Course Descriptions Index

Course Descriptions

Accounting (ACCT)

See School of Accountancy, pages 131-135.

ACCT 1050 Accounting Essentials 3
Overview of accounting concepts, with special emphasis on practical applications. Taught only as a special extension course as requested.

ACCT 1550 Accounting Software for Small Business Applications 3
Instruction in the use of small business accounting software. Prerequisite: ACCT 1050 or equivalent.

ACCT 2010 Survey of Accounting I 3©
Survey of uses of accounting information by investors and creditors for decision making. Emphasis on basic accounting principles used to prepare, analyze, and interpret financial statements. Prerequisites: STAT 1040 or MATH 1030 or 1050 (MATH 1050 or equivalent is required for College of Business majors); and GPA of 2.5 or higher. (F,Sp,Su)

ACCT 2020 Survey of Accounting II 3©
Survey of uses of accounting information by managers for decision making, including planning, budgeting, and controlling operations. Emphasizes accumulation, analysis, and control of product and service costs. Prerequisite: ACCT 2010. (F,Sp,Su)

ACCT 3110 Intermediate Financial Accounting and Reporting I 3
Study of accounting principles, theory, and practice relating to financial reporting of assets. Prerequisites: Cumulative GPA of 3.0 or higher; grade of *B* or better in ACCT 2010; ACCT 2020; admittance to a USU major; and completion of at least 40 credits. (F,Sp,Su)

ACCT 3120 Intermediate Financial Accounting and Reporting II 3
Study of accounting principles, theory, and practice relating to liabilities, equities, and other contemporary issues. Prerequisite: ACCT 3110; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp,Su)

ACCT 3310 Strategic Cost Management 3©
Contemporary theory and applications in the accumulation, analysis, and interpretation of accounting information for internal decision-making and control. Prerequisites: Cumulative GPA of 3.0 or higher; grade of *B* or better in ACCT 2010; ACCT 2020; admittance to a USU major; and completion of at least 40 credits. (F,Sp,Su)

ACCT 3410 Income Taxation I 3
Emphasis on Federal income taxation of individiuals. Introduction to tax research methods and taxation of corporations and partnerships. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp,Su)

ACCT 4200 Advanced Accounting 3
Study of accounting principles and theory relating to business combinations, nonprofit organizations, and governmental accounting. Prerequisites: ACCT 3120; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp,Su)

ACCT 4410 Income Taxation II 3
Federal income taxation of partnerships, corporations, S-corporations, estates and trusts, and gifts. Prerequisites: ACCT 3410; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

ACCT 4500 Accounting Information Systems 3
Theoretical concepts underlying accounting systems' computerized support of business processes. Topics include accounting systems development, controls, security, and audit. Prerequisites: ACCT 3110 and BIS 2450; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

ACCT 4510 CI Auditing Principles and Techniques 3
Fundamental principles and techniques of auditing and reporting of audits presented in the context of the audit logic sequence. Integrative applications emphasizing audits of organizational resources, processes, and systems. Also addresses ethics, legal environment, auditing standards, and fraud. Prerequisites: ACCT 3110; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits (F,Sp)

ACCT 4900 Independent Research and Readings 1-3®
Selected reading and research individually assigned, handled, and directed. Problems of mutual interest to students and the instructor are investigated and reported. Prerequisite: Departmental permission. (F,Sp,Su)

ACCT 4950H Senior Honors Thesis/Project 3
Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (Sp)

ACCT 6010 Financial and Managerial Accounting 3
Introduction to financial and managerial accounting at the graduate level. Prerequisite: Admission to a College of Business graduate program. (Su)

ACCT 6200 Advanced Topics in Financial Reporting 3
Study of accounting principles and theory related to advanced consolidations, multinational accounting, segment reporting, SEC reporting, partnerships, and financial distress. Prerequisites: ACCT 3120, 4200. (F,Su)

ACCT 6350 Accounting Strategies for Achieving Profit Goals 3
Action-oriented case studies to demonstrate management accounting techniques to achieve profit goals and business strategies in a variety of organizations. International accounting and ethical issues are addressed. Prerequisites: ACCT 2010 and 2020, or ACCT 6010. (F,Sp)

ACCT 6410 Tax Research and Procedures 3
Methods of researching tax problems, case studies in tax administration, civil procedures and penalties, professional responsibility, and tax ethics for the tax practitioner. Prerequisites: ACCT 3410 and 4410. (F,Su)

ACCT 6420 Taxation of Corporations and Shareholders 3
Concepts and principles governing the taxation of corporations and shareholders. Effect of taxes on corporation formation, capital structure, distributions, liquidations, and reorganizations. Prerequisites: ACCT 3410 and 4410. (Su)

ACCT 6440 Taxation of Partnerships, Estates, and Trusts 3
Concepts and principles governing the taxation of partnerships and partners and estates, trusts, and beneficiaries. Uses of partnerships and trusts in tax planning. Prerequisites: ACCT 3410 and 4410. (F)

ACCT 6460 Tax Topics 3
Topics of current interest to tax professionals. Prerequisites: ACCT 3410 and 4410. (Su)

ACCT 6500 Advanced Accounting Information Systems 3
Contemporary issues in accounting information systems, including emerging information technologies, systems evaluation and selection, and computer-based audit and security. Prerequisite: ACCT 4500. (Sp)

ACCT 6510 Financial Auditing 3
Application of generally accepted auditing standards to accounting systems. Some study of auditing theory and current issues, and an introduction to statistical auditing. Prerequisite: ACCT 4510. (F,Sp)

ACCT 6540 Forensic Accounting 3
Study of forensic accounting. Topics covered include types of fraud, recognition of red flags, and fraud investigation techniques. Also includes practice with computer-aided fraud detection, interrogation techniques, and case studies. (F)

ACCT 6600 Information Systems Auditing and Control 3
Study of information systems auditing methodologies, including risk assessment, systems controls, and the use of computer-assisted audit techniques. (F)

ACCT 6610 Accounting Theory and Research 3
Analytical approach to understanding the financial reporting environment. Integration of accounting theory and practical research methodology in the resolution of financial reporting problems. Prerequisite: ACCT 3120 (may be taken concurrently). (Sp,Su)

ACCT 6800 Accounting Communications and Professional Conduct 3
Study of written and oral communication skills appropriate for the accounting profession. Covers interpersonal skills and professional conduct, including ethical conduct, in various business settings. (F,Sp)

ACCT 6900 Independent Reading and Research 1-3®
Independent work in accounting areas: theory, auditing, taxation, and other related areas. Prerequisite: Departmental permission. (F,Sp,Su)

ACCT 6960 Professional Paper 1-3
A paper of professional quality prepared by the student. Designed to demonstrate the ability to complete a major business-related project and to effectively present the results. Prerequisite: Departmental permission. (F,Sp,Su)

ACCT 6990 Continuing Graduate Advisement 1-3®
Continuing enrollment at the University required after completing coursework. Prerequisite: Departmental permission. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Animal, Dairy and Veterinary Sciences (ADVS)

See Department of Animal, Dairy and Veterinary Sciences, pages 146-157.

ADVS 1010 Artificial Insemination and Reproduction 2
Principles of reproduction, artificial insemination, and handling of semen. Anatomy and physiology of the bovine reproductive tract and reproductive management of the dairy farm. (F)

ADVS 1020 Dairy Cattle Nutrition and Feeding 3
Applied approach to nutrients, feeds, digestion, and nutrient utilization by dairy cattle. Dietary requirements and feeding practices. (F)

ADVS 1030 Lactation and Milking Systems 3
The mammary gland, udder health, and mastitis and its control. Milk quality and marketing. Principles involved in the function, design, and maintenance of dairy equipment. (Sp)

ADVS 1040 Records and Financial Aspects of Dairy Herd Operations 3
Record keeping systems, tax records, estate planning, DHI records, and computer record systems. Principles of credit and finance. Accessing loan sources. (Sp)

ADVS 1050 Dairy Genetics 3
Principles of dairy genetics, mating, pedigrees, and breeding. Purebred cattle type traits and classification. (F)

ADVS 1060 Applied Feeding and Management of Dairy Calves and Basic Construction of Facilities 3
Practical experience in feeding and management of dairy calves from birth to weaning. Students participate in actual calf-raising programs. Development of basic skills required for planning and building agricultural structures. (Sp)

ADVS 1100 Small Scale Animal Production 3
Fundamentals of raising domestic farm animals in a semi-rural, noncommercial setting. Considerations of feeding, breeding, housing, marketing, sanitation, general health care, and community zoning factors. For nonmajors. (Su)

ADVS 1110 Introduction to Animal Science 4
Influence and contributions of animal production and its commodities to society. Introductory scientific principles of animal science, livestock production systems, and contemporary issues. Introduction to professions and careers in animal agriculture and veterinary sciences. (F,Sp)

ADVS 1250 QI Applied Agricultural Computations 2
Development of understanding and proficiency in the application of basic mathematical skills, including algebra and geometry, to practical computational situations encountered in the agricultural sciences. (F,Sp)

ADVS 1600 Western Horsemanship I 2
Grooming, saddling, bridling, mounting, seats and hands, horseback riding both bareback and on western saddle. For students with limited or no previous riding experience. Western-type riding boots and health insurance required. (F,Sp)

ADVS 1720 Dairy Cattle Evaluation and Judging 1
Evaluation of cattle based on exterior anatomical traits functional for improving longevity and milk production. Explanation of classification systems used by breed associations and the artificial insemination industry. Development of basic skills for preparing dairy cattle for show. (Sp)

ADVS 1910 Orientation to Animal and Dairy Science 0.5
Introduction to the Animal Science and Dairy Science programs, and to the opportunities in animal agriculture and related fields. (F)

ADVS 1920 Orientation to Bioveterinary Science 1
Introduction to the profession of veterinary medicine and related fields, and to the preparation required for veterinary medical careers. (F)

ADVS 2040 Introduction to Biotechnology 1
Introduces students to the emerging field of biotechnology and the impact this technology has on society. Also taught as BIOL 2040, NFS 2040, and PSB 2040. (Sp)

ADVS 2080 Beef Production Practices 2
Production practices in the handling, selection, and care of beef cattle. Demonstrations of equipment, facilities, and skills relevant to beef cattle production. Prerequisite: ADVS 1110 (may be taken concurrently) or permission of instructor. (Sp)

ADVS 2090 Sheep Production Practices 2
Production practices in the handling, selection, and care of sheep. Demonstrations of equipment, facilities, and skills relevant to sheep and wool production. Prerequisite: ADVS 1110 (may be taken concurrently) or permission of instructor. (Sp)

ADVS 2120 Swine Production Practices 2
Production practices in the selection, handling, and care of swine. Demonstrations of equipment, facilities, and skills relevant to swine industry. Prerequisite: ADVS 1110 (may be taken concurrently) or permission of instructor. (Su)

ADVS 2130 Dairy Production Practices 3
Basic husbandry skills needed to carry out day-to-day operations on a dairy farm. Principles of dairy herd health, disease prevention, and treatment. Prerequisite: ADVS 1020 or 1110 (may be taken concurrently) or permission of instructor. (F)

ADVS 2190 Horse Production Practices 2
Production practices in the selection, care, and evaluation of horses. Survey of breeds of horses, their characteristics, and their uses, as well as equine behavior, health care, nutrition, reproduction, anatomy, and physiology. Prerequisite: ADVS 1110 (may be taken concurrently) or permission of instructor. (F)

ADVS 2200 Anatomy and Physiology of Animals 4
Normal structure and function studied systematically. Comparative livestock, poultry, pleasure and companion animals, laboratory animals, and humans. (Sp)

ADVS 2250 Cooperative Work Experience 1-12®
For students who require animal industry experience to prepare them for advanced curriculum in Animal, Dairy, or Bioveterinary Science. (F,Sp,Su)

ADVS 2600 Western Horsemanship II 2
Alternative training techniques for western pleasure and western reining horses, teaching leads, cueing techniques, reining maneuvers, and show-style riding. Western-type riding boots and health insurance required. Prerequisite: ADVS 1600. (F,Sp)

ADVS 2920 Orientation to Veterinary Medicine 0.5
Preparation of preveterinary students for successful application and admission to professional veterinary schools. Taught first half of spring semester. (Sp)

ADVS 3000 Animal Health and Hygiene 3
Introduction to basic principles of disease. Agents, mechanisms, and preventive measures for common diseases of farm animals will be emphasized. Prerequisite: ADVS 2200. (Sp)

Course Descriptions

ADVS 3020 Biotechnology in Agriculture 3
Broad view of biotechnology in agriculture. Contributions of advances in recombinant DNA technology, molecular genetics, and genetic engineering toward animal breeding and development of new medicines. Prerequisites: BIOL 1220, CHEM 2310. (F)

ADVS 3200 DSC Ethical Issues in Genetic Engineering and Biotechnology 3
Critical evaluation of ethical issues of genetic engineering in biotechnology, including biological engineering and cloning of plants, animals, and humans. Presents basic science of genetic engineering and biotechnology. (Sp)

ADVS 3500 Principles of Animal Nutrition 3
Biochemical characterization and chemical analysis of feedstuffs for farm animals, with regard to carbohydrates, proteins, lipids, minerals, and vitamins. Catabolic/anabolic pathways associated with utilization of these nutrients with respect to production, general health, and nutritional disorders. Prerequisites: ADVS 2200; CHEM 1120 or 2320. (F)

ADVS 3510 QI Applied Animal Nutrition 3
Categorization of farm animal feeds into energy feeds, protein feeds, dry forages, silages and haylages, pasture and range plants, and vitamin-mineral supplements. Emphasis placed on practical diet formulation, including computerization and aspects of feed delivery and nutritional management. Prerequisite: ADVS 3500 or CHEM 3700. (Sp)

ADVS 3600 Western Horsemanship III 2
Utilization of current training methods relating to basic equine behavior, ground breaking skills, and riding and training of the unbroken and freshly broken horse. Prerequisite: ADVS 2600. (F,Sp)

ADVS 3650 Live Animal and Carcass Evaluation 3
Judging, grading, and pricing of market animals and carcasses, with emphasis on comparative evaluation of live animals and carcasses. (F)

ADVS 3710 Advanced Livestock Judging 2
Advanced methods of selection and identification of superior animals for breeding stock. Emphasis on performance records, judging, grading, and oral reasons. (F,Sp)

ADVS 3900 Special Problems and Readings 1-3®
Students conduct short-term studies and/or literature review with critical analysis of individualized subject matter. Formal written reports required. Prerequisite: Permission of instructor. (F,Sp,Su)

ADVS 3910 Special Topics 1-5®
Topics of special interest to those who have needs not satisfied by courses currently offered. (F,Sp,Su)

ADVS 3920 Internship in Veterinary Medicine 1-3®
A directed and evaluated work experience with a veterinarian. For each credit, student must document at least 54 hours of work time. Prerequisite: Permission of instructor. (F,Sp,Su)

ADVS 4200 CI Physiology of Reproduction and Lactation 4
Introduction to principles of physiology as they relate to the reproductive and lactation processes in domestic mammals. Factors affecting reproductive and lactation performance and their applications in animal management. Prerequisites: ADVS 2200; CHEM 1120 or 2310. (Sp)

ADVS 4250 Internship in Animal Industry 1-12®
Directed and evaluated educational work experience with an animal production unit, related business, or government facility in cooperation with the Livestock Education Foundation. Prerequisite: Permission of instructor. (F,Sp,Su)

ADVS 4260 Internship in Animal Biotechnology Industry 2-12®
Directed and evaluated educational work experience with an animal biotechnology unit, or with a related business or government facility. Prerequisite: ADVS 5160 or 5240 or 5260 and permission of instructor. (F,Sp,Su)

ADVS 4560 QI Principles of Animal Breeding 3
Genetic influences affecting animal performance and the application of selection principles, breeding systems, and methods of improvement to farm animals, including beef and dairy cattle, sheep, swine, and horses. Prerequisite: BIOL 1010 or 1620. (F)

ADVS 4800 Undergraduate Research or Creative Opportunity 1-6®
Research or creative activity pertaining to animals. May include management, production, medical, or basic science, with consideration of biological, chemical, or physical aspects, or instrument design. Prerequisite: Permission of instructor. (F,Sp,Su)

ADVS 4910 Preprofessional Orientation 0.5
Survey of the professional opportunities in the animal industries to enable graduating students to make the transition to careers and/or postgraduate study. Prerequisite: Senior standing. (F)

ADVS 4920 CI Undergraduate Seminar 2
Current developments in agricultural field selected by student. Each student is responsible for the research and oral presentation of a topic in the animal industries. Group investigations, preparations, and deliberations on issues in animal agriculture. Prerequisite: Senior standing. (F)

ADVS 5030 Sustainable Agricultural Production Systems with Animals 3
Study of various domestic animal production systems in relation to sustainable agriculture and integrated ranch and farm management strategies. Consideration of environmental factors and overall profitablity. Prerequisite: ADVS 1110. (F)

ADVS 5080 Beef Cattle Management 3
(dual listing 6080)
Managing the beef enterprise to yield optimum returns through integrating resource use and applying breeding, nutrition, reproduction, and animal health practices. Prerequisites: ADVS 2080; ADVS 3510, 4200, 4560 (may be taken concurrently). (Sp)

ADVS 5090 Sheep Management and Wool Technology 4
(dual listing 6090)
Detailed study of the managerial considerations for range and farm flock operations. Examinations of wool, and review of wool clip handling and merchandising. Prerequisites: ADVS 2090; ADVS 3510, 4200, 4560 (may be taken concurrently). (Sp)

ADVS 5120 Swine Management 3
(dual listing 6120)
Management decisions based on nutrition, breeding programs, herd health practices, herd records, and marketing opportunities. Prerequisites: ADVS 2120; ADVS 3510, 4200, 4560 (may be taken concurrently). (F)

ADVS 5130 Dairy Cattle Management 3
(dual listing 6130)
Capstone course drawing together concepts and applying them to a total dairy farm management program. Prerequisites: ADVS 2130; ADVS 3510, 4200, 4560 (may be taken concurrently). (Sp)

ADVS 5160 Methods in Biotechnology: Cell Culture 3
Techniques and fundamental knowledge for culturing mammalian and insect cells. Students will learn maintenance, growing, genetic engineering of cells, cytotoxicity, hybridoma creation, cloning, etc. Extensive laboratory experience is provided. Also taught as BIOL 5160, NFS 5160, and PSB 5160. (F)

ADVS 5190 Horse Management 3
(dual listing 6190)
Management decisions in horse enterprises emphasizing business procedures, including merchandising, records, selection, uses, housing, facilities, nutrition, feeding, health care, and breeding. Emphasizes total management of horse enterprise, rather than husbandry. Prerequsites: ADVS 2190; ADVS 3510, 4200, 4560 (may be taken concurrently). (Sp)

ADVS 5220 Endocrine Aspects of Nutrition 2
(dual listing 6220)
Provides physiological background into hormones involved in nutrient regulation, as well as mechanisms of hormone action at the cellular and molecular levels. Includes action of steroids in the nucleus and membrane-based signal transduction pathways. Course includes lectures and literature reviews/ presentations. Prerequisite: CHEM 3700 or permission of instructor. Also taught as BIOL 5220/6220 and NFS 5220/6220. (Sp)

ADVS 5240 Methods in Biotechnology: Protein Purification Techniques 3
Reviews basic methods of protein purification, including scaled-up use of 100L fermenter, large-scale centrifugation, diafiltration, chromotography, and use of BioCAD. Prerequisite: CHEM 3700. Also taught as BIOL 5240, NFS 5240, and PSB 5240. (Sp)

ADVS 5260 Methods in Biotechnology: Molecular Cloning 3
Laboratory-oriented course designed to teach molecular biology techniques such as DNA cloning, genetic probes, polymerase chain reaction, and DNA sequencing. Prerequisite: CHEM 3700 or 5710; or BIOL 3060; or permission of instructor. Also taught as BIOL 5260, NFS 5260, and PSB 5260. (F)

ADVS 5280 Animal Molecular Biology 3
(dual listing 6280)
Laboratory-based course designed to present the theory and provide an in-depth laboratory experience in RNA detection, differential gene expression analysis, real-time RT-PCR, protein detection and purification, 2-D gel electrophoresis, and microarrays. Prerequisite: ADVS 5260 or permission of instructor. (Sp)

ADVS 5350 Introductory Pharmacology and
(dual listing 6350) Pharmacokinetics 3
Basic principles of pharmacology and pharmacokinetics providing basis for extrapolation of biological kinetics of foreign compounds to a wide variety of xenobiotics encountered in toxicology, biology, and research. Prerequisites: BIOL 5600, CHEM 3700. (Sp)

ADVS 5370 Molecular Methods in Nutrition Science 2
(dual listing 6370)
Theory of modern techniques used to study macromolecules and ions. Prerequisite: CHEM 3700. Also taught as BIOL/NFS/PSB 5370/6370. (F)

ADVS 5400 Environmental Toxicology 3
(dual listing 6400)
Presents in-depth survey of toxic chemicals present in the environment, environmental factors impacting fate of chemicals, potential biological effects associated with chemical exposures, and methods of reducing associated risks. Prerequisite: CHEM 3700. (Sp)

ADVS 5520 Grazing Livestock Nutrition
(dual listing 6520) and Management 2**
Principles of livestock nutrition and production applied to the grazing environment and the relationships of livestock and range management for optimizing values from both. Prerequisites: ADVS 3510; FRWS 4000 (recommended). (Sp)

ADVS 5530 Nutritional Management of Farm Animals* 3
(dual listing 6530)
Nutritional management, problem solving, and feeding strategies as they influence performance of farm animals. Optimization of nutrition for various species and classes of domestic livestock. Prerequisite: ADVS 3510. (Sp)

ADVS 5690 Animal Histology 3
(dual listing 6690)
Microscopic anatomy and physiology of normal domestic animal's cells, tissues, organs, and system. Prerequisite: ADVS 2200 or permission of instructor. (F)

ADVS 5700 CI General Animal Pathobiology 3
(dual listing 6700)
Introduction to the principles of gross, microscopic, and physiological changes associated with diseases of domestic animals. Prerequisite: ADVS 5690/6690 or permission of instructor. (Sp)

ADVS 5750 Parasitology 4
Introduction to biology of parasitism. Discussion of representative examples of human and animal parasites. Emphasizes classification, life cycles, and clinical significance of medically important parasites. Laboratories concentrate on taxonomy and morphology of parasites. Prerequisite: BIOL 1620. This course is not currently being offered. For information about when it may be offered, contact the department.

ADVS 5820 Animal Cytogenetics and Gene Mapping 3**
(dual listing 6820)
Structure and properties of chromosomes, chromosome behavior during cell division, chromosomal influence on phenotype, and factors causing changes in chromosome structure and number. Gene markers and gene mapping, with emphasis on applications for livestock. Prerequisite: ADVS 4560 or BIOL 3200. (F)

ADVS 5860 Poisonous Range Plants Affecting Livestock 3**
Poisonous plants of rangelands and their effects on grazing animals, especially livestock. Management practices to reduce or prevent poisoning. Also taught as FRWS 5860. (Sp)

ADVS 6010 Animal Research Orientation 1
Orientation to graduate study and to research procedures and methods in the animal sciences, with introduction to the design and analysis of experiments, research ethics, and accessing research databases. For beginning graduate students. This course is not currently being offered. For information about when it may be offered, contact the department.

ADVS 6080 Beef Cattle Management 3
(dual listing 5080)
Managing the beef enterprise to yield optimum returns through integrating resource use and applying breeding, nutrition, reproduction, and animal health practices. Prerequisites: ADVS 2080; ADVS 3510, 4200, 4560 (may be taken concurrently). (Sp)

ADVS 6090 Sheep Management and Wool Technology 4
(dual listing 5090)
Detailed study of the managerial considerations for range and farm flock operations. Examinations of wool, and review of wool clip handling and merchandising. Prerequisites: ADVS 2090; ADVS 3510, 4200, 4560 (may be taken concurrently). (Sp)

ADVS 6120 Swine Management 3
(dual listing 5120)
Management decisions based on nutrition, breeding programs, herd health practices, herd records, and marketing opportunities. Prerequisites: ADVS 2120; ADVS 3510, 4200, 4560 (may be taken concurrently). (F)

ADVS 6130 Dairy Cattle Management 3
(dual listing 5130)
Capstone course drawing together concepts and applying them to a total dairy farm management program. Prerequisites: ADVS 2130; ADVS 3510, 4200, 4560 (may be taken concurrently). (Sp)

ADVS 6190 Horse Management 3
(dual listing 5190)
Management decisions in horse enterprises emphasizing business procedures, including merchandising, records, selection, uses, housing, facilities, nutrition, feeding, health care, and breeding. Emphasizes total management of horse enterprise, rather than husbandry. Prerequsites: ADVS 2190; ADVS 3510, 4200, 4560 (may be taken concurrently). (Sp)

ADVS 6200 Physiology of Reproduction 3**
Study of processes of reproduction in mammals, including fertilization, embryonic development, reproductive endocrinology, and mechanisms of control. Prerequisites: ADVS 4200, CHEM 3700. (Sp)

ADVS 6210 Molecular Reproduction and
(dual listing 7210) Development* 3
Lecture-based course focusing on current knowledge of genes associated with gametogenesis, fertilization, nuclear reprogramming, and embryonic and fetal development. Prerequisite: ADVS 6200 or permission of instructor. (Sp)

ADVS 6220 Endocrine Aspects of Nutrition 2
(dual listing 5220)
Provides physiological background into hormones involved in nutrient regulation, as well as mechanisms of hormone action at the cellular and molecular levels. Includes action of steroids in the nucleus and membrane-based signal transduction pathways. Course includes lectures and literature reviews/ presentations. Prerequisite: CHEM 3700 or permission of instructor. Also taught as BIOL 6220/5220 and NFS 6220/5220. (Sp)

ADVS 6280 Animal Molecular Biology 3
(dual listing 5280)
Laboratory-based course designed to present the theory and provide an in-depth laboratory experience in RNA detection, differential gene expression analysis,

real-time RT-PCR, protein detection and purification, 2-D gel electrophoresis, and microarrays. Prerequisite: ADVS 5260 or permission of instructor. (Sp)

ADVS 6300 Animal Breeding Theory* 3
Basic theoretics of populations as applied to breeding and improvement of domestic animals with emphasis on effects of directed selection and mating and design of effective breeding plans. Prerequisite: ADVS 4560. (F)

ADVS 6320 Animal Genomics and Proteomics* 3
(dual listing 7320)
Presents in-depth study of current animal genomic and proteomic technologies. Investigates the genetics of animal development, physiology, and disease through the application of techniques used to study genes and the modification of the animal genome. (F)

ADVS 6350 Introductory Pharmacology
(dual listing 5350) and Pharmacokinetics 3
Basic principles of pharmacology and pharmacokinetics providing basis for extrapolation of biological kinetics of foreign compounds to a wide variety of xenobiotics encountered in toxicology, biology, and research. Prerequisites: BIOL 5600, CHEM 3700. (Sp)

ADVS 6370 Molecular Methods in Nutrition Science 2
(dual listing 5370)
Theory of modern techniques used to study macromolecules and ions. Prerequisite: CHEM 3700. Also taught as BIOL/NFS/PSB 6370/5370. (F)

ADVS 6400 Environmental Toxicology 3
(dual listing 5400)
Presents in-depth survey of toxic chemicals present in the environment, environmental factors impacting fate of chemicals, potential biological effects associated with chemical exposures, and methods of reducing associated risks. Prerequisite: CHEM 3700. (Sp)

ADVS 6500 Animal Nutrition Research Techniques 2
Laboratory intensive course in routine feedstuff evaluation and research techniques to evaluate nutritional and metabolic responses under in vivo, in situ, and in vitro conditions using feed, digesta, feces, urine, tissue, metabolites, and products. Prerequisite: ADVS 3510. (F)

ADVS 6510 Rumen Physiology and Metabolism* 2
(dual listing 7510)
Discussion of some key aspects of physiology and metabolism of the ruminant digestive tract, with emphasis on the rumen. Topics include anatomy and function; motility; metabolism of protein, carbohydrates, and lipids; rumen microbiology; and common digestive disorders. Prerequisite: ADVS 3510. (Sp)

ADVS 6520 Grazing Livestock Nutrition
(dual listing 5520) and Management 2**
Principles of livestock nutrition and production applied to the grazing environment and the relationships of livestock and range management for optimizing values from both. Prerequisites: ADVS 3510; FRWS 4000 (recommended). (Sp)

ADVS 6530 Nutritional Management of Farm Animals* 3
(dual listing 5530)
Nutritional management, problem solving, and feeding strategies as they influence performance of farm animals. Optimization of nutrition for various species and classes of domestic livestock. Prerequisite: ADVS 3510. (Sp)

ADVS 6540 Animal Energetics and Nutrient
(dual listing 7540) Metabolism 3**
Techniques and procedures in measurement of heat production; factors affecting heat production; efficiency of energy utilization in body processes such as work, growth, and synthesis of fats, proteins, and carbohydrates; and the energetic costs of nutrient interconversion and turnover. Prerequisites: ADVS 6510/7510; CHEM 5700, 5710. (Sp)

ADVS 6550 Protein Metabolism and Utilization 3**
(dual listing 7550)
Processes involved in the digestion, synthesis, and degradation of protein in the rumen, with special emphasis on protein-energy relationships in the rumen and whole animal. Discussion of protein requirements and efficiency of protein utilization. Prerequisite: ADVS 6510/7510. (F)

ADVS 6560 Mineral and Vitamin Metabolism* 3
(dual listing 7560)
Principal roles of minerals and vitamins in nutrient metabolism as they apply to animal nutrition. Prerequisite: ADVS 6510/7510. (F)

ADVS 6600 Principles of Toxicology 3**
(dual listing 7600)
Mechanisms of action and effects of toxicants on living organisms. Prerequisite: ADVS 5350/6350. (F)

ADVS 6690 Animal Histology 3
(dual listing 5690)
Microscopic anatomy and physiology of normal domestic animal's cells, tissues, organs, and system. Prerequisite: ADVS 2200 or permission of instructor. (F)

ADVS 6700 General Animal Pathobiology 3
(dual listing 5700)
Introduction to the principles of gross, microscopic, and physiological changes associated with diseases of domestic animals. Prerequisite: ADVS 6690/5690 or permission of instructor. (Sp)

ADVS 6800 Graduate Student Seminar 1
Seminars on topics of interest in Animal, Dairy and Veterinary Sciences. (F,Sp)

ADVS 6810 Seminar in Toxicology 1®
Graduate seminar in toxicology and related topics. (Sp)

ADVS 6820 Animal Cytogenetics and Gene Mapping 3**
(dual listing 5820)
Structure and properties of chromosomes, chromosome behavior during cell division, chromosomal influence on phenotype, and factors causing changes in chromosome structure and number. Gene markers and gene mapping, with emphasis on applications for livestock. Prerequisite: ADVS 4560 or BIOL 3060. (F)

ADVS 6890 Mechanisms of Animal Disease 3
(dual listing 7890)
Discussion course dealing with biochemical and microbial mechanisms in disease processes, including cellular reaction to injury, host-viral interactions, and host-toxin interactions. Students enrolled in ADVS 7890 will be required to prepare a USDA/NIH grant application. This course is not currently being offered. For information about when it may be offered, contact the department.

ADVS 6900 Special Problems 1-3®
Readings, discussions, lectures, literature reviews, and research problems in animal, dairy, and bioveterinary sciences. Prerequisite: Consent of instructor and department. (F,Sp,Su)

ADVS 6910 Readings and Conference in
Pharmacology and Toxicology 1-3®
Independent readings and conferences in the area of pharmacology and toxicology with particular emphasis on current literature. Prerequisite: ADVS 6350/5350. (F)

ADVS 6970 Research and Thesis 1-12®
(F,Sp,Su)

ADVS 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

ADVS 7210 Molecular Reproduction and
(dual listing 6210) Development * 3
Lecture-based course focusing on current knowledge of genes associated with gametogenesis, fertilization, nuclear reprogramming, and embryonic and fetal development. Prerequisite: ADVS 6200 or permission of instructor. (Sp)

ADVS 7320 Animal Genomics and Proteomics* 3
(dual listing 6320)
Presents in-depth study of current animal genomic and proteomic technologies. Investigates the genetics of animal development, physiology, and disease through the application of techniques used to study genes and the modification of the animal genome. (F)

ADVS 7510 Rumen Physiology and Metabolism* 2
(dual listing 6510)
Discussion of some key aspects of physiology and metabolism of the ruminant digestive tract, with emphasis on the rumen. Topics include anatomy and function; motility; metabolism of protein, carbohydrates, and lipids; rumen microbiology; and common digestive disorders. Prerequisite: ADVS 3510. (Sp)

ADVS 7540 Animal Energetics and
(dual listing 6540) Nutrient Metabolism 3**
Techniques and procedures in measurement of heat production; factors affecting heat production; efficiency of energy utilization in body processes such as work, growth, and synthesis of fats, proteins, and carbohydrates; and the energetic costs of nutrient interconversion and turnover. Prerequisites: ADVS 7510/6510; CHEM 5700, 5710. (Sp)

ADVS 7550 Protein Metabolism and Utilization 3**
(dual listing 6550)
Processes involved in the digestion, synthesis, and degradation of protein in the rumen, with special emphasis on protein-energy relationships in the rumen and whole animal. Discussion of protein requirements and efficiency of protein utilization. Prerequisite: ADVS 7510/6510. (F)

ADVS 7560 Mineral and Vitamin Metabolism* 3
(dual listing 6560)
Principal roles of minerals and vitamins in nutrient metabolism as they apply to animal nutrition. Prerequisite: ADVS 7510/6510. (F)

ADVS 7600 Principles of Toxicology* 3
(dual listing 6600)
Mechanisms of action and effects of toxicants on living organisms. Prerequisite: ADVS 5350/6350. (F)

ADVS 7890 Mechanisms of Animal Disease 3
(dual listing 6890)
Discussion course dealing with biochemical and microbial mechanisms in disease processes, including cellular reaction to injury, host-viral interactions, and host-toxin interactions. Students enrolled in ADVS 7890 will be required to prepare a USDA/NIH grant application. This course is not currently being offered. For information about when it may be offered, contact the department.

ADVS 7970 Dissertation Research 1-12®
(F,Sp,Su)

ADVS 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008.

Agriculture (AG)

See College of Agriculture, pages 109-110.

AG 4250 Advanced Internship and
Cooperative Experience 1-9
Advanced or middle-level internship or cooperative experience to be approved by the Dean's Office. Intended for exchange students interested in a broad agricultural experience. (F,Sp,Su)

Anthropology (ANTH)

See Department of Sociology, Social Work and Anthropology, pages 500-511.

