: ELEG 320 and ELEG 340.

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 ENGL 110. 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 200 Approaches to Literature 3

Dual emphasis on reading and writing. Offers an introduction to poetry, fiction and drama, and provides for extensive practice in writing about literary subjects. PREREQ: ENGL 110.

ENGL 202 Biblical and Classical Literature 3

Influential epic, dramatic and lyric literature from Biblical and Greco-Roman cultures. May be cross-listed with CMLT 202 and/or FLLT 202.

PREREQ: ENGL 110.

ENGL 204 Great American Writers 3

Representative masterworks of the 19th and 20th centuries.

PREREQ: ENGL 110.

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: ENGL 110.

ENGL 206 Great English Writers II 3

Poetry and prose by great writers of English literature from the 18th through the 20th centuries.

PREREQ: ENGL 110.

ENGL 207 Introduction to Poetry 3

Representative masterworks of English, American and world verse.

PREREQ: ENGL 110.

ENGL 208 Introduction to Drama 3

Representative masterworks from the classical era to the present. May be cross-listed with CMLT 218.

PREREQ: ENGL 110.

ENGL 209 Introduction to the Novel 3

Representative masterworks of fiction, emphasizing those of Europe and America. May be cross-listed with CMLT 219.

PREREQ: ENGL 110.

ENGL 210 Short Story 3

Study of the short story as a narrative form, with readings from American and foreign short story traditions.

PREREQ: ENGL 110.

RESTRICTIONS: Not for major credit.

ENGL 211 Great Writers of the Western World I: 1100-1700 3

See CMLT 207 for course description.

ENGL 212 Great Writers of the Western World II: 1650-1950 3

See CMLT 208 for course description.

ENGL 214 Literature and Gender 3

Specific concepts of gender in society, as manifested in the literature of writers of both sexes. May be cross-listed with WOMS 214.

PREREQ: ENGL 110.

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 CMLT 217.

PREREQ: ENGL 110.

ENGL 260 Humanities Colloquium 3

See ARSC 260 for description.

PREREQ: ENGL 110.

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: ENGL 202, ENGL 205 and ENGL 206.

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: ENGL 110.

RESTRICTIONS: Not for major credit.

ENGL 302 Advanced Composition 3

Expository writing in a variety of forms, with emphasis on literary analysis.

PREREQ: ENGL 110.

ENGL 304 Poetry Writing 3

Practice in writing a variety of verse forms.

PREREQ: ENGL 110.

RESTRICTIONS: Final enrollment set after first class and submission of student portfolios.

ENGL 305 Fiction Writing 3

Practice in writing the short story.

PREREQ: ENGL 110.

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: ENGL 110.

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 ENGL 307 with reporting and writing experience on the student newspaper.

PREREQ: ENGL 307.

RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 309 Feature and Magazine Writing 3

All aspects of the newspaper feature article: developing ideas, doing research, interviewing and writing. Also some attention to magazine feature writing and marketing feature articles.

PREREQ: ENGL 307.

RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 310 Copy Editing and Layout 3

Newspaper copy editing, headline writing and layout, with emphasis on practical experience. Explores improvement or updating of news stories by rewriting.

PREREQ: ENGL 307.

RESTRICTIONS: Counts toward English major only as part of journalism concentration.

ENGL 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: ENGL 110.

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: ENGL 110.

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 AMST 314 and/or CMLT 314.

PREREQ: ENGL 110.

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: ENGL 110.

ENGL 316 Peer Tutoring/Advanced Composition 3

See ARSC 316 for course description.

ENGL 317 Film History 3

Chronological survey of world film history. In odd-numbered years, ENGL 317 deals with American films; in even-numbered years, with foreign films. Both terms may be taken for credit. May be cross-listed with CMLT 317.

PREREQ: ENGL 110.

ENGL 318 Studies in Film 3

Special topics such as film genres, major directors and Soviet cinema. Variable content. May be cross-listed with CMLT 318 and/or WOMS 318.

PREREQ: ENGL 110.

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 CMLT 321.

PREREQ: ENGL 110.

ENGL 322 Chaucer 3

Troilus and Criseyde, The Canterbury Tales (in part), and some of the shorter poems.

PREREQ: ENGL 110.

ENGL 324 Shakespeare 3

Representative histories, comedies and tragedies.

PREREQ: ENGL 110.

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: ENGL 110.

ENGL 326 Seventeenth-Century Prose and Poetry 3

History of poetry and prose exclusive of Milton.

PREREQ: ENGL 110.

ENGL 327 English Bible 3

The King James version as literature.

PREREQ: ENGL 110.

ENGL 328 Milton 3

Study of Paradise Lost and selected other poetry and prose by this author.

PREREQ: ENGL 110.

ENGL 331 The Age of Satire 3

Dryden, Pope, Swift and their contemporaries.

PREREQ: ENGL 110.

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: ENGL 110.

ENGL 335 The Later Romantics 3

Poetry and prose of Byron, Shelley, Keats and their associates.

PREREQ: ENGL 110.

ENGL 336 Victorian Poetry 3

Tennyson, Browning, Arnold and their contemporaries.

PREREQ: ENGL 110.

ENGL 337 Victorian Prose 3

Carlyle, Ruskin, Arnold and their contemporaries.

PREREQ: ENGL 110.

ENGL 338 Victorian Fiction 3

Focuses on important novels of the nineteenth century in Britain. Authors include Dickens, the Brontes, Eliot, Hardy and their contemporaries.

PREREQ: ENGL 110.

ENGL 339 Twentieth-Century British Literature 3

PREREQ: ENGL 110.