ANTH 1010 BSS Cultural Anthropology 3©
Role of cultural concepts within discipline of anthropology. Relationship of cultural concepts to survival and adaptation, society and social life, ideology and symbolism, and cultural change and diversity. Applications to contemporary world problems. (F,Sp)

ANTH 1020 BLS Biological Anthropology 3
Survey of multidisciplinary field of biological anthropology. Includes study of fossil and living primates, fossil evidence for human evolution, bioarchaeology, contemporary human variation and adaptation, principles of evolutionary theory, and introductory population genetics. (F)

ANTH 2010 BSS Peoples of the Contemporary World 3
(formerly ANTH 2100 BSS)
Introduces different ways of life, rural and urban, from the world's major culture areas. Focuses on how contemporary societies have evolved in ecological, historical, and political context. Introduces problems arising from third world social change. (F)

ANTH 2030 BSS/CI World Archaeology 3
(formerly ANTH 1030 BSS/CI)
Surveys archaeology and the means by which inferences about the past are made. Examines major processes shaping humans, including world colonization, our foraging legacy, origins of agriculture and civilization, and implications of our past for the present and future. (F,Sp)

ANTH 2210 BHU Introduction to Folklore 3
(formerly ANTH 1710 BHU)
Introduction to major genres of folklore (folk narrative, custom, folk music and song, vernacular architecture and arts), folk groups (regional, ethnic, occupational, familial), and basic folklore research method (collecting and archiving). Also taught as ENGL 2210 and HIST 2210. (F,Sp)

ANTH 2720 Survey of American Folklore 3
Principal ethnic, regional, and occupational folk groups in America. Relations between folklore and American history, literature, and society. Key genres in American folklore (narrative, art, song, etc.) and their role in American culture. Also taught as ENGL 2720 and HIST 2720. (Sp)

ANTH 3110 North American Indian Cultures 3
Introduces ethnography of native cultures found within the USA and Canada, documenting their pre-contact adaptations and their interactions with changing national policies leading to today's resurgence of native peoples. (F)[1]

ANTH 3130 CI Peoples of Latin America 3
Survey of Latin American cultures, past and present. Emphasis on culture as a dynamic, adaptive system and on contemporary issues in rural and urban Andean South America, Amazonia, and Mesoamerica. Appropriate for both majors and nonmajors.[4]

ANTH 3150 Applied Anthropology Survey:
History, Uses, Methods, and Careers 3
Surveys the field of applied anthropology, including discussions of emergence, application, and usefulness. Introduces students to methods and skills used by practitioners, as well as to those used to prepare for careers in applied anthropology. (F,Sp)[1,2]

ANTH 3160 DSS Anthropology of Religion 3
Cross-cultural description and theoretical analysis of religion and its functional relationships to human psychology, society, and the natural environment. (F)

ANTH 3200 DSS/CI Perspectives on Race 3
Study of the processes of racial differentiation, the basis of biological differences found among existing human groups, the influence of biology and culture on human variation, and the influence of social context on perceptions of race. (Sp)

ANTH 3250 Osteology 3
Detailed hands-on study of human skeleton, including component of comparative vertebrate skeletal anatomy. Applications to fields of archaeology, forensic science, paleopathology, and zoology. Includes methods component. (F)[2]

ANTH 3300 DSS Archaeology in North America 3
Prehistoric and historic archaeology of the North American continent. Explores initial colonization and Native American origins; variability among foraging adaptations; spread of farming; cultural complexity in Midwest, Southwest, and West Coast; Indian-environment relationships; European contact; depopulation; and historic archaeology of Euro-Americans. (Sp)[1]

ANTH 3310 CI Introduction to Museum Studies 3
Explores all aspects of museum work, from the acquisition and storage of collections to fundraising and educational programs. As part of course requirements, students tour area museums and get first-hand perspectives on the challenges and rewards of museum work from professionals in the field. (Sp)[1,2]

Course Descriptions

ANTH 3320 DSS Ancient Humans and the Environment 3
Explores human-environment relationships during the past 40,000-plus years, from small-scale societies to ancient civilizations. In this problem-oriented, topical course, emphasis placed on small group projects, discussion, writing, and oral presentation. (F)[1]

ANTH 3350 DSS Archaeology of Ancient Civilizations 3
Surveys primary states in antiquity, including Mesopotamia, China, Egypt, South America, and Mesoamerica. In-depth study of the process of their formation and theories of their origins. Emphasis is anthropological and scientific to complement the classical and humanistic. (Sp)[1]

ANTH 3990 History and Theories of Anthropology 3
Traces history of anthropology, main currents of theoretical thought shaping claimed anthropological knowledge, and major figures associated with the discipline. Conceptualizes anthropology among the social sciences, life sciences, and humanities. Prerequisite: ANTH 1010. (F)[3]

ANTH 4100 The Study of Language 3
Investigates ways in which human languages are structured, how they change, how they reflect the cultures in which they are used, and how they are learned. Also taught as LING 4100. (F,Sp)

ANTH 4110 DSS Southwest Indian Cultures,
(dual listing 6110) Past and Present 3
Reviews past and present Indian cultures of greater southwest region. Examines the prehistoric Anasazi, the Pueblos, the canyon and desert peoples, the Utes, and the Navajos. Interprets these cultures in ecological, historic, and political contexts. (F)[1]

ANTH 4120 CI/DSS Ethnography of Childhood 3
Focuses on ethnographic methods and the anthropological study of childhood. Students design and carry out ethnographic study of children in school, family, or other setting. Readings of ethnograpic studies of childhood from the U.S. and abroad. Includes methods component. (F)[1,2]

ANTH 4130 DSS Medical Anthropology: Matter,
Culture, Spirit, and Health 3
Examines the bio-ecological (matter) and socio-cultural aspects of disease/illness in human populations and examines "spiritual" dimensions of health in cross-cultural context. Includes methods component for anthropology majors and serves as a Liberal Arts cluster capstone course. (Sp)[1,2]

ANTH 4150 QI Problems in Cultural Anthropology 3
Introduction to the wide range of information obtainable through the study of cross-cultural data. Methods and techniques of scientific inquiry in cultural anthropology explored through critical evaluation of quantitative, cross-cultural research literature and analysis of cultural data using SPSS. Prerequisites: ANTH 1010 and STAT 1040. (F,Sp)[1]

ANTH 4250 QI Problems in Bioarchaeology 3®
Examines various approaches to the study of human biocultural adaptation through the analysis of human remains from archaeological sites. Includes methods component. Prerequisite: STAT 1040 or ANTH 3250 or permission of instructor. (Sp)[1,2,3]

ANTH 4350 Archaeological Method/Theory and
Cultural Resource Management 3
Examines contemporary theories, as well as methods used by archaeologists to address questions arising from theory. Also considers contributions of cultural resource management to meeting anthropological and public concerns. Includes methods component. Prerequisite: ANTH 2030; and one of the following courses: ANTH 3300, 3350, 4360, or 4380. (Sp)[1,2,3]

ANTH 4360 DSS Ancient Desert West 3-4
Prehistoric to historic human ecology and paleoenvironments of the Great Basin, Southwest, and southern California deserts. Emphasizes perspective of human evolutionary ecology and detailed examination of the archaeological record in conjunction with paleoenvironmental data. For classroom work only, 3 credits are granted. For 4 credits, one or more weekend field trips are required. Prerequisite: ANTH 2030 or permission of instructor. (F)[1,3]

ANTH 4370 Archaeology and Paleoenvironments
Field Trip 2
Two-hour class session and assigned readings prepare students for a three-day field trip to explore the archaeology and paleoenvironments of the northern Bonneville Basin. Post-field writing assignment integrates the field experience with readings and discussion. Prerequisite: Instructor permission. (F)

ANTH 4380 Peopling of the New World 3
Explores how, when, and why humans first populated the Americas. Through emphasis on critical thinking and hypothesis testing, students scientifically evaluate evidence for initial colonization drawn from the fields of archaeology, biological anthropology, genetics, and linguistics. (Sp)[1]

ANTH 4800 Topics in Anthropology 1-3®
Focuses on special topics in anthropology. Topics and course format vary.

ANTH 4990 Contemporary Issues in Anthropology 3
Capstone course in anthropological theory and method, required for all majors. Prerequisite: ANTH 1010. Recommended Prerequisite: ANTH 3990. (Sp)[1,3]

ANTH 5100 DSS Anthropology of Sex and Gender 3
(dual listing 6100)
Increases awareness of sexuality and gender, and of feminist perspectives about social problems related to gender and sexuality that cross-cut cultural boundaries. Emphasizes gender-related social problems in contemporary world societies. (Sp)[1]

ANTH 5120 Applied Rural Development 3
(dual listing 6120)
Reviews development anthropology for practitioners. Examines human dimensions of planned policy, program, and project interventions. Examines how rural development occurs and how it is analyzed and managed in selected real-world cases. Includes methods component. (Sp)[1]

ANTH 5130 Ethnographic Field School 3-6
(dual listing 6130)
Provides practical training in use of ethnographic field methods, qualitative data analysis, and ethnographic report-writing. Combines classroom instruction with supervised off-campus field research, while living in a cross-cultural setting. Fulfills program methods requirement. Application and additional fee required. Also taught as SOC 5130/6130. (Su)

ANTH 5160 DSS Cities and Development 3
(dual listing 6160)
Examines role of emergent urban areas in national development. Employs ethnographic case studies of selected cities, coupled with a policy perspective on problems of hyperurbanization in both poor and more advanced societies. Includes methods component. (Sp)[1]

ANTH 5190 Applied Anthropology Practicum 1-5®
Supervised projects in applied anthropology for advanced students. Integrates academic knowledge and field technique. Minimum contact hours, requirements, and credits available vary. Includes methods component. Prerequisite: Application and instructor approval.[2,3]

ANTH 5210 Physical Anthropology Lab 1-3
Laboratory experience enabling participation in analysis/reporting stages of physical anthropology projects. Includes methods component. Prerequisite: Permission of instructor.[2,3]

ANTH 5300 Archaeology Field School 1-5®
Internship on archaeological field project, including survey, excavation, recording, mapping, and scientific conduct of archaeological problem solving. Application process begins in March. Additional field support fee required. Prerequisites: ANTH 2030 and instructor's permission. (Su)[2,3]

ANTH 5310 Archaeology Lab 1-3®
Laboratory experience enabling participation in analysis/reporting stages of archaeology projects. Includes methods component. Prerequisite: Permission of instructor.[2,3]

ANTH 5650 DSS Developing Societies 3
(dual listing 6650)
Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing

livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. Also taught as GEOG 5650/6650 and SOC 5650/6650. (F)[1]

ANTH 5700 Folk Narrative 3
Forms and functions of folk narrative genres: myth, legend, folktale, memorate, and ballad. Also taught as ENGL 5700 and HIST 5700. (Sp)

ANTH 5800 Museum Development 1-3®
Apprenticeship in the USU Museum of Anthropology to learn the operation of a small museum. Entails close ongoing consultation with museum director and other staff members. Possible projects include artifact curation, exhibit development, public outreach, and others. Prerequisite: Instructor's permission. (F,Sp,Su)[2,3]

ANTH 5900 Independent Studies 1-3®
Customized study or readings for upper-division or graduate students on topics not covered in regular courses. Prerequisite: Approval, prior to registration, of proposal written by student in consultation with instructor.

ANTH 5980 Senior Project 1
Develops advanced research and writing skills in a specialty area, and results in a research project/report. Must register in combination with a 4000- or 5000-level anthropology course, in consultation with instructor and subject to approval.

ANTH 6100 Anthropology of Sex and Gender 3
(dual listing 5100)
Increases awareness of sexuality and gender, and of feminist perspectives about social problems related to gender and sexuality that cross-cut cultural boundaries. Emphasizes gender-related social problems in contemporary world societies. (Sp)[1]

ANTH 6110 Southwest Indian Cultures,
(dual listing 4110) Past and Present 3
Reviews past and present Indian cultures of greater southwest region. Examines the prehistoric Anasazi, the Pueblos, the canyon and desert peoples, the Utes, and the Navajos. Interprets these cultures in ecological, historic, and political contexts. (F)[1]

ANTH 6120 Applied Rural Development 3
(dual listing 5120)
Reviews development anthropology for practitioners. Examines human dimensions of planned policy, program, and project interventions. Examines how rural development occurs and how it is analyzed and managed in selected real-world cases. Includes methods component. (Sp)[1]

ANTH 6130 Ethnographic Field School 3-6
(dual listing 5130)
Provides practical training in use of ethnographic field methods, qualitative data analysis, and ethnographic report-writing. Combines classroom instruction with supervised off-campus field research, while living in a cross-cultural setting. Fulfills program methods requirement. Application and additional fee required. Also taught as SOC 6130/5130. (Su)

ANTH 6160 Cities and Development 3
(dual listing 5160)
Examines role of emergent urban areas in national development. Employs ethnographic case studies of selected cities, coupled with a policy perspective on problems of hyperurbanization in both poor and more advanced societies. Includes methods component. (Sp)[1]

ANTH 6650 Developing Societies 3
(dual listing 5650)
Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. Also taught as GEOG 6650/5650 and SOC 6650/5650. (F)[1]

ANTH 6900 Independent Studies 1-3®
Customized study or readings for graduate students on topics not covered in regular courses. Prerequisite: Approval of proposal written by student in consultation with instructor.

[1]This course is taught alternating years. Check with department for information about when course will be taught.

[2]This course may be used to satisfy the methods component requirement for the anthropology major.
[3]This course has one or more prerequisites. Check with the department for details.
[4]This course is offered infrequently. Check with department for information about when course will be taught.
[®]Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
[©]This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Art (ART)

See Department of Art, pages 158-168.

ART 1010 BCA Exploring Art 3©
(formerly ART 1100)
Introduction to the visual arts, including the language, elements, and history of art. (F)

ART 1020 Drawing I 3
(formerly ART 1110)
Introduction to the visual language of drawing, the graphic elements, various drawing media, and the creative problems involved. (F,Sp)

ART 1050 Introduction to Photography 3
(formerly ART 2800)
Overview of photography. Operation of camera and related equipment, exposure and development of black and white and color positive film materials, and enlarging and printing of black and white negatives, with a strong emphasis on composition and photographic aesthetics. (F)

ART 1110 Drawing I (Art Majors Only) 3
(formerly ART 1140)
Development of foundation drawing skills for art majors. Introduction to fundamental drawing principles and various drawing media through creative applications. Required for art majors. Enrollment limited to art majors having freshman standing (30 or less earned credits) *only*. (F,Sp)

ART 1120 Two-dimensional Design 3
Study and problem solving of form, space, texture, value, and color theory. (F,Sp)

ART 1130 Three-dimensional Design 3
Fosters development of basic understanding of three-dimensional form and space relationships. Includes three-dimensional problem solving, as well as use of a range of materials. (F,Sp)

ART 1150 Two-dimensional Design
(Art Majors Only) 3
Foundation design course for art majors. Exploration of the elements and principles of two-dimensional design. Extensive use of a variety of media in creative problem solving. Required for art majors. Enrollment limited to art majors having freshman standing (30 or less earned credits) *only*. (F,Sp)

ART 1160 Three-dimensional Design
(Art Majors Only) 3
Foundation design course for art majors. Exploration into the principles and vocabulary of visual organization in three dimensions. Through the manipulation of a variety of materials, students gain understanding of form and space. Required for art majors. Enrollment limited to art majors having freshman standing (30 or less earned credits) *only*. (F,Sp)

ART 2110 Drawing II 3
(formerly ART 2140)
A continuation of ART 1020 or 1110, with an emphasis on more complex problems and techniques. Prerequisite: ART 1020 or 1110 or permission of instructor. Enrollment limited to art majors having freshman standing (30 or less earned credits) *only*. (F,Sp)

ART 2200 Painting I 3
Introduction to visual language of painting. Focuses on organization of visual ideas and basic oil painting techniques. Provides experience in both direct and indirect painting methods, as well as introducing applied color concepts. Prerequisites: ART 1020 or 1110; and ART 1120 or 1150. (F)

Course Descriptions

ART 2220 Watercolor Painting 3
Exploration of formal, technical, and conceptual problems in water media, for students with basic painting experience. Emphasis on gaining proficiency in both transparent and opaque watercolor techniques. Prerequisite: ART 2200. (F,Sp)

ART 2230 Basic Printmaking 3
Introductory course to acquaint students with the broader aspects of relief, intaglio, and planographic processes. Prerequisites: ART 1020 or 1110; and ART 1120 or 1150. (F)

ART 2400 Computers and Art 3
Basic course dealing with the study and use of the personal computer as a creative medium. Emphasizes hands-on software training directed toward the art of visual design and aesthetic expression. Several projects created using the computer and related peripherals. Discusses various forms of digital output and communications. Critical reviews of art projects focus on the elements and principles of visual design, as well as basic graphic design concepts. Enrollment limited to Art majors *only*. (F)

ART 2600 Basic Sculpture 3
Introduction to additive and subtractive processes in the realization of sculptural ideas. Student involvement in carving, clay modeling, and construction projects. Prerequisite: ART 1130 or 1160. (F,Sp)

ART 2650 Introduction to Ceramics 3
Introduction to basic processes of ceramics and the operation of the USU ceramics lab. Includes handbuilding, throwing, and firing. (F,Sp,Su)

ART 2810 Photography I 3
Black and white photography, including camera operation, exposure and development, and enlarging and printing of black and white negatives, with a concern for advancing technical controls, aesthetics, and darkroom experimentation. Introduction to electronic imaging. (F,Sp)

ART 2900 Introductory Internship/Coop 3®
Introductory level educational work experience in an internship/cooperative education position approved by the Department of Art. (F,Sp)

ART 3000 Secondary Art Methods I 3®
Focuses on developing art curricula by formulating objectives for teaching art history, art appreciation, and the making of art in the secondary schools. Required for art education majors. (F,Sp)

ART 3050 Japanese Calligraphy 1®
Study of Japanese writing system through practicing the art of calligraphy. No prerequisites. Also taught as JAPN 3050. (Sp)

ART 3110 DHA/CI Ancient Near East 3
Survey of history and civilization of ancient Mesopotamia, Egypt, and Israel, from prehistory to 500 B.C. Writing intensive. Prerequisite: ENGL 2010 or equivalent. Also taught as HIST 3110. (F,Sp)

ART 3200 Painting II 3
Continuation of concepts and techniques covered in ART 2200, emphasizing more complex formal and conceptual problems. Prerequisite: ART 2200. (Sp)

ART 3210 Classical Mythology* 3
Introduces major myths of the Classical world. Explores how these myths serve as keys to understanding the documents and arts of Classical civilization. Also taught as CLAS 3210. (Sp)

ART 3220 Screen Printing 3
Investigation of the basic processes employed in screen printing. Includes surface preparation, image preparation, drawing techniques, registration, and printing of the screen. Prerequisite: ART 2230. (Sp)

ART 3230 Lithography 3
Investigation of the basic processes employed in lithography, including surface preparation, basic drawing techniques, registration, processing, and printing of the stone or plate, as well as photo, transfer, and color methods. Prerequisite: ART 2230. (F)

ART 3240 Intaglio 3
Investigation of the basic processes employed in intaglio, including acid (line etch, aquatint, lift grounds, soft ground) and nonacid (dry point, mezzotint, engraving) techniques, as well as transfer and color methods. Prerequisite: ART 2230. (Sp)

ART 3250 Relief Prints 3®
Introduction to relief printing, including woodcut, linoleum cut, and wood engraving. Prerequisite: ART 2230. (F)

ART 3260 Anatomy for Artists 3
Study of principles of anatomical structure of the figure as it applies to two-dimensional and three-dimensional art media. Prerequisites: ART 1020 or 1110; and ART 2110. This course is not currently being offered. For information about when it may be offered, contact the department.

ART 3270 Color: Theory and Practice 3
Explores both the theory and application of color in the visual arts. Special emphasis placed on the development of applied color skills. (Su)

ART 3300 Clinical Experience I 1®
First clinical practicum (30 hours minimum) in middle and secondary schools, arranged by special methods instructors in department. Required at level I. (Sp)

ART 3350 Drawing for Illustration 3®
Encourages drawing with a variety of media. Students will draw from the model in class. Homework consists of filling two 100-page sketchbooks with drawings from life, memory, or photographs.

ART 3370 Illustration Concepts* 3®
Students learn to develop visual ideas for illustrations and carry an idea through the stage of roughs to a comprehensive and finished image, using both digital and traditional media. Prerequisites: ART 1020 or 1110; ART 1120 or 1150; and ART 2400. (F)

ART 3400 Typography 3®
Introductory graphic design course, dealing with concepts and principles related to the exploration of typography as an art and design element. Series of exercises designed to give students professional and philosophical look at aesthetic and functional use of type and related visual elements. Prerequisites: ART 1120 or 1150; and ART 2400. (Sp)

ART 3420 Communication Arts Seminar 1®
Lecture seminars by professional guest artists in illustration and graphic design. (F,Sp)

ART 3610 Intermediate Sculpture 3
Further development in the materials, techniques, and traditions of sculpture. Expands on specific explorations, such as modeling, construction, and carving. Emphasizes strong relationship between concept and the technical execution of a sculptural form. Prerequisite: ART 2600. (F)

ART 3650 Intermediate Ceramics: Handbuilding 3®
Application of traditional ceramic construction techniques to vessel and sculptural subjects. Prerequisite: ART 2650. (F)

ART 3660 Intermediate Ceramics: Throwing on the Potter's Wheel 3®
Focuses on throwing and trimming techniques using the potter's wheel. Emphasizes production of multiples. Prerequisite: ART 2650. (Sp)

ART 3700 Elementary Art Methods 3®
Focuses on developing art curricula by formulating objectives for teaching art processes, art history, and art appreciation in the elementary schools. Required preparation for a grade school teacher. (F,Sp)

ART 3710 Fine Art Seminar 1®
Lecture seminars given by professionals as part of the Art Department visiting artist program. (F,Sp)

ART 3810 Photography II 3
Advanced black and white photography emphasizing technical controls, including the zone system and introduction to the 4x5 camera. Application of technical skills to enhance creative photographic expression. Continuation of digital imaging and use of computer for sensitometry graphing. Prerequisite: ART 2810 or equivalent experience. (Sp)

ART 3820 History of Early Photography* 3
Reviews early history of photography, beginning before the 1839 public announcement by Daguerre and continuing through the early twentieth century. Explores social change, invention, and the fulfillment of the artist's desire to represent reality. (Sp)

ART 3830 History of Contemporary Photography 3**
Reviews history of contemporary photography, beginning with the modernist movements of the 1920s and progressing through the aesthetic, technical, and communicative changes, up to today's contemporary uses of the medium. Examines photography's relationship to the historical changes in society, through its evolution as an art form, a commercial venue, and a visual record. (Sp)

ART 4000 Secondary Art Methods II 3®
Focuses on developing methodologies for presenting art concepts and techniques in the secondary schools. Prerequisite: ART 3000. (F)

ART 4200 Advanced Painting Studio 3-6®
Advanced individual painting projects. Students may use a variety of painting methods to execute a series of closely related paintings that are intended to develop a focused and personal portfolio. Prerequisite: ART 2200. (F,Sp)

ART 4210 Figure Painting 3®
Painting from the model, with emphasis on solving problems of the planar structure of the human form. Prerequisites: ART 3200 and 3260. (Sp)

ART 4250 Advanced Printmaking Studio 1-9®
In-depth investigation of one printmaking process with emphasis placed on both technical and aesthetic considerations. Prerequisites: ART 2230 and consent of instructor. (F,Sp)

ART 4260 Life Drawing 3®
Drawing from live models with emphasis on exploring interpretation, techniques, and compositional approach. Prerequisites: ART 1020 or 1110; and ART 2110. (Sp)

ART 4300 Clinical Experience II 1®
Second clinical practicum (30 hours minimum) in middle and secondary schools, arranged by special methods instructors in department. Required at level II. Prerequisite: ART 3300. (F)

ART 4370 Illustration Studio 3®
Students build and enhance their portfolios through solving a series of advanced illustration problems. Emhasizes development of personal style through an examination of content, materials, and techniques. Explores both digital and traditional media. Prerequisite: ART 3370. (Sp)

ART 4410 Graphic Interface Design I 3®
Concentrates on development of graphic design techniques and theories necessary to create successful graphical user interfaces. Students explore aesthetic and functional uses of motion, sound, interactivity, information architecture, branding, and typography as they relate to graphic interface design. Prerequisites: ART 4420, 4440. (F)

ART 4420 Brand Identity Design 3
Advanced studio course focusing on the visual expression of a brand. Students study the design and application of trademarks/logos, related brand strategies, positioning, and processes of research and analysis. Students complete a series of symbol design and application projects. Prerequisite: ART 3400. (F)

ART 4430 Graphic Interface Design II 3®
Advanced graphic design course exploring dynamic interactivity. Students take a professional and philosophical look at the use of multimedia as it relates to business and society. Emphasizes research and the exploration of innovative ideas using interactive interface as a vehicle for communicating information. Prerequisite: ART 4410. (Sp)

ART 4440 Type, Image, and Visual Continuity 3®
Examines the application of design theory and process to complex information organization systems. Focuses on relationships between typography, imagery, and visual continuity. Students design varied text-intensive publications and image-intensive poster projects. Prerequisite: ART 3400. (Sp)

ART 4450 Portfolio Preparation 1-9®
Builds students' job-seeking portfolios through lectures, critiques, and studio work. Existing projects are refined and gaps are filled in with new projects. All work must meet professional standards, with focus on quality and job-related subject matter. Prerequisites: ART 4410, 4420, 4440. (F)

ART 4460 Advanced Computer Graphics Studio 1-9®
Independent research and development of advanced projects in the field of digital graphics. Prerequisiste: ART 4440. (F,Sp,Su)

ART 4470 Special Topics in Graphic Design and Illustration 1-9®
Focuses on various issues in the field of visual communications design. Allows students to pursue production of digital and traditional projects related to the topic of the course. Content of this studio course varies from semester to semester. Prerequisite: Permission of instructor. (F,Sp,Su)

ART 4610 Sculpture Projects 3®
Develops skills in a particular sculptural methodology. Investigates genres of public sculpture, installation, and advanced modeling, from traditional to contemporary. Stresses ideas based in a broader context of social and cultural issues. Prerequisite: ART 3610. (Sp)

ART 4620 Sculpture Seminar 3
Designed to focus on and challenge current assumptions in regard to contemporary issues in sculpture. Prerequisite: ART 4660. (F)

ART 4640 Technology of Ceramic Art 3®
Selected topics in aesthetics and technology of ceramic art, including ceramic history, glaze chemistry and calculation, firing techniques, kiln design and construction, etc. Students enrolling for more than 3 credits arrange credit for directed studies in specific topics. Prerequisites: ART 3650, 3660. (F,Sp,Su)

ART 4650 Advanced Ceramic Studio 3-6®
Provides time, equipment, and facilities for advanced students to pursue directed studies leading to personal expression through ceramic media. To be repeated during at least four semesters by art majors with ceramics emphasis. Prerequisites: ART 3650, 3660. (F,Sp,Su)

ART 4660 Advanced Sculpture Studio 1-9®
Advanced directed study in specific technical, aesthetic, and/or conceptual issues in sculpture. Prerequisite: ART 4610. (Sp)

ART 4780 Sacred Art: Art of the World's Major Religions 3
Designed to give students understanding of the world's seven major religions or "wisdom traditions" (Hinduism, Buddhism, Confucianism, Taoism, Judaism, Christianity, and Islam) through the history of their art. (Alt Sp)

ART 4790 Art History Seminar and Special Problems 1-6®
Prerequisite: Permission of instructor. (F,Sp,Su)

ART 4810 Digital Photography 3®**
Continued exploration of digital photography, from computer to studio, with strong ties to traditional image making. Digital image processing and use of both software and hardware of digital photography. Study of ethical, artistic, and personal issues. Prerequisite: ART 3810. (F)

ART 4820 Nineteenth Century Photography Printing Processes* 3
Introduction to hand-made photographic emulsions invented and used in the nineteenth century. Production of gum prints, cyanotypes, photogravures, carbon prints, and platinum prints. Explores unique visual characteristics of each process. Includes basic bookbinding. Prerequisite: ART 3810. (F)

ART 4830 Independent Projects in Photography 1-9®
Student-initiated, independent projects in photography. Provides opportunity for students to gain technical proficiency and aesthetic creativity. Major emphasis on critiques and group discussions. Prerequisite: ART 3810 or permission of instructor. (F,Sp,Su)

Course Descriptions

ART 4840 Color Photography I* 3
Introduction to technical, conceptual, aesthetic, and digital explorations available with exposure and development of color positive and negative films. Investigation of color theory accompanied by production of correctly balanced color prints. Prerequisite: ART 3810. (F)

ART 4850 Color Photography II* 3
Continuation of study with color materials including digital investigations. Explores alternative techniques and manipulative capabilities with color processes. Stresses individual pursuit of color print portfolio. Prerequisite: ART 4840. (Sp)

ART 4860 Photographic Studio 3**
Exploration of the photographic studio, 4x5 view camera, the principles of applied lighting, and the communication of an idea through photography. Commercial, editorial, portrait, and digital photography directed toward professional portfolio preparation. All students required to have 4x5 camera. Enrollment limited to BFA students *only*. Prerequisite: ART 3810. (F)

ART 4870 Photographic Portfolio 3**
Advanced photography class in preparation for life after graduation. Strong emphasis on work toward a personal professional portfolio (fine art and commercial) and written support documentation (resumes, cover letters, artist statement, etc.). Enrollment limited to BFA students *only*. Prerequisite: ART 4860. (Sp)

ART 4880 Imaging Services 3
Internship situation at a commercial photographic studio and lab facility. Prerequisites: ART 4810, 4840. Enrollment limited to BFA candidates *only*. (F,Sp,Su)

ART 4900 Advanced Internship/Coop 1-9®
Internship/cooperative education work experience in art. For those students needing complexity and a more professional level of experience in the workplace. (F,Sp)

ART 4910 Senior BFA Exhibition 2
Professional presentation and exhibition procedures. Enrollment limited to senior standing and BFA candidates *only*. Required for all BFA candidates. Prerequisite: Approval of advisor. (Sp)

ART 4920 Independent Projects 1-9®
Student-planned projects, executed through individual initiative and scheduled consultation with instructor. Prerequisites: ART 1020 or 1110; ART 1120 or 1150; and ART 1130 or 1160. (F,Sp,Su)

ART 4930 Student Teaching at University Level 3
Teaching methods and procedures for university-level classes, working directly with faculty in lower-division classes. Prerequisite: Approval of instructor. (F,Sp,Su)

ART 5500 Student Teaching Seminar 2
Capstone seminar focused upon student teaching issues, professional development, and principles of effective instruction, emphasizing a reflective methodology. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. (F,Sp)

ART 5630 Student Teaching in Secondary Schools 10
Thirteen-week culminating practicum in which students assume full-time teaching responsibilities under direction of cooperating teachers in major and minor fields. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. (F,Sp)

ART 6200 Graduate Drawing and Painting Studio 1-9®
Emphasizes individual attainment of personal conviction or direction in painting. Prerequisite: Graduate status. (F,Sp,Su)

ART 6250 Graduate Printmaking Studio 1-9®
Intensive individual production in advanced printmaking techniques. Prerequisite: Graduate status. (F,Sp,Su)

ART 6370 Graduate Illustration Studio 3-9®
(Advertising, Editorial, Fashion.) Techniques in advertising illustration meeting the needs of client and his or her audience. Prerequisite: Graduate status. (F,Sp,Su)

ART 6400 Graduate Graphic Design Studio 3-9®
Graphic design problems leading to understanding of major concepts in this area. Prerequisite: Graduate status. (F,Sp,Su)

ART 6640 Technology of Ceramic Art 3®
Selected topics in aesthetics and technology of ceramic art, including ceramic history, glaze chemistry and calculation, firing techniques, kiln design and construction, etc. Prerequisite: Graduate status. (F,Sp,Su)

ART 6650 Graduate Ceramic Studio 3-9®
Arranged to provide time, equipment, and facilities for graduate students to pursue directed studies. Tutorial format with group critiques. Prerequisite: Graduate status. (F,Sp,Su)

ART 6660 Graduate Sculpture Studio 3-9®
Advanced individual problems in various media and technique. Prerequisite: Graduate status. (F,Sp,Su)

ART 6710 Graduate Greek and Roman Art 3
Origin and development of the art and architecture of Crete, Mycenae, Greece, and the Roman world. Prerequisite: Graduate status. (Sp)

ART 6770 Graduate Gender Issues in Art 3
Discussion of major issues and debates regarding gender in the visual arts. Topics include: revising the canon, representing gender, and theories of gender and spectatorship. Readings are discussed and applied to visual works of art.

ART 6790 Art History Seminar and Special Problems 1-6®
Prerequisite: Graduate status and consent of instructor. (F,Sp,Su)

ART 6800 Graduate Photography Studio 3-9®
Designed to cover several phases of photography, with emphasis on composing what we see in an artistic manner. Allows graduate students to further emphasize their thesis project area of study. Prerequisite: Graduate status. (F,Sp,Su)

ART 6900 Graduate Seminar 3®
Deals with general topic of professional practice, including art criticism and how contemporary work relates to current social issues. Prerequisite: Graduate status. (F,Sp)

ART 6910 Graduate Interdisciplinary Critique 1®
Focuses on current work of critique participants. Brings disciplinary analysis to specific problem. Prerequisite: Graduate status. (F,Sp)

ART 6920 Graduate Independent Projects in Art 1-9®
Advanced problems in emphasis, medium, and idiom of student's choice. Student plans project and executes it through individual initiative and scheduled consultation with the instructor. Prerequisites: Consent of instructor, graduate status. (F,Sp,Su)

ART 6940 Graduate Internship/Coop 1-9®
Internship/cooperative education work experience in art. Designed to allow graduate students to receive more complex and professional workplace experience. Prerequisite: Graduate status. (F,Sp,Su)

ART 6970 Research and Thesis 3®
Prerequisite: Candidacy status. (F,Sp,Su)

ART 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.

Art History (ARTH)

See Department of Art, pages 158-168.

ARTH 2710 BHU Survey of Western Art: Prehistoric to Medieval 3©
(formerly ART 2710 BHU)
Prehistoric art through the end of the Gothic era. (F)

ARTH 2720 BHU Survey of Western Art: Renaissance to Post-Modern 3©
(formerly ART 2720 BHU)
Renaissance through modern. (Sp)

ARTH 4510 DHA Islamic Visual Cultures* 3
(dual listing 6510)
(formerly ART 3720 DHA)
Explores the emergence and development of Islamic visual cultures in Asia and around the Mediterranean between 622 and 1250. Recommended prerequisite: ARTH 2710. (Sp)

ARTH 4610 Greek and Roman Art* 3
(dual listing 6610)
(formerly ART 4710)
Origin and development of art and architecture of Crete, Mycenae, Greece, and the Roman world.

ARTH 4620 DHA Byzantine Art* 3
(dual listing 6620)
(formerly ART 3130 DHA)
Focuses on the art and architecture of the Byzantine empire from late antiquity to the fifteenth century. In addition to including study of the visual arts, course incorporates readings in the history of religion and gender studies. Recommended prerequisite: ARTH 2710. (F)

ARTH 4630 DHA Medieval Art* 3
(dual listing 6630)
(formerly ART 3140 DHA)
Covers art and architecture in Europe between 450 and 1450, with an emphasis on cultural diversity and artistic variety. Study of the visual arts is complemented by readings in history and literature. Recommended prerequisite: ARTH 2710. (Sp)

ARTH 4720 Renaissance Art 3
(formerly ART 4720)
Development of European art and architecture from the thirteenth to the sixteenth century.

ARTH 4730 Baroque and Rococo Art 3
(formerly ART 4730)
Development of painting, sculpture, and architecture in Europe from the late sixteenth through the eighteenth centuries.

ARTH 4740 Nineteenth Century Art 3
(formerly ART 4740)
Painting and sculpture from Neoclassicism to Symbolism. Prerequisite: ARTH 2720.

ARTH 4750 Twentieth Century Art* 3
(formerly ART 4750)
History of painting, sculpture, and architecture from post-impressionists to the present. Prerequisite: ARTH 4610.

ARTH 4760 American Art 3
(formerly ART 4760)
History of painting, sculpture, and architecture in America from colonial times to the present. Prerequisite: ARTH 2720. (Sp)

ARTH 4800 Directed Reading and Research in Art History 1-3
Directed reading, writing, and research in art history. Prerequisite: Permission of instructor. (F,Sp)

ARTH 4810 Museum Internship 1-3
Through this course, advanced art history students may arrange for credit in conjunction with a local museum. Supervisor at museum oversees student's work. A faculty member in Art History oversees the written component, including portfolio, documentation, and research paper, depending on number of credits student is enrolled for. Prerequisite: Permission of instructor. (F,Sp)

ARTH 5710 Gender Issues in Art* 3
(formerly ART 4770)
Discussion of major issues and debates regarding gender in the visual arts. Topics include: revising the canon, representing gender, and theories of gender and spectatorship. Readings are discussed and applied to visual works of art. (Sp)

ARTH 5720 Central European Art* 3
(formerly ART 4110)
Discussion-based seminar covering the traditionally neglected theme of art in Central Europe. Emphasizes modern art, with the theme of national identity as a constant concern. (F)

ARTH 5730 The Art Museum* 3
The history of museums and display practice has become a significant field in studies of contemporary art and art history. Topics covered include: cabinets of curiosity and historical origins, art museums and their publics, blockbusters, revisionism, architecture, museums, and memory.

ARTH 6510 DHA Islamic Visual Cultures* 3
(dual listing 4510)
(formerly ART 3720 DHA)
Explores the emergence and development of Islamic visual cultures in Asia and around the Mediterranean between 622 and 1250. Recommended prerequisite: ARTH 2710. (Sp)

ARTH 6610 Greek and Roman Art* 3
(dual listing 4610)
(formerly ART 4710)
Origin and development of art and architecture of Crete, Mycenae, Greece, and the Roman world.

ARTH 6620 Byzantine Art* 3
(dual listing 4620)
(formerly ART 3130 DHA)
Focuses on the art and architecture of the Byzantine empire from late antiquity to the fifteenth century. In addition to including study of the visual arts, course incorporates readings in the history of religion and gender studies. Recommended prerequisite: ARTH 2710. (F)

ARTH 6630 DHA Medieval Art* 3
(dual listing 4630)
(formerly ART 3140 DHA)
Covers art and architecture in Europe between 450 and 1450, with an emphasis on cultural diversity and artistic variety. Study of the visual arts is complemented by readings in history and literature. Recommended prerequisite: ARTH 2710. (Sp)

ARTH 6720 Graduate Renaissance Art 3
(formerly ART 6720)
Development of European art and architecture from the thirteenth to the sixteenth centuries. Prerequisite: Graduate status. (F)

ARTH 6730 Graduate Baroque and Rococo Art 3
(formerly ART 6730)
Development of art and architecture in Europe from the sixteenth to the eighteenth centuries. Prerequisite: Graduate status. (Sp)

ARTH 6740 Graduate Nineteenth Century Art 3
(formerly ART 6740)
Painting and sculpture from Neoclassicism to Symbolism. Prerequisites: ARTH 2720 or consent of instructor, graduate status. (F)

ARTH 6750 Graduate Twentieth Century Art 3
(formerly ART 6750)
History of painting, sculpture, and architecture from the post-impressionists to the present. Prerequisite: Graduate status. (Sp)

ARTH 6760 Graduate American Art 3
(formerly ART 6760)
History of painting, sculpture, and architecture from the post-impressionists to the present. Prerequisite: Graduate status. (F)

ARTH 6900 Graduate Seminar: Issues in Contemporary Art 3
Sessions devoted to select issues prevalent in contemporary art, including the body, the real, text, gender, display, and conceptualism. Requires intensive verbal and written participation. (Sp)

©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught alternate years. For further information, consult department.

Aerospace Studies (AS)

See Department of Aerospace Studies, pages 136-137.

AS 1010 Introduction to the Air Force Today 1
AS 1020 Introduction to the Air Force Today 1
Introduces the United States Air Force and Air Force Reserve Officer Training Corps. Air Force mission and organization, officership and professionalism, military customs and courtesies, officer opportunities, group leadership problems, and communication skills. Leadership Laboratory is mandatory for cadets. (F) (Sp)

AS 1110 Leadership Laboratory I 1
AS 1120 Leadership Laboratory I 1
Air Force customs and courtesies, drill and ceremonies, military commands, environment of the Air Force officer, and officer opportunities. AS 1110 must be taken concurrently with AS 1010; AS 1120 must be taken concurrently with AS 1020. (F) (Sp)

AS 2010 The Evolution of U.S. Aerospace Power 1
AS 2020 The Evolution of U.S. Aerospace Power 1
Examines general aspects of air and space power through a historical perspective. Illustrates Air Force Core Values with historical examples and continues development of communications skills. Leadership Laboratory is mandatory for cadets. (F) (Sp)

AS 2110 Leadership Laboratory II 1
AS 2120 Leadership Laboratory II 1
Air Force customs and courtesies, drill and ceremonies, military commands, environment of the Air Force officer, and officer opportunities. AS 2110 must be taken concurrently with AS 2010; AS 2120 must be taken concurrently with AS 2020. (F) (Sp)

AS 3010 Air Force Leadership and Management 3
AS 3020 Air Force Leadership and Management 3
Presents advanced leadership and management skills. Cadets given opportunity to practice these leadership skills and management techniques in a supervised environment. Leadership Laboratory is mandatory for cadets. (F) (Sp)

AS 3060 Physical Fitness Training 2®
Early morning workout to build stamina. Organized to keep cadets in shape to pass the Physical Fitness Test (PFT). Team instructed. (F) (Sp)

AS 3110 Leadership Laboratory III 1
AS 3120 Leadership Laboratory III 1
Advanced leadership experiences to include the planning and controlling of cadet corps activities, and the preparation and presentation of briefings and other oral and written communications. AS 3110 must be taken concurrently with AS 3010; AS 3120 must be taken concurrently with AS 3020. (F) (Sp)

AS 3400 Field Training (4 Weeks) 1-4
Students in the four-year program participate in four weeks of Field Training. Major areas of study include junior officer training, career orientation, survival training, base functions, Air Force environment, and physical training. (Su)

AS 3500 Field Training (5 Weeks) 1-5
Students in the two-year program participate in five weeks of Field Training. Major areas of study include junior officer training, career orientation, survival training, base functions, Air Force environment, and physical training. (Su)

AS 4010 National Security Affairs/Preparation for Active Duty 3
AS 4020 National Security Affairs/Preparation for Active Duty 3
Designed to give college seniors the foundation to understand military officer's role in American society. Overviews complex social and political issues facing the military profession. Leadership Laboratory is mandatory for cadets. (F) (Sp)

AS 4110 Leadership Laboratory IV 1
AS 4120 Leadership Laboratory IV 1
Advanced leadership experiences to include the planning and controlling of cadet corps activities, and the preparation and presentation of briefings and other oral and written communications. AS 4110 must be taken concurrently with AS 4010; AS 4120 must be taken concurrently with AS 4020. (F) (Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Agricultural Systems Technology and Education (ASTE)

See Department of Agricultural Systems Technology and Education, pages 138-145.

ASTE 1010 Introduction to Agricultural Systems Technology 3
Introduction to problem solving related to the areas of agricultural power and machinery, soil and water conservation, structures and animal environments, electrical circuits, and emerging technologies. (F)

ASTE 1120 Forage and Harvest Equipment 3
Fundamentals and principles in operations, adjustments, and maintenance of technologies utilized in agricultural forage and combine harvesting. (F)

ASTE 1130 Planting and Tillage Equipment 3
Fundamentals and principles in operation, maintenance, and repair of planting and tillage equipment. Exploration of different systems and their applications. (Sp)

ASTE 1610 Agricultural Machinery Engines 6
Fundamental principles and components utilized in the power production for agricultural machinery. Diesel engines, as power plants, will be overhauled using a systems approach. (F)

ASTE 1620 Agricultural Machinery Power Trains 6
Fundamental principles and components utilized in agricultural machinery transmittal of power through drive trains. A systems approach to overhauling these components will be developed. (Sp)

ASTE 1640 Agricultural Equipment and Parts Marketing and Communications 3
Introduction to principles and operation of computer software systems related to marketing and management within the agricultural machinery business industry. Emphasis on business communication principles for effective transfer of information and problem resolution. (F)

ASTE 1710 Introduction to Agricultural Communication 3
Overview of the history, importance to society, and role of mass communication in agriculture. Introduces students to the use of mass media in the agricultural industry. (F)

ASTE 2200 Electricity in Agricultural Systems 3
Fundamentals of electricity (AC) as used on farms and ranches. Residential and commercial agricultural applications of the National Electric code. Electrical supply and service, distribution, proper grounding, and installation of components. (Sp)

ASTE 2250 Occupational Experience in Agriculture 1-6
Supervised occupational experiences for technical vocational preparation. (F,Sp)

ASTE 2710 Orientation to Agricultural Education 2®
Students examine the framework of agricultural education, with a special emphasis on the nature of the programs, career opportunities, and the qualifications and preparation requirements of future agricultural educators. (F)

ASTE 2830 Agribusiness Sales and Marketing 3
Basic principles of agribusiness sales and marketing. After completing a series of self-assessments relating to sales, learning, and personality preferences, students learn to complete each major step of the sales process. (F)

ASTE 2900 BSS Humanity in the Food Web 3
Provides broad overview of food systems in conjunction with detailed analysis of particular issues, such as different theories and supporting data on the domestication of plants and animals, the use of human labor, the development and operation of complex technologies, and the analysis of socioeconomic data on human population growth and well-being. (F,Sp)

ASTE 2930 Individualized Projects in Agricultural Mechanics 1-3®
Basic skill preparation for employment in agricultural industry. (F,Sp)

ASTE 3030 Metal Welding Processes and Technology in Agriculture 3
Selection of ferrous and nonferrous welding techniques in agricultural applications. Welding, cold- and hot-working metal in agricultural construction and maintenance. (F)

ASTE 3040 QI Fabrication Practices in Agricultural Buildings 2
Selection and use of agricultural building materials, including concrete and masonry, lumber, plywood, finishes, and fasteners. Application of hand and power tools and procedures in agricultural construction. (Sp)

ASTE 3050 CI Technical and Professional Communcation Principles in Agriculture 3
Technical communication principles and practices used in the agricultural industry. Emphasizes technical writing of reports and correspondence using electronic information retrieval and presentation. Prerequisite: ENGL 2010. (F,Sp)

ASTE 3080 Compact Power Units for Agricultural and Turfgrass Applications 3
Operation and application of agricultural and turfgrass equipment powered by internal combustion engines having less than 40 horsepower. (Sp)

ASTE 3090 Computer Applications in Agriculture 3
Overview of computer systems and software currently used in agriculture. Emphasis placed on spreadsheet development, file management, computer ethics, and design of materials for print, presentation, and web media. Prerequisite: Satisfactory completion of University computer and information literacy exam. (F)

ASTE 3100 Leadership Applications in Agricultural Science, Management, and Development 2
Study of leadership styles and their applications in development of agricultural programs for youth and adults. Emphasizes leadership and communication principles for effective community resource management in rural environments. Experiences provided in leadership styles, program planning, and meeting organization. (Sp)

ASTE 3200 Irrigation Principles and Practices 3
Introduction to planning principles for irrigation systems and farm water resource development. Layout of system components and coverage of practices common to the Intermountain West. (Sp)

ASTE 3240 CI Teaching in Laboratory Settings 3®
Basic principles of teaching students in laboratory settings. Overview of major concepts, considerations, and practices used for developing and evaluating agriscience curricula. Prerequisite: ASTE 2710. (Sp)

ASTE 3300 Clinical Experience I in Agricultural Education 1
In-school clinical observation experience. Students involved in observing management and assisting in teaching. Designed to provide familiarity with agricultural education classroom. (Sp)

ASTE 3440 DSC Science, Technology, and Modern Society 3
Designed to challenge students from all academic majors to develop an understanding of the dynamic interaction between science, technology, and society. Explores responsibility of humans for directing the utilization of technology as a creative enterprise. Also taught as ETE 3440. (F,Sp)

ASTE 3500 Teaching Apprenticeship in Agricultural Education 2
Each student serves as an apprentice to professional agricultural educator. Students complete competencies leading to early preparation for student teaching. (F,Sp,Su)

ASTE 3600 QI Management of Agricultural Machinery Systems 3
Management principles for evaluation and selection of agricultural complements for performance, optimization, economics, environmental impact, and long-term sustainable agricultural practices. Prerequisite: MATH 1050 or STAT 1040. (Sp)

ASTE 3620 Managing the FFA and SAE Programs 2
Introduction to basic concerns, understandings, and practices needed to effectively advise an FFA chapter. Students learn appropriate philosophies and skills for operation of a comprehensive supervised agricultural experience program. Prerequisite: Admission to Secondary Teacher Education Program. (Sp)

ASTE 3710 Agricultural Machinery Hydraulic Systems and Diagnosis 3
Fundamental principles and components overhaul of hydraulic systems as applied in agricultural machinery. Exploration of techniques for diagnosing malfunctions and related failures with a systems approach. (F)

ASTE 3720 Agricultural DC Electrical Systems and Diagnosis 3
Fundamental principles and components overhaul of DC electrical systems as applied in agricultural machinery. Exploration of techniques for diagnosing malfunctions and related failures with a systems approach. (F)

ASTE 3730 Agricultural Machinery Auxiliary Systems and Diagnosis 3
Application of theory, testing, diagnosis, and repairs of auxiliary systems, including air conditioning, fuel injection, analog, electronic monitoring, and GPS as utilized in agricultural equipment. Prerequisite: ASTE 3720 or approval of instructor. (Sp)

ASTE 3900 Special Problems in Agricultural Systems Technology and Education 1-6
Students conduct short-term investigation and/or literature analysis with critical review of contemporary issues in Agricultural Systems Technology. Formal contract with approved faculty. Activities culminate with a written report. (F,Sp,Su)

ASTE 4100 Agricultural Structures and Environment 3**
Overview of agricultural structures and environmental considerations related to livestock, livestock waste management, and commodity storage. Planning, layout, construction materials, concrete masonry, ventilation, insulation, and energy. (Sp)

ASTE 4150 CI Methods of Teaching Agriculture 3®
Introduction to basic practices of classroom teaching and program planning. Through participation in discussions, activities, and assignments, students refine their abilities to develop programs, diagnose the learner, prepare the instruction, and guide student learning. Prerequisites: ASTE 2710, 3240. (F)

ASTE 4250 Occupational Experiences in Agriculture 1-6
Supervised occupational experience for technical and professional preparation in teacher education and/or agricultural business. (F,Sp,Su)

ASTE 4300 Clinical Experience II in Agricultural Education 1
Continued in-school observation of agricultural education teaching. Requires student participation in teaching, management, and program development in agricultural education. (F)

Course Descriptions

ASTE 4400 Advising Applied Technology Education Student Organizations 1
Principles and practices for advising applied technology student organizations in secondary education. Examination of leadership organizations supporting applied technology education. Emphasis on program planning, leadership development, and evaluation. This course is currently inactive. Contact department for information about when this course may be taught.

ASTE 4900 Senior Project Research and Creative Opportunity 1-6
Returning student teachers work to strengthen their weaknesses in areas such as scaled drawing, cost estimating, machine shop practices, construction, and small engines. (Sp)

ASTE 5100 (dual listed 6100) Electrical Controls and Motors for Agri-Industrial Applications 3
Operation and application of electrical motors, electrical and electronic controls, and circuit and overload protection utilized in agricultural and industrial installations. This course is currently inactive. Contact department for information about when this course may be taught.

ASTE 5200 Assessment in Applied Technology Education 3
Principles and practices in assessing performance and development of applied technology students. Emphasizes testing and evaluation techniques used in applied technology education. (Sp,Su)

ASTE 5260 CI (dual listed 6260) Environmental Impacts of Agricultural Systems 3
Investigation of relationship between agricultural practices and environmental quality, including control of agricultural nonpoint-source pollution. (F)

ASTE 5500 Agricultural Education Secondary Curriculum Seminar 2®
Cooperative examination of considerations and processes for teaching secondary students. Reflection on the practice of teaching. Preparation for entry into the teaching profession. (Sp)

ASTE 5630 Agricultural Education Student Teaching in Secondary Schools 10
Students teach agriscience and technology courses in secondary and middle school settings under the guidance of clinical and Utah State University supervisors. (Sp)

ASTE 6000 Methods of Equipment Testing, Diagnosis, and Repair 3
Investigation and demonstration of methods and procedures for testing, troubleshooting, and diagnosis of tractors, power units, and all types of agricultural equipment. This course is currently inactive. Contact department for information about when this course may be taught.

ASTE 6070 Program and Curriculum Development in Career and Technical Education 3
Program planning for locally applied curriculum design to meet student interests and community needs for career and technical educators. (F,Sp,Su)

ASTE 6100 (dual listing 5100) Electrical Controls and Motors for Agri-Industrial Applications 3
Operation and application of electrical motors, electrical and electronic controls, and circuit and overload protection utilized in agricultural and industrial installations. This course is currently inactive. Contact department for information about when this course may be taught.

ASTE 6110 Applied Technology Education Program Planning and Evaluation 3
Program planning and evaluation. Study of strategies used in applied technology. Demonstration of manpower surveys and job analysis for curriculum development. (F)

ASTE 6130 Electrical and Hydraulic Component Testing, Diagnosis, and Repair 3
Involves supervision and demonstration of procedures for testing, diagnosis, and repair of all types of electrical and hydraulic components on modern agricultural equipment. (F)

ASTE 6140 Agricultural Development and Evaluation 3
Principles and strategies for developing, implementing, and evaluating agricultural technology and educational programs for U.S. and international organizations. (Sp)

ASTE 6170 Supervision and Administration of International Extension Programs 3
Investigation and analysis of theories and practices of supervision and administration as applied to international extension-education programs and rural development/agricultural extension operations. (F)

ASTE 6240 Strategies for Teaching Adults 3
Features contemporary strategies and guided practice for teaching adults in group and individualized learning settings. (F,Sp,Su)

ASTE 6250 Special Problems in Agricultural Systems Technology 1-5®
A consideration of needs and special types of service in FFA, young farmers, and adult programs for applied technology teachers. (F,Sp,Su)

ASTE 6260 (dual listing 5260) Environmental Impacts of Agricultural Systems 3
Investigation of relationship between agricultural practices and environmental quality, including control of agricultural nonpoint-source pollution. (F)

ASTE 6300 Foundations of Adult Education and Program Evaluation 3
Addresses the context and providers of adult education. In addition, adult learning theories and participation models are examined. (F)

ASTE 6400 Food, Land and People Workshop 0.5-3®
Designed for practicing K-12 teachers. Offers in-service development for infusing agriculture and the concepts of Food, Land and People into existing curriculum standards and objectives. Presentation of Agriculture in the Classroom instructional units, as well as hands-on methods and materials. (F,Sp,Su)

ASTE 6510 Principles and Practices of Extension Education 3
History, philosophy, and organizational structure of U.S. and international extension organizations, including programming models, teaching strategies, and accountability. (F)

ASTE 6700 Research Methods 3
Introduction to techniques used in applied agricultural research and career and technical education research. Includes research design, data gathering, and statistical analysis and interpretation. (Sp)

ASTE 6750 Agricultural Safety and Health: Issues and Decisions 3
Review of agricultural safety and health issues. Public and private concerns addressed through problem identification, data gathering, resolution, and evaluation. (Sp)

ASTE 6970 Research and Thesis 1-9®
(F,Sp,Su)

ASTE 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

ASTE 7000 Principles and Practices of Community College Education 3
Examines the American two-year college, including historical and philosophical development, curricula, students and the learning process, faculty and instruction, administration and governance, support, and control. Focuses upon principles, practices, and problems of community colleges in America. (Su)

ASTE 7400 Community and Interagency Partnerships 3
Explores relationship between education and the community, with special emphasis on community needs and interagency relationships needed for the development of a total community education program. Furthers understanding of leadership and agency, through exploring and examining contemporary and perennial issues from multiple perspectives in a diverse higher-educational context. (Su)

ASTE 7500 Diffusion of Innovations 3
Explores processes by which professional change agents influence the introduction, adoption, and diffusion of technological change. Course content is applicable to persons who work closely with people in formal and informal educational settings. (Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
**Taught 2007-2008.

Aviation Technology (AV)

See Department of Engineering and Technology Education, pages 273-277.

AV 1100 The Aviation Profession 1
Covers attributes of aviation professional, career planning, and certification process. (F,Sp)

AV 1130 Flight Principles 2
Basic flight theory and physics of flight. Aircraft control systems related to flight. Ground handling and servicing of aircraft. Special lab fee. (F)

AV 1140 Aircraft Components and Principles 2
Materials and hardware, as well as nondestructive inspection applicable to aircraft. Plumbing methods, maintenance publications, and aircraft weight and balance control. (F)

AV 1170 Aircraft Structures 3
Accepted methods and repair for metal structures. Organic finishes and application techniques with laboratory applications and practical experience. (F)

AV 1240 Aircraft Maintenance 3
Maintenance, repair, alteration, and inspection of aircraft. Assembly and rigging of control systems with laboratory application of maintenance assembly and rigging procedures. Prerequisites: AV 1130, 1140. (Sp)

AV 2100 Aircraft Reciprocating Powerplants and Accessories 3
Theory of operation, maintenance, and repair of reciprocating engines, propellers, exhaust systems, ignition systems, and fuel systems with laboratory applications of principles and components studied. Prerequisite: AV 2110 (must be taken concurrently). (F)

AV 2110 Aircraft Reciprocating Powerplants and Accessories Lab 3
Laboratory application of principles studied in AV 2100. Prerequisite: AV 2100 (must be taken concurrently). (F)

AV 2140 Aircraft Turbine Powerplants and Maintenance Operations 3
Theory of turbine powerplants, including turbine engine and components operation, hot section inspection, and servicing. Aircraft engine 100-hour inspections and maintenance, with laboratory applications of principles and components studied. Prerequisite: AV 2150 (must be taken concurrently). (Sp)

AV 2150 Aircraft Turbine Powerplant Maintenance Operations Lab 3
Theory of turbine powerplants, including turbine engine and components operation, hot section inspection, and servicing. Aircraft engine 100-hour inspections and maintenance, with laboratory applications of principles and components studied. Prerequisite: AV 2140 (must be taken concurrently). (Sp)

AV 2170 Aircraft Systems 2
Theory and operation of aerospace environmental systems, communication, navigation and guidance systems, fuel and propellant systems, fire detection, and warning. (Sp)

AV 2180 Aircraft Hydraulic and Pneumatic Systems 2
Theory and operation of aircraft hydraulic, landing gear, and brake systems. (F)

AV 2190 Aircraft Systems Lab 1
Laboratory application of principles and components studied in AV 2170. Prerequisite: AV 2170 (must be taken concurrently). (Sp)

AV 2200 Aircraft Hydraulics and Pneumatics Systems Lab 1
Laboratory application of principles and components studied in AV 2180. Prerequisite: AV 2180 (must be taken concurrently). (F)

AV 2250 Internship 1-4®
Planned supervised work experience in industry. Must have departmental approval. (F,Sp,Su)

AV 2330 Private Pilot Ground School 4
Instructions in principles of flight, aircraft and engine operation, weather, navigation, radio aids to navigation, radio communications, and federal air regulations. Preparation for FAA Private Pilot written exam. (F,Sp,Su)

AV 2350 Private Pilot Certification 1
FAA approved flight training program meeting all requirements for, and in the issuance of, the Private Pilot Airplane License. Prerequisite: AV 2330 (may be taken concurrently). (F,Sp,Su)

AV 2420 FAA Regulations, Records, and Certification 2
Maintenance forms, records, and regulations releasing aircraft to airworthy status. Certification of maintenance technicians is also included. (Sp)

AV 2430 Aircraft Electrical Systems and Components 2
Aircraft electrical power generating systems. Theory of generation, alternators, regulation, and control systems with laboratory application of principles and systems studied. Prerequisite: ETE 2300. (Sp)

AV 2440 Aircraft Electrical Systems Laboratory 2
Laboratory application of principles and systems studied in AV 2430. Prerequisites: ETE 2300; AV 2430 (must be taken concurrently). (Sp)

AV 2510 Intermediate Flight 1
FAA approved flight training program that fulfills the cross country requirements for commercial and instrument ratings. Prerequisite: AV 2350. (F,Sp,Su)

AV 2520 Instrument Pilot Ground School 4
Ground school approved by FAA under Part 141 of the Federal Aviation Regulations. Designed to prepare students to pass the FAA oral and written examinations required for becoming instrument rated pilots. Prerequisite: AV 2350. (F,Sp)

AV 2540 Instrument Pilot Certification I 1
FAA approved flight training program introducing requirements for issuance of the Instrument Pilot Airplane Rating. Prerequisites: AV 2350; AV 2520 (may be taken concurrently). (F,Sp,Su)

AV 2550 Instrument Pilot Certification II 1
Continuation of AV 2540. Completes all requirements for issuance of the instrument pilot airplane rating. Prerequisite: AV 2540. (F,Sp,Su)

AV 2620 Commercial Pilot Ground School 2
Commercial flight operations including performance, cross country planning, advanced systems operations, complex airplanes, and flight maneuvers. Prerequisites: AV 2350 and 2520. (F,Sp)

AV 2660 Commercial Pilot Certification 1
Flight instruction to meet FAA requirements and completion of tests for certification. Prerequisites: AV 2540; AV 2620 (may be taken concurrently). (F,Sp,Su)

AV 2720 CFI and CFII Ground School 3
Designed to prepare students to pass the FAA oral and written examinations required for becoming certified flight and instrument instructors. Combines Certified Flight Instructor and Certified Flight Instructor-Instrument into one course. Prerequisite: AV 2660. (F,Sp)

AV 2740 CFI Certification 1
FAA-approved flight training program meeting all requirements for the issuance of the Certified Flight Instructor Airplane Rating. Prerequisite: AV 2720 (may be taken concurrently). (F,Sp,Su)

AV 2860 CFII Certification 1
FAA approved flight training program meeting all the requirements for, and issuance of, the Certified Flight Instructor, Airplane Instrument Rating. Prerequisites: AV 2720 and 2740 (may be taken concurrently). (F,Sp,Su)

AV 2880 Multi-Engine Certification 1
FAA approved flight training program meeting all the requirements for, and the issuance of, the Multi-Engine Airplane Rating. Prerequisite: AV 2660. (F,Sp,Su)

AV 3010 National Airspace, Air Traffic Control, and Airport Administration 3
Study of air traffic control system, airspace usage, and facilities. Airport planning, development, and management and their importance to the achievement of a successful airport operation. Management of publicly owned and operated airports, ranging in size from general aviation to the large air carrier hubs. (F)

AV 3120 Aviation Law 3
Law as it affects aviation industry. Rights and responsibilities of individual organizations and the aviation community. Regulation and liability pertaining to design, manufacturing, operation, and maintenance of aircraft. Prerequisite: AV 1100. (F)

AV 3140 Advanced Avionics Systems and Flight Simulation 3
In-depth study of state-of-the-art aircraft instrumentation systems and advanced flight training utilizing a flight simulator. Prerequisite: AV 2540. (F,Sp,Su)

AV 3280 Advanced Turbine Engines 2
Advanced study of turbo-jet propulsion. Comparative examination of jet, fan, turbo-prop, and turbo-shaft engines. Prerequisite: AV 2150. (F)

AV 3410 FCC License 1
Prepares students to obtain the FCC General Radio Telephone Operator's License. Covers electronic fundamentals through microwave radar and FCC rules and regulations. Prerequisite: ETE 3400. (Sp)

AV 3610 AeroTechnology Design I 1
Students select and plan a senior project. Requires written proposal, including technical description of the project and management plans. (Sp)

AV 4200 Composite Manufacturing Processes and Repair 3
Composite manufacturing processes, composite materials survey, tooling design and fabrication, autoclave processes, vacuum bag techniques, filament winding processes, equipment requirements, materials cutting and storage, and composite materials testing. (Sp)

AV 4250 Internship 1-6®
Planned supervised work experience in industry. Prerequisite: Departmental approval. (F,Sp,Su)

AV 4280 Airline Operations 3
Study of airline operations and their organizational structure. Examines functions of airline dispatcher, operations specialists, managers, and cockpit flight crew. Discussion of advanced flight planning, aircraft performance and loading considerations, and impact of weather on flight operations and routing priorities. Prerequisite: AV 1100. (F)

AV 4300 Airline Marketing 3
Introduces marketing thought, basic marketing principles and their application to airline business and operations, strategic planning, and decision-making. No prerequisites; however, AV 4280 is *highly recommended*. (Sp)

AV 4480 Certified Flight Instructor Practicum 2
Under supervision of ground school instructor, students gain practical experience teaching ground school subjects. Prerequisite: AV 2740.

AV 4490 Human Factors in Aviation Safety 3
Examines major causative agent in aircraft accidents: the human being. Emphasizes psychological and physiological factors enhancing accident probability. Includes detailed analysis of ergonomics (human engineering) and its influence on safety. Prerequisite: AV 1100. (Sp)

AV 4610 CI AeroTechnology Design II 3
Execution and completion of a team or individual project. Requires design reviews and written reports. Prerequisite: AV 3610. (F)

AV 4620 CI AeroTechnology Design III 3
Preparation and presentation of a team or individual project. Writing and speaking skills emphasized through technical reports and presentations. Prerequisite: AV 4610. (Sp)

AV 4660 CI Flight Senior Project 3
Students select, plan, and execute an approved senior project. Writing and speaking skills emphasized through technical reports and presentations. (F,Sp)

AV 5400 Regional Jet Ground School I 4
Introduction to a typical commercial jet aircraft in use by Regional Airlines. Course includes the following: Aircraft Systems, Standard Operating Procedures, and Flight Planning and Performance. Introduction to Airline Flight Operations in preparation for entry-level pilot positions with a regional airline. Prerequisite: AV 2660. (Sp)

AV 5410 Regional Jet Ground School II 4
Continuation of AV 5400. Prerequisite: AV 2660. (F)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Aquatic, Watershed, and Earth Resources (AWER)

See Department of Watershed Sciences, pages 535-540.

Note: Effective Spring Semester 2007, courses listed with the AWER prefix will use the Watershed Sciences (WATS) prefix.

AWER 1020 Aquatic, Watershed, and Earth Resources Profesional Orientation 1
Introduction and orientation to natural resource/environmental disciplines and related professional careers for Watershed Sciences majors. Discussion of education, curricula, faculty, professional societies, and employment opportunities. (F)

AWER 1200 BLS Biodiversity: Its Conservation and Future 3
Today, species extinctions are occurring at an unprecedented rate. People in developed countries are concerned with this loss. Solving this problem requires knowledge of what determines biodiversity, how it is being threatened, and how its loss can be countered. (F,Sp)

AWER 2250 Introductory Internship/Co-op 1-3®
Introductory-level educational experience in internship/cooperative education position approved by department. Prerequisite: Permission of department. (F,Sp,Su)

AWER 3000 DSC Oceanography 3
Examines fundamental interrelationships between physical environment of the oceans and the life forms they support. Suitable for nonbiologists. (Sp)

AWER 3100 DSC/CI Fish Diversity and Conservation 3
Systematics, physiology, ecology, evolution, and conservation of major groups of marine and freshwater fishes. Stresses functional morphology, physiological ecology, and community interactions explaining fish abundance and distribution. Prerequisite: BIOL 1010 or 1610 or 1620. (F)

AWER 3110 Fish Diversity Laboratory 1
Focuses on field collection, identification, and habitat relationships of freshwater fishes in North America. Prerequisite: AWER 3100 (may be taken concurrently). (F)

AWER 3600 Geomorphology 4
Geomorphic processes, origin of landforms and surficial deposits. Emphasizes fluvial and hillslope landscape elements, and surficial geologic mapping. Three one-hour lectures and one three-hour lab per week. Prerequisite: GEO 1010 or 1110 or GEOG 1000. Also taught as GEO 3600. (F)

AWER 3700 CI Fundamentals of Watershed Science 3
Study of water movement, hillslope processes, and nutrient movement in catchments, and its relevance to the properties, land use, and management of watersheds as natural resource units. (Sp)

AWER 3820 DSC/QI Climate Change 3
Emphasizes physical basis of climate (climate dynamics), as well as the mechanisms and processes for its fluctuations on sub-seasonal to interannual time scales (climate variations) and on regional to hemispheric/global time scales. Prerequisite: BMET 2000 or GEOG 1000. Also taught as BMET 3820. (Sp)

AWER 3900 Spatial Analysis 3
Analysis of geographic data, including spatial economic theory, spatial quantitative methods, and spatial distributions. Prerequisite: STAT 2000. (Sp)

AWER 4250 Advanced Internship/Co-op 1-9®
Internship/cooperative education work experience; increased complexity to help student gain a more professional level of experience. Prerequisite: Permission of department. (F,Sp,Su)

AWER 4490 Small Watershed Hydrology* 4**
(dual listing 5490)
Detailed exploration of concepts of hydrologic processes in small, wildland watersheds. Concentrates on recent research findings concerning key hydrological processes. Particular attention paid to study of partitioning of water in the hydrologic cycle, sources for runoff generation, snow and snowmelt, and erosion. Features process modeling and parameter estimation techniques as related to wildland systems. Prerequisites: MATH 1210, AWER 3700. (F)

AWER 4500 Limnology: Ecology of Inland Waters 3
Ecosystem analysis of physical, chemical, and biological interactions in lakes and streams. Application of these concepts for managing aquatic system. Prerequisite: CHEM 1210. (Sp)

AWER 4510 Aquatic Ecology Practicum 3
Integration of limnological theory and methods of conducting field and laboratory analyses of physical, chemical, and biological parameters. Students will design and conduct their own research project within the framework of a general water quality or fishery issue addressed by the class. Development of analytical, statistical, and writing skills. Field trips required. Prerequisites: AWER 4500; STAT 3000 (may be taken concurrently). (F)

AWER 4530 Water Quality and Pollution 3
(dual listing 6530)
Reviews biological and social problems caused by point and nonpoint source water pollution; toxicology; abiotic and biotic water quality parameters; and use criteria of the Clean Water Act. Graduate-level class will require additional readings of the peer-reviewed literature and an additional class meeting to have in-depth discussions of those readings. Each graduate student will be responsible for making a presentation at the beginning of class, and leading the discussion. (Sp)

AWER 4650 Principles in Fishery Management 3
(dual listing 6650)
Emphasizes management of fish populations within context of community and ecosystem dynamics. Stresses use of simulation models to assess effects of growth, recruitment, and mortality on age-structured populations. (Sp)

AWER 4750 Fundamentals of Remote Sensing Science 3
(dual listing 6740)
Develops the scientific principles behind remote sensing. Examines the basic physics of electromagnetic radiation and the interactions of radiation with the surface and the atmosphere. Prerequisites: MATH 1060, 1210; PHYS 2210. (F)

AWER 4930 Geographic Information Systems 4
(dual listing 6920)
Examines structure and operation of Geographic Information Systems (GIS). Explores design, theory, and implementation of GIS software, digitizing, fundamentals of vector and raster GIS processing, georeferencing, map accuracy, and site location. To receive graduate-level credit, students must complete a more rigorous final project directed toward their thesis or dissertation. (F)

AWER 4950 Special Topics 1-3®
Individual study and research upon selected watershed sciences problems. (F,Sp,Su)

AWER 4960 Directed Readings 1-3®
Provides one-on-one interaction between student and instructor. Prerequisite: Permission of department. (F,Sp,Su)

AWER 4970 Undergraduate Research 1-3®
Individual or team research. Prerequisite: Permission of department. (F,Sp,Su)

AWER 4980 Undergraduate Seminar 1
Intended to bring upperclassmen up-to-date on watershed sciences topics. (F,Sp)

AWER 5150 Fluvial Geomorphology 3
(dual listing 6150)
Focuses on physical processes in streams that control their shape, plan form, slope, bed material, and distribution of channel bars. Emphasizes field analysis of these topics, and application of geomorphology to aquatic ecology and environmental restoration. Prerequisite: GEO/AWER 3600. Also taught as GEO 5150/6150. (F)

AWER 5170 Fluvial Geomorphology Lab 2
(dual listing 6170)
Field analysis focuses on physical processes in streams which control their shape, plan form, slope, bed material, and distribution of channel bars. Application of geomorphology to aquatic ecology and environmental restoration. Prerequisite: GEO/AWER 3600. Also taught as GEO 5170/6170. (F)

AWER 5200 Fish Habitat Relationships in Managed Forests 3
Examines biological and social factors influencing aquatic ecosystems and fish habitats within the context of forest management. Analyzes ecological relationships of fish habitats within forest ecosystem, and how these are influenced by forest management practices. Provides examples of forest habitat issues in major regions of North America, illustrating that both biological and social factors must be considered in developing management strategies and programs. (Sp)

AWER 5250 Remote Sensing of Land Surfaces 4
(dual listing 6250)
Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: MATH 1100 or 1210; and PHYS 2110 or 2210. Also taught as BIE 5250/6250 and BMET 5250/6250. (Sp)

AWER 5330 Large River Management 3
(dual listing 6330)
Focuses on constituencies participating in modern management of large river basins, including water developers, irrigators, municipalities, power consumers, recreationists, environmentalists, and scientists. Primary examples drawn from Colorado, Columbia, Rio Grande, and Missouri river basins. (F)

AWER 5490 Small Watershed Hydrology* 4**
(dual listing 4490)
Detailed exploration of concepts of hydrologic processes in small, wildland watersheds. Concentrates on recent research findings concerning examining key hydrological processes. Particular attention paid to study of partitioning of water in the hydrologic cycle, sources for runoff generation, snow and snowmelt, and erosion. Features process modeling and parameter estimation techniques as related to wildland systems. Additional oral and written assignments required for graduate students. Prerequisites: MATH 1210, AWER 3700. (F)

AWER 5550 Freshwater Invertebrates 3
Ecology, collection, and systematics of freshwater aquatic invertebrates. Focuses on insects, but also covers crustaceans, molluscs, and annelids. Several weekend field trips and a collection are required. Prerequisite: One year of general biology or zoology, or permission of instructor. Also taught as BIOL 5550. (Sp)

AWER 5600 Surface Hydrologic Field Methods* 3
(dual listing 6600)
Hydrologic concepts and terminology taught through collection, analysis, and interpretation of hydrologic data. Emphasizes principles and practice of

several hydrologic measurements and water sampling in natural and manmade environments. Prerequisite: SOIL 3000 or instructor's permission. Also taught as SOIL 5600/6600. (Sp)

AWER 5640 Riparian Ecology and Management 3
(dual listing 7640)
Explores structure and function of riparian ecosystems and management options for maintaining sustainable ecological function. Prerequisite: NR/BIOL 2220, AWER 3700. (Sp)

AWER 5660 Watershed and Stream Restoration 2
Overview of the current theory and practice of watersheds and streams. Emphasizes field visits with restoration projects and specialists. Prerequisites: AWER/FRWS 5490/4490, AWER/GEO 5150, FRWS 5610 (or equivalent). Currently taught through Continuing Education as a summer short course. (Su)