ENGL 340 American Literature to the Civil War 3

PREREQ: ENGL 110.

ENGL 341 American Literature: Civil War to World War II 3

PREREQ: ENGL 110.

ENGL 342 American Literature Since World War II 3

PREREQ: ENGL 110.

ENGL 343 Cultural Issues in American Literature 3

See AMST 343 for course description.

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 AMST 344 and/or BAMS 313.

PREREQ: ENGL 110.

ENGL 345 Black American Literature II 3

Literature by Black American writers from the Harlem renaissance to the present. May be cross-listed with AMST 345.

PREREQ: ENGL 110.

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: ENGL 110.

ENGL 355 King Arthur in Literature 3

Study of the historical background and literary treatments of Arthurian characters and themes in English literature.

PREREQ: ENGL 110.

ENGL 360 Humanities Colloquium 3

See ARSC 360 for course description.

ENGL 365 Studies in Literary Genres, Types and Movements 3

Particular areas or writers to be announced. May be cross-listed with BISC 365, CMLT 365 and/or CSCC 365.

PREREQ: ENGL 110.

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 AMST 368 and/or CSCC 368.

PREREQ: ENGL 110.

ENGL 369 Literature and Medicine 3

See CSCC 369 for course description.

ENGL 380 Women Writers 3

Works of English and American women writers such as Emily Dickinson, Jane Austen, the Brontës, George Eliot, Virginia Woolf and Gwendolyn Brooks. May be cross-listed with WOMS 380.

PREREQ: ENGL 110.

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 WOMS 381.

PREREQ: ENGL 110.

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 WOMS 382.

PREREQ: ENGL 110.

RESTRICTIONS: May be repeated once for credit when topics vary.

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: ENGL 110.

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 LING 390.

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 AMST 398 and/or HIST 398.

PREREQ: ENGL 110.

ENGL 404 Poetry Writing Workshop 3

PREREQ: ENGL 304.

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: ENGL 305.

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: ENGL 307.

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: ENGL 307.

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: ENGL 110.

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: ENGL 312 or ENGL 410.

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: ENGL 411.

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: ENGL 312 or ENGL 410.

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: ENGL 312 or ENGL 410.

ENGL 417 Film Theory and Criticism 3

Specialized course emphasizing methods of film criticism and survey of major theories of film.

PREREQ: ENGL 110.

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: ENGL 110.

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: ENGL 110.

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; the Puritan Rebellion. Variable content.

PREREQ: ENGL 110.

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: ENGL 110.

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: ENGL 110.

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: ENGL 110.

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. May be cross-listed with AMST 441.

PREREQ: ENGL 110.

RESTRICTIONS: May be repeated once for credit when topics vary.

ENGL 460 Humanities Colloquium 3

See ARSC 460 for description.

PREREQ: ENGL 110.

ENGL 464 Internship in Business/Technical Writing 3 PF

Student 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: ENGL 312 or ENGL 410.

ENGL 465 Studies in Literature Genres, Types and Movements 3

Particular areas or writers to be announced. May be cross-listed with CMLT 465 and/or WOMS 465.

PREREQ: ENGL 110.

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: ENGL 110.

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: ENGL 110.

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: ENGL 110.

RESTRICTIONS: May be repeated for credit when topics vary.

ENGL 477 The Structure of English 3

See EDST 477 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 AMST 480 and/or CMLT 480.

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: ENGL 110.

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 CMLT 484.

PREREQ: ENGL 300.

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: ENGL 110.

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: ENGL 110.

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 EDST 677 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 LING 801.

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 LING 803.

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 LING 890 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 BISC 302.

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; 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 ENTO 214. Bee identification and culture; hive management. Work with bees in an apiary to develop confidence in keeping bee colonies.

PREREQ: ENTO 214.

COREQ: ENTO 214.

ENTO 300 Principles of Animal and Plant Genetics 3

See PLSC 300 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: ENTO 205.

COREQ: ENTO 205.

ENTO 310 Animal and Plant Genetics Laboratory 1

See PLSC 310 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: BISC 302, BISC 321 or ENTO 201.

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: ENTO 305.

ENTO 406 Insect Identification - Taxonomy 3

Lecture and laboratory course in the collection, preservation and classification of common insect families.

PREREQ: ENTO 305.

ENTO 408 Field Taxonomy 2

The collection, classification, preservation and curation of insects. An insect collection is required.

PREREQ: ENTO 406.

COREQ: ENTO 406.

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: ENTO 105 or ENTO 205.

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: ENTO 205.

ENTO 418 Avian Biology 2

Birds as adaptive complexes. Anatomy, physiology and behavior associated with feeding, thermoregulation, flight, migration, communication and reproduction.

PREREQ: BISC 208.

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: ANSC 134 or BISC 207, and BISC 208.

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 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: ENTO 305.

ENTO 602 Larval Taxonomy 3

Lecture-laboratory course treating the collection, preservation and classification of the immature stages of common holometabolous insect families.

PREREQ: ENTO 305.

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: ENTO 305.

ENTO 606 Insect Identification - Taxonomy 3

Lecture and laboratory course in the collection, preservation and classification of common insect families.

PREREQ: ENTO 305.

ENTO 608 Field Taxonomy 2

The collection, classification, preservation and curation of insects. An insect collection is required.

PREREQ: ENTO 606.

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. Consideration given to diagnostic recognition, control and habits of major economic pest species.

PREREQ: ENTO 205.

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: ENTO 305.

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: BISC 302 and ENTO 305, or BISC 637.

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: BISC 302.

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: BISC 208

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: ENTO 305

ENTO 620 Insect Ethology 3

Advanced treatment of selected topics in the ecology of insect behavior. Original research project required.