AWER 5670 Watersheds and Stream Restoration Practicum 2
Capstone experience. Development of a restoration plan for a site, involving site planning and design. Currently taught through Continuing Education as a summer short course. (Su)

AWER 5680 Paleoclimatology* 3
(dual listing 6680)
Covers climate through the past four billion years of geologic time. Explores driving forces behind climate changes. Examines data and methods used in paleoclimate research. Includes discussion of literature and stresses local paleoclimate records. Three lectures per week, along with field trips. Prerequisite: GEO/AWER 3600 or permission of instructor. Also taught as GEO 5680/6680 and BMET 5680/6680. (Sp)

AWER 5760 Remote Sensing: Modeling and Analysis 3
(dual listing 6760)
Advanced techniques in the analysis of the earth's surface using remotely-sensed imagery and data in a digital format. Projects employ and/or develop research models. (Sp)

AWER 5930 Geographic Information Analysis 4
(dual listing 6930)
Techniques of geographic information systems, data structures, data input and output, and data manipulation and analysis. Prerequisites: STAT 2000 or higher; AWER 4930 or ENVS 3500, or instructor's permission. (Sp)

AWER 6120 Aquatic Production Biology 2**
(dual listing 7120)
Review of current literature on bacterial, algal, invertebrate, and fish production in lakes, rivers, and the sea. Particular emphasis is placed on whole-ecosystem productivity studies. (Sp)

AWER 6150 Fluvial Geomorphology 3
(dual listing 5150)
Focuses on physical processes in streams that control their shape, plan form, slope, bed material, and distribution of channel bars. Emphasizes field analysis of these topics, and application of geomorphology to aquatic ecology and environmental restoration. Prerequisite: GEO/AWER 3600. Also taught as GEO 6150/5150. (F)

AWER 6160 Hillslope and Landscape Geomorphology 3**
Includes basics of hillslope weathering, transport, and hydrologic processes. Surveys classic and recent literature on hillslope-scale and landscape-scale geomorphic research. Three lectures and several Saturday field trips. Prerequisite: GEO/AWER 3600. Also taught as GEO 6160. (Sp)

AWER 6170 Fluvial Geomorphology Lab 2
(dual listing 5170)
Field analysis focuses on physical processes in streams which control their shape, plan form, slope, bed material, and distribution of channel bars. Application of geomorphology to aquatic ecology and environmental restoration. Prerequisite: GEO/AWER 3600. Also taught as GEO 6170/5170. (F)

AWER 6200 Watershed Analysis 2**
Explores watershed analysis, which is a procedure used to characterize the human, aquatic, riparian, and upland features, conditions, processes, and interactions within a watershed. Watershed analysis includes ecosystem analysis at the watershed level, providing a systematic way to understand and organize system information for the purpose of understanding the consequences of management actions prior to implementation. (Sp)

AWER 6230 Fish Ecology 2**
(dual listing 7230)
Reviews current literature on physiological, behavioral, population, and the community ecology of fishes. Particular emphasis placed on current literature relevant to management of sport and endangered freshwater species. (Sp)

AWER 6240 Graduate Internship/Co-op 1-9®
Graduate-level educational experience in internship/cooperative education position approved by department. (F,Sp,Su)

AWER 6250 Remote Sensing of Land Surfaces 4
(dual listing 5250)
Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: MATH 1100 or 1210; and PHYS 2110 or 2210. Also taught as BIE 5250/6250 and BMET 5250/6250. (Sp)

AWER 6330 Large River Management 3
(d5330)
Focuses on the scientific basis of river management and the constituencies participating in modern management of large rivers, including water developers, irrigators, municipalities, power consumers, recreationists, environmentalists, and scientists. Primary examples drawn from Colorado, Columbia, Rio Grande, and Missouri river basins. (F)

AWER 6520 Applied Hydraulics 3**
Basic fluid mechanics applied to wildland watershed systems and directed at nonengineering students. Explores nature of fluid state, fluid motion, and steady uniform and varied flow in open channels, under both subcritical and supercritical conditions. Surveys concepts of boundary layers, turbulence, convection, dispersal, and wave formation in unsteady flows. Emphasizes problem formulation and solving. Prerequisites: AWER 5490/4490; MATH 2280 (recommended). Also taught as CEE 6520. (Sp)

AWER 6530 Water Quality and Pollution 3
(dual listing 4530)
Reviews biological and social problems caused by point and nonpoint source water pollution; toxicology; abiotic and biotic water quality parameters; and use criteria of the Clean Water Act. Graduate-level class will require additional readings of the peer-reviewed literature and an additional class meeting to have in-depth discussions of those readings. Each graduate student will be responsible for making a presentation at the beginning of class, and leading the discussion. (Sp)

AWER 6550 Assessment of Abundance and Related Parameters for Biological Populations 3
Students learn to estimate population abundance and associated error bounds using mark-recapture, area-swept, declining catch, line-transect, and other techniques. Emphasizes sampling design considerations to match objectives of an assessment to appropriate/feasible level of accuracy and precision. (Sp)

AWER 6600 Surface Hydrologic Field Methods* 3
(dual listing 5600)
Hydrologic concepts and terminology taught through collection, analysis, and interpretation of hydrologic data. Emphasizes principles and practice of several hydrologic measurements and water sampling in natural and manmade environments. Prerequisite: SOIL 3000 or instructor's permission. Also taught as SOIL 6600/5600. (Sp)

AWER 6650 Principles in Fishery Management 3
(dual listing 4650)
Emphasizes management of fish populations within context of community and ecosystem dynamics. Stresses use of simulation models to assess effects of growth, recruitment, and mortality on age-structured populations. (Sp)

AWER 6680 Paleoclimatology* 3
(dual listing 5680)
Covers climate through the past four billion years of geologic time. Explores driving forces behind climate changes. Examines data and methods used in paleoclimate research. Includes discussion of literature and stresses local paleoclimate records. Three lectures per week, along with field trips. Prerequisite: GEO/AWER 3600 or permission of instructor. Also taught as GEO 6680/5680 and BMET 6680/5680. (Sp)

AWER 6740 Fundamentals of Remote Sensing Science 3
(dual listing 4750)
Develops the scientific principles behind remote sensing. Examines the basic physics of electromagnetic radiation and the interactions of radiation with the surface and the atmosphere. Prerequisites: MATH 1060, 1210; PHYS 2210. (F)

AWER 6760 Remote Sensing: Modeling and Analysis 3
(dual listing 5760)
Advanced techniques in the analysis of the earth's surface using remotely-sensed imagery and data in a digital format. Projects employ and/or develop research models. (Sp)

AWER 6800 Aquatic, Watershed, and Earth
(dual listing 7800) Resources Departmental Seminar 1®
Exposes students to new developments in research and management in the fields of aquatic, watershed, and earth resources. Features participation by students, faculty, and guest lecturers. Students should register for only one semester per year, but attend all year. (F,Sp)

AWER 6820 Stream Ecology 3
(dual listing 7820)
Explores structure, function, and dynamics of flowing water ecosystems. Prerequisites: NR/BIOL 2220 and AWER 4500. (F)

AWER 6870 Ecology Seminar 1®
The Ecology Center schedules regular seminars throughout the school year with ecological scientists from other institutions participating. Ecology majors are required to attend a minimum of 10 such lectures. Students should register for fall semester, but attend through spring semester. Also taught as BIOL 6870, ENVS 6870, and FRWS 6870. (F,Sp)

AWER 6900 Graduate Special Topics 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

AWER 6910 Directed Study 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

AWER 6920 Geographic Information Systems 4
(dual listing 4930)
Examines structure and operation of Geographic Information Systems (GIS). Explores design, theory, and implementation of GIS software, digitizing, fundamentals of vector and raster GIS processing, georeferencing, map accuracy, and site location. To receive graduate-level credit, students must complete a more rigorous final project directed toward their thesis or dissertation. (F)

AWER 6930 Geographic Information Analysis 4
(dual listing 5930)
Techniques of geographic information systems, data structures, data input and output, and data manipulation and analysis. Prerequisites: STAT 2000; AWER 4930 or NR 3600 or instructor's permission. (Sp)

AWER 6940 Snow Hydrology 3
Focuses on snow science, including atmospheric formation, precipitation, distribution on the landscape, metamorphosis prior to melt, and snow pack melt dynamics. Also covers related issues, such as snow melt modeling, remote sensing, water supply, and biogeochemical cycling. Prerequisites: AWER 3700 or 4600 or SOIL 4600 or CEE 3430, or permission of instructor. Also taught as CEE 6940. (Sp)

AWER 6960 Graduate General Ecology 5
General concepts, history, and issues in all major areas of the science of ecology including: environmental biophysics; and physiological, behavioral, evolutionary, community, ecosystem, and applied ecology in both terrestrial and aquatic environments. Also taught as BIOL 6960, ENVS 6960, and FRWS 6960. (F)

AWER 6970 Thesis Research 1-12®
Offers credit for field or laboratory research at master's level. (F,Sp,Su)

AWER 6990 Continuing Graduate Advisement 1-9®
Offers credit for students currently enrolled in a master's program, who are not currently taking classes. Students may be conducting research or waiting for final approval from School of Graduate Studies. (F,Sp,Su)

AWER 7120 Aquatic Production Biology* 2
(dual listing 6120)
Review of current literature on bacterial, algal, invertebrate, and fish production in lakes, rivers, and the sea. Particular emphasis is placed on whole-ecosystem productivity studies. (Sp)

AWER 7230 Fish Ecology* 2
(dual listing 6230)
Reviews current literature on physiological, behavioral, population, and the community ecology of fishes. Particular emphasis placed on current literature relevant to management of sport and endangered freshwater species. (Sp)

AWER 7640 Riparian Ecology and Management 3
(dual listing 5640)
Explores structure and function of riparian ecosystems and management options for maintaining sustainable ecological function. Prerequisite: NR/BIOL 2220, AWER 3700. (Sp)

AWER 7800 Aquatic, Watershed, and Earth
(dual listing 6800) Resources Departmental Seminar 1®
Exposes students to new developments in research and management in the fields of aquatic, watershed, and earth resources. Features participation by students, faculty, and guest lecturers. Students should register for only one semester per year, but attend all year. (F,Sp)

AWER 7820 Stream Ecology 3
(dual listing 6820)
Explores structure, function, and dynamics of flowing water ecosystems. Prerequisites: NR/BIOL 2220 and AWER 4500. (F)

AWER 7900 Graduate Special Topics 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

AWER 7910 Directed Study 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

AWER 7970 Dissertation Research 1-12®
Offers credit for field or laboratory research at doctoral level. (F,Sp,Su)

AWER 7990 Continuing Graduate Advisement 1-9®
Offers credit for students currently enrolled in a doctoral program, who are not currently taking classes. Students may be conducting research or waiting for final approval from School of Graduate Studies. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008.
***This course is taught alternating years. Check with department for information about when course will be taught.

Business Administration (BA)

See Department of Business Administration, pages 191-198.

BA 1350 Introduction to Business 3©
Investigation of the role of business in contemporary society, including an introduction to the general problems of business operation. (F)

BA 3080 QI Operations Research 3©
Quantitative methods for resource allocation: linear programming, queuing theory, simulation, project management, etc. Prerequisites: STAT 2300 or 3000; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 3400 QI Corporate Finance 3©
How corporations raise and manage capital. Study of modern financial principles, methods, policies, and institutions. Corporate organization, creation, and reorganization. Prerequisites: MATH 1050; ACCT 2010; choose one statistics course from: STAT 1040, 2300, 3000, or PSY 2800; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp,Su)

BA 3460 Fundamentals of Personal Investing 3
Examination of investment vehicles available to personal investor. Principal emphasis on corporate and government securities. Credit cannot be used toward requirements for finance major.

BA 3500 Fundamentals of Marketing 3©
Overview of marketing function, emphasizing concepts and terminology. Includes basic marketing activities of product management, pricing, distribution, promotion, marketing research, and consumer behavior. Prerequisites: Admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp,Su)

BA 3700 Operations Management 3©
Covers the concepts and tools related to managing a business operation. Topics include demand forecasting, operations strategy and resource planning, process layout, lean systems, inventory and quality, and project management. Prerequisites: STAT 2300 or 3000; MATH 1100; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp,Su)

BA 4050 International Retailing 3
(dual listing 6050)
Issues related to retailing in international markets, such as motivations, cultural influence on consumer behavior, and entry strategies. Prerequisites: Grade of *B*- (2.67) or better in BA 3500; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (Prerequisites *do not apply* to students taking BA 6050.)

BA 4070 CI Retail Management 3
(dual listing 6070)
Basic issues related to retail management, such as merchandising, location, promotion, store management, and retail image. Prerequisites: Grade of *B*- (2.67) or better in BA 3500; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (Prerequisites *do not apply* to students taking BA 6070.)

BA 4240 Merchandise Planning and Control 3
Issues related to pricing, budgeting, open-to-buy, and planning inventory. Prerequisites: Grade of *B*- (2.67) or better in BA 3500; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits.

BA 4300 International Finance 3
Overview of international financial management, including international financial markets, exchange rate behavior, and financing international trade. Prerequisites: Grade of *B*- (2.67) or better in BA 3400; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 4410 Financial Institutions 3
Role of domestic and international financial institutions in supplying services to consumers, businessmen, and government. Prerequisites: Grade of *B*- (2.67) or better in BA 3400; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 4420 Insurance 3
Studied from the standpoint of insurance services consumers, course explores types of life, property, and casualty insurance contracts; nature and uses of life and property insurance; and the organization, management, and government supervision of insurance companies. Prerequisites: Grade of *B*- (2.67) or better in BA 3400; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F)

BA 4430 Real Estate Finance 3
Covers theory, principles, and techniques of real estate investment, emphasizing present value and cash-flow approaches to real estate investment decisions. Prerequisites: Grade of *B*- (2.67) or better in BA 3400; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (Sp)

BA 4450 Financial Policy 3
Analyzes working capital management, capital budgeting, capital management, and other short-term and long-term financial decisions. Prerequisites: Grade of *B*- (2.67) or better in BA 3400; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 4460 Investments 3
Provides an understanding of security analysis and portfolio management. Market operations; risk and return; stock, bond, and option analysis; and portfolio theory and creation. Prerequisites: Grade of *B*- (2.67) or better in BA 3400; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 4510 Buyer Behavior 3©
Marketing analysis of the decision processes of individuals, households, businesses, and not-for-profit institutions. Builds on concepts from psychology, sociology, anthropology, and economics. Prerequisites: Grade of *B*- (2.67) or better in BA 3500; PSY 1010 or SOC 1010 or USU 1340; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 4530 Marketing Research 3
Management of marketing research function. Basic vs. decisional research, survey research, cost vs. value of information, research design, experimentation, and analysis techniques. Prerequisites: Grade of *B*- (2.67) or better BA 3500; choose one of the following statistics courses: STAT 1040, 2300, 3000, or PSY 2800; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 4540 Marketing Institutions 3©
Examination of strategic decision-making by institutions involved in the marketing channel. Primary emphasis on retail institutions. Explores types of marketing intermediaries, vertical integration, channel member power and conflict, and international channel management issues. Prerequisites: Grade of *B*- (2.67) or better in BA 3500; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 4550 Promotion Management 3
Examines role of promotion concepts in development of a communication strategy. Based on an introduction to the nature of communications, course covers advertising, personal selling, and sales promotion, emphasizing the competitive and strategic value of communications in both the marketplace and society. Prerequisites: Grade of *B*- (2.67) or better in BA 3500; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 4590 Global Marketing Strategy 3©
Analytical approach to strategic marketing problems facing the firm competing in global markets. Emphasizes key analytical and decision-making frameworks concerning the global marketing environment and the marketing mix and their impact on the firm's performance. Prerequisites: Grade of *B*- (2.67) or better in BA 3500; BA 4540, 4550; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F,Sp)

BA 4720 Production Planning and Control 3
Examines concepts and tools used in the planning and control of production activity and material flow. Topics include production scheduling, capacity analysis, and push versus pull production. Prerequisites: Grade of *B*- (2.67) or better in BA 3700; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F)

BA 4750 Production Simulation 3
Computer simulation of production environment, including scheduling, routing, labor capacity, inventory, and delivery. Emphasizes just-in-time concepts. Prerequisites: Grade of *B*- (2.67) or better in BA 3700; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (Sp)

BA 4790 Supply Chain Management 3
Analysis of the concept of supply chains and how managing them supports operations strategy and organizational competitiveness. Topics include supply management, supply chain alliances, distribution planning, and logistics systems design. Prerequisites: Grade of *B*- (2.67) or better in BA 3700; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (Sp)

BA 4800 Independent Research and Reading 1-3®

BA 4950H Senior Honors Thesis/Project 3
Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (Sp)

BA 5730 Process Analysis and Improvement 3
Application of quality management concepts to business processes. Students learn a variety of methods for documenting, analyzing, and improving a process. Topics include the DMAIC Cycle, process mapping, capacity analysis, root cause

analysis, mistake proofing, and creative problem solving. Prerequisites: Grade of *B-* (2.67) or better in BA 3700; STAT 2300 or 3000; admittance to a USU major, cumulative GPA of 2.67 or higher, completion of at least 40 credits. (F)

BA 6050 International Retailing 3
(dual listing 4050)
Issues related to retailing in international markets, such as motivations, cultural influence on consumer behavior, and entry strategies.

BA 6070 Retail Management 3
(dual listing 4070)
Basic issues related to retail management, such as merchandising, location, promotion, store management, and retail image.

BA 6180 Intrasession MBA Workshop 0.5-1®
Intensive workshops designed to enhance the MBA experience.

BA 6350 Managerial Economics 3
Application of concepts and theories, based on managerial economics, to business problems. Addresses cost theory, pricing, market structures, and forecasting. (Sp)

BA 6410 Corporate Finance Essentials 1.5
Introduction of corporate finance principles for students entering a master's degree program in the College of Business. Prerequisite: Acceptance into a College of Business master's degree program. (Su)

BA 6420 Financial Problems 3
Corporate finance case course, dealing with problems in working capital management, capital budgeting, cost of capital problems, and corporate restructuring. (F)

BA 6440 Financial Decision Making 3
Presentation of financial modelling techniques impacting firm decisions. (Sp)

BA 6510 Marketing Techniques 1.5
Introduction of marketing principles for students entering a master's degree program in the College of Business. Prerequisite: Acceptance into a College of Business master's degree program. (Su)

BA 6520 Marketing Strategy 3
Advanced case approach to current marketing management problems. Emphasizes concepts, research, techniques, decision making, and marketing strategy development. (Sp)

BA 6540 Special Topics in Marketing 3
Selected topics in marketing pursued in depth. Topics and instructors vary semester to semester. Current topics include: Marketing Communications and Supplemental Aspects of Electronic Commerce, The Changing Environment of Marketing Institutions, and Buyer Behavior. Prerequisite: BA 6520. (Sp)

BA 6560 Market Analysis and Decision Making 3
Develops skills necessary to plan and implement an effective marketing strategy. Focuses on role of marketing information in managerial decision making. Uses marketing cases and/or simulation games throughout the course. (F,Sp)

BA 6710 Essentials of Operations Management 1.5
Introduction of operations management principles for students entering a master's degree program in the College of Business. Prerequisite: Acceptance into a College of Business master's degree program. (Su)

BA 6720 Operations Management 3
Study of basic process functions in managing a production or service organization, such as inventory control, production control, procurement, quality control, production planning, forecasting, etc. (F)

BA 6740 Decision Making in Operations Management 3
Selected topics in operations management pursued in depth. Topics and instructors vary from semester to semester. Prerequisite: BA 6720. (Sp)

BA 6860 Business Research Methods 3
Explores the fundamentals of qualitative and quantitative data collection and analysis. Students design and implement small, integrated research activities, then use the results to make business strategy recommendations. (Sp)

BA 6900 Independent Research and Reading 1-3®
(F,Sp,Su)

BA 6960 Professional Paper 3
A paper of professional quality prepared by each student. Designed to demonstrate the ability to complete a major business-related project and to effectively present the results. (F,Sp,Su)

BA 6970 Thesis 1-6®
(F,Sp,Su)

BA 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Biological and Irrigation Engineering (BIE)

See Department of Biological and Irrigation Engineering, pages 171-176.

BIE 1880 Engineering Quantification of Biological Processes 3
Introduction to engineering practice of biological modeling and quantification of biological processes. Introduction to transport of heat and mass; bioenergetics, thermodynamics, and enzyme kinetics; metabolism; mechanical work processes; and modeling of biological systems. Recommended that students take BIE 1880 *after* taking calculus and biology. (Sp)

BIE 2330 Engineering Properties of Biological Materials 3
Relationships between composition, structure, and properties of biological materials. Definition, measurement, and use of mechanical, thermal, electromagnetic, chemical, and biological properties in computation and design. Prerequisites: BIOL 1610, BIE 1880, CHEM 1210, 1215. (F)

BIE 3000 Instrumentation for Biological Systems 2
Fundamentals of measurement systems used in bioprocess, biomedical, agricultural, biological, and environmental applications. Selection and use of sensors, data acquisition systems, and elementary controls. Prerequisite: ECE 2210 or ETE 2300. (Sp)

BIE 3200 Introduction to Unit Operations in Biological Engineering 3
Introduction to the fundamental unit operations required to process biological materials in bioprocessing, biomedical, and food engineering applications. Integration of biology and chemistry into biological engineering using basic concepts in heat, mass, and energy conservation and transport. Prerequisites: BIE 2330, CHEM 2300. (F)

BIE 3670 Transport Phenomena in Bio-Environmental Systems 3
Core course in both biological and environmental engineering. Students develop a detailed understanding of the principles, concepts, modes, and methods of calculating heat and mass transfer. Emphasis given to contaminant and nutrient flux, along with their state transformations, in order for the biological or environmental engineer to evaluate options for production, clean-up, and control of bio-environmental systems. Prerequisites: CEE 3500 and MAE 2300. Also taught as CEE 3670. (Sp)

BIE 3870 Biological Engineering Design I 1
Students select and plan a senior design project. A project proposal, including a technical description of the project and management plans, is required. (F,Sp,Su)

BIE 4250 Cooperative Practice 3
Planned work experience in industry or government. Detailed program must be approved prior to registration. Written report required. (F,Sp,Su)

BIE 4880 CI Biological Engineering Design II 3
Execution and completion of a comprehensive senior design project. Design reviews and written reports are required. Prerequisite: BIE 3870. (F,Sp,Su)

Course Descriptions

BIE 4890 CI Biological Engineering Design III 3
Preparation and presentation of the senior design project. The presentation will involve a professional standard report and an evaluation and critique by Biological Engineering students and faculty. Prerequisite: BIE 4880. (F,Sp,Su)

BIE 4930 Special Studies 1-4®
Independent or group study of biological and irrigation engineering subjects not covered in regular course offerings. (F,Sp,Su)

BIE 5010 Principles of Irrigation Engineering 3
(dual listing 6010)
Soil-water-plant relationships; evapotranspiration and water requirements; effective water use; irrigation scheduling; infiltration; irrigation systems planning. Prerequisites: CEE 3430, 3500, ENGR 2200. (F, Sp online, Su)

BIE 5110 Sprinkle and Trickle Irrigation 4
(dual listing 6110)
Sprinkle and trickle irrigation system demand, system selection and configuration, emitter and sprinkler characteristics and sizing, uniformity and efficiency, pipe network layout and sizing, and system operation, management, and maintenance. Prerequisite: BIE 5010/6010. (F)

BIE 5150 Surface Irrigation Design 3
(dual listing 6150)
Design and evaluation of surface irrigation systems. Field measurements for evaluating and improving uniformity and efficiency. Simulation of surface systems. Land leveling computation and equipment. Prerequisite: BIE 5010/6010. (F, Sp online, Su)

BIE 5250 Remote Sensing of Land Surfaces 4
(dual listing 6250)
Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: MATH 1100 or 1210; and PHYS 2110 or 2210. Also taught as AWER 5250/6250 and BMET 5250/6250. (Sp)

BIE 5300 Irrigation Conveyance
(dual listing 6300) and Control Systems 3
Design, evaluation, and operation of irrigation distribution systems. Measurement and monitoring of flows and water levels, and canal and pipeline automation. Simulation of system hydraulics. (F)

BIE 5350 Drainage and Water Quality Engineering 3
(dual listing 6350)
Introduction to principles and practices of drainage. Engineering investigation and design of drains. Formation and function of wetlands caused by irrigation and drainage systems. Prerequisite: BIE 5010/6010. (Sp)

BIE 5450 Field Evaluation of Agricultural
(dual listing 6450) Irrigation Systems 2
Field measurements in pressurized and surface irrigation systems for performance evaluation and determination of water application uniformity and efficiency. (Su)

BIE 5520 Irrigation Project Operation
(dual listing 6520) and Maintenance 3
Organizing, administering, and financing irrigation and drainage projects. Operation and maintenance of irrigation distribution systems. Simulation of command area water demands. Prerequisite: BIE 5010/6010. (Sp)

BIE 5550 Groundwater Systems Engineering I 3
(dual listing 6550)
Groundwater exploration; well drilling and testing; pumping plant design, operation, and testing; aquifer evaluations; siting of multiple well systems. Development of pumping strategies for water supply and environmental control systems. Introduction to conjunctive use. Prerequisite: BIE 5010/6010. (F)

BIE 5610 Food and Bioprocess Engineering 3
(dual listing 6610)
Standardization and compounding of biomaterials and food products; preservation processing using heat, refrigeration, concentration, and dehydration. Basic unit operations in the bioprocessing industry. Prerequisite: BIE 3200. Also taught as NFS 5610/6610. (F)

BIE 5680 Soil-based Waste Management 2
(dual listing 6680)
Engineering management of wastes present in the vadose zone, including extraction, containment, and biological, chemical, and physical destruction technologies for sustainable agriculture and environmental quality. Aspects include engineering characterization, problem definition, treatment, and monitoring. Analysis and design emphasized through problems, examinations, and report writing. Prerequisites: CEE/PUBH 3610, CEE 3640, 3870, CEE/BIE 3670. Also taught as CEE 5680/6680. (Sp)

BIE 5810 Biochemical Engineering 3
(dual listing 6810)
Fundamentals of bioreactor design and bioengineering to produce biological commodities. Emphasizes mathematical models of microbial and enzymatic processes in environmental and industrial biotechnology. Prerequisites: BIE 3200 and BIE/CEE 3670; *or* BIE/CEE 3670, CEE/PUBH 3610, and CEE 3640. Also taught as CEE 5810/6810. (F)

BIE 5830 Management and Utilization of
(dual listing 6830) Biological Solids and Wastewater 3
Focuses on production, management, and disposal of biosolids and wastewater generated in food processing and wastewater treatment. Emphasizes beneficial use of biosolids and wastewater for agricultural production, forest enhancement, and land reclamation. Prerequisites: BIE 3200, BIE/CEE 3670, CEE/PUBH 3610, CEE 3640. Also taught as CEE 5830/6830. (F)

BIE 5850 Biomaterials Engineering 3
(dual listing 6850)
Explores identification and modification of properties of natural and artificial biomaterials. Design of applications for by-product recovery and recycling, environmental, food processing, and biomedical industries. Commercialization of biomaterial feed stocks, biotechnology output, and bioprocessing by-products into traditional and alternative products. Prerequisites: BIE 2330, BIE/NFS 5610/6610. (F)

BIE 5890 Tissue Engineering 3
(dual listing 6890)
Introduction to fundamentals of tissue engineering. Investigation of engineering design strategies for artificial organs, as well as treatments for disease disorders of nerves, blood vessels, bones, cartilage, skin, and liver. Exploration of the use of stem cell gene therapy in tissue engineering. Prerequisite: BIE 2330 or permission of instructor. (Sp)

BIE 5910 Introduction to Biosensors 3
(dual listing 6910)
Principles of biologically based sensing elements and interfacing techniques. Design and analysis methods of biosensing and transducing components in bio-interface. Applications of biosensors and bioelectronics in biomedical, bioprocessing, and biomechanical engineering. Prerequisite: BIE 2330 or permission of instructor. (F)

BIE 5930 Special Studies 1-4®
Independent or group study of biological and irrigation engineering subjects not covered in regular course offerings. (F,Sp,Su)

BIE 6010 Principles of Irrigation Engineering 3
(dual listing 5010)
Soil-water-plant relationships; evapotranspiration and water requirements; effective water use; irrigation scheduling; infiltration; irrigation systems planning. Prerequisites: CEE 3430, 3500, ENGR 2200. (F, Sp online, Su)

BIE 6110 Sprinkle and Trickle Irrigation 4
(dual listing 5110)
Sprinkle and trickle irrigation system demand, system selection and configuration, emitter and sprinkler characteristics and sizing, uniformity and efficiency, pipe network layout and sizing, and system operation, management, and maintenance. Prerequisite: BIE 6010/5010. (F)

BIE 6150 Surface Irrigation Design 3
(dual listing 5150)
Design and evaluation of surface irrigation systems. Field measurements for evaluating and improving uniformity and efficiency. Simulation of surface systems. Land leveling computation and equipment. Prerequisite: BIE 6010/5010. (F, Sp online, Su)

BIE 6250 (dual listing 5250) Remote Sensing of Land Surfaces 4
Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: MATH 1100 or 1210; and PHYS 2110 or 2210. Also taught as AWER 6250/5250 and BMET 6250/5250. (Sp)

BIE 6260 Hydrology of Irrigation Agriculture 3
Impacts of irrigation activities on local and regional hydrology, wetlands, and natural systems. Determination of components of field and project water balances, including evapotranspiration. Effects of water conservation practices and changes in efficiency on timing and disposition of water resources and return flows. Irrigation scheduling and use of computer models. Prerequisite: BIE 6010/5010.

BIE 6300 (dual listing 5300) Irrigation Conveyance and Control Systems 3
Design, evaluation, and operation of irrigation distribution systems. Measurement and monitoring of flows and water levels, and canal and pipeline automation. Simulation of system hydraulics. (F)

BIE 6350 (dual listing 5350) Drainage and Water Quality Engineering 3
Introduction to principles and practices of drainage. Engineering investigation and design of drains. Formation and function of wetlands caused by irrigation and drainage systems. Prerequisite: BIE 6010/5010. (Sp)

BIE 6450 (dual listing 5450) Field Evaluation of Agricultural Irrigation Systems 2
Field measurements in pressurized and surface irrigation systems for performance evaluation and determination of water application uniformity and efficiency. (Su)

BIE 6520 (dual listing 5520) Irrigation Project Operation and Maintenance 3
Organizing, administering, and financing irrigation and drainage projects. Operation and maintenance of irrigation distribution systems. Simulation of command area water demands. Prerequisite: BIE 6010/5010. (Sp)

BIE 6550 (dual listing 5550) Groundwater Systems Engineering I 3
Groundwater exploration; well drilling and testing; pumping plant design, operation, and testing; aquifer evaluations; siting of multiple well systems. Development of pumping strategies for water supply and environmental control systems. Introduction to conjunctive use. Prerequisite: BIE 6010/5010. (F)

BIE 6610 (dual listing 5610) Food and Bioprocess Engineering 3
Standardization and compounding of biomaterials and food products; preservation processing using heat, refrigeration, concentration, and dehydration. Basic unit operations in the bioprocessing industry. Prerequisite: BIE 3200. Also taught as NFS 6610/5610. (F)

BIE 6680 (dual listing 5680) Soil-based Waste Management 2
Engineering management of wastes present in the vadose zone, including extraction, containment, and biological, chemical, and physical destruction technologies for sustainable agriculture and environmental quality. Aspects include engineering characterization, problem definition, treatment, and monitoring. Analysis and design emphasized through problems, examinations, and report writing. Prerequisites: CEE/PUBH 3610, CEE 3640, 3870, CEE/BIE 3670. Also taught as CEE 6680/5680. (Sp)

BIE 6810 (dual listing 5810) Biochemical Engineering 3
Fundamentals of bioreactor design and bioengineering to produce biological commodities. Emphasizes mathematical models of microbial and enzymatic processes in environmental and industrial biotechnology. Prerequisites: BIE 3200 and BIE/CEE 3670; *or* BIE/CEE 3670, CEE/PUBH 3610, and CEE 3640. Also taught as CEE 6810/5810. (F)

BIE 6830 (dual listing 5830) Management and Utilization of Biological Solids and Wastewater 3
Focuses on production, management, and disposal of biosolids and wastewater generated in food processing and wastewater treatment. Emphasizes beneficial use of biosolids and wastewater for agricultural production, forest enhancement, and land reclamation. Prerequisites: BIE 3200, BIE/CEE 3670, CEE/PUBH 3610, CEE 3640. Also taught as CEE 6830/5830. (F)

BIE 6850 (dual listing 5850) Biomaterials Engineering 3
Explores identification and modification of properties of natural and artificial biomaterials. Design of applications for by-product recovery and recycling, environmental, food processing, and biomedical industries. Commercialization of biomaterial feed stocks, biotechnology output, and bioprocessing by-products into traditional and alternative products. Prerequisites: BIE 2330, BIE/NFS 6610/5610. (F)

BIE 6860 (dual listing 7860) Research Orientation 1
Promotes familiarization with departmental and graduate school rules, procedures, and research. (F)

BIE 6870 (dual listing 7870) Research Planning 1
Tools and techniques for writing research proposals and giving presentations. (Sp)

BIE 6890 (dual listing 5890) Tissue Engineering 3
Introduction to fundamentals of tissue engineering. Investigation of engineering design strategies for artificial organs, as well as treatments for disease disorders of nerves, blood vessels, bones, cartilage, skin, and liver. Exploration of the use of stem cell gene therapy in tissue engineering. Prerequisite: BIE 2330 or permission of instructor. (Sp)

BIE 6910 (dual listing 5910) Introduction to Biosensors 3
Principles of biologically based sensing elements and interfacing techniques. Design and analysis methods of biosensing and transducing components in bio-interface. Applications of biosensors and bioelectronics in biomedical, bioprocessing, and biomechanical engineering. Prerequisite: BIE 2330 or permission of instructor. (F)

BIE 6930 Special Problems 1-4®
Independent study of problems in biological and agricultural engineering. (F,Sp,Su)

BIE 6970 Thesis Research 1-8®
Credit for MS research and report requirements. (F,Sp,Su)

BIE 6990 Continuing Graduate Advisement for MS and PhD Students 1-9®
(F,Sp,Su)

BIE 7350 Groundwater Systems Engineering II 4
System analysis techniques applied to aquifer and stream/aquifer management. Development of economically, quantitatively, and environmentally optimal strategies for alternative water policies. Modeling techniques for managing aquifer systems under volumetric, economic, and environmental management goals. Prerequisites: CEE 5470/6470 or 6500. (Sp)

BIE 7600 Advanced Research Topics 3
Study of advanced biological and engineering topics. Analysis of project scale water management issues, software development, crop modeling, advanced drainage systems, remote sensing, groundwater systems, and other topics taken from the research interests of the faculty. Prerequisite: PhD enrollment. (Sp)

BIE 7860 (dual listing 6860) Research Orientation 1
Promotes familiarization with departmental and graduate school rules, procedures, and research. (F)

BIE 7870 Research Planning 1
(dual listing 6870)
Tools and techniques for writing research proposals and giving presentations. (Sp)

BIE 7970 Dissertation Research 1-10®
(F,Sp,Su)

BIE 7990 Continuing Graduate Advisement for PhD Students 1-9®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation

Biology (BIOL)

See Department of Biology, pages 177-190.

BIOL 1010 BLS Biology and the Citizen 3©
Principles and methods of biology and how they impact the daily life and environment of the individual. (F,Sp,Su)

BIOL 1020 Biological Discovery: A Lab Course 1
Field and laboratory investigative exercises. Emphasizes observation, hypothesis formulation and testing, data analysis, and writing. (F,Sp)

BIOL 1100 Introduction to Microbiology 3©
Biology and the role of microorganisms in the world around us, with emphasis on their contributions to human disease. Offered only through Independent Study. No laboratory component. Not open to students with credit in BIOL 1110. (F,Sp,Su)

BIOL 1110 Elementary Microbiology 4©
Biology and role of microorganisms in the world around us, with emphasis on their contributions to human disease. Not intended for biology majors. (F)

BIOL 1300 BLS Of Maggots, Mites, and Men 3
Examines the natural history, evolution, and behavior of insects and spiders, as well as their impact on human individuals and societies. (F)

BIOL 1610 BLS Biology I 4
(formerly BIOL 1210 BLS)
Principles of cell biology, energetics, and genetics; plant structure, function, and development. Three lectures and one lab. To receive University Studies Breadth Life Sciences (BLS) credit, students must complete *both* BIOL 1610 *and* either BIOL 1620 or 3300. (F)

BIOL 1620 BLS Biology II 4
(formerly BIOL 1220 BLS)
Animal structure, function, and development; principles of evolution, ecology, and behavior. Three lectures and one lab. Prerequisite: BIOL 1610. (Sp)

BIOL 1750 Topics in Biology (Topic) 1-3®
(F,Sp)

BIOL 1800 Herbarium Studies 1-2
Provides classroom and practical experience in developing and maintaining an herbarium and extending its reach to the community. Students taking this course for one credit will complete classroom and laboratory work, while those earning two credits will in addition complete an herbarium research or service project. (F)

BIOL 2040 Introduction to Biotechnology 1
Introduces freshmen to the emerging field of biotechnology and the impact this technology has on society. Also taught as ADVS 2040, NFS 2040, and PSB 2040. (Sp)

BIOL 2220 General Ecology 3
Study of the interrelationships among organisms and their environments, addressing where and how organisms live. Adaptation, population growth, species interactions, biodiversity, and ecosystem function are explored for a wide variety of organisms and ecosystems. Prerequisites: BIOL 1610 and 1620. Also taught as NR 2220. (F,Sp)

BIOL 2300 Mushroom Identification 1
Lecture course covering taxonomy, ecology, and importance of macro and micro fungi. Also taught as FRWS 2300. (F)

BIOL 2310 Mushroom Identification Lab 1-2®
Lab course acquainting students with basic fungal taxonomic groups. Students collect, preserve, and identify fungi they collect. Edible fungi prepared and eaten. Also taught as FRWS 2310. (F)

BIOL 2320 Human Anatomy 4
(formerly BIOL 2010)
Study of the human body, with emphasis on the structure of each of the body's essential organ systems. Three lectures, one lab. (Sp,Su)

BIOL 2410 Plants and Fungi in the Field 2
Introduction to identification of green plants and macrofungi. Quantitative methods for field studies. Prerequisite: BIOL 1610. (Su)

BIOL 2420 Human Physiology 4©
(formerly BIOL 2000)
Functioning of the human body, with emphasis upon major organ systems. Medical and athletic examples used to illustrate important concepts. (F,Sp,Su)

BIOL 2520 Pathophysiology 3
Promotes an understanding of disease and dysfunctional variations of normal health across the body. Prerequisites: BIOL 2320 and 2420, each with a minimum grade of *C*. Course offered *only* at select branch campuses, not at the Logan campus. (F,Sp)

BIOL 2700 Predental Orientation and Observation 3
Introduces predental students to the dental curriculum and characteristics of the dental profession. Each student assigned to a practicing dentist for part of the course. Prerequisite: Permission of advisor. (Sp)

BIOL 3000 DSC Discovering Utah's Biodiversity 3
Lecture and field course designed to identify and study local organisms and their role in ecosystems. Topics include ecology, local geology, adaptations to the local environment, and human impacts. Major components include writing, as well as the collection and presentation of data. Prerequisite: Completion of a University Studies Breadth Life Sciences (BLS) course. (F,Sp)

BIOL 3010 DSC/CI Evolution 3
Origins and evidence for the theory of biological evolution, and its significance for society and science. Prerequisite: University Studies Breadth Life Sciences (BLS) course. (Sp)

BIOL 3030 DSC Genetics and Society 3
Course for nonscience majors. Addresses ethical, political, and social implications of advances in genetics and basic genetic principles, as well as contemporary issues in human genetics. Prerequisite: University Studies Breadth Life Sciences (BLS) course. Not open to biology majors or to those with credit in BIOL 3060. (Sp)

BIOL 3040 DSC Plants and Civilization 3
Examines the importance of plants as food, shelter, clothing, medicine, and drugs. Social and historical role of plants in aesthetics, religion, energy, biotechnology, human exploration, and migration. Prerequisite: University Studies Breadth Life Sciences (BLS) course. (F)

BIOL 3060 QI Principles of Genetics 4
(formerly BIOL 3200 QI)
Introduction to transmission, population, and molecular aspects of modern genetics. Prerequisites: BIOL 1610; MATH 1050; CHEM 1110 or 1220. (F,Sp,Su)

BIOL 3065 Genetics Laboratory 2**
(formerly BIOL 4100)
Experimental approach to genetics using bacteria, fungi, plants, insects, and humans. Students will be introduced to several computer and laboratory techniques, and will design many of the experiments. Prerequisite: BIOL 3060 (may be taken concurrently). (F)

BIOL 3100 CI Bioethics 3
Discussion of current controversial ethical issues in medicine, animal rights, and environmental conservation. (Sp)

BIOL 3220 QI Field Ecology 2
Field trips and exercises to study ecological patterns and processes in terrestrial and aquatic habitats. Emphasis on hypothesis testing and collection and analysis of data from the field. Prerequisite: BIOL 2220 (may be taken concurrently); MATH 1100 or 1210. Recommended: Course in statistics. (F)

BIOL 3300 BLS General Microbiology 4
Biology, ecology, and diversity of microorganisms. Emphasis placed on bacteria, viruses, fungi, and protists, and their role in the environment. Two lectures, two labs. Prerequisites: BIOL 1610 (with a grade of *C*- or better); CHEM 1120 or 2300 or 2310 (may be taken concurrently). To receive University Studies Breadth Life Sciences (BLS) credit, students must complete *both* BIOL 1610 *and* 3300. (F,Sp)

BIOL 3500 DSC Plagues, Pests, and People 3
Examines the biology and diversity of medically important insects and their associated diseases. Emphasizes the basic principles and concepts in medical, veterinary, and forensic entomology, as well as the historical impact of insect-borne diseases. Prerequisite: University Studies Breadth Life Sciences (BLS) course. (Sp)

BIOL 3760 Independent Study 1-3®
Directed individual or group study. Prerequisite: BIOL 1620. Not counted as Biology degree elective or toward the Biology, Biomath, or Public Health minors. (F,Sp,Su)

BIOL 4000 Human Dissection 1
Exposure and dissection of the human body, with an emphasis on bones, joints, muscles, and internal organs. One evening lab per week. Prerequisite: BIOL 2320. (F)

BIOL 4060 CI Exploring Animal Behavior 3
In-depth investigation into current topics. Students will generate hypotheses; design and complete experiments in field and lab; and prepare a written lab report, book review, and poster for public presentation. Two lectures, one lab. Prerequisite: BIOL 1620, 2220. (Sp)

BIOL 4230 QI Applied Mathematics in Biology 3**
Formulation, analysis, and experimental tests of mathematical models in biology. Combines mathematics, computing, experimental design, and statistical analysis while applying the scientific method to biological systems. Lectures, recitations, and a laboratory. Prerequisites: *C*- or better in BIOL 1620 and MATH 2250; or permission of instructor. Programming recommended. Also taught as MATH 4230. (Sp)

BIOL 4250 Internship/Co-op 1-2
Internship/cooperative work experience in biology or prehealth biology to allow student to gain a professional level of experience. Advisor's signature required. (F,Sp,Su)

BIOL 4400 QI Plant Physiology 4
Introduction to plant metabolism, water relations, and growth. Prerequisites: BIOL 1620; MATH 1050 or higher. (F)

BIOL 4410 Plant Structure 3
Morphology, anatomy, and development of seed plants, with an emphasis on angiosperms. Two lectures and one lab. Prerequisites: BIOL 1610, 1620. (Sp)

BIOL 4420 Plant Taxonomy 3
Identification of vascular plant species and recognition of families common in northern Utah. Introduction to principles and practices of plant taxonomy. Prerequisite: BIOL 1610. (Sp)

BIOL 4500 Applied Entomology 3
Fundamentals of insect biology, emphasizing species of economic importance. Principles and tactics of pest management. Laboratory includes survey of beneficial and harmful insects affecting humans and agriculture. Prerequisites: BIOL 1610 and 1620. (Sp)

BIOL 4710 Teaching Internship 1®
Advanced undergraduates function as teaching interns under supervision of faculty member. Only 1 credit may be counted toward Biology degree electives. Prerequisite: Consent of instructor. (F,Sp,Su)

BIOL 4750 Topics in Biology (Topic) 1-3®
(F,Sp,Su)

BIOL 5010 Biogeography 3
(dual listing 6010)
Distributions of plants and animals, including invertebrates, from terrestrial, freshwater, and marine systems, discussed from historical and ecological perspectives. Explores ecological patterns of body size, color, species density, home range, etc., as well as their causes. Prerequisite: BIOL 1620. (Sp)

BIOL 5020 QI Modeling Biological Systems* 3
(dual listing 6020)
Basic techniques of mathematical and computer simulation applied to a wide variety of biological systems: ecology, physiology, agroecosystems, and cell biology. Model formulation, validation, sensitivity and stability analysis, stochastic systems. Prerequisites: MATH 1220, STAT 3000, programming experience. (F)

BIOL 5030 Individual-Based Models in
(dual listing 6030) Ecology and Evolution* 3
Examines the nature, application, and student development of computer simulation models that follow the demographic fates and spatial movement of individual organisms in the context of ecological and evolutionary questions. Recommended prior to enrollment: Programming experience (preferably in C), upper-division courses in statistics and ecology or evolution, and BIOL 5020/6020. (Sp)

BIOL 5100 Neurobiology 3**
(dual listing 6100)
Physiology, organization, and development of nervous systems. Examples taken from vertebrate and invertebrate systems. Special emphasis placed on cellular and molecular substrates of electrical excitability. Prerequisites: BIOL 5600 or 5620; CHEM 1220; and PHYX 2120 or 2220. (F)

BIOL 5150 Immunology 3
Immune response in health and disease. Experimental approach to investigating immune function and abnormalities. Prerequisites: CHEM 1220; BIOL 3060; and BIOL 3300 or 5210. (Sp)

BIOL 5160 Methods in Biotechnology: Cell Culture 3
Techniques and fundamental knowledge for culturing mammalian and insect cells. Students will learn maintenance, growing, genetic engineering of cells, cytotoxicity, hybridoma creation, cloning, etc. Extensive laboratory experience is provided. Also taught as ADVS 5160, NFS 5160, and PSB 5160. (F)

BIOL 5190 Molecular Genetics 3
(dual listing 6190)
Molecular aspects of genetics, including DNA replication, structure, rearrangement, transposition, recombination, repair, genetic engineering, and gene expression. For 6000-level (graduate) credit, additional reading, recitation, and/or writing is required. Prerequisites: BIOL 3060; and CHEM 3700 or 5700. (Sp)

BIOL 5210 Cell Biology 3
Examines the mechanisms of cell structure and function at the molecular level. Prerequisites: BIOL 1620, 3060; CHEM 2300 or 2320; CHEM 3700 or 5700 highly recommended. (F)

BIOL 5220 Endocrine Aspects of Nutrition 2
(dual listing 6220)
Provides physiological background into hormones involved in nutrient regulation, as well as mechanisms of hormone action at the cellular and molecular levels. Includes action of steroids in the nucleus and membrane-based signal transduction pathways. Course includes lectures and literature reviews/ presentations. Prerequisite: CHEM 3700 or permission of instructor. Also taught as ADVS 5220/6220 and NFS 5220/6220. (Sp)

BIOL 5230 Developmental Biology 3
Examines the mechanisms of biological development using classical embryological and modern molecular and cellular approaches. Prerequisites: BIOL 3060 and 5210; CHEM 3700 and 5700 strongly recommended. (Sp)

BIOL 5240 Methods in Biotechnology:
Protein Purification Techniques 3
Reviews basic methods of protein purification, including scaled-up use of 100L fermenter, large-scale centrifugation, diafiltration, chromatography, and use of

BioCAD. Prerequisite: CHEM 3700. Also taught as ADVS 5240, NFS 5240, and PSB 5240. (Sp)

BIOL 5250 CI Evolutionary Biology 3
Current topics in organic evolution from molecular to macroevolutionary scales. Prerequisite: BIOL 3060 or FRWS 4880 or permission of instructor; BIOL/NR 2220 recommended. (F,Sp)

BIOL 5260 Methods in Biotechnology: Molecular Cloning 3
Laboratory-oriented course designed to teach molecular biology techniques such as DNA cloning, genetic probes, polymerase chain reaction, and DNA sequencing. Prerequisite: CHEM 3700 or 5710; or BIOL 3060; or permission of instructor. Also taught as ADVS 5260, NFS 5260, and PSB 5260. (F)

BIOL 5300 QI Microbial Physiology 4
Lectures, discussions, and laboratory investigations concerning the physiology, structure, and metabolism of prokaryotic and eukaryotic microbes. Prerequisites: BIOL 3300, MATH 1210. (Sp)

BIOL 5310 Soil Microbiology* 3
Ecology and diversity of microorganisms in soils. Emphasis on factors controlling microbial activity and the role of microorganisms in organic matter decomposition and nutrient cycling. Prerequisites: BIOL 1610, 1620; CHEM 2300 or 2310; SOIL 3000. Also taught as SOIL 5310. (F)

BIOL 5320 Soil Microbiology Laboratory* 2
Techniques for measuring microbial activity and diversity in soils. Includes use of molecular and isotope methods. Prerequisite: Concurrent or prior enrollment in BIOL/SOIL 5310. Also taught as SOIL 5320. (F)

BIOL 5330 Virology 3
Structure, replication, genetics, and molecular biology of viruses. Virus-host interactions. Viral diseases and antiviral agents. Prerequisites: BIOL 3060 and 3300. (Sp)

BIOL 5370 Molecular Methods in Nutrition Science 2
(dual listing 6370)
Theory of modern techniques used to study macromolecules and ions. Prerequisite: CHEM 3700. Also taught as ADVS/NFS/PSB 5370/6370. (F)

BIOL 5380 Evolutionary Genetics 4
(dual listing 6380)
Examines theoretical and applied aspects of genes in natural and artificial populations. Topics include molecular evolution, population, and quantitative genetics, with emphasis on the intersection of genetics with evolution, ecology, and conservation biology. Prerequisite: BIOL 3060 or permission of instructor. (F)

BIOL 5410 Introduction to Plant Pathology 4
Combined lecture-lab course emphasizing concepts in plant pathology. Symptoms and disease-causing organisms are described. Methods of control, the nature of epidemics, and disease prediction. Prerequisites: BIOL 1610, 1620; BIOL 3300 recommended. (Sp)

BIOL 5420 CI Forest and Shade Tree Pathology 3
Nature, cause, and management of forest diseases. Also taught as FRWS 5420 and PLSC 5420. (Sp)

BIOL 5440 Plant Molecular, Cellular,
(dual listing 6440) and Developmental Biology I* 3**
Examines background and recent advances. Students analyze and discuss structure, genome, molecular, development, and photosynthesis topics from a research perspective. Prerequisites: BIOL 3060, 5210; CHEM 3700 or 5710. Also taught as PLSC 5440/6440. (Sp)

BIOL 5450 Plant Molecular, Cellular,
(dual listing 6450) and Developmental Biology II* 3**
Examines background and recent advances. Students analyze and discuss cell wall, growth regulator, and environmental response topics from a research perspective. Prerequisites: BIOL 3060, 5210; CHEM 3700 or 5710. Also taught as PLSC 5450/6450. (Sp)

BIOL 5530 Insect Systematics and Evolution 3
Evolution, biology, and classification of insects, including basic external morphology. Emphasizes role of phylogeny in systematics and importance of systematics in comparative biology. Prerequisite: BIOL 1620. (F)

BIOL 5550 Freshwater Invertebrates 3
Ecology, collection, and systematics of freshwater aquatic invertebrates. Focuses on insects, but also covers crustaceans, molluscs, and annelids. Several weekend field trips and a collection are required. Prerequisite: One year of general biology or zoology, or permission of instructor. Also taught as AWER 5550. (Sp)

BIOL 5560 Ornithology 3
Surveys evolution, systematics, physiology, anatomy, ecology, behavior, and identification of birds. Includes lectures, laboratory and field exercises, field trips, and an independent project. Attendance required at one Saturday and one Friday-Sunday field trip. Prerequisites: BIOL 1620; MATH 1050 or higher. (Sp)

BIOL 5570 Herpetology 3
Evolution, adaptations, distribution, natural history, behavior, and identification of amphibians and reptiles of the world, with special emphasis on North American species. Two lectures and one lab. Prerequisite: BIOL 1620. (Sp)

BIOL 5580 Mammalogy 3
Evolution, adaptations, distribution, natural history, behavior, and identification of mammals of the world, with special emphasis on North American species. Two lectures and one lab. Prerequisite: BIOL 1620. (F)

BIOL 5590 Animal Community Ecology 4**
(dual listing 6590)
Concepts and controversies in modern community ecology emphasizing aquatic and terrestrial animals. Covers the community concept, diversity and stability, null models, relative importance of competition and predation, food webs, disturbance, metapopulations, biogeography, and new directions. Prerequisites: BIOL 2220, STAT 3000. (Sp)

BIOL 5600 Comparative Animal Physiology 3
(dual listing 6600)
Principles and mechanisms of physiology in vertebrate and invertebrate animals. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: BIOL 1620 and CHEM 1220; or permission of instructor. (F)

BIOL 5610 QI Animal Physiology Laboratory 2
Laboratory exercises designed to explore principles of animal physiology, using computer simulations, tissue models, and animal preparations. Emphasis placed on hypothesis design and data interpretation. Prerequisite: BIOL 5600 or 5620 (either may be taken concurrently). (F,Sp)

BIOL 5620 Medical Physiology* 3
Cardiovascular, respiratory, endocrine, gastrointestinal, excretory, and nervous system function in the mammalian body. Emphasis on molecular mechanisms. Examples from mammalian diseases used to illustrate key concepts. Prerequisites: BIOL 1620; BIOL 2420 or 5600; CHEM 1120 or 3700 (may be taken concurrently) or 5710. (Sp)

BIOL 5730 Genomic Technologies 4
Provides theoretical background in genomics/proteomics technologies and laboratory training in advanced techniques. Topics include: whole genome sequencing, transcriptome and proteome characterization, DNA and expressed gene libraries, and operation of modern genomics laboratory equipment. Prerequisites: BIOL 1620, 3060; CHEM 3700 or 5710; CS 2200; STAT 3000. Also taught as CHEM 5730. (Sp)

BIOL 5800 Undergraduate Research 1-3®
Faculty-directed research in biology. Prerequisites: BIOL 1620 and consent of instructor. Maximum of 3 credits of BIOL 5800 are acceptable toward Biology degree elective requirements. (F,Sp,Su)

BIOL 5810 Bachelor's Thesis 3
Preparation of a written thesis, based upon individual investigation, under the supervision of faculty. Prerequisites: 3 credits of BIOL 5800 (or concurrent enrollment) and consent of instructor. (F,Sp,Su)

BIOL 5850 Microbiology Seminar 1®
(dual listing 6850)
(F,Sp,Su)

BIOL 6010 Biogeography 3
(dual listing 5010)
Distributions of plants and animals, including invertebrates, from terrestrial, freshwater, and marine systems, discussed from historical and ecological perspectives. Explores ecological patterns of body size, color, species density, home range, etc., as well as their causes. Prerequisite: BIOL 1620. (Sp)

BIOL 6020 QI Modeling Biological Systems* 3
(dual listing 5020)
Basic techniques of mathematical and computer simulation applied to a wide variety of biological systems: ecology, physiology, agroecosystems, and cell biology. Model formulation, validation, sensitivity and stability analysis, stochastic systems. Prerequisites: MATH 1220, STAT 3000, programming experience. (F)

BIOL 6030 Individual-Based Models in
(dual listing 5030) Ecology and Evolution* 3
Examines the nature, application, and student development of computer simulation models that follow the demographic fates and spatial movement of individual organisms in the context of ecological and evolutionary questions. Recommended prior to enrollment: Programming experience (preferably in C), upper-division courses in statistics and ecology or evolution, and BIOL 6020/5020. (Sp)

BIOL 6100 Neurobiology 3**
(dual listing 5100)
Physiology, organization, and development of nervous systems. Examples taken from vertebrate and invertebrate systems. Special emphasis placed on cellular and molecular substrates of electrical excitability. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: BIOL 5600 or 5620; CHEM 1220; and PHYX 2120 or 2220. (F)

BIOL 6180 Molecular Population
Genetics Laboratory 5**
Application of molecular techniques to population genetics, ecology, and systematics. Includes experimental and sampling design, and data analysis. Prerequisite: BIOL 6170/5170 or permission of instructor. Also taught as FRWS 6180. (F)

BIOL 6190 Molecular Genetics 3
(dual listing 5190)
Molecular aspects of genetics, including DNA replication, structure, rearrangement, transposition, recombination, repair, genetic engineering, and gene expression. For 6000-level (graduate) credit, additional reading, recitation, and/or writing is required. Prerequisites: BIOL 3060; and CHEM 3700 or 5700. (Sp)

BIOL 6200 Biogeochemistry of Terrestrial
Ecosystems 3**
Inputs, outputs, and cycling patterns of major nutrients. Emphasizes mechanisms for transformations, factors influencing process rates, and the impacts of management and global change on nutrient cycles and air and water quality. Prerequisites: BIOL 1620, SOIL 3000, CHEM 2300 or 2310, or permission of instructor. Also taught as FRWS 6200 and SOIL 6200. (F)

BIOL 6210 Advanced Cell Biology 3**
Presents most recent advances in cell biology research. Prerequisites: BIOL 3060 and 5210. (Sp)

BIOL 6220 Endocrine Aspects of Nutrition 2
(dual listing 5220)
Provides physiological background into hormones involved in nutrient regulation, as well as mechanisms of hormone action at the cellular and molecular levels. Includes action of steroids in the nucleus and membrane-based signal transduction pathways. Course includes lectures and literature reviews/ presentations. Prerequisite: CHEM 3700 or permission of instructor. Also taught as ADVS 6220/5220 and NFS 6220/5220. (Sp)

BIOL 6250 Graduate Internship 1-6
Work experience, for which the student is paid, tied to academics in a graduate student's field of study. Prerequisite: Permission of department head prior to enrollment. (F,Sp,Su)

BIOL 6260 Behavioral Ecology* 3**
Focuses on current topics, emphasizing critical reading and thinking skills. Includes lectures, student presentations, and discussions of primary literature. (Sp)

BIOL 6370 Molecular Methods in Nutrition Science 2
(dual listing 5370)
Theory of modern techniques used to study macromolecules and ions. Prerequisite: CHEM 3700. Also taught as ADVS/NFS/PSB 6370/5370. (F)

BIOL 6380 Evolutionary Genetics 4
(dual listing 5380)
Examines theoretical and applied aspects of genes in natural and artificial populations. Topics include molecular evolution, population, and quantitative genetics, with emphasis on the intersection of genetics with evolution, ecology, and conservation biology. Prerequisite: BIOL 3060 or permission of instructor. (F)

BIOL 6440 Plant Molecular, Cellular,
(dual listing 5440) and Developmental Biology I* 3**
Examines background and recent advances. Students analyze and discuss structure, genome, molecular, development, and photosynthesis topics from a research perspective. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: BIOL 3060, 5210; CHEM 3700 or 5710. Also taught as PLSC 6440/5440. (Sp)

BIOL 6450 Plant Molecular, Cellular,
(dual listing 5450) and Developmental Biology II* 3**
Examines background and recent advances. Students analyze and discuss cell wall, growth regulator, and environmental response topics from research perspective. For graduate (6000-level) credit, additional reading, recitation, and/ or writing will be required. Prerequisites: BIOL 3060, 5210, CHEM 3700 or 5710. Also taught as PLSC 6450/5450. (Sp)

BIOL 6510 Insect-Plant Interactions 2**
Ecology, evolution, and physiology of the interactions between insects and plants, including herbivory, defenses/compensations of plants to insect attack, pollination, and other mutualisms. (F)

BIOL 6520 Ecological Vertebrate Physiology* 3**
Physiological responses and adaptations of vertebrates to physical, chemical, and biological environments. Bioenergetics at the species level. Three lectures. Prerequisites: One course in physiology and one course in ecology. (F)

BIOL 6590 Animal Community Ecology 4**
(dual listing 5590)
Concepts and controversies in modern community ecology emphasizing aquatic and terrestrial animals. Covers the community concept, diversity and stability, null models, relative importance of competition and predation, food webs, disturbance, metapopulations, biogeography, and new directions. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: BIOL 2220, STAT 3000. (Sp)

BIOL 6600 Comparative Animal Physiology 3
(dual listing 5600)
Principles and mechanisms of physiology in vertebrate and invertebrate animals. For graduate (6000-level) credit, additional reading, recitation, and/or writing will be required. Prerequisites: BIOL 1620 and CHEM 1220; or permission of instructor. (F)

BIOL 6740 Cellular Communication by
Small Molecules and Proteins 3**
Using post-translational modifications, small molecules, and protein motifs in cellular communication. Variances in the communication systems related to disease state and/or cell stress and therapeutic strategies to manipulate the communication systems. Prerequisite: CHEM 5700 or equivalent. Also taught as CHEM 6740. (Sp)

BIOL 6750 Topics in Biology (Topic) 1-3®
(F,Sp,Su)

BIOL 6800 Biology Seminar 1®
Format for general graduate-level seminar topics. (F,Sp)

BIOL 6820 Plant Biology/Pathology Seminar 1®
(F,Sp)

BIOL 6830 Entomology Seminar 1®
(F,Sp)

BIOL 6840 Zoology Seminar 1®
(F,Sp)

BIOL 6850 Microbiology Seminar 1®
(dual listing 5850)
(F,Sp,Su)

BIOL 6870 Ecology Seminar 1®
The Ecology Center schedules regular seminars throughout the school year with ecological scientists from other institutions participating. Ecology majors are required to attend a minimum of 10 such lectures. Students should register for fall semester, but attend through spring semester. Also taught as AWER 6870, ENVS 6870, and FRWS 6870. (F)

BIOL 6910 Special Problems 1-3®
Individual or group study under faculty guidance. Prerequisite: Permission of instructor. (F,Sp,Su)

BIOL 6960 Graduate General Ecology 5
General concepts, history, and issues in all major areas of the science of ecology including: environmental biophysics; and physiological, behavioral, evolutionary, community, ecosystem, and applied ecology in both terrestrial and aquatic environments. Also taught as AWER 6960, ENVS 6960, and FRWS 6960. (F)

BIOL 6970 Thesis Research 1-12®
(F,Sp,Su)

BIOL 6990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

BIOL 7750 Topics in Biology 1-3
(F,Sp,Su)

BIOL 7970 Dissertation Research 1-12®
(F,Sp,Su)

BIOL 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.
***This course is taught alternating years. Check with department for information about when course will be taught.

Business Information Systems (BIS)

See Department of Business Information Systems, pages 199-204.

BIS 2100 Principles of Management Information Systems 3
Covers principles of management information systems on how to use and manage information technology to improve business processes, improve decision making, and gain competitive advantage. Includes MIS concepts and vocabulary, as well as information technology. Prerequisites: Cumulative GPA of 2.5 or higher; Computer Information Literacy (CIL) Exam or equivalent, or OSS 1400; STAT 1040 or MATH 1030 or MATH 1050 (MATH 1050 or equivalent is required for College of Business majors). (F,Sp,Su)

BIS 2200 CI Business Communication 3
(formerly BIS 2550 CI)
Development and application of effective oral and written business communication skills. Language/mechanics, grammar, and document formatting. Prerequisites: ENGL 1010; STAT 1040 or MATH 1030 or 1050 or 1100 (MATH 1050 or 1100 is required for College of Business majors); GPA of 2.5 or higher; and passing score on College of Business English Usage Exam or ACT English section score of 29. (F,Sp,Su)

BIS 3000 Principles of Business and Marketing Education 1
Covers principles of business and marketing education, including professionalism, historical overview of the field, student organizations, advisory committees, applied technology education, and school-to-careers program. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 3300 Clinical Experience I 1
First business/marketing clinical practicum (40 hours minimum) in middle and secondary schools; must be taken concurrently with BIS 3400 methods class. Required at Level I. Prerequisites: Program admission; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 3330 Database Management 3
Theory and application of designing, developing, and maintaining database systems. Principles of management of data resources to support effective information systems in organizations. Prerequisites: One programming language; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 3400 Methods of Teaching Keyboarding and Microcomputing 3
Psychological principles and methodology for teaching keyboarding, word processing, microcomputing, and accounting. Includes equipment and laboratory needs, classroom management, and lesson planning. Prerequisites: OSS 1420; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F)

BIS 3500 Management Information Systems Development 3
Creation of applications to solve business problems or support common functions, such as inventory control, sales management, or personnel management. Students create working systems using widely-used Windows software. Prerequisites: CS 1400; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 4100 Information Technology Hardware and System Software 3
Principles and application of computer hardware and software. Includes topics related to theoretical underpinnings, setup, installation, configuration, and management of computer hardware and system software. Prerequisites: BIS 2100; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 4300 Clinical Experience II 1
Second business/marketing clinical practicum (40 hours minimum) in middle and secondary schools; must be taken concurrently with BIS 4400 methods class. Required at Level 2. Prerequisites: Program admission and completion of Level 1; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 4330 Database Implementation 3
(dual listing 6330)
Application of database concepts using industrial database products. Includes structured query language (SQL) development, database programming development, front- and back-end interface development, web database design, database administration basics, and integration of database tools within a project context. Prerequisites: BIS 3330 or equivalent; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 4350 Introduction to Training and Development 3
Introductory course in training and development. Examines various roles of the human resource manager in the training domain. Students learn systems approach to developing and implementing training programs in business. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (Sp)

BIS 4400 Business Education and Marketing Education Methods 3
Instructional methods for conceptual business and marketing classes. Includes methods for advising student organizations, school to careers programs, and relationships between general and applied technology education. Prerequisites: ECON 1500, MHR 2050, ACCT 2010; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (Sp)

BIS 4550 CI Principles of International Business Communications 3
Culture-general and culture-specific study of business communication in the diverse world of international business from both theoretical and applied perspectives. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (Sp)

BIS 4950H Senior Honors Thesis/Project 3
Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (Sp)

BIS 5100 Systems Design and Implementation 3
Management, evaluation, documentation, maintenance, and reengineering of business information systems projects. Prerequisites: BIS 3330; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. Corequisite: BIS 5110. (F,Sp)

BIS 5110 Systems Design Laboratory 1
Required laboratory for BIS 5100, allowing students to complete assigned team projects. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 5300 Advanced Data Communications 3
Principles of data communications, local and wide-area networks, hardware, software, media standards, management, and business applications. Management and strategic use of local-area networks (LANs) and wide-area networks (WANs) to solve business problems. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 5450 Designing Graphical User Interfaces
(dual listing 6450) for Electronic Commerce 3
Integration of specialized web-design software, current multimedia technology (e.g., video/audio streaming, computerized slide shows, graphic animations, digital graphics) and web-design principles to create graphical user interfaces for e-commerce sites. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 5500 Business/Marketing Teaching Seminar 2
Capstone seminar focused upon student business teaching issues, professional development, and principles of effective instruction, emphasizing reflective teaching. Must be taken concurrently with BIS 5600. Prerequisites: Level 1 and Level 2 completion; student teaching placement; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 5630 Business/Marketing Student Teaching 10
A 13-week culminating student teaching experience in which students assume full-time teaching responsibilities under the direction of cooperating teachers in major and minor fields. Must be taken concurrently with BIS 5500. Prerequisites: Level 1 and Level 2 completion; student teaching placement; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 5650 Advanced Website Development 3
(dual listing 6650)
Creation of static and dynamic HTML pages, CGI, Perl, and Java script. Students create websites using Access or Oracle as the database backend. This technical course maintains a business focus as a transaction-oriented commercial site. Prerequisites: BIS 3330 and 3500; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

BIS 5700 DSS Internet Management and Electronic Commerce 3
Familiarizes students with concepts and technologies relating to business and the Internet. Focuses on the new business environment that has evolved through the Internet, as well as associated technologies and strategies. Prerequisites: OSS 1400 or Computer and Information Literacy (CIL) Exam; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. Some programming experience is helpful. (F,Sp)

BIS 5800 Security of Business Information Systems 3
(dual listing 6800)
In-depth exploration of security issues in business information systems. Includes workstation, work-groups, intranet, and wide-area network security. Covers development of security policies and procedures. Prerequisites: BIS 3500 or graduate admission; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F)

BIS 5950 Independent Readings 1-5®
Designed for individual student projects as approved by the department. (F,Sp,Su)

BIS 6050 Advanced Web-Based Management Information Systems Development 3
Students learn how to design, develop, and implement an Internet commerce website. Includes instruction in modeling and building an advanced management website system. Prerequisites: BIS 3330 and 3500. (F,Sp)

BIS 6110 Workshop 1-3®
Intensive workshops. (F,Sp,Su)

BIS 6120 Business Information Systems Development 3
Business information systems development, including analysis, design, and implementation. Students develop a working prototype to solve a real-world information systems problem. (Sp)

BIS 6150 Communication for Business 3
In-depth study of the process for preparing written business communications and related oral presentations. Preparation of reports relevant to student's major. Prerequisite: BIS 2200 or equivalent. (F,Su)

BIS 6180 Intrasession MBA Workshop 0.5-1®
Intensive workshops designed to enhance the MBA experience.

BIS 6200 Business Data Communication Systems 3
Introduction to business data communications, including concepts, network architecture, data communication software and hardware, distributed information systems, and business communication system services. (F)

BIS 6250 Graduate Internship 1-6®
Graduate-level internship in business, industry, or government position approved by department. Requires written learning objectives, performance evaluation, and a final internship written report. Requires 75 hours internship per 1 semester credit. (F,Sp,Su)

BIS 6330 Database Implementation 3
(dual listing 4330)
Application of database concepts using industrial database products. Includes structured query language (SQL) development, database programming development, front- and back-end interface development, web database design, database administration basics, and integration of database tools within a project context. Prerequisite: BIS 3330 or equivalent. (F,Sp)

BIS 6350 Managing Business Training Programs 3
Examines various management topics in the training and development field, including program development, implementation, and evaluation. Discusses the various roles of training program managers. (F)

BIS 6400 Local Area Network Management for Business 3
Application of networking concepts related to the management of local area networks. Includes topics related to setup, management, and maintenance of local area networks and installation of electronic mail handling systems. (F,Sp)

BIS 6410 Human-Computer Interface Design 3
Integrates aspects of industrial psychology, work physiology, human environments, job analysis, and hardware/software engineering in the study of designing effective, efficient input/output interfaces for business information systems.

Course Descriptions

BIS 6440 Information and Decision Making 3
Case-based approach to learning role of information technology when making quantitative and qualitative analyses, including statistical techniques to solve business problems through the use of information technology. Prerequisite: At least one graduate or undergraduate class in statistics. (Sp,Su)

BIS 6450 (dual listing 5450) Designing Graphical User Interfaces for Electronic Commerce 3
Integration of specialized web-design software, current multimedia technology (e.g., video/audio streaming, computerized slide shows, graphic animations, digital graphics) and web-design principles to create graphical user interfaces for e-commerce sites. (F,Sp)

BIS 6500 Developing Business Information Systems with Advanced Software Concepts 3
Creation of custom applications to solve typical business problems or support common functions, using Visual Basic programming and OLE Automation with MS Office software. Prerequisite: Knowledge of database and spreadsheet software. (F,Sp,Su)

BIS 6510 Information Systems for Business 3
Introduction to information systems at general management level. Includes strategic look at needs of an organization and how the function of information systems can help the organization become more effective. (F,Sp,Su)

BIS 6550 International Business Communication 3
Culture-general and culture-specific study of business communication in the diverse world of international business, from both theoretical and applied perspectives. (F,Su)

BIS 6600 Business Teaching Internship 1-3®
Graduate-level business teaching experience at approved corporate, secondary, or post-secondary sites. (F,Sp,Su)

BIS 6640 E-Commerce Data Interchange Using XML 3
Designed to build e-commerce applications using XML (Extensible Markup Language) as the underlying technology. Students will also learn to parse XML documents, use Extensible Style Sheet language, and use XSQL (an Oracle technology) to tie XML with its database. Prerequisites: BIS 3100, 3330, and 3500.

BIS 6650 (dual listing 5650) Advanced Website Development 3
Creation of static and dynamic HTML pages, CGI, Perl, and Java script. Students create websites using Access or Oracle as the database backend. This technical course maintains a business focus as a transaction-oriented commercial site. Prerequisites: BIS 3330 and 3500. (F,Sp,Su)

BIS 6660 The Adult Business Learner 3
Focuses on the adult business learner, the concept of the "learning organization," and the different types of postsecondary institutions that provide adult training and education in business.