PREREQ: BISC 302 and ENTO 406 or ENTO 606

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: ANSC 134 or BISC 207, and BISC 208.

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: ENTO 305

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 MS and PhD 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: ACCT 208.

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: FINC 311.

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: FINC 311.

RESTRICTIONS: Used only as FINC 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: FINC 311.

FINC 412 The American Financial System 3

Analysis of financial institutions and economic impact of changing money flows upon the savings-investment process.

PREREQ: FINC 311 and ECON 302.

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.

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 FINC 412.

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: ECON 302 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 FINC 407.

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 FINC 412.

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: ACCT 551.

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: FINC 850.

FINC 852 Portfolio Management 3

Examines techniques of security analysis; theory and practice of portfolio management.

PREREQ: FINC 850.

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: FINC 850.

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: FLLT 105.

FLLT 107 Modern Language III - Intermediate 4

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

PREREQ: FLLT 106.

RESTRICTIONS: Satisfies the foreign language requirement.

FLLT 202 Biblical and Classical Literature 3

See ENGL 202 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 CMLT 316.

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 Troubadors (Women in Medieval Literature); and the European Postwar Novel. May be cross-listed with CMLT 320.

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 CMLT 322.

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 WOMS 324.

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 WOMS 325.

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 WOMS 326.

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 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 CMLT 330, CSCC 330 and/or WOMS 330.

RESTRICTIONS: May be repeated for credit when topics vary.

FLLT 360 Humanities Colloquium 3

See ARSC 360 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 LING 403 for course description.

FLLT 460 Humanities Colloquium 3

See ARSC 460 for description.

FLLT 466 Independent Study 1-6**FLLT 620 Interactive Language Teaching 3**

See LING 620 for course description.

FLLT 660 Humanities Colloquium 3

See ARSC 660 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: FOSC 211.

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: FOSC 201.

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 ANSC 301 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 ANSC 305.

PREREQ: FOSC 201, FOSC 211 and CHEM 213.

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 ANSC 306.

COREQ: FOSC 305.

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 ANSC 409.

PREREQ: FOSC 428.

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 ANSC 410.

PREREQ: FOSC 409 and FOSC 428.

FOSC 415 Food Processing Engineering Technology I 4

Engineering fundamentals of successful handling and treatment of food materials, including applied thermodynamics, fluid flow and heat transfer principles; examples drawn from non-Newtonian systems characterizing food materials.

PREREQ: MATH 222 and PHYS 201.

RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 416 Food Processing Engineering Technology II 4

Selected unit operations of importance to the food processing industry including evaporation, dehydration, distillation, etc. Emphasis on the role that properties of food take in constraining the application of classical unit operations analyses.

PREREQ: FOSC 415.

RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 428 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. May be cross-listed with ANSC 428.

PREREQ: CHEM 214 and CHEM 321.

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 ANSC 429.

PREREQ: CHEM 216.

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: BISC 371.

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: BISC 371 or FOSC 439.

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: FOSC 609 and FOSC 628.

FOSC 615 Food Processing Engineering Technology I 4

Engineering fundamentals of successful handling and treatment of food materials, including applied thermodynamics, fluid flow and heat transfer principles; examples drawn from non-Newtonian systems characterizing food materials.

PREREQ: MATH 222 and PHYS 201.

RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

FOSC 616 Food Processing Engineering Technology II 4

Selected unit operations of importance to the food processing industry including evaporation, dehydration, distillation, etc. Emphasizes the role that properties of food take in constraining the application of classical unit operation analyses.

PREREQ: FOSC 615.

RESTRICTIONS: Not open to majors in mechanical or chemical engineering.

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: CHEM 321 and CHEM 214.

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: CHEM 216.

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 ANSC 639.

PREREQ: BISC 371.

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: BISC 371 or FOSC 439.

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 688 Research 1-6**FOSC 689 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; evaluation of alternative capital investments.

PREREQ: FREC 235.

COREQ: FREC 120 and FREC 235.

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 nonbusiness and nonaccounting 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: MATH 115; and FREC 120 or ECON 151.

FREC 270 Biotech: Science and Socioeconomic Issues 3

See ANSC 270 for course description.

FREC 302 Management of Agribusiness Firms 3

Principles and practical problems of firm management (decision-making) and planning.

PREREQ: FREC 120 or ECON 151.

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: FREC 120 and FREC 201 or ACCT 207.

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: FREC 120 or ECON 151.

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 various programs on producers, consumers and taxpayers.

PREREQ: FREC 120 or ECON 151.

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: FREC 120 or ECON 151.

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: FREC 120 or ECON 151.

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: FREC 201 or ACCT 207 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: FREC 120 or ECON 151.

FREC 435 Microcomputer Use in Agricultural Economics 3

Microcomputer systems and their use and application in contemporary agricultural economics problems.

PREREQ: FREC 235.

FREC 441 Futures Markets in Agriculture 4

Analysis of commodity futures contracts, cash and futures price relationships, hedging and speculative theory.

PREREQ: FREC 404.

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: FREC 120 or ECON 151.

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: FREC 408.

FREC 630 Computer Use in Agriculture and Biology 3

Coding of data, selection and use of computer programs for data analysis, and interpretation of results.

PREREQ: Statistics course.

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: FREC 608.

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 ORES 806.

PREREQ: FREC 608.

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 ORES 810.

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 ECON 827 and/or ORES 827.

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 ORES 834.

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: FREC 101 or FREN 105.

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: FREN 105.

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: FREN 106.

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: FREN 102 or FREN 106.

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: FREN 111.

RESTRICTIONS: Four years of high school French acceptable in lieu of Prereq. Course satisfies Arts and Science foreign language requirement.

FREN 201 French Reading and Composition: Short Story 3

Reading and discussion of French short story. Frequent compositions. Grammar review where appropriate.

PREREQ: FREN 107 or FREN 112.

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: FREN 107 or FREN 112.

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: FREN 107 or FREN 112 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: FREN 107 or FREN 112.

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: FREN 107 or FREN 112.

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: FREN 201 or FREN 202.

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: FREN 201 or FREN 202.

FREN 303 Intensive French Composition 3

Exercises and practice in composing correct and idiomatic French. May be taken in conjunction with FREN 301 or FREN 302.

PREREQ: FREN 202.

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: French course at the 200 level.

FREN 305 Advanced French Conversation 3

Focuses on current issues and is based primarily on French video cassettes.

PREREQ: FREN 205 or any 300-level course.

RESTRICTIONS: Requires a grade of B for Prereq: FREN 205.

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 200-level French course.

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 200-level French course.

RESTRICTIONS: Course taught in French.

FREN 312 French Civilization III 3

Culture, customs and political and economic life in France since 1945.

PREREQ: Any 200-level French course.

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 200-level French course.

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: FREN 202 or FREN 302.

FREN 402 Advanced French Composition 3

PREREQ: FREN 202 or FREN 302.

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: FREN 401 or FREN 402.

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: FREN 301 and FREN 302.

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: FREN 301 and FREN 302.

FREN 423 French Medieval Literature 3

Survey of French literature to 1500.

PREREQ: FREN 302.

FREN 424 French Renaissance Literature 3

Selected works by Rabelais, the poets of the Pleiade, Montaigne and others.

PREREQ: FREN 302.

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: FREN 302.

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: FREN 302.

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: FREN 302.

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: FREN 302.

FREN 445 Nineteenth-Century French Novel 3

The novel from Romanticism to Naturalism. Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.
PREREQ: FREN 302.

FREN 446 Nineteenth-Century French Poetry and Theatre 3

Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.
PREREQ: FREN 302.

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: FREN 302.

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, Jacottet and Barthes.
PREREQ: FREN 302.

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 460 Selected Authors, Works & Themes 0-0

Seminar on the works of one or more outstanding authors or of a special theme.

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 Chénier.

FREN 645 Nineteenth-Century French Novel 3

The novel from Romanticism to Naturalism. Chateaubriand, Balzac, Stendhal, Flaubert, Zola and others.

FREN 646 Nineteenth-Century French Poetry and Theatre 3

Poets and dramatists representative of Romanticism, Realism and the Symbolist movement.

FREN 651 Twentieth-Century French Literature: The Age of Anxiety and the Absurd 3

Main trends from Gide, Celine and Malraux to Camus and Beckett, including Surrealism, Existentialism and the Theater of the Absurd.

FREN 652 Aspects of Contemporary French Literature 3

A study of contemporary French literature, including novels, plays, essays and poetry of such authors as Robbe-Grillet, Sarraute, Perec, Tournier, Duras, Ponge, Bonnefoy, 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

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

General introduction to the field, emphasizing the spatial organization of human activities and its significance to society.

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 and landscapes through time. Emphasis on ethics and aesthetics in the creation of 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 in man's 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 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 257 Paleoclimatology 3

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.

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 man-environment relationships.

GEOG 342 Bioclimatology 3

Influences of weather and climate on plants, animals and people; adaptation to normal and extreme environments; and environmental measurement and interpretation.

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: GEOG 206, GEOL 105 or GEOL 107.

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: GEOG 352 and GEOG 255.

GEOG 352 Physical Climatology 4

Energy and mass exchange in the land-ocean-air system for characteristic natural and man-made environments.

PREREQ: GEOG 250.

COREQ: GEOG 250.

GEOG 366 Independent Study 1-6**GEOG 370 Production Cartography 3**

Map design and construction in laboratory and darkroom. Techniques include pen-and-ink drafting, scribing, masking, and multi-plate color map production.

PREREQ: GEOG 270

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. May be cross-listed with AMST 380.

GEOG 390 Honors Colloquium 3

See ARSC 390 for description.

GEOG 420 Advanced Meteorology 3

Application of basic principles of thermodynamics and fluid dynamics to an understanding of motion and precipitation processes in the atmosphere.

PREREQ: GEOG 220 and MATH 242.

GEOG 425 Internal Structure of the City 3

Theoretical and practical approaches to an understanding of changing land uses within urban areas.

PREREQ: GEOG 325.

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: GEOG 230.

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: GEOG 240 or GEOG 340.

GEOG 441 The Ecology of Crime 3

See CRJU 455 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 preprofessional 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.

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: GEOG 255 and GEOG 352.

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: GEOG 220.

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 SOCI 460 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: GEOG 250.

GEOG 620 Advanced Meteorology 3

Application of basic principles of thermodynamics and fluid dynamics to an understanding of motion and precipitation processes in the atmosphere.

PREREQ: GEOG 220, MATH 242 and GEOG 250.

COREQ: GEOG 250.

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: GEOG 325.

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: GEOG 230.

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: GEOG 240 or GEOG 340.

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: GEOG 255 and GEOG 352.

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: GEOG 220.

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: GEOG 250 and MATH 302.

GEOG 670 Computer Cartography 4

Introduction to cartographic theory and computational methods necessary for drawing maps with the aid of a digital computer.

PREREQ: GEOG 250.

GEOG 681 Remote Sensing of Environment 3

See MAST 681 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, GEOL 105 or GEOL 107, 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: GEOL 203.