BIS 6700 Information Systems Strategies for Electronic Commerce 3
A management-oriented treatment of general information systems principles and topics relating to information systems strategies for electronic commerce, such as business models, mass customization, market research, security and assurance, entrepreneurship, intelligent agents, virtual corporations, electronic payments, and customer service. (F)

BIS 6720 Instruction and Training in Business and Marketing Education 3
Designed for experienced training and educational personnel. Focuses on ways to improve instructional techniques and approaches. Compares traditional teacher/trainer-style teaching to student-centered teaching and training. (Su)

BIS 6730 Teaching Methods in Business Education, Marketing Education, and Information Systems 3
Advanced methodology for teaching business, marketing, and information system subjects, including techniques for teaching word processing, keyboarding, Internet, basic business, accounting, marketing, economics, and other business subjects in cognitive, psychomotor, and affective instructional domains. Taught online.

BIS 6750 Business Process Reengineering Using Information Technology 3
Examines methodologies and state-of-the-art thinking in the area of business process reengineering. Designed to help students understand how organizations manage change in contemporary global business environments by utilizing the latest information systems and technology techniques.

BIS 6760 The Administration and Organization of School-to-Careers Programs in Business 3
Covers the philosophy of the school-to-careers movement in the U.S., as well as how to organize and administer such a program. Includes discussion of the school-based, linking, and work-based components of such a program.

BIS 6770 Competency-based Instruction 3
Business teachers learn how to develop competency-based instruction by completing a CBI project. (F,Sp,Su)

BIS 6800 (dual listing 5800) Security of Business Information Systems 3
In-depth exploration of security issues in business information systems. Includes workstation, workgroups, intranet, and wide-area network security. Covers development of security policies and procedures. Includes information necessary to pass Certified Information Systems Security Professionals exam. Prerequisite: BIS 3500 or graduate admission. (F)

BIS 6810 Introduction to the Research Process 3®
Essential scientific research concepts of theory development and data collection. The technology of research, including writing and funding proposals, experimental and study design, and project management. Includes a hands-on research project conducted by the student. (Sp,Su)

BIS 6950 Independent Readings 1-3®
Specialized projects for graduate students. (F,Sp,Su)

BIS 6970 Master's Paper 1-6®
Master's-level thesis or Plan B research credit. (F,Sp,Su)

BIS 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

BIS 7250 Graduate Research Internship 1-3®
For doctoral students desiring to improve their research capability. Prior approval required. Repeatable to a maximum of six credits. (F,Sp,Su)

BIS 7330 School-Based Internship 3-9®
Internship for doctoral candidates preparing to be school supervisors. Repeatable to a maximum of 9 credits. (F,Sp,Su)

BIS 7610 Critical Analysis of Issues 3
Examines critical analysis/thinking techniques, creative problem solving, and the identification of issues and trends in the field.

BIS 7950 Independent Readings 1-3®
Independent readings for graduate students. Repeatable to a maximum of 6 credits. (F,Sp,Su)

BIS 7970 Doctoral Dissertation 1-12®
Doctoral-level dissertation research credit. (F,Sp,Su)

BIS 7990 Continuing Graduate Advisement 1-9®
Enrollment restricted to doctoral-level students only. Signature of department head required. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Biometeorology (BMET)

See Department of Plants, Soils, and Biometeorology, pages 459-472.

BMET 2000 BPS The Atmosphere and Weather 3
Survey of the processes governing the behavior of the atmosphere and the phenomenon of weather. Basic physical principles of radiation, energy, evaporation, and heat transport are introduced and connected to atmospheric circulation and weather. (F,Sp)

BMET 3250 Aviation Weather 3
Discussion, observation, and analysis of weather important for pilots and those associated with air travel. (Sp)

BMET 3820 DSC/QI Climate Change 3
Emphasizes physical basis of climate (climate dynamics), as well as the mechanisms and processes for its fluctuations on sub-seasonal to interannual time scales (climate variations) and on regional to hemispheric/global time scales. Prerequisites: BMET 2000 or GEOG 1130. Also taught as AWER 3820. (Sp)

BMET 4300 General Meteorology 3
Introductory meteorology for students with background in physical sciences. Emphasis placed on physical processes (quantitatively) in the atmosphere, resulting in general weather phenomena around the world. Prerequisite: BMET 2000. Will not be taught during Fall 2005. Contact department for further information. (F)

BMET 5250 Remote Sensing of Land Surfaces 4
(dual listing 6250)
Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: MATH 1100 or 1210; and PHYS 2110 or 2210. Also taught as AWER 5250/6250 and BIE 5250/6250. (Sp)

BMET 5400 Introduction to Meteorology 3
(dual listing 6400)
Designed for senior and graduate students in different fields who desire some basic introduction to meteorology. Bridges a large gap between courses describing meteorological phenomena in broad and simple terms and other courses treating the atmosphere more theoretically. (F)

BMET 5500 Land-Atmosphere Interactions 3
(dual listing 6500)
Examination of interactions between the surface and atmosphere. Consideration of flows of mass and energy in soil-vegetation-atmosphere continuum, and their linkage to local and regional climates. Detailed study of feedbacks between vegetation and atmosphere. (Sp odd)

BMET 5680 Paleoclimatology* 3
(dual listing 6680)
Covers climate through the past four billion years of geologic time. Explores driving forces behind climate changes. Examines data and methods used in paleoclimate research. Includes discussion of literature and stresses local paleoclimate records. Three lectures per week, along with field trips. Prerequisite: GEOL/AWER 3600 or permission of instructor. Also taught as GEOL 5680/6680 and AWER 5680/6680.

BMET 5700 Environmental Measurements 3
(dual listing 6700)
Examination of critical instrumentation and principles involved in measuring key properties of terrestrial environment. Consideration of measurements in soils, plants, and atmosphere. Will not be taught during Spring 2006. Contact department for further information. (Sp)

BMET 6250 Remote Sensing of Land Surfaces 4
(dual listing 5250)
Basic principles of radiation and remote sensing. Techniques for ground-based measurements of reflected and emitted radiation, as well as ancillary data collection to support airborne and satellite remote sensing studies in agriculture, geography, and hydrology. Prerequisites: MATH 1100 or 1210; and PHYS 2110 or 2210. Also taught as AWER 6250/5250 and BIE 6250/5250. (Sp)

BMET 6400 Introduction to Meteorology 3
(dual listing 5400)
Designed for senior and graduate students in different fields who desire some basic introduction to meteorology. Bridges a large gap between courses describing meteorological phenomena in broad and simple terms and other courses treating the atmosphere more theoretically. (F)

BMET 6410 Applied Agricultural Meteorology 2
Explores applied concepts in agricultural meteorology, with emphasis on weather-agriculture and microclimate-agriculture relationships. Includes crop modeling applications. Course materials, resources, and teaching provided in cooperation with Iowa State University. Not currently being taught. Contact department for further information.

BMET 6500 Land-Atmosphere Interactions 3
(dual listing 5500)
Examination of interactions between the surface and atmosphere. Consideration of flows of mass and energy in soil-vegetation-atmosphere continuum, and their linkage to local and regional climates. Detailed study of feedbacks between vegetation and atmosphere. (Sp odd)

BMET 6680 Paleoclimatology* 3
(dual listing 5680)
Covers climate through the past four billion years of geologic time. Explores driving forces behind climate changes. Examines data and methods used in paleoclimate research. Includes discussion of literature and stresses local paleoclimate records. Three lectures per week, along with field trips. Prerequisite: GEOL/AWER 3600 or permission of instructor. Also taught as GEOL 6680/5680 and AWER 6680/5680.

BMET 6700 Environmental Measurements 3
(dual listing 5700)
Examination of critical instrumentation and principles involved in measuring key properties of terrestrial environment. Consideration of measurements in soils, plants, and atmosphere. Will not be taught during Spring 2006. Contact department for further information. (Sp)

BMET 6800 Environmental Biophysics 2
Explores connections between biosphere and atmosphere at many scales. Introduces processes governing exchanges of mass and energy between surface and atmosphere, as well as connections to climate. Examines role of the biota at local to global scales. (Sp)

BMET 6910 Special Problems in Climatology 3®
Study of physical causes and effects of various climate regimes found upon the Earth. Study of the basis and mechanisms of all types of physically-based climate models. Assists students in comprehending relative complexities and applicabilities of the whole range of climate models. (Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*This course is taught alternating years. Check with department for information about when course will be taught.

Business (BUS)

See College of Business, pages 111-115.

BUS 1000 Business Orientation 0.5
Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. This course is not currently being offered. For information about when it may be offered, contact the College of Business.

BUS 2250 Introductory Internship 1-9®
Introductory-level experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. A maximum of 12 credits of 2250 and 4250 combined can be counted toward the minimum degree requirements for the College of Business. Prerequisite: Permission of instructor. (F,Sp,Su)

BUS 3010 Intermediate Accounting I 3
Study at the intermediate level in accounting theory and practice relating to financial repporting of assets. Prerequisites: Cumulative GPA of 2.5 or higher; grade of *B-* or better in ACCT 2010.

BUS 3020 Intermediate Accounting II 3
Study at the intermediate level in accounting theory and practice relating to financial repporting of liabilities and equities. Prerequisites: Cumulative GPA of 2.5 or higher; BUS 3010.

BUS 3100 DSS Survey of Management Information Systems 3
Survey of business uses of information technology, emphasizing vocabulary, concepts, career emphases, and systems components. Includes general systems theory and business functional information subsystems (e.g., accounting, management, finance, and marketing). Prerequisites: Cumulative GPA of 2.5 or higher; and Computer and Information Literacy (CIL) Exam, OSS 1400, or equivalent. (F,Sp,Su)

BUS 3110 DSS Management Fundamentals 3
Study of the role of management, leadership theory, defining goals, organizing work, and managing performance. Prerequisite: Cumulative GPA of 2.5 or higher.

BUS 3250 Discussions With Business Leaders 1
Introduces current business trends, issues, and problems. This is accomplished through readings and discussions, as well as by required attendance at Dean's Convocation, Partner's in Business, and other appropriate business seminars. (F,Sp)

BUS 3310 Managerial Cost Accounting 3
Intermediate level of accounting and interpretation of accounting information for internal decision-making and control. Prerequisites: Cumulative GPA of 2.5 or higher; ACCT 2020.

BUS 3330 Essentials of Database Systems 3
Includes essential theory of database systems in areas such as E/R design, relational design, the SQL language, and distributed databases. Prerequisites: BIS 2100, completion of at least 40 credits, and cumulative GPA of 2.5 or higher.

BUS 3400 QI Finance Fundamentals 3
Study of basic financial management principles, methods, and policies for business. Prerequisites: Cumulative GPA of 2.5 or higher; ACCT 2010; MATH 1050; choose one statistics course from STAT 1040, 2300, 3000, or PSY 2800.

BUS 3410 Federal Income Tax I 3
Study of tax law and procedures for individuals, with an introduction to corporations and other entities. Prerequisite: Cumulative GPA of 2.5 or higher.

BUS 3500 Marketing Principles 3
Study of basic marketing principles, functions, concepts, and terminology. Prerequisite: Cumulative GPA of 2.5 or higher.

BUS 3510 Business Programming 3
Includes basics of business systems development using programming languages supporting the Windows environment. Prerequisites: BIS 2100, completion of at least 40 credits, and cumulative GPA of 2.5 or higher.

BUS 3700 Operations Management Fundamentals 3
Study of basic concepts and tools relating to managing the operations of a business. Prerequisites: Cumulative GPA of 2.5 or higher; MATH 1100 or 1210; STAT 2300 or 3000.

BUS 4010 Selected Topics in Finance 3
Selected topics in finance pursued in depth. Topics may vary. Prerequisites: Cumulative GPA of 2.5 or higher; BUS 3400.

BUS 4020 Selected Topics in Marketing 3
Selected topics in marketing pursued in depth. Topics may vary. Prerequisites: Cumulative GPA of 2.5 or higher; BUS 3500.

BUS 4030 Selected Topics in Management 3
Selected topics in management pursued in depth. Topics may vary. Prerequisites: Cumulative GPA of 2.5 or higher and completion of at least 40 credits.

BUS 4040 Selected Topics in Human Resources 3
Selected topics in human resources pursued in depth. Topics may vary. Prerequisites: Cumulative GPA of 2.5 or higher and completion of at least 40 credits.

BUS 4050 Selected Topics in Information Systems 3
Selected topics in information systems pursued in depth. Topics may vary. Prerequisites: BUS 3330, completion of at least 40 credits, and cumulative GPA of 2.5 or higher.

BUS 4250 Advanced Internship 1-9®
Advanced or middle-level internship experience in a career-related position approved by the Cooperative Education Office. One credit for every 75 hours of internship experience, with a maximum of 9 credits. Prerequisite: Permission of instructor. (F,Sp,Su)

BUS 4880 CI Business Strategy 3
Capstone course dealing with the processes of operating a business venture. Emphasizes market entry, finance, operations, managing growth, business ethics, and social responsibility. Addresses entrepreneurial issues and global strategies. Prerequisites: Cumulative GPA of 2.5 or higher; BUS 3110, 3400, 3500, 3700.

BUS 5100 Systems Analysis and Design and Project Management 3
Requires students to build an information system using state-of-the-art analysis and design principles, as well as project management essentials. The project must be completed for an external organization using state-of-the-art software. Prerequisites: BUS 3330, 3510, completion of at least 40 credits, and cumulative GPA of 2.5 or higher.

BUS 6250 Graduate Internship 1-6®
Graduate-level internship in a career-related position for graduate students wishing to develop or expand their occupational experience. Maximum of 6 credits. Prerequisite: Permission of instructor. (F,Sp,Su)

BUS 6310 MBA Career Development 0.5®
Provides background in theory and practice of career development, including student assessment, organizational entry, and career planning and mentoring. (F,Sp,Su)

BUS 6860 Applied Business Research 3
Provides students with the capability to design and conduct applied business research projects in all areas of business. Introduces students to the philosophy of science, research design, measurement and scaling, reliability and validity, communication of research results, and other topics. (Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Civil and Environmental Engineering (CEE)

See Department of Civil and Environmental Engineering, pages 212-219.

CEE 1880 Civil and Environmental Engineering Orientation and Computer Applications 1
Orients students to programs of the Department of Civil and Environmental Engineering, professional and academic advising, student services, professional societies, and engineering careers. Laboratory activities emphasize problem solving using computer applications, such as spreadsheets and the HP48 Scientific Calculator. (F,Sp)

CEE 2240 Engineering Surveying 3
Experience with a wide variety of common surveying equipment, including use and operation of levels, theodolites, total station equipment, and GPS. Prior to graduation, computer applications and field exercises prepare students for civil engineering employment early in their careers. Prior to taking this course, students should have taken at least high school trigonometry. (F,Su)

CEE 2250 Cooperative Practice I 3
Planned work experience in industry. Detailed program must have prior approval. Written report required. Prerequisite: Preprofessional enrollment in either the Civil or Environmental Engineering program. (F,Sp,Su)

CEE 2870 Sophomore Seminar 1
Supervised discussion and review of problems encountered by professional engineers. (Sp)

CEE 2890 Environmental Engineering Sophomore Seminar 1
Introduces students to the field of environmental engineering, emphasizing design, ethics, and leadership in the environmental engineering profession. Emphasizes creative thinking, organizational skills, team work, professional ethics, and social responsibility. Prerequisite: Sophomore standing in environmental engineering. (Sp)

CEE 3010 Mechanics of Materials 2
Includes principal stresses; combined loading and stresses; deflection of beams by direction integration, moment-area, and superposition; and deflection of beams and frames by energy methods and columns. Includes laboratories to demonstrate the mechanical behavior of materials. Prerequisites: ENGR 2000 and 2040. (F)

CEE 3020 Structural Analysis 2
Classification of structural types and development of loads. Analysis of both statically determinate and indeterminate structures. Analysis of trusses, beams, frames, cables, and arches. Utilization of approximate methods of analysis focusing on structural behavior. Prerequisite: CEE 3010. (Sp)

CEE 3030 Uncertainty in Engineering Analysis 2
Principles of probability and statistics applied specifically to problems in civil and environmental engineering, including transportation, water quality, waste treatment, hydrology, and materials. (F,Sp)

CEE 3080 Design of Reinforced Concrete Structures 3
Design of reinforced concrete structural elements, simple and continuous reinforced beams, columns, joints, and one-way slabs. Includes concrete materials laboratory. Prerequisite: CEE 3010. Prerequisite or corequisite: CEE 3020. (Sp)

CEE 3210 Introduction to Transportation Engineering 3
Introduction to basic concepts of roadway geometric design, and intersection and highway capacity analysis. Other topics include: traffic flow characteristics, traffic studies, signal design, and transportation project evaluation. Prerequisite: CEE 3030. (Sp)

CEE 3430 Engineering Hydrology 3
Provides a basic understanding of engineering hydrology through the hydrologic cycle, watershed characteristics, atmospheric water, rainfall-runoff processes, infiltration and evaporation, stream flow analysis, groundwater flow, and related designs. Prerequisite: CEE 3500. (Sp)

CEE 3500 Civil and Environmental Engineering Fluid Mechanics 3
Explores fluid properties, hydrostatics, fluid dynamics similitude, energy and momentum principles, closed conduit flow, open channel flow, and flow measurement. Includes laboratory exercises in flow measurement, open channel flow, pipe friction, physical modeling, and data collection. Prerequisites: MATH 1220; MATH 2210 or 2250; ENGR 2010, 2030. (F,Sp)

CEE 3510 Civil and Environmental Engineering Hydraulics 3
Steady flow in open channel and closed circuits, nonuniform flow in open channels, combined energy losses in pipelines, and distribution in pipe networks. Includes laboratory and computer exercises in data collection, pipe networks, and unsteady and nonuniform flow. Prerequisite: CEE 3500. (F,Sp)

CEE 3610 Environmental Management 3
Introduction to environmental health, emphasizing relationships among environmental quality, public health, environmental and occupational health regulations, human health risk assessment, institutions, and engineered systems in environmental health management. Prerequisites: CHEM 1210; BIOL 1610 or Breadth Life Sciences course; MATH 1210. Also taught as PUBH 3610. (F)

CEE 3640 Water and Wastewater Engineering 4
Engineering analysis and design of processes for treatment of water and wastewater. Major topics include water quality evaluation; physical, chemical, and biological treatment systems; design of facilities for production of drinking water and for treatment and reclamation of municipal and industrial wastewater; and management of residuals from water and wastewater treatment facilities. Prerequisite: CEE/PUBH 3610. (Sp)

CEE 3670 Transport Phenomena in Bio-Environmental Systems 3
Core course in both biological and environmental engineering. Students develop a detailed understanding of the principles, concepts, modes, and methods of calculating heat and mass transfer. Emphasis given to contaminant and nutrient flux, along with their state transformations, in order for the biological or environmental engineer to evaluate options for production, clean-up, and control of bio-environmental systems. Prerequisites: CEE 3500 and MAE 2300. Also taught as BIE 3670. (Sp)

CEE 3780 Solid and Hazardous Waste Management 3
Introduction to integrated management of municipal and industrial solid waste; household, commercial, and industrial hazardous waste; and resource recovery and recycling principles. Three lectures augmented by computer modeling and field trip experiences related to modern solid and hazardous waste management principles. Prerequisite: Acceptance into professional program in engineering. (F)

CEE 3870 Professional/Technical Writing in Civil and Environmental Engineering 2
Gives CEE students intensive practice with oral and written communication in business and technical CEE writing. Requires concurrent enrollment in CEE/PUBH 3610. (F)

CEE 3880 Civil Engineering Design I 1
Introduction to senior engineering students' integrated design experience. Design project is identified and proposal for its completion during the senior year is produced. Emphasizes project scheduling, and completion of design proposal. Prerequisite: CEE 3870. (Sp)

CEE 3890 Environmental Engineering Design I 1
Introduction to senior environmental engineering students' integrated design experience. Design project identified and proposal for its completion during the senior year is produced, under mentoring of course instructor. Emphasizes project identification, project scoping, manpower and materials budgeting, project scheduling, and completion of design proposal. Prerequisites: CEE/PUBH 3610, CEE 3640, CEE/BIE 3670. (Sp)

CEE 4200 Engineering Economics 2
Applications of the mathematics of finance to engineering decision making. (F)

CEE 4300 Engineering Soil Mechanics 4
Physical and mechanical properties of soils. Topics include: classification, permeability, soil stresses and settlement analysis, soil strength, slope stability, lateral earth pressures, introduction to foundations, numerical solutions, and computer applications. Prerequisites: CEE 3500 (taken previously or concurrently) and ENGR 2140. (Sp)

CEE 4790 CI Environmental Engineering Design II 2
Provides senior environmental engineering students with integrated design experience in two-semester sequence. Design projects proposed in CEE 3890 completed under mentoring of course instructor. Emphasizes team work, scheduling, design calculations, and completion of design report. Prerequisites: CEE 3890 and concurrent enrollment in environmental engineering technical elective course during fall semester. (F)

CEE 4870 CI Civil Engineering Design II 2
Provides senior engineering students with integrated design experience in two-semester sequence. Design projects proposed in Junior Design Proposal placed on team work, scheduling, design calculations, and completion of design report. Prerequisite: CEE 3880; senior design technical elective should be taken concurrently. (F)

CEE 4880 CI Civil Engineering Design III 2
Provides senior engineering students with integrated design experience in two-semester sequence. Design projects started in CEE 4870 will be completed with presentation, report, and defense of design project. Prerequisite: CEE 4870. (Sp)

CEE 4890 CI Environmental Engineering Design III 2
Provides senior environmental engineering students with integrated design experience in two-semester sequence. Completion of design projects begun in CEE 4790, with presentation, report, and defense. Prerequisite: CEE 4790. (Sp)

CEE 4930 Independent Study 1-3®
Laboratory design or research project on problem selected by student. Requires review of literature, preparation of proposal describing project, completion of design or research project, and preparation of report. (F,Sp,Su)

Course Descriptions

CEE 5010 Matrix Analysis/Finite Element 3
Analysis of structures using matrix methods. Application of software based on the stiffness method to practical analysis problems. Introduction of Finite Element method based on stiffness approach and mathematical derivation of simple finite elements, along with application to practical problems. Prerequisite: CEE 3020. (F)

CEE 5020 Finite Element Methods in Solid Mechanics I 3
Introduction to finite element methods and their application to the analysis and design of mechanical engineering systems. Prerequisite: MAE 3040. Also taught as MAE 5020. (F)

CEE 5050 Design of Wood and Masonry Structures 3
Design of beams, columns, joints, walls, and diaphragms in both wood and masonry materials. Current design codes will be utilized. Prerequisite: CEE 3080. (Sp)

CEE 5060 Mechanics of Composite Materials I 3
Stress-strain relations for nonisotropic composites, such as fiber-reinforced plastic laminates, properties and their uses, strength and life determination, and methods for design using composite materials. Prerequisite: MAE 3040 or CEE 3010. Also taught as MAE 5060. (F)

CEE 5070 Structural Steel Design 3
Structural steel design using load and resistance factor design (LRFD) method. Focuses on design of structural beams, columns, and connections utilizing steel design codes. Prerequisites: CEE 3020, 3080. (F)

CEE 5080 Numerical Methods in Elasticity 3
(dual listing 6080)
Elasticity theory, stress and strain analysis, and yield criteria. Governing equilibrium, kinematic, and compatibility equations. Generalized Hooke's law. Classical solutions of flex and torsion problems. Energy methods. Introduction to finite difference, finite element, and boundary element methods. Computer applications. Prerequisite: CEE 3020. (F)

CEE 5100 Infrastructure Evaluation and Renewal 3
Evaluation of existing structural systems and techniques to improve their performance. Focuses on structures which are seismically deficient. Prerequisites: CEE 3080, 5070. (Sp)

CEE 5190 Geographic Information Systems
(dual listing 6190) for Civil Engineers 3
Introduction to GIS concepts addressing data structures, spatial entities, and queries. Topics include location referencing methods, data collection techniques, current applications, and institutional and organizational issues. (Sp)

CEE 5220 Traffic Engineering 3
(dual listing 6220)
Topics covered include characteristics, measurements, and analysis of volume, speed, density, and travel time; capacity and level of service analysis; signalization and traffic control devices. (Sp)

CEE 5230 Geometric Design of Highways 3
(dual listing 6230)
Principles of highway location and planning, with full consideration of economic, environmental, and other impacts. Capacity analysis of intersections and highways, passing-lane design, and risk-cost based horizontal and vertical alignment design. Introduction to design software through coursework and term projects. Prerequisite: CEE 3210. (Sp)

CEE 5240 Urban and Regional
(dual listing 6240) Transportation Planning 3
Examination of travel demand forecasting, data collection, and survey data analysis techniques. Focuses on transportation-land use interactions and impact of market-based policies on travel demand. Theories and applications of traditional and advanced trip distribution, mode choice, and route assignment models. (F)

CEE 5250 Environmental Engineering Cooperative Practice 2
Applied environmental employment with primary focus of work experience related to one of the environmental engineering specialty areas. Prerequisites: Senior status and permission of instructor. (F,Sp,Su)

CEE 5350 Foundation Analysis and Design 3
(dual listing 6350)
Applications of theories studied in soil mechanics. Design considerations for various foundation types, including shallow foundations, driven piles, drilled shafts, walls, soil anchorages, and mechanically-stabilized earth support systems. Field investigation techniques and computer applications. Prerequisite: CEE 4300. (F)

CEE 5380 Earthquake Engineering 3
(dual listing 6380)
Covers wide variety of earthquake engineering topics, including seismology and earthquake source characterization, strong ground motion, seismic hazard analysis, wave propagation, soil dynamics, ground response, local site effects, liquefaction, seismic slope stability, soil improvement, vibrational analyses, and structural seismic design. Prerequisite: CEE 4300. (Sp)

CEE 5430 Groundwater Engineering 3
(dual listing 6430)
Explores fundamentals of groundwater hydrology by focusing on theory related to aquifer systems and flow analysis, regional groundwater balance, well hydraulics, aquifer testing, capture zone analysis, unsaturated flow, saltwater intrusion, and basics of flow modeling. Prerequisite: CEE 3430 or a similar hydrology course. (F)

CEE 5450 Hydrologic Modeling 3
(dual listing 6450)
Case studies of hydrologic modeling and decision methods: (1) Real-time flood warning; (2) extended streamflow prediction; (3) probabilistic water resource management; and (4) physical modeling of ungaged basins. Prerequisite: CEE 3430. (Sp)

CEE 5460 Water Resources Engineering 3
(dual listing 6460)
Engineering design course covering a wide range of topics, including: surface and groundwater hydrology, statistical analysis, water law, hydroelectric power, water supply, irrigation, flood control, wastewater, drainage, dams and reservoirs, pipelines, open channels, and planning. (F)

CEE 5470 Sedimentation Engineering 3
(dual listing 6470)
Explores river response, sediment transport, sediment and watershed yield, flow resistance, scour and erosion, and floodplain management. Prerequisite: CEE 3500. (Sp)

CEE 5500 Open Channel Hydraulics with an
(dual listing 6500) Emphasis on Gradually Varied Flow 3
Theory and applications of steady uniform and gradually varied flow under both subcritical and supercritical flow conditions. Solutions to multiple-network canal systems by solving systems of combined ordinary differential and algebraic equations. Method for defining natural channel systems and solving steady-state flows in them. Prerequisites: CEE 3500, 3510. (F)

CEE 5540 Hydraulic Structures Design 3
(dual listing 6540)
Design of a variety of hydraulic structures is explored, both in the classroom and laboratory. Integrates student-developed, original computer programs; commercially available software; field trips; and hands-on laboratory design projects to further students' understanding of hydraulic structures. Prerequisites: CEE 3500 and 3510. (F)

CEE 5550 Hydraulics of Closed Conduits 3
(dual listing 6550)
Includes design and operation of piping systems; economics; feasibility and impact of pipelines; pipe, pump, and valve selection; transient and cavitation analysis; and pipeline operation and filling. Prerequisites: CEE 3500 and 3510. (Sp)

CEE 5610 Environmental Quality Analysis 3
(dual listing 6610)
Familiarizes students with various methods used for analysis of chemical parameters in environmental samples (water, soil, and air). Provides students with skills enabling them to make proper selection/evaluation of analytical procedure and evaluate data generated. Prerequisite: CHEM 1210. (F)

CEE 5620 Aquatic Chemistry 3
Provides students with understanding of principles of aquatic chemistry, emphasizing chemical equilibria, acid-base reactions, complex formation, oxidation-reduction reactions, complex formation, and dissolution chemistry. Prerequisite: CHEM 1210 or equivalent. Also taught as SOIL 5620. (F)

CEE 5670 Hazardous Chemicals Handling and Safety 2
Provides students with necessary skills and knowledge for working safely in areas associated with hazardous chemicals. Topics covered include: regulations, exposure routes, toxicology, chemical and physical hazards, personal protective equipment, sampling, monitoring, decontamination, and emergency response procedures. Prerequisite: CHEM 1210. Also taught as PUBH 5670. (Sp)

CEE 5680 Soil-based Waste Management 2
(dual listing 6680)
Engineering management of wastes present in the vadose zone, including extraction, containment, and biological, chemical, and physical destruction technologies for sustainable agriculture and environmental quality. Aspects include engineering characterization, problem definition, treatment, and monitoring. Analysis and design emphasized through problems, examinations, and report writing. Prerequisites: CEE/PUBH 3610, CEE 3640, 3870, CEE/BIE 3670. Also taught as BIE 5680/6680. (Sp)

CEE 5690 Natural Systems Engineering 3
(dual listing 6690)
Application of modeling tools commonly utilized in water resources systems for assessment of environmental impacts associated with engineered systems. Topics include: water resources modeling; physical, chemical, and biological process effects; assessment methods; data integration techniques; and impact assessment. Prerequisites: CEE/PUBH 3610, CEE 3500, 3510, 3640. (F)

CEE 5700 Field Sampling Techniques for
(dual listing 6700) Natural Systems Engineering 2
Provides students with hands-on approach to utilizing several of the most commonly applied spatial and temporal sampling techniques for data acquisition in support of natural systems modeling. Explores standard and advanced surveying techniques for water quality, stream geomorphology, and hydraulics, utilizing levels, total stations, laser levels, GPS, and hydroacoustic technologies. Integrative sampling strategies across spatial and temporal scales emphasized for multi-disciplinary studies. Prerequisite: CEE 5690/6690. (F)

CEE 5710 Pollution Prevention and
Industrial Ecology* 2**
Explores pollution prevention and waste minimization concepts, focusing on implementation of these concepts in design of production processes and products. Discussion of pollution prevention/waste minimization concepts, energy and materials conservation, Life Cycle Analysis, materials and process audits, industrial process design for waste minimization and energy conservation, packaging, and ISO 14000. Prerequisites: CEE/BIE 3670, CEE 3780, MAE 2400. (Sp)

CEE 5720 Natural Systems Modeling 3
(dual listing 6720)
Provides hands-on approach to utilizing several of the most commonly applied modeling tools employed to estimate physical, chemical, and biological impacts of existing and proposed water resource systems. Focuses on utility and climitation of specific modeling approaches, while also stressing integrative multi-disciplinary nature of impact assessment frameworks. Prerequisite: CEE 5690/6690. (Sp)

CEE 5730 Analysis and Fate of
(dual listing 6730) Environmental Contaminants 3
Provides students with understanding of methods used in analysis of environmental samples for organic contaminants. Examines various properties and processes determining the fate of organic contaminants in the environment. Prerequisites: CHEM 1210, 2300. Also taught as PUBH 5730/6730. (Sp)

CEE 5750 Air Quality Measurements 2
Laboratory-based course designed to familiarize participants with federally-approved reference measurement techniques for embient and source air pollutants. Also provides understanding of temporal and spatial pollutant behavior. (Sp)

CEE 5760 Hydraulic Structures Field Course 1
Week-long course, with one day of in-class lectures and four days of field trips. Introduces students to field applications of hydraulic structures design. Field trips may involve backpacking to remote areas. (F,Su)

CEE 5790 Accident and Emergency Management* 3**
Introduction to fundamentals of accident, hazard, and emergency management. Topics include legislation; chemical safety fundamentals; fire, explosion, and spill fundamentals; contaminant air transport fundamentals; hazard and risk assessment; dispersion applications; and hazard and risk management applications. Prerequisite: CHEM 1220. Also taught as PUBH 5790. (Sp)

CEE 5810 Biochemical Engineering 3
(dual listing 6810)
Fundamentals of bioreactor design and bioengineering to produce biological commodities. Emphasizes mathematical models of microbial and enzymatic processes in environmental and industrial biotechnology. Prerequisites: BIE 3200 and BIE/CEE 3670; *or* BIE/CEE 3670, CEE/PUBH 3610, and CEE 3640. Also taught as BIE 5810/6810. (F)

CEE 5830 Management and Utilization of
(dual listing 6830) Biological Solids and Wastewater 3
Focuses on production, management, and disposal of biosolids and wastewater generated in food processing and wastewater treatment. Emphasizes beneficial use of biosolids and wastewater for agricultural production, forest enhancement, and land reclamation. Prerequisite: BIE/CEE 3670. Also taught as BIE 5830/6830. (F)

CEE 5860 Air Quality Management 3
Introduction to air quality management. Explores the legislation, sources, behaviors, and effects of regulated and nonregulated air pollution, control techniques, and air dispersion modeling. Prerequisites: CEE 3640, 3780, CEE/BIE 3670, MAE 2300. (F)

CEE 5870 Hazardous Waste Incineration 2
Provides introduction to hazardous waste incineration principles. Topics include: thermodynamics, stoichiometry, thermochemistry, chemical kinetics, energy recovery, pollution control systems, and incinerator design principles. Prerequisites: CEE/BIE 3670, CEE 3780, MAE 2300; CEE 5860 (may be taken concurrently). (Sp)

CEE 5880 Remediation Engineering 3
Physical, chemical, and biological principles associated with remediation of hazardous waste contaminated soil, water, sediments, and air. Topics include: source removal and source control, product recovery, chemical treatment methods, biological remediation concepts, in situ processes, ex situ processes, and integrated process design. Prerequisites: CEE 3430, 3640, 3780, CEE/PUBH 3610. (F)

CEE 5900 Cooperative Practice II 3
A planned work experience in industry. Detailed program must have prior approval. Written report required. (F,Sp,Su)

CEE 6010 Finite Element Methods in
Solid Mechanics II 3
Advanced theory and applications of finite element methods to both static and dynamic solid mechanics problems. Prerequisite: MAE 5020. (Sp)

CEE 6020 Structural Stability 3**
Elastic and inelastic buckling of columns; analysis of beam columns, thin-walled beams of open cross-section. Stability analysis of frame and plate structures. Large deflection theory. Historical notes on stability of structures. Computer applications. Prerequisite: CEE 3010. (F)

CEE 6030 Structural Optimization* 3
Introduction to optimization techniques for linear and nonlinear, univariable, and multivariable functions with or without constraints. Computer applications, and applications to structural design. Prerequisite: CEE 3010 or instructor's consent. (Sp)

CEE 6040 Structural Reliability* 3
Elements of probability theory and its application to structural engineering and mechanics. Statistical distribution of loads. Uncertainties in material parameters and their effects in design. Reliability-based safety analysis and computer applications. Prerequisite: Instructor's consent. (F)

Course Descriptions

CEE 6050 Experimental Methods in Structural Engineering 3**
Experimental techniques used in research and design in structural engineering and mechanics. Structural models. Theory and practical applications. Development of principles used to design research projects. Prerequisite: Instructor's consent. Also taught as MAE 6050. (Sp)

CEE 6070 Mechanics of Composite Materials II 3
Second course in composite materials. Stress-strain states of laminated composite structures, including interlaminar stresses, failure criteria, and hygrothermal stresses. Prerequisite: MAE 5060. Also taught as MAE 6070. (F)

CEE 6080 Numerical Methods in Elasticity 3
(dual listing 5080)
Elasticity theory, stress and strain analysis, and yield criteria. Governing equilibrium, kinematic, and compatibility equations. Generalized Hooke's law. Classical solutions of flex and torsion problems. Energy methods. Introduction to finite difference, finite element, and boundary element methods. Computer applications. Prerequisite: CEE 3020. (F)

CEE 6090 Theory of Plates and Shells 3
Introduction to plate and shell theories. Development of bending and buckling of plates and shells through classical theory. Prerequisite: MAE 3040 or CEE 3010. Also taught as MAE 6090. (F)

CEE 6110 Probabilistic and Statistical Methods in Engineering 3
Explores principles related to probability and statistical methods commonly used in engineering practice, as well as applying these principles to the solution of engineering problems. Prerequisites: Undergraduate-equivalent knowledge in statistical methods or CEE 3030, plus 3000-level calculus and numerical methods. (F)

CEE 6130 Structural Dynamics and Seismic Design 3
Development and solutions for equations of motion for single- and multi-degree of freedom systems. Dynamic analysis by Modal Superposition and Response Spectra. Design of structures for seismically active areas. Also taught as MAE 6130. (Sp)