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; application to geologic principles.

PREREQ: GEOL 107.

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: GEOL 204 and GEOL 301.

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: GEOL 204, GEOL 301 and GEOL 303.

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: GEOL 107 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: GEOL 304.

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: GEOL 304.

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: GEOL 304.

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 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: GEOL 453 and GEOL 454.

COREQ: GEOL 453 and GEOL 454.

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, interpretations of the thermal history of the earth.

PREREQ: MATH 242, PHYS 201 and PHYS 202.

GEOL 454 Elementary Geophysics II 3

Gravity and the shape of the earth, theories of isostasy. Geomagnetism, magnetization of rocks, paleomagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging.

PREREQ: MATH 242, PHYS 201 and PHYS 202.

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: GEOL 304.

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 selected other 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 MAST 631.

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.

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 MAST 650 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, paleomagnetism. Gravity and magnetic surveys and interpretations. Electrical and radioactive surveying and well logging.

GEOL 657 Statistics for Earth Sciences 3

See STAT 657 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 modelling 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 GEOL 969.

GEOL 869 Master's Thesis 1-6**GEOL 872 Advanced Micropaleontology 3**

Taxonomy, morphology and biostratigraphy of selected phyla of microfossils.
PREREQ: GEOL 806.

GEOL 969 Doctoral Dissertation 1-12 PF

German

GERM 101 Elementary German I 3

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

GERM 102 Elementary German II 3

Completion of basic German.

PREREQ: GERM 101 or GERM 105.

GERM 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.

GERM 106 German II - Elementary/Intermediate 4

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

PREREQ: GERM 105.

RESTRICTIONS: Two to three years of high school German acceptable in lieu of Prerequisite.

GERM 107 German III - Intermediate 4

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

PREREQ: GERM 106.

RESTRICTIONS: Four years of high school German acceptable in lieu of Prerequisite. Satisfies Arts and Science foreign language requirement.

GERM 111 Intermediate German I 3

Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing.

PREREQ: GERM 102 or GERM 106.

RESTRICTIONS: Three years of high school German acceptable in lieu of Prerequisite.

GERM 112 Intermediate German II 3

Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed.

PREREQ: GERM 111.

RESTRICTIONS: Four years of high school German acceptable in lieu of Prerequisite. Satisfies Arts and Sciences foreign language requirement.

GERM 203 German Grammar Review 3

Systematic review of elementary and intermediate German grammar. Emphasis on grammar. Conversational practice.

PREREQ: GERM 107 or GERM 112.

GERM 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: GERM 107, GERM 112, or one 200-level course.

RESTRICTIONS: Prerequisites require minimum grade of B.

GERM 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: GERM 107 or GERM 112.

GERM 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.

GERM 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.

GERM 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: GERM 203, GERM 205 or GERM 206.

GERM 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: GERM 203, GERM 205 or GERM 206.

GERM 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.

GERM 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: GERM 107, GERM 112, or GERM 118.

GERM 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.

GERM 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 GERM 203, GERM 205, GERM 206, GERM 211, GERM 212, or GERM 250.

GERM 306 Practical Oral/Written Expression 3

Strengthens grammar and vocabulary skills in preparation for advanced courses. Class exercises include oral expositions, discussion of articles and videos, textual analysis and compositions.

PREREQ: Any two 200-level German courses conducted in German

RESTRICTIONS: Taught abroad only.

GERM 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.

GERM 311 Introduction to German Literature I 3

Masterpieces of poetry, narrative prose and drama from the 18th to the mid-19th century.

PREREQ: GERM 211 or GERM 212.

GERM 312 Introduction to German Literature II 3

Masterpieces of poetry, narrative prose and drama from the mid-19th century to the present.

PREREQ: GERM 211 or GERM 212.

GERM 325 German Civilization and Culture 3

A survey of the major cultural, social and political developments in Germany from the mid-18th century to the present.

PREREQ: GERM 211 or GERM 212.

GERM 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: GERM 311 or GERM 312.

RESTRICTIONS: May be repeated for credit when topics vary.

GERM 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: GERM 311 or GERM 312.

RESTRICTIONS: May be repeated for credit when topics vary.

GERM 366 Independent Study 1-3

GERM 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.

GERM 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.

GERM 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.

GERM 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.

GERM 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.

GERM 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.

GERM 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.

GERM 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.

GERM 466 Independent Study 1-3

GERM 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.

GERM 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.

GERM 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.

GERM 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.

GERM 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.

GERM 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.

GERM 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.

GERM 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 mori" (Grimmelshausen's Simplicissimus, Gryphius' plays, Baroque poetry).

GERM 869 Master's Thesis 1-6

Greek

GREK 101 Elementary Greek I 3

Course for beginners.

GREK 102 Elementary Greek II 3

Completion of basic Greek.

PREREQ: GREK 101.

GREK 213 Plato 3**GREK 214 Homer 3**

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 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 BAMS 134.

HIST 135 Latin America to 1830 3

An introduction to Latin American history from the preconquest period until the wars of independence.

HIST 136 Latin America Since 1830 3

An introduction to Latin American history from the wars of independence until the present.

HIST 137 East Asian Civilization: China 3

A historical survey of major aspects of Chinese civilization, relating the past to the present.

HIST 138 East Asian Civilization: Japan 3

A historical 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 Since 1775 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 240 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 the construction and use of religious edifices. Extensive use of slides to illustrate the lectures.

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 ARSC 260 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 278 Historic Cultures of the Middle Atlantic Region 3

See ANTH 278 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 EDST 290 for course description.

HIST 293 Honors Short Course 1

See ARSC 293 for course description.