CEE 6180 Dynamics and Vibrations 3
Fundamentals of two-dimensional and three-dimensional rigid body dynamics, including Newtonian, Lagrangian, and Leavit Energy Methods. Equations of motion, mode shapes, and natural frequencies for continuous media and multi degree-of-freedom systems. Prerequisite: MAE 5300 or CEE 6130. Also taught as MAE 6180. (Sp)

CEE 6190 Geographic Information Systems
(dual listing 5190) for Civil Engineers 3
Introduction to GIS concepts addressing data structures, spatial entities, and queries. Topics include location referencing methods, data collection techniques, current applications, and institutional and organizational issues. (Sp)

CEE 6200 Pavement Design 3
Analysis and design of flexible and rigid pavements for highways and runways, including the design of overlays. Equal emphasis on current practice and advanced concepts of pavement management. Prerequisite: CEE 3010. (F)

CEE 6210 Transportation Systems Analysis 3
Introduces systems approach to analysis of transportation services and infrastructure. Focuses on basic and advanced concepts, including operations research techniques, simulation, and artificial intelligence. Topics include facility sizing and location, financial and economic analysis of investment projects, and privatization. Prerequisite: CEE 3030 or equivalent. (F)

CEE 6220 Traffic Engineering 3
(dual listing 5220)
Topics covered include characteristics, measurements, and analysis of volume, speed, density, and travel time; capacity and level of service analysis; signalization and traffic control devices. (Sp)

CEE 6230 Geometric Design of Highways 3
(dual listing 5230)
Principles of highway location and planning, with full consideration of economic, environmental, and other impacts. Capacity analysis of intersections and highways, passing-lane design, and risk-cost based horizontal and vertical alignment design. Introduction to design software through coursework and term projects. Prerequisite: CEE 3210. (Sp)

CEE 6240 Urban and Regional Transportation
(dual listing 5240) Planning 3
Examination of travel demand forecasting, data collection, and survey data analysis techniques. Focuses on transportation-land use interactions and impact of market-based policies on travel demand. Theories and applications of traditional and advanced trip distribution, mode choice, and route assignment models. (F)

CEE 6250 Transportation Data/Safety Analysis 3
Statistical analysis of transportation data, including safety and risk assessment. Regression and multivariate analysis, such as discriminant analysis, canonical correlation, and factor analysis. In-depth study of selected methodologies for analyzing transportation safety and designing counter measures. Prerequisite: CEE 3210 or equivalent. (F)

CEE 6260 Public Transportation 3
Principles of planning, design, and operation of transit systems in urban and rural areas. Determination of optimal route alignments, schedules, and station/stop spacings. Exploration of innovations in financing and pricing, including cost-cutting techniques. (Sp)

CEE 6270 Traffic Operations Analysis 3
Traffic flow fundamentals, macroscopic and microscopic models of traffic flow, shock wave analysis, car following principles, queuing systems, and simulation. (Sp)

CEE 6290 Transportation Network Analysis 3
Analytical approaches and algorithms to the formulation and solution of the equilibrium assignment problem for transportation networks. Emphasis on user equilibrium, comparison with system optimal stochastic user equilibrium, origin-destination matrix estimation, and network design problems. (Sp)

CEE 6300 Earth Structures 3
Design and construction of earth and rockfill dams, embankments, excavations, and retaining structures. Prerequisites: CEE 4300, 5350/6350. (Sp)

CEE 6310 Environmental Geotechniques 3
Geotechnical aspects of environmental systems, with concentration on waste containment facilities. Prerequisite: CEE 4300. (F)

CEE 6320 Deep Foundations 3
Analysis, design, and construction of deep foundations with emphasis on driver piles and drilled shafts. Prerequisites: CEE 4300, 5350/6350. (Sp)

CEE 6330 Ground Reinforcement, Improvement, and Treatment 3
Theory, design, and construction methods for ground reinforcement, improvement, and treatment applications. Prerequisites: CEE 4300, 5350/6350. (F)

CEE 6340 Laboratory and Field Methods in Geotechnical Engineering 3
Subsurface investigation, field testing and instrumentation, and laboratory testing. Prerequisites: CEE 4300, 5350/6350. (F)

CEE 6350 Foundation Analysis and Design 3
(dual listing 5350)
Applications of theories studied in soil mechanics. Design considerations for various foundation types, including shallow foundations, driven piles, drilled shafts, walls, soil anchorages, and mechanically-stabilized earth support systems. Field investigation techniques and computer applications. Prerequisite: CEE 4300. (F)

CEE 6360 Geotechnical Principles 3
Theoretical soil behavior. Hydraulic conductivity, compression, and shearing properties. Prerequisites: CEE 4300, 5350/6350. (F)

CEE 6370 Buried Structures 3
Analysis of structural performance of buried structures (pipes, tanks, silos, etc.) using principles of mechanics of materials and finite element methods. Prerequisite: CEE 4300. (Sp)

CEE 6380 Earthquake Engineering 3
(dual listing 5380)
Covers wide variety of earthquake engineering topics, including seismology and earthquake source characterization, strong ground motion, seismic hazard analysis, wave propagation, soil dynamics, ground response, local site effects, liquefaction, seismic slope stability, soil improvement, vibrational analyses, and structural seismic design. Prerequisite: CEE 4300. (Sp)

CEE 6400 Physical Hydrology 3
Fundamentals of hydrologic cycle and hydrologic processes. Precipitation, infiltration, runoff generation, evaporation and transpiration, and snowmelt. Representation of hydrologic processes in hydrologic models. Prerequisite: CEE 3430. (F)

CEE 6410 Water Resource Systems Analysis 3
Systems formulation of decision problems. Solution by simulation and optimization, constrained and unconstrained optimization algorithms, case studies and applications to water supply, and quality and ecosystems management. (Sp)

CEE 6420 Engineering Risk Assessment and Risk Management 3
Comprises both quantitative risk assessment techniques and a range of issues in risk management. Examples drawn from various civil engineering subdisciplines such as: environmental engineering, geotechnical engineering, hydraulics and hydrology, structural engineering, transportation engineering, and water resource management. (Sp)

CEE 6430 Groundwater Engineering 3
(dual listing 5430)
Explores fundamentals of groundwater hydrology by focusing on theory related to aquifer systems and flow analysis, regional groundwater balance, well hydraulics, aquifer testing, capture zone analysis, unsaturated flow, saltwater intrusion, and basics of flow modeling. Prerequisite: CEE 3430 or a similar hydrology course. (F)

CEE 6440 Geographic Information Systems in Water Resources 3
Principles and operation of geographic information systems. Spatial hydrologic modeling done by developing a digital representation of the environment in the GIS, then adding functions simulating hydrologic processes. Includes term project on use of GIS in water resources. (F)

CEE 6450 Hydrologic Modeling 3
(dual listing 5450)
Case studies of hydrologic modeling and decision methods: (1) Real-time flood warning; (2) extended streamflow prediction; (3) probabilistic water resource management; and (4) physical modeling of ungaged basins. Prerequisite: CEE 3430. (Sp)

CEE 6460 Water Resources Engineering 3
(dual listing 5460)
Engineering design course covering a wide range of topics, including: surface and groundwater hydrology, statistical analysis, water law, hydroelectric power, water supply, irrigation, flood control, wastewater, drainage, dams and reservoirs, pipelines, open channels, and planning. (F)

CEE 6470 Sedimentation Engineering 3
(dual listing 5470)
Explores river response, sediment transport, sediment and watershed yield, flow resistance, scour and erosion, and floodplain management. Prerequisite: CEE 3500. (Sp)

CEE 6480 Groundwater Contamination: Modeling, Monitoring, and Management 3
In-depth exploration of physical, chemical, and biological processes related to fate and transport of contaminants in the subsurface, mathematical modeling, remediation technologies, and mitigation of contaminated sites using risk-based decision-making. Prerequisite: CEE 5430/6430 or equivalent. (F)

CEE 6490 Integrated River Basin/Watershed Planning and Management 3
Reviews fundamental building blocks of water resource institutions, emphasizing creation of institutions which are sensitive to a particular culture, economic, and political environment. Addresses institutional mission and regulatory roles, public participation, property and water rights, and elements of production. (Sp)

CEE 6500 Open Channel Hydraulics with an
(dual listing 5500) Emphasis on Gradually Varied Flow 3
Theory and applications of steady uniform and gradually varied flow under both subcritical and supercritical flow conditions. Solutions to multiple-network canal systems by solving systems of combined ordinary differential and algebraic equations. Method for defining natural channel systems and solving steady-state flows in them. Prerequisites: CEE 3500, 3510. (F)

CEE 6510 Numerical Methods for Civil Engineers 3
Engineering applications of approximation and interpolation, solution methods for ordinary differential equations, numerical solution of partial differential equations, nonparametric and parametric probability and regression estimation, and Monte Carlo and uncertainty analysis. (F)

CEE 6520 Applied Hydraulics 3
Basic fluid mechanics applied to wildland watershed systems and directed at nonengineering students. Explores nature of fluid state, fluid motion, and steady uniform and varied flow in open channels, under both subcritical and supercritical conditions. Surveys concepts of boundary layers, turbulence, convection, dispersal, and wave formation in unsteady flows. Emphasizes problem formulation and solving. Prerequisites: AWER 5490/4490; MATH 2280 (recommended). Also taught as AWER 6520. (F)

CEE 6530 Unsteady Flows in Open Channels and Numerical Solutions of St. Venant Equations 3
Derivation and physical meaning of the St. Venant equations, types of water waves, solutions to unsteady free surface flows based on the characteristics, and direct and iterative implicit methods of solution. Emphasizes solving unsteady flow problems in channel systems. Prerequisite: CEE 6500. (Sp)

CEE 6540 Hydraulic Structures Design 3
(dual listing 5540)
Explores design of a variety of hydraulic structures, both in the classroom and laboratory. Integrates student-developed, original computer programs; commercially available software; field trips; and hands-on laboratory design projects to further students' understanding of hydraulic structures. Prerequisites: CEE 3500 and 3510. (F)

CEE 6550 Hydraulics of Closed Conduits 3
(dual listing 5550)
Includes design and operation of piping systems; economics; feasibility and impact of pipelines; pipe, pump, and valve selection; transient and cavitation analysis; and pipeline operation and filling. Prerequisites: CEE 3500 and 3510. (Sp)

CEE 6580 Intermediate Fluid Mechanics 3
Survey of mathematical methods used in fluid mechanics, including: potential flow solutions (complex variables), laminar flow and turbulent flow solutions, boundary layer theory, and introduction to dispersion in fluid. (F)

CEE 6590 Evaluation of Hydrologic Modeling Systems 3
Focuses on different techniques for evaluating the performance, diagnosing the model structure, and assessing the uncertainty of hydrologic modeling systems. Examines mathematical and systems theory methods for examining the interrelation between model inputs and outputs. Prerequisite: CEE 6400. (Sp)

CEE 6600 Environmental Chemistry of Inorganic Contaminants 2
Inorganics of environmental concern discussed in terms of processes affecting their behavior in soil and water systems. Explores remediation of environmental systems contaminated with inorganic pollutants. Taught second half of spring semester. Prerequisite: CEE/SOIL 5620. (Sp)

CEE 6610 Environmental Quality Analysis 3
(dual listing 5610)
Familiarizes students with various methods used for analysis of chemical parameters in environmental samples (water, soil, and air). Provides students with skills enabling them to make proper selection/evaluation of analytical procedure and evaluate data generated. Prerequisite: CHEM 1210. (F)

CEE 6620 Field Sampling and Analysis of Environmental Systems 3
Explores applied field sampling, as well as field and laboratory techniques used in the monitoring of environmental media. Includes theory and practice of field site monitoring and measurement of physical, chemical, and biological processes in the environment. Prerequisite: Consent of instructor. (F)

CEE 6630 Process Dynamics in Environmental Engineering Systems 2
Fundamental principles used in analysis and simulation of environmental systems. Emphasizes reaction kinetics, mass transfer, reactor analysis and design, and development and solution of mathematical models to describe natural and engineered environmental systems. Prerequisites: CEE 3500, 3510. (F)

CEE 6640 Physical and Chemical Environmental Process Engineering 3
Principles of physical and chemical environmental engineering processes, including sedimentation, filtration, gas transfer, aeration, absorption, ion exchange, membrane processes, coagulation, flooculation, precipitation, oxidation, reduction, and disinfection. Process modeling and analysis applications in treatment of water, wastewater, industrial wastes, vapor treatment, and soil remediation. Prerequisites: CEE/SOIL 5620, CEE 6630. Corequisite: CEE 6670. (Sp)

CEE 6650 Biological Processes in Environmental Engineering 2
Theory and design of biological processes used in environmental engineering. Stoichiometric, energetic, and kinetic analysis of biological treatment processes; modeling and design of suspended growth and fixed-film processes for treatment of municipal, industrial, and hazardous wastes; nutrient removal; and bioremediation. Prerequisites: CEE 6630, 6640, 6710. (Sp)

CEE 6660 Environmental Data Analysis and Experimentation 2
Data analysis and experimental design for environmental science and engineering. Graphical data analysis, parametric and nonparametric statistics, frequency distributions, hypothesis testing, propagation of variance, censored data, correlation and causation, parameter estimation, factorial experimental design and response surfaces, environmental monitoring and uncertainty. (F)

CEE 6670 Environmental Process Laboratory 2
Laboratory testing to demonstrate physical, chemical, and biological principles utilized in environmental engineering processes. Corequisites: CEE 6640, 6650. (Sp)

CEE 6680 Soil-based Waste Management 2
(dual listing 5680)
Engineering management of wastes present in the vadose zone, including extraction, containment, and biological, chemical, and physical destruction technologies for sustainable agriculture and environmental quality. Aspects include engineering characterization, problem definition, treatment, and monitoring. Analysis and design emphasized through problems, examinations, and report writing. Prerequisites: CEE/PUBH 3610, CEE 3640, 3870, CEE/BIE 3670. Also taught as BIE 6680/5680. (Sp)

CEE 6690 Natural Systems Engineering 3
(dual listing 5690)
Application of modeling tools commonly utilized in water resources systems for assessment of environmental impacts associated with engineered systems. Topics include: water resources modeling; physical, chemical, and biological process effects; assessment methods; data integration techniques; and impact assessment. Prerequisites: CEE/PUBH 3610, CEE 3500, 3510, 3640. (F)

CEE 6700 Field Sampling Techniques for
(dual listing 5700) Natural Systems Engineering 2
Provides students with hands-on approach to utilizing several of the most commonly applied spatial and temporal sampling techniques for data acquisition in support of natural systems modeling. Explores standard and advanced surveying techniques for water quality, stream geomorphology, and hydraulics, utilizing levels, total stations, laser levels, GPS, and hydroacoustic technologies. Integrative sampling strategies across spatial and temporal scales emphasized for multi-disciplinary studies. Taught first half of fall semester. Prerequisite: CEE 6690/5690. (F)

CEE 6710 Environmental Engineering Microbial Ecology 2
Principles of microbial ecology applied to engineered and natural systems. Prerequisites: BIOL 3300, CEE/PUBH 3610. (F)

CEE 6720 Natural Systems Modeling 3
(dual listing 5720)
Provides hands-on approach to utilizing several of the most commonly applied modeling tools employed to estimate physical, chemical, and biological impacts of existing and proposed water resource systems. Focuses on utility and limitation of specific modeling approaches, while also stressing integrative multi-disciplinary nature of impact assessment frameworks. Prerequisite: CEE 6690/5690. (Sp)

CEE 6730 Analysis and Fate of
(dual listing 5730) Environmental Contaminants 3
Provides students with understanding of methods used in analysis of environmental samples for organic contaminants. Examines various properties and processes determining the fate of organic contaminants in the environment. Taught first half of spring semester. Prerequisites: CHEM 1210, 2300. Also taught as PUBH 6730/5730. (Sp)

CEE 6740 Environmental Quality Modeling 3
Development and application of mathematical models for conventional and toxic pollutants in environmental systems. Description of advection, dispersion, sediment transport, partitioning, interphase transfer, and transformation kinetics applied to organic and inorganic pollutants. Equilibrium, steady state, and nonsteady systems. Prerequisite: CEE 6630. (Sp)

CEE 6750 Eco-Hydraulics for Natural Systems Engineering 4
Provides students with advanced multi-disciplinary modeling course in the application of hydraulics and water resource modeling in light of impact assessment frameworks for natural systems modeling. Focuses on application on one-dimensional and two-dimensional hydraulic modeling as basis for examining quantitative impacts on stream and riparian ecosystems under altered flow, as well as channel conditions with particular emphasis on fish and aquatic macro-invertebrates. Prerequisite: CEE 6690/5690. (F)

CEE 6800 Division of Environmental Engineering Seminar 1
Environmental engineering graduate seminar for faculty, student, and guest lecturer research presentations. (F,Sp)

CEE 6810 Biochemical Engineering 3
(dual listing 5810)
Fundamentals of bioreactor design and bioengineering to produce biological commodities. Emphasizes mathematical models of microbial and enzymatic processes in environmental and industrial biotechnology. Prerequisites: BIE 3200 and BIE/CEE 3670; *or* BIE/CEE 3670, CEE/PUBH 3610, and CEE 3640. Also taught as BIE 6810/5810. (F)

CEE 6830 Management and Utilization of
(dual listing 5830) Biological Solids and Wastewater 3
Focuses on production, management, and disposal of biosolids and wastewater generated in food processing and wastewater treatment. Emphasizes beneficial use of biosolids and wastewater for agricultural production, forest enhancement, and land reclamation. Prerequisite: BIE/CEE 3670. Also taught as BIE 6830/5830. (F)

CEE 6840 Application of Technology Transfer for Teachers 2®
Focuses on application of modern instructional strategies to the transfer of technology and science to the public education setting. Part of a series of six courses. Prerequisite: Participation in an In*Step Science Program in the public schools. (F,Sp,Su)

CEE 6850 Atmospheric and Air Pollution Chemistry 3
Provides students with training in the fundamentals of natural and anthropogenically impacted atmospheric chemistry, primarily focusing on tropospheric meteorology, kenetics, and photochemistry, including gas-phase, aqueous-phase, and aerosol-forming reactions. Prerequisite: CEE 5680/6680 or upper-level chemistry or consent of instructor. (Sp)

CEE 6900 Directed Reading 1-3®
Prerequisite: Instructor's consent. (F,Sp,Su)

CEE 6930 Special Problems 1-4®
Independent or group study of engineering problems not covered in regular course offerings. Prerequisite: Instructor's consent. (F,Sp,Su)

CEE 6940 Snow Hydrology 3
Focuses on snow science, including atmospheric formation, precipitation, distribution on the landscape, metamorphosis prior to melt, and snow pack melt dynamics. Also covers related issues, such as snow melt modeling, remote sensing, water supply, and biogeochemical cycling. Prerequisites: AWER 3700 or 4600 or SOIL 4600 or CEE 3430, or permission of instructor. Also taught as AWER 6940. (Sp)

CEE 6970 Thesis Research 1-6®
Prerequisite: Instructor's consent. (F,Sp,Su)

CEE 6990 Continuing Graduate Advisement 1-9®
Prerequisite: Instructor's consent. (F,Sp,Su)

CEE 7050 Plasticity 3
Analysis of stresses, deformation, and collapse in devices constructed of plastic material. Prerequisite: MAE 6040 or CEE 6080/5080 or instructor's consent. Also taught as MAE 7050. (Sp)

CEE 7080 Advanced Plate and Shell Theory 3
Analysis of plate and shell structures by classical and numerical methods. Emphasis on numerical solutions. Prerequisite: Instructor's consent. Also taught as MAE 7080. (F)

CEE 7110 Constitutive Modeling and Structural Response of Engineering Materials 3**
Constitutive modeling of reinforced concrete, metals, soils, and composite materials. Plasticity and endochronic theories. Finite element modeling and predictive analysis of two- and three-dimensional structures. Computer applications and implementations. Prerequisite: Instructor's consent. (F)

CEE 7120 Advanced Topics in Civil Engineering 3
Discussion of current research topics conducted by civil and other engineering faculty and staff at USU and elsewhere. Offered on either arranged or regular basis. Topics and times can be arranged with instructor and advisor. Prerequisite: Instructor's consent. (F,Sp,Su)

CEE 7150 Effective Engineering Instruction 1
Seminar-style course designed to give PhD candidates insight and guidance for becoming effective engineering instructors. (F)

CEE 7160 Successful Faculty Strategies 1
Seminar-style course designed to give PhD candidates insight and guidance into the expectations and approaches for becoming successful university faculty members. (Sp)

CEE 7170 Research Methods in Engineering 1
Seminar-style course designed to give PhD candidates insight and guidance into research methods in engineering. (F)

CEE 7270 Travel Demand and Supply Analysis 3
Fundamentals of demand and supply analysis. Theoretical aspects of travel demand modeling techniques. Modeling of performance characteristics and costs of transportation modes. Emphasis on theoretical aspects of discrete choice analysis and their applications in the modeling of transportation systems. (F)

CEE 7300 Theoretical Soil Mechanics 3
Advanced studies of stress distribution in soil masses, shear strength, consolidation, constitutive modeling, and finite applications. Prerequisite: CEE 6360. (Sp)

CEE 7310 Fundamentals of Soil Behavior 3**
The influence of clay mineralogy, clay chemistry, and soil origin on the engineering properties of soil. Prerequisite: CEE 6360. (F)

CEE 7320 Advanced Soil Dynamics 3**
Advanced studies in the response of soil structures and foundations to dynamic loads. Prerequisite: CEE 6360. (F)

CEE 7430 Stochastic Hydrology* 3**
Stochastic description of hydrologic variability in time, space, and space-time. Markov processes, time series synthesis and forecasting, spectral analysis, spatial interpolation and random field simulation, data imputation, and parameter estimation for physical models. Lattice and Markov chain Monte Carlo methods, simulated annealing, and Gibbs processes. Applications to rainfall, streamflow, groundwater quality and quantity, and subsurface characterization. (Sp)

CEE 7460 Advanced Topics in Hydrology 3®
Topics of prominent current interest for advanced MS and PhD students. Can be repeated for credit with consent of instructor. (Sp)

CEE 7470 Continuous and Macro-Scale Hydrologic Modeling 3
Presents existing different approaches to the modeling of continuous hydrologic systems and long-term forecasting. Reviews and analyzes lumped and distributed catchment and macroscale hydrologic models, as well as state-of-the-art computer codes. Prerequisite: CEE 6440. (F)

CEE 7520 Mathematical Methods for Civil and Environmental Engineers 3
Applications of advanced mathematical methods to analyze civil and environmental engineering problems, including analysis of dynamical systems, solutions to nonlinear and stochastic differential equations, Fourier analysis, and neural networks. (Sp)

CEE 7580 Advanced Finite Element Analysis in Fluid Mechanics 3
Application of the finite element method of analysis to problems in fluid mechanics. Use of higher order element to two- and three-dimensional flows. Prerequisites: CEE 3510, CEE/MAE 6570; or MAE 3420, 5020. Also taught as MAE 7580. (Sp)

CEE 7970 Dissertation Research 1-10®
Prerequisite: Instructor's consent. (F,Sp,Su)

CEE 7990 Continuing Graduate Advisement 1-9®
Prerequisite: Instructor's consent. (F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008.
***This course is taught alternating years. Check with department for information about when course will be taught.

Chemistry and Biochemistry (CHEM)

See Department of Chemistry and Biochemistry, pages 205-211.

CHEM 1010 BPS Introduction to Chemistry 3©
For nonscience majors. Includes basic chemical concepts and a survey of the various branches of chemistry. Heavy emphasis on everyday applications to problems involving environmental pollution, radioactivity, energy sources, and human health. No prerequisites. (F,Sp)

CHEM 1110 BPS General Chemistry I 4
For nonscience majors. Progression made from the basic tenets of general chemistry to introduction to organic chemistry, with ascent in terms of practical importance and sophistication. Prerequisite: Math ACT score of at least 23, or MATH 1050 or higher. (F,Sp)

CHEM 1115 General Chemistry Laboratory 1 (formerly CHEM 1130)
Laboratory course designed to accompany CHEM 1110. Covers basic aspects of general chemistry. (Sp)

CHEM 1120 BPS General Chemistry II 4
Continuation of CHEM 1110. Continued coverage of organic chemistry, along with introduction to biochemistry. Prerequisite: CHEM 1110. (Sp)

Course Descriptions

CHEM 1210 Principles of Chemistry I 4
First of a two-semester sequence, covering fundamentals of chemistry. Designed for science and engineering students. Prerequisite: Math ACT score of at least 25, or MATH 1050 or higher. High school chemistry recommended. (F,Sp)

CHEM 1215 Chemical Principles Laboratory I 1
(formerly CHEM 1230)
Laboratory course designed to be taken concurrently with CHEM 1210. Experiments cover acids/bases, thermochemistry separations, molecular weights, gases, and spectroscopy. Prerequisite: CHEM 1210 (may be taken concurrently). (F,Sp)

CHEM 1220 BPS Principles of Chemistry II 4
Continuation of CHEM 1210. Prerequisite: CHEM 1210. (F,Sp,Su)

CHEM 1225 Chemical Principles Laboratory II 1
(formerly CHEM 1240)
Continuation of CHEM 1215. Normally taken concurrently with CHEM 1220. Experiments cover elementary kinetics, electrochemistry, gravemetric analysis, chromatography, and equilibria. Prerequisite: CHEM 1215. (F,Sp)

CHEM 1990 Introduction to the Chemistry and Biochemistry Professions 1®
Seminar-format course designed to expose students to exciting areas of chemistry and biochemistry. Includes seminars on topical issues presented by faculty and invited guests. Discussion of career options. (Sp)

CHEM 2300 Principles of Organic Chemistry 3
Shape, bonding, nomenclature, stereochemistry, physical properties, and reactivity of organic molecules is covered for a range of molecules, beginning with simple alkanes and finishing with some of the more complex abiotic and biotic organic molecules known today. Prerequisite: CHEM 1210. (F)

CHEM 2310 Organic Chemistry I 4
First of a two-semester sequence, covering physical properties, nomenclature, mechanisms of reactions, and biological relevance of organic and bioorganic molecules. Prerequisite: CHEM 1220. (F)

CHEM 2315 Organic Chemistry Laboratory I 1
(formerly CHEM 2330)
Laboratory course designed to accompany CHEM 2310. Covers basic aspects of experimental organic chemistry. Prerequisites: CHEM 1210 and 1215. (F)

CHEM 2320 Organic Chemistry II 4
Continuation of CHEM 2310. Prerequisite: CHEM 2310 *or* CHEM 2300 and permission of instructor. (Sp)

CHEM 2325 Organic Chemistry Laboratory II 1
(formerly CHEM 2340)
Continuation of CHEM 2315. Prerequisite: CHEM 2315. (Sp)

CHEM 3000 QI Quantitative Analysis 3
(formerly CHEM 3600 QI)
Basic theory and laboratory practice in analytical chemistry, including introduction to multiple equilibria and chemical separation methods. Prerequisites: CHEM 1215, 1225, MATH 1050 or higher. (F)

CHEM 3005 Quantitative Analysis Laboratory 1
(formerly CHEM 3610)
One three-hour laboratory per week. Must be taken concurrently with CHEM 3000. Prerequisites: CHEM 1215, 1225, MATH 1050. (F)

CHEM 3060 QI Physical Chemistry 3
Chemical thermodynamics. Laws of thermodynamics. Changes of state. Chemical equilibrium. Introduction to quantum mechanics. Schrodinger equation. Exactly-soluble problems. Prerequisites: CHEM 1220, MATH 2210, PHYX 2220. (F)

CHEM 3070 QI Physical Chemistry 3
Chemical applications of quantum mechanics, periodic table, and chemical bonding. Spectroscopy. Statistical thermodynamics. Chemical kinetics. Rate laws. Reaction mechanisms. Theories of reaction rates. Prerequisite: CHEM 3060. (Sp)

CHEM 3080 CI Physical Chemistry Laboratory I 1
Experimental work to accompany CHEM 3060. Corequisite: CHEM 3060. (F)

CHEM 3090 CI Physical Chemistry Laboratory II 1
Continuation of CHEM 3080. Experimental work to accompany CHEM 3070. Corequisite: CHEM 3070. (Sp)

CHEM 3510 Intermediate Inorganic Chemistry 2
Survey of basic structure, bonding, and reactivity across the periodic table. Prerequisites: CHEM 1220, 2310, and 2315. (Sp)

CHEM 3520 Inorganic Chemistry Laboratory 1
Covers basic aspects of inorganic synthesis and compound characterization. Corequisite: CHEM 3510. (Sp)

CHEM 3650 DSC Environmental Chemistry* 3**
Survey of issues and chemical nature of environmental problems, including air, soil, and water pollution. Prerequisite: CHEM 1010 or 1120 or 1220. (Sp)

CHEM 3700 Introductory Biochemistry 3
Brief survey of the chemistry of biologically important compounds and their role in microbial, animal, and plant metabolism. Prerequisite: CHEM 2300 or 2310. (Sp)

CHEM 3710 Introductory Biochemistry Laboratory 1
Laboratory course designed to accompany CHEM 3700. Corequisite: CHEM 3700. (Sp)

CHEM 4250 Cooperative Experience 1-2®
Planned work outside the University. Specific experience must receive prior approval for credit to be earned. Consult advisor or department head for details. (F,Sp,Su)

CHEM 4800 CI Research Problems 1-3®
Directed undergraduate research. Departmental permission required. (F,Sp,Su)

CHEM 4890 CI Undergraduate Biochemistry Seminar I 1
Presentation of scientific seminars, critiquing of and participation in departmental seminars, scientific literature searching, accessing and using scientific databases, career preparation and development. To be taken during senior year of biochemistry major. (F)

CHEM 4891 CI Undergraduate Biochemistry Seminar II 1
Continuation of CHEM 4890. Prerequisite: CHEM 4890. (Sp)

CHEM 4990 CI Undergraduate Seminar 2®
Writing and speaking skills necessary for presenting scientific information. (F,Sp)

CHEM 5070 Biophysical Chemistry 3
Biological applications and theories of physical chemistry. Equilibrium, thermodynamics, chemical kinetics, transport properties, and spectroscopy. Prerequisites: CHEM 1220; MATH 1220; and PHYX 2120 or 2220. (F)

CHEM 5520 Advanced Inorganic Chemistry 2
Advanced treatment of the structure/bonding/reactivity relationships across the periodic table. Prerequisites: CHEM 3070, 3510. (F)

CHEM 5530 Advanced Synthesis Laboratory 2
Laboratory course in advanced synthetic techniques, including vacuum lines, inert atmosphere, Schlenk manipulations, liquid ammonia solvent, and tube furnace reactions. Prerequisites: CHEM 2325, 3070, 3520. (Sp)

CHEM 5640 Instrumental Analysis 3
Theory and application of physiochemical methods of analysis. Chromatography. Selected electrochemical and optical methods. Prerequisites: CHEM 3005, 3080. (Sp)

CHEM 5650 Instrumental Analysis Laboratory 2
Laboratory course to accompany CHEM 5640. Two three-hour labs per week. Prerequisites: CHEM 3005, 3080. (Sp)

CHEM 5670 Intermediate Environmental Chemistry 3**
Survey of chemical processes and pollutants in the environment. Sampling and analysis of pollutants to determine chemical fate. Prerequisites: CHEM 3000 and 3005; CHEM 3070 recommended. (Sp)

CHEM 5680 Environmental Chemistry Laboratory 2**
Laboratory course to accompany CHEM 5670. Field sampling and laboratory analysis of air, water, and soil samples. Method building and hypothesis testing. Prerequisites: CHEM 3000, 3005. Corequisite: CHEM 5670. (Sp)

CHEM 5700 General Biochemistry I 3
General biochemistry for science majors, including proteins, enzymes, catalysis, bioenergetics, and catabolic metabolism. Prerequisite: CHEM 2320. (F)

CHEM 5710 General Biochemistry II 3
Continuation of CHEM 5700. General biochemistry for science majors, including anabolic metabolism, DNA, RNA, and protein synthesis. Prerequisite: CHEM 5700. (Sp)

CHEM 5720 General Biochemistry Laboratory 2
Prerequisite: CHEM 5710 (may be taken concurrently). (Sp)

CHEM 5730 Genomic Technologies 4
Provides theoretical background in genomics/proteomics technologies and laboratory training in advanced techniques. Topics include: whole genome sequencing, transcriptome and proteome characterization, DNA and expressed gene libraries, and operation of modern genomics laboratory equipment. Prerequisites: BIOL 1220, 3200; CHEM 3700 or 5710; CS 2200; STAT 3000. Also taught as BIOL 5730. (Sp)

CHEM 6010 Quantum Chemistry* 3**
Quantum mechanics applied to chemical problems. Theory of atoms and molecules. Prerequisites: CHEM 3070, MATH 2250. (F)

CHEM 6020 Molecular Spectroscopy* 3**
Spectroscopy of atoms and molecules. Prerequisite: CHEM 6010. (Sp)

CHEM 6250 Curricular Practical Training 1-6®
Work experience tied to academics, in the graduate student's major field of study, either chemistry or biochemistry, for which the student is paid. Prerequisite: Permission of department head prior to enrollment. (F,Sp,Su)

CHEM 6300 Advanced Modern Organic Chemistry* 3**
Covers topics in molecular structure, reaction mechanisms of organic molecules, and physical organic chemistry. Prerequisites: CHEM 2320, 3070. (F)

CHEM 6500 Reactivity and Mechanisms in Inorganic Chemistry* 3**
Inorganic reactions and mechanisms relevant to areas of main group, transition metals, and bioinorganic and organometallic chemistry. Prerequisite: CHEM 5520. (Sp)

CHEM 6510 Chemical Applications of Group Theory 1
Introduction to symmetry point groups and theorems of group theory for application to structure, bonding, and spectroscopy. Some familiarity with linear algebra is recommended. Prerequisite: CHEM 3070. (F)

CHEM 6600 Modern Chemical Analysis* 3**
Methodology and statistical treatment of chemical data, experimental design, quality control, and chemical separations. Prerequisite: CHEM 5640. (Sp)

CHEM 6700 Advanced Biochemistry I 3
Advanced-level biochemistry course intended for biochemistry MS and PhD students. Covers proteins, enzyme mechanism, nucleic acid structure and function, and catabolic metabolism at a level appropriate for students preparing for the qualifying examination. This course (which is co-instructed with CHEM 5700, with additional projects for CHEM 6700) cannot be taken for credit by students who have previously taken CHEM 5700 for credit. (F)

CHEM 6710 Advanced Biochemistry II 3
Advanced-level biochemistry course intended for biochemistry MS and PhD students. Covers anabolic metabolism and bioinformation processes at a level appropriate for students preparing for the qualifying examination. This course (which is co-instructed with CHEM 5710, with additional projects for CHEM 6710) cannot be taken for credit by students who have previously taken CHEM 5710 for credit. (Sp)

CHEM 6720 Advanced Biochemistry Laboratory 2®
To obtain advanced laboratory skills, students complete specific laboratory experiments in research laboratories of departmental faculty members. (F,Sp)

CHEM 6730 Principles of Enzymology* 3
Mechanisms of enzyme action, emphasizing recent advances in enzymology, including theory and modern experimental approaches to elucidation of mechanism. Prerequisite: CHEM 5700 or equivalent. (Sp)

CHEM 6740 Cellular Communication by Small Molecules and Proteins 3**
Using post-translational modifications, small molecules, and protein motifs in cellular communication. Variances in the communication systems related to disease state and/or cell stress and therapeutic strategies to manipulate the communication systems. Prerequisite: CHEM 5700 or equivalent. Also taught as BIOL 6740. (Sp)

CHEM 6750 Principles of Structural Biology 3
General principles of protein and nucleic acid structure. Approaches to understanding biological function through structural analysis. Prerequisite: CHEM 5700 or 6700 or instructor approval. (F)

CHEM 6760 Principles of Bioenergetics* 3**
Global biological energy cycles including carbon, nitrogen, and sulfur cycles; respiration; electron transfer; and energy transduction. Prerequisite: CHEM 5700 or equivalent. (F)

CHEM 6910 Special Problems in Chemistry and Biochemistry 1-4
Selected problems in chemistry and biochemistry. Registration permitted only with written permission from department head. (F,Sp,Su)

CHEM 6970 Thesis Research 1-10®
Research for MS degree. (F,Sp,Su)

CHEM 6990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

CHEM 7020 Statistical Mechanics * 3**
Statistical mechanics with applications to research problems of current interest. Prerequisite: CHEM 6010.