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 WOMS 300.

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. May be cross-listed with AMST 301

HIST 302 The World in Our Time 3

An examination of current events within the context of historical forces.

HIST 303 American Intellectual History 3

The development of principal patterns of American religious, social and scientific thought before 1865. May be cross-listed with AMST 303.

HIST 304 American Intellectual History 3

The development of principal patterns of American religious, social and scientific thought after 1865. May be cross-listed with AMST 304.

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 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 ANTH 316 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 1760-1789 with particular emphasis on political and cultural developments in the age of the American Revolution. May be cross-listed with AMST 319.

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 ANTH 322 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 BAMS 304 for course description.

HIST 326 History of Black America Since the Civil War 3

See BAMS 306 for course description.

HIST 327 Early American Society 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, class values and the meaning of material possessions. May be cross-listed with AMST 327.

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. May be cross-listed with AMST 328.

HIST 330 Peasants and Revolution in Africa 3

The most remarkable nationalist struggles in modern Africa have been supported by peasants. This course seeks to pay special attention to these struggles especially in Guinea-Bissau; Angola; Zimbabwe; Mozambique; and Mau-Mau of Kenya. Why did the peasants support the revolution? Did they benefit from the victories?

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 338 Greek-Roman Sport-Recreation 3

Covers period c. 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. 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-Present 3

Political, socioeconomic and cultural developments in the Soviet Union since 1917.

HIST 360 Humanities Colloquium 3

See ARSC 360 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 ANTH 379 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 CSCC 382 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 CSCC 385 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. May be cross-listed with AMST 389.

HIST 391 History of Modern China 3

The history of China since 1600, including Western impact, modernization, communism and China's role in the world today.

HIST 392 History of Modern Japan 3

An introductory survey dealing with Japan since 1600, with special emphasis on domestic forces of change, impact of the West, the dilemma of progress and Japan's place in the modern world.

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 BAMS 395.

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, and the impact of agricultural and labor laws on African struggles for freedom.

HIST 398 Film and Modern American Culture 3

See ENGL 398 for course description.

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

See MSST 403 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 WOMS 409.

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 CSCC 411.

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 WOMS 416.

HIST 430 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 AMST 454.

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 ARSC 460 for 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," "Women in Europe, 1100-1600" or "Rome and Religion." May be cross-listed with WOMS 473.

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 EAMC 605 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, 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 633 The U.S. in the Twentieth Century 3

Reading seminar on 20th-century U.S. history.

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 MSST 645.

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 URAF 629 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 URAF 654.

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 MSST 655.

HIST 656 Archival Management II 3

Internship with paper. May be cross-listed with MSST 656

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 MSST 657.

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 ARSC 660 for 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 691 American Social Environment: 1607-1850 3

See EAMC 601 for course description.

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 MSST 804 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 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: HRIM 280

HRIM 381 Management of Food and Beverage Operations 3

Management tools available to control sales and expenses in food and beverage operations. Analysis of centers of responsibility. Cost management approach to development of control systems.

PREREQ: NTD 321.

HRIM 382 Managerial Accounting and Finance in the Hospitality Industry 3

Generation and analysis of quantitative information for planning, control and decision making by managers at various levels. Use of timely and relevant information as a vital tool in management.

PREREQ: ACCT 208.

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: ACCT 352

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: HRIM 380.

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: HRIM 488.

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

Development of collection techniques; analysis and presentation of data pertaining to child, family and community populations; elements of statistical analysis; and evaluation of research designs.

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 on 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 Preschool Curriculum I: Materials 2

Principles underlying values in and guidance of preschool children's play, creative activities and curriculum content: selection and use of appropriate materials.

PREREQ: IFST 221.

COREQ: IFST 224.

IFST 224 Preschool 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.

PREREQ: IFST 221.

COREQ: IFST 222.

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: IFST 221.

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 to personal lives.

IFST 294 Honors Short Course 1

See ARSC 294 for course description.

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 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; the integration of theories with practical applications.

IFST 340 Preschool Curriculum II: Organization 3

Organization and operation of programs for children under six; adapting the curriculum, facilities and equipment to the needs of preschool children.

PREREQ: IFST 222 and IFST 224.

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 PF

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: HURE 380.

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: IFST 222 and IFST 224.

IFST 422 Family Relationships 3

Interpersonal relationships and problems in courtship, marriage and the family in contemporary society.

PREREQ: IFST 202.

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.

PREREQ: IFST 221 and IFST 422.

IFST 435 Preschool Programs for Exceptional Children 4

Philosophy, organization and operation of programs for exceptional children; development and adaptation of curriculum, materials, facilities and equipment. Observation of exceptional children and programs.

PREREQ: EDST 230, IFST 340.

IFST 440 Preschool Administration 3

Organization and administration of programs for preschool children. Consideration of personnel, facilities, equipment and business management.

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: IFST 101.

COREQ: IFST 459 or EDDV 400.

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: IFST 222 and IFST 224.

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 PSYC 460.

PREREQ: IFST 221.

IFST 459 Child Development Practicum 1-9 PF

Supervised student teaching experience.

PREREQ: IFST 435, IFST 452 and IFST 470.

RESTRICTIONS: Requires permission of instructor.

IFST 460 Women in International Development 3

See SOCI 460 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: IFST 221 and IFST 236.

IFST 465 Seminar 1-3 PF

IFST 466 Independent Study 1-12

IFST 470 Exceptional Children and Their Families 3

Deals with the social-emotional considerations of exceptionalities upon the development of children and the effects of these deviations upon their families and society. Includes early diagnostic techniques, and the implications of physical disabilities, hearing impairment, defective speech, impaired vision, epilepsy, chronic medical disorders, mental retardation, social-emotional disorders, learning disabilities and giftedness.

PREREQ: IFST 221 or PSYC 325.

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 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 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.

PREREQ: IFST 222 and IFST 224.

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 Dynamics of Family Development 3

Critical analysis of selected readings and research in the area of family development.

PREREQ: IFST 422.

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.

PREREQ: IFST 221, IFST 422 and HURE 380.

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.

PREREQ: IFST 651.

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.

PREREQ: IFST 221 and a basic course in psychology.

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 child advocacy.

PREREQ: IFST 435.

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.

PREREQ: IFST 221, PSYC 201.

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: EDDV 665.

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.

PREREQ: IFST 452.

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.

PREREQ: IFST 651.

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.

PREREQ: IFST 221 or PSYC 325.

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.

PREREQ: IFST 621 and IFST 651.

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 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.

PREREQ: IFST 621.

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: ITAL 101 or ITAL 105.

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: ITAL 105.

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: ITAL 106.

RESTRICTIONS: Four years of high school Italian acceptable in lieu of Prereq. 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: ITAL 102 and ITAL 106.

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: ITAL 111.

RESTRICTIONS: Four years of high school Italian acceptable in lieu of Prereq. Satisfies Arts and Science foreign language requirement.

ITAL 201 Advanced Italian Readings and Composition 3

Readings in classical and contemporary Italian literature and composition.

PREREQ: ITAL 107 or ITAL 112.

ITAL 202 Advanced Italian Readings and Composition 3

Readings in classical and contemporary Italian literature and composition.

PREREQ: ITAL 107 or ITAL 112.

ITAL 203 Italian Composition 3

Students write reports on various topics. Mistakes will be discussed in class and will lead to explanations of advanced grammar points and style. Students make ample use of Italian idioms presented by the instructor.

ITAL 205 Italian Conversation 3

Daily oral presentations and discussions on various topics drawn from readings of materials from textbooks, magazines and newspapers.

PREREQ: ITAL 107 and ITAL 112.

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: ITAL 107 and ITAL 112.

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 301 Survey of Italian Literature 3

Development of Italian literature from its origins to the mid-18th century. Readings and discussions of selected texts.

PREREQ: ITAL 202 or ITAL 205.

ITAL 302 Survey of Italian Literature 3

Development of Italian literature from the mid-18th century to the present. Readings and discussions of selected texts.

PREREQ: ITAL 202 or ITAL 205.

ITAL 366 Independent Study 1-3

ITAL 404 History of the Italian Language 3

Development of the Italian language from its Latin origins. Exposition of the questione della lingua; linguistic analysis of old Italian texts; and the effects of social, political and cultural factors on usage. Influences from and on other languages.

ITAL 455 Selected Authors, Works and Themes 3

Works of one or more outstanding authors or on a special theme.

PREREQ: Two 300-level Italian literature courses.

RESTRICTIONS: May be repeated for credit when topics vary.

ITAL 466 Independent Study 1-3

ITAL 604 History of the Italian Language 3

Development of the Italian language from its Latin origins. Exposition of the questione della lingua; linguistic analysis of old Italian texts; and effects of social, political and cultural factors on usage. Influences from and on other languages.

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: JAPN 105.

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: JAPN 106.

RESTRICTIONS: Four years of high school Japanese acceptable in lieu of Prerequisite. Satisfies the Arts and Science foreign language requirement.

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 LATN 101/102.

RESTRICTIONS: May be repeated for up to six credits. Maximum of six credits of LATN 100, LATN 101 or LATN 102 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: LATN 101.

RESTRICTIONS: One year of high school Latin acceptable in lieu of Prerequisite.

LATN 111 Intermediate Latin I 3

Review of grammar and readings in selected authors including Cicero.

PREREQ: LATN 102.

RESTRICTIONS: Two years of high school Latin acceptable in lieu of Prerequisite.

LATN 112 Intermediate Latin II 3

Vergil's Aeneid. Review of grammar and readings in the poetry of Vergil.

PREREQ: LATN 111.

RESTRICTIONS: Four years of high school Latin acceptable in lieu of Prerequisite.

LATN 201 Roman Letters 3

The letter as a literary form in the Roman world. Readings from the letters of Cicero and Pliny.

PREREQ: LATN 112.

LATN 202 Historians of the Republic 3

Selected readings from the works of Livy, Sallust and Cornelius Nepos.

PREREQ: LATN 112.

LATN 301 Roman Drama 3

Readings in selected dramas of Plautus, Terence and Seneca.

PREREQ: LATN 112.

LATN 302 Roman Didactic Poetry 3

Readings in Roman didactic poetry, such as Lucretius' De Rerum Natura.

PREREQ: LATN 112.

LATN 303 Historians of the Empire 3

Selected readings from Tacitus, Suetonius and Ammianus.

PREREQ: LATN 112.

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: LATN 112.

LATN 402 Roman Satire 3

Readings in selected satires of Horace, Persius, Petronius, Juvenal and Seneca.

PREREQ: LATN 112.

LATN 403 Roman Lyric Poetry 3

Readings in the lyric poetry of Catullus and Horace.

PREREQ: LATN 112.

LATN 404 Vergil 3

In-depth study of the Eclogues, Georgics and Aeneid of Vergil.

PREREQ: LATN 112.

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 and history of language. Language and the individual, society, culture, communication and thought.

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: LING 105.

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: LING 106.

RESTRICTIONS: Requires interview with instructor if Arabic has been studied elsewhere.

LING 108 Intermediate Arabic II 3

Completion of intermediate course.

PREREQ: LING 107.

RESTRICTIONS: Requires interview with instructor if Arabic has been studied elsewhere.

LING 123 Elementary Hebrew I 3

Course for beginners.

RESTRICTIONS: Requires interview with instructor if Hebrew has been studied elsewhere. Hebrew courses may not be offered in the necessary sequence to satisfy the language requirement.

LING 124 Elementary Hebrew II 3

Completion of basic course.

PREREQ: LING 123.

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: LING 124.

RESTRICTIONS: Requires interview with instructor if Hebrew has been studied elsewhere.

LING 126 Intermediate Hebrew II 3

Completion of intermediate course.

PREREQ: LING 125.

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 LING 130.

PREREQ: LING 130.

RESTRICTIONS: Requires interview with instructor if Sign Language has been studied elsewhere.

LING 132 American Sign Language III 3

Continuation of LING 131.

PREREQ: LING 131.

RESTRICTIONS: Requires interview with instructor if Sign Language has been studied elsewhere.

LING 133 American Sign Language IV 3

Continuation of LING 132.

PREREQ: LING 132.

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 265 Studies: Language 3

Topics vary and will be announced in registration booklet. May be cross-listed with WOMS 265.

RESTRICTIONS: May be repeated for credit when topics vary.

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 390 Introduction to the English Language 3

See ENGL 390 for course description.

LING 401 Historical Linguistics 3

Languages of the world, Indo-European languages, the comparative method and linguistic evolution.

PREREQ: Completion of two years of a college language course.

LING 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 FLLT 403.

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: LING 402.

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: One linguistics course.

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

Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science.

LING 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.

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.

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: LING 101.

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: LING 427.

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 LING 426.

COREQ: LING 426.

RESTRICTIONS: Requires successful completion of a series of proficiency and aptitude tests.

LING 428 Theory and Techniques of Interpretation II 3

Continuation of LING 426.

PREREQ: LING 426.

COREQ: LING 429.

RESTRICTIONS: Grade of B or higher required of Prerequisite.

LING 429 Interpretation Practicum II 3

Continuation of LING 427.

PREREQ: LING 427.

COREQ: LING 428.

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 (LING 426, LING 427, LING 428 and LING 429) to continue interpretation training at an advanced level and perfect their simultaneous and consecutive skills.

PREREQ: LING 428 and LING 429.

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.

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.

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 460 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 462 Language Acquisition 4

See EDST 462 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 EDST 476 for course description.

LING 477 The Structure of English 3

See EDST 477 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: LING 101.

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 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.

PREREQ: LING 101.

LING 608 Phonology II 3

Continuation of LING 607. More advanced phonological analysis and rule writing. Introduction to recent developments in nonsegmental phonology: autosegmental, metrical and prosodic theories.

PREREQ: LING 607.

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.

PREREQ: LING 602.

LING 610 Syntax II 3

Continuation of LING 609. More advanced analysis of syntactic structures. Attention given to the theory of Government and Binding and to principles of universal grammar.

PREREQ: LING 609.

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: One course in linguistics.

LING 612 Introduction to Morphology 3

Introduces major types of morphological phenomena, their analysis and current theoretical approaches to handling them.

PREREQ: LING 607.

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 FLLT 620.

LING 621 Methods of Teaching Foreign Languages 3

Description, discussion and analysis of techniques pertinent to the teaching and learning of foreign languages. Emphasis on contributions of contemporary linguistic science. Practical exercises and research projects.

LING 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.

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.

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: LING 101.

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: LING 627.

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 LING 626.

COREQ: LING 626.

RESTRICTIONS: Requires successful completion of a series of proficiency and aptitude tests.

LING 628 Theory and Techniques of Interpretation II 3

Continuation of LING 626.

PREREQ: LING 626.

COREQ: LING 629.

RESTRICTIONS: Grade of B or higher required of Prerequisite.

LING 629 Interpretation Practicum II 3

Continuation of LING 627.

PREREQ: LING 627.

COREQ: LING 628.

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 (LING 626, LING 627, LING 628 and LING 629) to continue interpretation training at an advanced level and perfect their simultaneous and consecutive skills.

PREREQ: LING 628 and LING 629.

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.

LING 652 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 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, coversbs and the serial verb construction.

LING 675 Language Acquisition 4

See EDST 675 for course description.

LING 676 Bilingualism and Language 3

See EDST 676 for course description.

LING 677 The Structure of English 3

See EDST 677 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: LING 101.

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.

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 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: LING 101.

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 ENGL 801 for course description.

LING 803 Middle English 3

See ENGL 803 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 807 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 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: LING 624.

LING 830 Syntax III 3

In-depth investigation of syntactic universals and recent developments in the theory of syntax.

PREREQ: LING 610.

LING 831 Topics in Syntax 3

Current topics in syntactic theory, problems in the syntactic analysis of specific languages.

PREREQ: LING 830.

RESTRICTIONS: May be repeated for credit when topics vary.

LING 848 Seminar in Language Development 3

See EDST 848 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: LING 608.

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: LING 881.

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 ENGL 890.

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 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 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 618 Studies in the History of Art 3

Selected topics in the history of art. Focuses on art in the context of cultural and social history for an advanced audience of non-specialists.

RESTRICTIONS: Open to MALS majors only.

MALS 647 Philosophy of Technology 3

See PHIL 647 for course description.

Materials Science

MASC 302 Materials Science for Engineers 4

Crystal binding and structure; energetics and structure of lattice defects; elasticity, plasticity, and fracture; phase equilibria and transformations; relations of structure and treatment to properties; structures of inorganic and organic polymers; and electronic and magnetic properties.