CHEM 7030 Special Topics in Physical Chemistry (Topic)* 3®**
Covers special areas of current interest and activity in physical chemistry. (F,Sp)

CHEM 7300 Reactions and Synthesis in Modern Organic Chemistry 3**
Reactions of modern organic chemistry and their application to organic synthesis. Prerequisite: CHEM 6300. (Sp)

CHEM 7310 Molecular Structure/Spectroscopy of Organic Compounds* 3
Modern methods of predicting and determining molecular structure of organic compounds using advanced computational and spectroscopic tools. Prerequisite: CHEM 6300. (F)

CHEM 7330 Special Topics in Organic Chemistry (Topic)* 3®**
Covers special areas of current interest and activity in organic chemistry. Prerequisite: CHEM 6300. (F,Sp)

CHEM 7500 Coordination Chemistry* 3**
Theory and spectroscopy of transition metal coordination complexes. Prerequisites: CHEM 3070, 6500, 6510. (Sp)

CHEM 7510 Bioinorganic Chemistry* 1-3**
Advanced systematic study of metallobiochemical structure and function. Prerequisite: CHEM 6500. (F)

CHEM 7530 Special Topics in Inorganic Chemistry (Topic)* 3®**
Topics of current interest in inorganic chemistry. Prerequisite: CHEM 6500. (Sp)

CHEM 7600 Analytical Spectroscopy 3**
Practical description of spectroscopy-based analysis, emphasizing instrumentation and methods. Prerequisites: CHEM 5640, graduate standing, or instructor's permission. (Sp)

CHEM 7610 Chemical Separations* 3
Survey of theory and practice of modern chemical separations, including extractions, chromatography, distillation, and phase separations. Prerequisite: CHEM 5640 or instructor's permission. (F)

CHEM 7620 Electrochemistry* 3**
Survey of electrochemistry with emphasis on electrochemical analysis. Prerequisite: CHEM 5640. (F)

CHEM 7640 Special Topics in Analytical Chemistry (Topic)* 1-3®**
Topics may include electronics from the scientist's perspective, laser-based spectroscopy, mass spectrometry, and chemometrics. Prerequisite: CHEM 6600. (F,Sp)

CHEM 7770 Special Topics in Biochemistry (Topic)* 2-3®
Topics of current interest in biochemistry.

CHEM 7800 Seminar 1®
Graduate seminar. (F,Sp)

CHEM 7970 PhD Dissertation Research 1-12®
(F,Sp,Su)

CHEM 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

*Taught 2006-2007.
**Taught 2007-2008.
***Contact Department o!f Chemistry and Biochemistry for information about when this course will be taught.
®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Chinese (CHIN)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

CHIN 1010 Chinese First Year I 5
Communicative competencies in the four language skills: speaking, listening, reading, and writing with exposure to cultures and customs. Native speaker instructor. (F)

CHIN 1020 Chinese First Year II 5
Communicative competencies in the four language skills: speaking, listening, reading, and writing with exposure to cultures and customs. Native speaker instructor. Prerequisite: CHIN 1010 or equivalent. (Sp)

CHIN 2010 Chinese Second Year I 5
Second-year overview of speaking, listening, reading, and writing with exposure to cultures and customs. Native speaker instructor. Prerequisite: CHIN 1020 or equivalent. (F)

CHIN 2020 Chinese Second Year II 5
Second-year overview of speaking, listening, reading, and writing with exposure to cultures and customs. Native speaker instructor. Prerequisite: CHIN 2010 or equivalent. (Sp)

CHIN 3010 Chinese Third Year I 4
First segment of the third-year overview of speaking, listening, reading, and writing, with additional exposure to cultures and customs. Readings include excerpts from televised drama. Prerequisite: CHIN 2020 or equivalent. (F)

CHIN 3020 Chinese Third Year II 4
Second segment of the third-year overview of speaking, listening, reading, and writing, with additional exposure to cultures and customs. Readings include short essays, Chinese proverbs and folktales, and other literary selections. Prerequisite: CHIN 3010 or equivalent. (Sp)

CHIN 3100 DHA Readings in Contemporary Chinese Culture 3
Introduction to contemporary Chinese culture through readings from newspapers and other source materials. Prerequisite: CHIN 2020 or equivalent. (Sp)

CHIN 3510 Chinese Business Language 3
Designed to develop students' business Chinese language skills in speaking, listening, reading, and writing, as well as cultural competence. Classwork focuses on Chinese business terms, business conversation, and basic business practices, as well as the Chinese cultural environment. Prerequisite: CHIN 2020 or equivalent. (F)

CHIN 3880 Individual Readings in Chinese 1-2
Individual study of selected readings in Chinese. Designed to broaden student's reading comprehension beyond the level addressed in CHIN 3020. Prerequisite: Instructor's permission. (F,Sp)

CHIN 4920 Chinese Language Tutoring 1®
Allows students to develop tutoring skills by assisting professors in lower-division courses or fulfilling instructional duties for a comparable amount of time in the language laboratory, public schools, or similar activities with departmental approval. May be repeated to a maximum of 3 credits. Prerequisite: Permission of instructor. (F,Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Classics (CLAS)

See Classics Minor, page 220.
Also see Department of History, pages 332-337.

CLAS 1100 The Latin and Greek Element in English* 3
Survey of classical word roots in English, with a view to enhancing students' comprehension of English vocabulary and its Indo-European heritage. (F,Sp)

CLAS 3210 Classical Mythology* 3
Introduces major myths of the Classical world. Explores how these myths serve as keys to understanding the documents and arts of Classical civilization. (F,Sp)

*Taught 2006-2007.

Communicative Disorders and Deaf Education (COMD)

See Department of Communicative Disorders and Deaf Education, pages 221-227.

COMD 2400 Orientation and Observation 1®
Introduces students to the professional responsibilities required of communicative disorders and deaf education specialists in a variety of employment settings. Observation of normal/abnormal communication abilities. Language, hearing, and speech disorders. (F,Sp)

COMD 2500 Language, Speech, and Hearing Development 3
Language, speech, and hearing development throughout life and strategies for facilitating development. Requisites for human communication and language learning. Theoretical models of language acquisition and intracultural/intercultural differences. Nature, causes, and prevention of language, speech, and hearing disorders. (F,Sp)

COMD 2910 CI Sign Language I 4
Introduction to American Sign Language and Deaf Culture. Basic study of grammatical structure of ASL, as well as the history and folklore associated with the culture. Students have ample opportunities for laboratory practice of ASL. Course taught in a no-voice, total immersion atmosphere. (F,Sp,Su)

COMD 3050 Practicum and Methods in Teaching Children who are Deaf and Hard of Hearing 1-3®
Students investigate various aspects of teaching methods through field experiences in the classroom, curriculum and effective teaching assessment, observation and reflections, and guest speakers focusing on areas of mathematics and science in the primary grades. (F,Sp)

COMD 3080 American Sign Language Practicum 1®
Provides opportunities for practice and continued improvement of receptive and expressive skills in American Sign Language. (F,Sp)

COMD 3100 Fundamentals of Anatomy for Speech and Language 3
Basic study of the structures and functions associated with the subprocesses of speech and hearing, including respiration, phonation, resonation, articulation, neurology, and hearing. Prerequisite: BIOL 2000 or 2010. (F)

COMD 3120 Disorders of Articulation and Phonology 3
Introduction to articulation and phonological disorders and related problems. Emphasis directed at evaluation, management, and measures of success. Principles of programming are presented. Prerequisites: COMD 2500 and 3500. (Sp)

COMD 3400 Acoustics and Anatomy of the Ear 3
Principles of physical acoustics as applied to Communicative Disorders. Course includes anatomy, physiology, and metabolism of the human auditory system. (Sp)

COMD 3500 Phonetics/Developmental Phonology 3
Study of the development of the phonological subsystem in English and the acoustic and physiological characteristics of speech sounds. (F)

COMD 3650 CI Clinical Processes and Behavior 2
A consideration of clinical management as an interactive process. Interpersonal sensitivity, technical knowledge and skills, professional infection-control measures, and behavior modification are core considerations. Prerequisites: COMD 2500 and PSY 1010. (Sp)

COMD 3700 Basic Audiology 3
Study of pure tone audiometry, including clinical masking, speech audiometry, and clinical immittance measures. Laboratory exercises are required. Prerequisite: COMD 3400. (F)

COMD 3910 Sign Language II 4
Provides a more in-depth study of American Sign Language, Deaf folklore and literature, and the grammatical structure of ASL. Focuses on unique number systems, idioms, lexicalized fingerspelling, and ASL poetry. Course taught with a total immersion approach, with ample opportunities for practice with fluent users of ASL in the lab. Prerequisite: COMD 2910 or instuctor approval. (F,Sp,Su)

COMD 4100 CI Clinical Practicum in Speech-Language Pathology 1-2®
Supervised diagnostic and treatment practicum with individuals with communication disorders. Prerequisites: COMD 2500, 3120, 3650, and permission of instructor. (F,Sp,Su)

COMD 4400 Clinical Practicum in Audiology 1-2®
Supervised diagnostic and treatment practicum with individuals with hearing loss. Prerequisites: COMD 3400, 3650, 3700, and consent of instructor. (F,Sp,Su)

COMD 4600 Senior Thesis 1-6®
Student-initiated research project under faculty supervision. Prerequisites: Satisfactory grade point average, instructor recommendation, and approval of Honors Committee. (F,Sp,Su)

COMD 4630 (dual listing 6630) Teaching Speech to Deaf and Hard of Hearing Children 3
Evaluative and instructional models, processes, and methodologies in the development of speech for children who are deaf and hard of hearing. (Sp)

COMD 4750 (dual listing 6750) Teaching the English Language to Individuals who are Deaf and Hard of Hearing 3
Evaluation and teaching of the English language to individuals who are deaf and hard of hearing. Language development and remediation using structure, modeling, natural approach, and grammar. Prerequisite: COMD 2500. (F)

COMD 4760 (dual listing 6760) Early Intervention for Children who are Deaf and Hard of Hearing 3
Family-centered early intervention for infants and young children who are deaf and hard of hearing. Identification, testing, hearing aids, communication, auditory, language, and emerging literacy programming, parent and family programs, mentoring. (F)

COMD 4770 (dual listing 6770) Audiology and Teachers of Children who are Deaf and Hard of Hearing 3
Focuses on the fields of hearing science and audiology and how information from these disciplines relates to education of deaf and hard of hearing children. (F)

COMD 4780 (dual listing 6780) Socio-Cultural Aspects of Deafness 3
Leads students to understand how society, political institutions, and education have impacted the Deaf culture. (F)

COMD 4790 (dual listing 6790) Psychological Principles and Individuals who are Deaf and Hard of Hearing 3
Psychological theories and research used to describe the deaf and hard of hearing. Exploration of principles that can be used in helping these individuals achieve emotional well-being. Also taught as PSY 4790/6790. (Sp)

COMD 4910 CI (dual listing 6910) Sign Language III 4
Students receive individual, detailed feedback concerning their expressive ASL skills. Students present material in American Sign Language, with a focus on improving identified areas of weakness. Cooperative learning is encouraged. Experiences with fluent users of ASL and interpreter mentors via the lab provide students with basic interpreting skills. Prerequisites: COMD 2910 and 3910; or instructor approval. (F,Sp)

COMD 4920 (dual listing 6920) Sign Language IV 4
Basic concepts of linguistics are explored, as well as an in-depth analysis of ASL history, grammatical structure, and ASL poetry. Students apply linguistic principles to the analysis of American Sign Language, with ample opportunities to interact with fluent users of ASL via the lab experience. Prerequisites: COMD 2910 and 3910; or permission of instructor. (Sp)

COMD 5000 Institute in Communicative Disorders and Deaf Education 0.5-3®
Special colloquial offerings in communicative disorders and deaf education. (F,Sp,Su)

COMD 5070 Speech Science 3
Explores contemporary theory, research findings, clinical applications, and laboratory experiences in measurement and analysis of normal speech production. Speech subsystems of respiration, phonation, articulation, and resonation are examined in detail through the collection and analysis of physiologic data. (F)

COMD 5100 Language Science 3
Study of clinical analysis of syntactic and morphological properties of speech. (Sp)

COMD 5200 Language Assessment and Intervention for Preschool Children 4
Preschool assessment and intervention, including language sampling and analysis procedures, test administration and interpretation, informal language assessment, intervention goals and objectives, planning clinical management, language facilitation strategies, teaching approaches, classroom-based language intervention, and enhancing emergent literacy. Prerequisite: COMD 2500 or equivalent. (Sp)

COMD 5330 Aural Rehabilitation 3
Ramifications of hearing loss among children and adults and rehabilitative audiological techniques and programs. (Sp)

Course Descriptions

COMD 5600 Classroom Teaching Using American Sign Language 3
Emphasizes development and presentation of lesson plans for different grade levels. Focuses on developing students' abilities in moving from and linking Language 1 (American Sign Language) and Language 2 (the written form of English). Prerequisites: COMD 2910, 3910, and 4910. (Sp)

COMD 5610 Introduction to Education of the Deaf and Hard of Hearing 3
Overview of the history of educating children who are deaf and hard of hearing. Presents an overview of techniques, anatomy of the ear, and different philosophical views for teaching people who are deaf and hard of hearing. (F)

COMD 5620 Teaching School Subjects to Students who are Deaf and Hard of Hearing 3
Focuses on effective strategies for teaching students who are deaf and hard of hearing across curricular subject areas. Emphasizes infusion of language and reading into all content areas. (Sp)

COMD 5730 (dual listing 6730) Children with Multiple Disabilities and Hearing Loss 3
Students will obtain a basic understanding of the problems and characteristics of children who have hearing loss plus one or more disabling conditions. Teaching strategies will also be discussed. (F)

COMD 5740 (dual listing 6740) Teaching Reading to Deaf and Hard of Hearing Children 3
Exploration of resources and methods used to teach reading to deaf and hard of hearing children. Discussion of current research regarding the effectiveness of these methods and ideas for improving reading instruction. (F)

COMD 5860 (dual listing 6860) Interdisciplinary Training in Assistive Technology I 3
Provides interdisciplinary training in assistive technology, focusing on assistive devices related to powered mobility, seating and positioning, computer access, and augmentative and alternative communication. Prerequisite: Departmental permission. (F)

COMD 5870 (dual listing 6870) Interdisciplinary Training in Assistive Technology II 3
Provides advanced training in assistive technology, focusing on assistive devices related to cognitive, hearing, visual, and dual sensory impairments. Funding issues also addressed. (Sp)

COMD 5900 Independent Study 1-6®
Selected work individually assigned, handled, and directed. Problems of mutual interest to students and the instructor are investigated and reported. (F,Sp,Su)

COMD 6020 Language Assessment and Intervention for School-age Children and Adolescents 4
Curriculum-based assessment and intervention. Emphasizes communication and literacy development of students with language impairments. Narrative and written language assessment procedures. Intervention strategies for language acquisition in conversation, narration, and expository discourse. Prerequisite: COMD 5200 or equivalent. (F, Alt Su)

COMD 6030 Disorders of Fluency—Stuttering 3
Provides understanding of theory, nature, etiologies, and principles of diagnosis and treatment of communication disorders related to stuttering and other disorders of fluency. (F)

COMD 6040 Communication Disorders Related to Orofacial Anomalies 3
Nature, etiologies, and principles of diagnosis and treatment of communication disorders related to orofacial anomalies. Prerequisite: Graduate standing. (Sp)

COMD 6050 Professional Practice in Speech-Language Pathology 1
Lecture, discussion, and guest presenters on various professional practice topics pertaining to speech-language pathology. Prerequisite: Graduate standing. (F)

COMD 6100 Advanced Clinical Practicum in Speech-Language Pathology 1-4
Supervised diagnostic and treatment practicum with individuals with communication disorders. Prerequisites: COMD 2500, 3120, 3650, or equivalent, and permission of instructor. (F,Sp,Su)

COMD 6120 Adult Disorders of Motor Speech and Swallowing 4
Considers the neurological substrates and clinical manifestation of dysarthria, apraxia, and dysphagia in the adult population. Addresses diagnostic methods and management of these disorders. (Sp)

COMD 6130 Neuropathologies of Speech and Language 4
Study of neuropathologies of speech and language associated with aphasia, traumatic brain injury, right hemisphere syndrome, dementia, and degenerative neurological diseases. (F)

COMD 6140 Pediatric Neurogenic Disorders 3
Global perspective of normal pediatric development. Study of neurogenic pathologies and effects on respiration, phonation, and articulation. Also addresses assessment and intervention of oral-motor skills for speech and swallowing purposes. (Sp)

COMD 6200 Internship in Public Schools—Speech-Language Pathology 4-5®
Supervised public school practicum in speech-language pathology. (F,Sp,Su)

COMD 6210 Bilingual/Bicultural Services 2
Study of the cultural, linguistic, educational, and socioeconomic status of individuals with speech-language disabilities from ethnic or linguistic minority groups. (F)

COMD 6220 Severe Communication Impairments 3
Study of assessment and treatment strategies for individuals with severe communication impairments, including those requiring augmentative and alternative communication systems. (Sp)

COMD 6230 Introduction to Research in Communicative Disorders 3
Introduction to experimental research designs, including educational research and development, causal-comparative, correlational, and qualitative research. Includes research reviews, research proposals, threats to internal and external validity, and statistical/practical significance. Prerequisite: PSY 2800. (Sp)

COMD 6300 Externship in Speech-Language Pathology 1-12®
Supervised off-campus practicum externship in speech-language pathology. Prerequisite: Consent of instructor. (F,Sp,Su)

COMD 6370 Educational Audiology 3
Management of deaf and hard of hearing children in the regular schools. Population and individual profiles, evaluation and staffing, models of delivery, integration considerations, remedial and facilitative programming. (F)

COMD 6430 Speech Communication and Hearing Loss 3
History of listening and speech programs for the hearing impaired. Hearing aids and FM systems, as well as computer and electronic devices used in supporting the speech of this population. Discussion of cochlear implants, the palatometer, and TranSonic hearing aids. (F)

COMD 6630 (dual listing 4630) Teaching Speech to Deaf and Hard of Hearing Children 3
Evaluative and instructional models, processes, and methodologies in the development of speech for children who are deaf and hard of hearing. (Sp)

COMD 6640 Strategies for Teaching Children who are Deaf and Hard of Hearing 3
Provides clinical experience in practicing teaching strategies. Emphasizes evaluation, teaching groups, and tutoring children in speech, listening, and English. Includes lecture, demonstration, observation, and practice in classrooms for the deaf. Prerequisite: COMD 4630/6630. (F)

COMD 6650 Strategies for Teaching English Language to Children who are Deaf and Hard of Hearing 3
Practical methods for applying theories of teaching the English language in classrooms where deaf and hard of hearing children are educated. Prerequisite: COMD 4750/6750. (F)

COMD 6660 INSITE Training 1-3
Training in implementation of the INSITE Model. Early home intervention for infants and young children having a combination of sensory impairments and other disabilities. (F,Sp,Su)

COMD 6670 AHEAD Training 1-3
Training in implementation of the AHEAD Model. Early intervention services for families and child care providers of children with noncategorical disabilities, birth to three years, in home and child care settings. (F,Sp,Su)

COMD 6680 SKI*HI Training 1-3
Training in implementation of the SKI*HI Model. Early home intervention for infants and young children who are deaf and hard of hearing, and their families. (F,Sp,Su)

COMD 6690 Early Intervention for Infants and Toddlers with Vision Impairment and Their Families 1-3
Students will gain an understanding of and develop skills in working with infants and toddlers who are visually impaired and their families. (F,Sp,Su)

COMD 6700 Practicum in Education of Children who are Deaf and Hard of Hearing 1-3®
Supervised diagnostic and remedial casework in education of the deaf and hard of hearing. (F,Sp,Su)

COMD 6710 Mainstreaming Children who are Deaf and Hard of Hearing 3
Rationale and procedures used to successfully mainstream children with hearing loss. Also methods of evaluating programs where children with hearing loss are to be placed. (F)

COMD 6720 Serving Preschoolers with Vision Impairments in Center Based Settings 1-3
To provide students with knowledge and skills in working with children with visual impairments in the preschool setting. (F,Sp,Su)

COMD 6730 (dual listing 5730) Children with Multiple Disabilities and Hearing Loss 3
Students will obtain a basic understanding of the problems and characteristics of children who have hearing loss plus one or more disabling conditions. Teaching strategies will also be discussed. (F)

COMD 6740 (dual listing 5740) Teaching Reading to Deaf and Hard of Hearing Children 3
Exploration of resources and methods used to teach reading to deaf and hard of hearing children. Discussion of current research regarding the effectiveness of these methods and ideas for improving reading instruction. (F)

COMD 6750 (dual listing 4750) Teaching the English Language to Individuals who are Deaf and Hard of Hearing 3
Evaluation and teaching of the English language to individuals who are deaf and hard of hearing. Language development and remediation using structure, modeling, natural approach, and grammar. Prerequisite: COMD 2500. (F)

COMD 6760 (dual listing 4760) Early Intervention for Children who are Deaf and Hard of Hearing 3
Family-centered early intervention for infants and young children who are deaf and hard of hearing. Identification, testing, hearing aids, communication, auditory, language, and emerging literacy programming, parent and family programs, mentoring. (F)

COMD 6770 (dual listing 4770) Audiology and Teachers of Children who are Deaf and Hard of Hearing 3
Focuses on the fields of hearing science and audiology and how information from these disciplines relates to education of deaf and hard of hearing children. (F)

COMD 6780 (dual listing 4780) Socio-Cultural Aspects of Deafness 3
Leads students to understand how society, political institutions, and education have impacted the Deaf culture. (F)

COMD 6790 (dual listing 4790) Psychological Principles and Individuals who are Deaf and Hard of Hearing 3
Psychological theories and research used to describe the deaf and hard of hearing. Exploration of principles that can be used in helping these individuals achieve emotional well-being. Also taught as PSY 6790/4790. (Sp)

COMD 6800 Student Teaching—Day-School Program 6-12®
Full-time student teaching in a day-school program for the deaf. (F)

COMD 6810 Disorders of Phonation 3
Advanced consideration of issues and methods in the diagnosis and treatment of voice problems associated with the larynx and the respiratory tract. (Sp)

COMD 6820 Principles of Intervention for Children who are Deaf and Hard of Hearing 3
Application of teaching principles to classrooms for the deaf and hard of hearing. Practicum with children is part of this course. Prerequisites: COMD 6640, 6650, and permission of instructor. (Sp)

COMD 6830 Student Teaching—Residential 6-12
Full-time student teaching at a residential school for the deaf. Prerequisite: Permission of instructor. (Sp)

COMD 6850 Seminar in Communicative Disorders and Deaf Education 1-3®
Research and analysis of selected topics. (F,Sp,Su)

COMD 6860 (dual listing 5860) Interdisciplinary Training in Assistive Technology I 3
Provides interdisciplinary training in assistive technology, focusing on assistive devices related to powered mobility, seating and positioning, computer access, and augmentative and alternative communication. Prerequisite: Deparartmental permission. (F)

COMD 6870 (dual listing 5870) Interdisciplinary Training in Assistive Technology II 3
Provides advanced training in assistive technology, focusing on assistive devices related to cognitive, hearing, visual, and dual sensory impairments. Funding issues also addressed. (Sp)

COMD 6880 Methods and Procedures in Early Intervention 3
Teaches specific methods and procedures necessary for working in early intervention programs serving families of infants and young children with hearing loss, including assessment procedures, specific home visit delivery procedures, and methods of working with support professionals and team members. (Sp)

COMD 6900 Independent Study 1-9®
Prerequisite: Permission of instructor. (F,Sp,Su)

COMD 6910 (dual listing 4910) Sign Language III 4
Students receive individual, detailed feedback concerning their expressive ASL skills. Students present material in American Sign Language, with a focus on improving identified areas of weakness. Cooperative learning is encouraged. Experiences with fluent users of ASL and interpreter mentors via the lab provide students with basic interpreting skills. Prerequisites: COMD 2910 and 3910; or instructor approval. (F,Sp)

COMD 6920 (dual listing 4920) Sign Language IV 4
Basic concepts of linguistics are explored, as well as an in-depth analysis of ASL history, grammatical structure, and ASL poetry. Students apply linguistic principles to the analysis of American Sign Language, with ample opportunities to interact with fluent users of ASL via the lab experience. Prerequisites: COMD 2910 and 3910; or permission of instructor. (Sp)

COMD 6950 Practicum in Early Childhood—Deaf 3-9®
Supervised student practicum in a preschool, infant, home-based program for children who are deaf or hard of hearing. (F,Sp)

COMD 6960 Master's Project 1-4®
This experience provides student with opportunity to design and carry out a creative project which is closely related to his or her area of teaching specialty. May require a written report. (F,Sp,Su)

Course Descriptions

COMD 6970 Thesis 1-7®
Prerequisite: Permission of instructor. (F,Sp,Su)

COMD 6990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

COMD 7200 Introduction to Clinical Practice 2®
Supervised diagnostic practicum for first-year students in the Audiology Program. Prerequisite: Admission to the Audiology Program. (F,Sp,Su)

COMD 7300 Intermediate Clinical Practicum 2®
Supervised diagnostic practicum for second-year students in the Audiology Program. Prerequisite: Admission to the Audiology Program. (F,Sp,Su)

COMD 7310 Psychoacoustics and Instrumentation 3
Covers psychoacoustic aspects of human audition, with emphasis on application in the clinical settting. Explores basic electronics and audio systems. Prerequisite: Admission to the Audiology Program. (F)

COMD 7320 Amplification I 1-4
Hearing aid types and uses, hearing aid components and characteristics, electroacoustic performance, hearing aid candidacy and hearing aid evaluation, and hearing aid fitting and orientation. Prerequisite: Admission to the Audiology Program. (Sp)

COMD 7330 Supervision Internship 1-7®
Provides extensive supervisory experience for advanced students. Internship is for a period of time to be specified by the department and cooperating agency. Prerequisite: Permission of instructor. (F,Sp,Su)

COMD 7340 Pediatric Audiology 3
Provides students with understanding of normal auditory development and theoretical, clinical, and practical issues involved in screening, assessment, and management of children with hearing loss. Prerequisite: Admission to the Audiology Program. (F)

COMD 7380 Advanced Audiology 2
Special auditory testing for site of lesion in the conductive, sensory, neural, and central auditory systems. Emphasizes Immittance Battery and Otoacoustic Emissions Battery. Tests for assessment of functional hearing loss are also included. Sensitivity and specificity of auditory tests are treated. Test results related to auditory disease process. Prerequisite: Admission to the Audiology Program. (F)

COMD 7400 Advanced Clinical Practicum 2-4®
Supervised clinical practicum for third-year students in the Audiology Program. Prerequisite: Admission to the Audiology Program. (F,Sp,Su)

COMD 7410 Noise and Hearing Conservation 3
Principles of noise hazard evaluation, effects of noise on the auditory mechanism, and development and maintenance of an effective hearing conservation program. Prerequisite: Admission to the Audiology Program. (F)

COMD 7420 Amplification II 1-4
Applications of advanced hearing aid circuitry, especially digital and digitally programmable hearing aids. Presentation of various aspects of measuring hearing aid satisfaction. Tinnitus management and cochlear implants area also treated. Hearing aid trouble shooting, modifications, and repairs are included. Prerequisite: Admission to the Audiology Program. (F)

COMD 7430 Electrophysiology 3
Provides students with extensive working knowledge of early, middle, and late evoked potentials. Upon completion of this class, students should be capable of providing comprehensive services requiring evoked potentials. Prerequisite: Admission to the Audiology Program. (F)

COMD 7460 Adult Aural Rehabilitation 3
Focuses on traditional aural rehabilitation models, amplification, counseling, speech reading, and assistive listening devices. Upon course completion, students should be able to effectively use these elements to assist adults in compensating for hearing impairment. Prerequisite: Admission to the Audiology Program. (Sp)

COMD 7470 Educational Audiological Management 3
Plans for assessing children who are deaf and hard of hearing in schools. Management plans for audiological services, as well as appropriate intervention strategies for children. Students develop plans and present methods for bringing change to schools. Prerequisite: COMD 6370. (F)

COMD 7490 Medical Aspects of Audiology 3
Study of the etiology, symptomatology, audiological manifestations, and medical treatment of various pathological conditions of the auditory system. Prerequisite: Admission to the Audiology Program. (Sp)

COMD 7510 Supervision in Communicative Disorders 2
Principles and practices of supervision in Communicative Disorders and Deaf Education. Emphasizes clinical and educational supervision as these styles relate to individuals who are deaf and hard of hearing or who have communicative disorders. (Su)

COMD 7530 Balance Evaluation and Management 3
Explores techniques and technology for vestibular and balance assessment, including electronystagmography, videonystagmography, rotational testing, and posturography. Prerequisite: Admission to the Audiology Program. (Sp)

COMD 7800 Clinical Externship in Audiology 6®
Twelve-month full-time clinical practicum experience in one or more off-campus clinical sites. Prerequisite: Admission to the Audiology Program. (F,Sp,Su)

COMD 7810 Research Seminar in Educational Audiology 1-3®
Identification of research problem, consideration of research strategies and methods, application of research and statistical concepts in departmental focus, interaction with faculty. (F,Sp,Su)

COMD 7820 Research Seminar in Audiology 1®
Facilitates development of student audiology projects. Further enables students to become competent clinician-researchers in the field of audiology. Prerequisite: Admission to the Audiology Program. (F)

COMD 7850 Externship Seminar 3®
Internet-based seminar in current clinical-related topics for fourth-year students in the Doctorate of Audiology Program. Prerequisite: Admission to Doctorate of Audiology Program. (F,Sp,Su)

COMD 7860 Practice Management in Audiology 3
Audiology business and practice management. Discussion of business set-up, the business plan, managerial accounting and financial analysis, marketing, pricing, reimbursement, record keeping, and forensics. Prerequisite: Admission to the Audiology Program. (Sp)

COMD 7870 Audiology Capstone Project 1-6®
Under the direction of his or her advisory committee, student develops a clinically-related project. This project is a creative work at a doctoral level and worthy of publication or presentation. Prerequisite: Admission to the Audiology Program. (F,Sp,Su)

COMD 7900 Independent Study 1-2®
Advanced students, under direction of a faculty member, will study independently; however, departmental permission is necessary. (F,Sp,Su)

COMD 7910 Independent Research 1-2®
Advanced students, under direction of a faculty member, will do research in an area of interest to themselves. (F,Sp,Su)

COMD 7970 Dissertation 1-9®
Variable credit for dissertation project in connection with the doctoral program emphasis in educational audiology. (F,Sp,Su)

COMD 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Computer Science (CS)

See Department of Computer Science, pages 228-237.

CS 1020 Campus Computing and Beyond 1
Hands-on laboratory for CS 1030. Introduces the campus network and the Internet. Emphasizes general problem-solving strategies and skills associated with computer and application software use. (F,Sp,Su)

CS 1030 BPS Foundations of Computer Science, and the Application of Computer Science to the Investigation of Physical Systems and Phenomena 3
(formerly CS 1010 BPS)
Investigation of computers and computing in today's society, including the basic scientific and mathematical concepts that underlie computer science, computing, and computer systems. No prerequisites. (F,Sp,Su)

CS 1050 Problem Solving with Computers 3
Investigates problem-solving using methodologies of computer science. Emphasizes techniques used by computer scientists to solve problems, as well as the scientific method. Develops problem-solving methodology for both new and traditional computer applications. (F,Sp)

CS 1400 Introduction to Computer Science—CS 1 3
(formerly CS 1700)
Introduction to science of problem solving, programming, program development, algorithm analysis, and data structures. Students will learn to develop correct software in a current programming language environment. Computer science majors must enroll in CS 1405 concurrently with CS 1400. Prerequisite: Grade of *C-* or better in MATH 1050 or Math ACT score of at least 25. (F,Sp,Su)

CS 1405 Introduction to Computer
(formerly CS 1710) Science—CS 1 Lab 1
One-hour lab taught in conjunction with CS 1400. Students learn to develop correct software in a hands-on structured environment. Computer science majors are required to pass both the laboratory and the lecture, and are required to enroll in CS 1400 concurrently with CS 1405. For students not majoring in computer science, this laboratory is advised, but not required, for CS 1400. Prerequisite: Grade of *C-* or better in MATH 1050 or Math ACT score of at least 25. (F,Sp,Su)

CS 1410 QI Introduction to Computer Science—CS 2 3
(formerly CS 1720 QI)
Introduction to science of problem solving, programming, program development, algorithm analysis, and data structures. Students will learn to develop correct software in a current programming language environment. Prerequisite: Grade of *C-* or better in CS 1400. (F,Sp,Su)

CS 2250 Cooperative Work Experience 1-9®
Provides credit for students working at a participating firm under faculty supervision. Prerequisites: 2.5 GPA; permission of instructor. (F,Sp,Su)

CS 2420 QI Algorithms and Data Structures—CS 3 3
(formerly CS 2200 QI)
Introduction to science of problem solving, programming, program development, algorithm analysis, and data structures. Students will learn to develop correct software in a current programming language environment. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 1410. (F,Sp,Su)

CS 2450 CI Software Engineering 3
(formerly CS 2370 CI)
Science of small and large software project development, taught in team and project management format. Students complete a well-documented functional product, working in teams of four to five students. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420. (F,Sp)

CS 2550 Computer Organization 3
Fundamental building blocks of digital computers, and the underlying theories upon which these building blocks are assembled. Introduction to information representation, number systems, combinational logic circuits, sequential logic circuits, and instruction sets. Programming such systems at the assembly level. Prerequisites: 2.5 GPA; grade of *C-* or better in *both* CS 1400 and MATH 1050 and Math ACT score of at least 23. (F,Sp)

CS 2810 Computer Organization
(formerly CS 3550) and Architecture 3
Architecture of a computer system, as viewed by the programmer. Topics such as memory management, RISC vs. CISC, pipelining, parallelism, interrupts, and networking discussed in detail. Includes several homework assignments, at least one of which deals with interrupts and interrupt-driven applications. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2550. Not available to pre-Computer Science majors. (F,Sp)

CS 3000 Undergraduate Seminar 1
Serves as a capstone course for the pre-computer science curriculum, as well as an introduction to the advanced standing curriculum. Also includes discussion of computer science as a career and discussion of the advanced standing test. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420, or concurrent enrollment in CS 2420. (F,Sp)

CS 3010 DSC/CI/ Information Acquisition,
QI Analysis, and Presentation 3
Introduces students to use of scientific method and computer technology in analysis of multi-faceted problem, and presentation of that analysis. Each semester, built around single topic such as global warming. Prerequisites: Completion of University Studies Computer and Information Literacy (CIL) and Quantitative Literacy (QL) requirements. (F,Sp,Su)

CS 3100 Operating Systems and Concurrency 3
Design and implementation of operating systems. UNIX will be used as one example, but all categories of operating systems will be discussed. Presentation of the concept of concurrency as it applies to operating system design and application. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420. Not available to pre-Computer Science majors. (F,Sp)

CS 3410 DSC/CI Algorithm Development: JAVA/Internet 3
Introduces students to algorithm development and programming for JAVA-based applications, especially those dealing with the Internet. Examines computer-based representation, storage, retrieval, and transmission of information, along with the algorithms used to perform such operations. Prerequisites: CS 1400 and completion of University Studies Computer and Information Literacy (CIL) and Quantitative Literacy (QL) requirements. (F,Su)

CS 3420 QI Algorithm Development: C# and .NET 3
Introduces students to algorithm development and programming for C#-based applications, especially those dealing with the Internet. Examines computer-based representation, storage, retrieval, and transmission of information, along with the algorithms used to perform such operations. Prerequisites: CS 1400 and completion of University Studies Computer and Information Literacy (CIL) and Quantitative Literacy (QL) requirements. (Sp)

CS 3500 DSC/QI Algorithm Development: Visual BASIC/Graphical User 3
Introduces students to algorithm development and programming in Visual BASIC, with special emphasis on graphical user interfaces for Windows applications and environments. Prerequisites: Completion of University Studies Computer and Information Literacy (CIL) and Quantitative Literacy (QL) requirements. (Su)

CS 3510 DSC/QI Algorithm Development: COBOL/Business 3
Introduces students to algorithm development and programming in COBOL. Special emphasis given to applications and algorithms for use in business and information processing applications. Prerequisites: Completion of University Studies Computer and Information Literacy (CIL) and Quantitative Literacy (QL) requirements. (F)

CS 4250 Cooperative Work Experience 1-9®
Provides credit for students working at a participating firm under faculty supervision. Prerequisites: 2.5 GPA; permission of instructor. (F,Sp,Su)

CS 4700 Programming Languages 3
Theories of programming design and implementation. Introduction to variety of programming languages, showing how they represent trade-offs with respect to these theories. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420. Not available to pre-Computer Science majors. (F,Sp)

CS 4720 Computer Networking I 3
Focuses on client/server model, which is the dominant architectural model for today's computer systems. Explores the network underlying this model,

specifically examining the topology, protocol(s), user interface(s), and hardware. Emphasizes the general theory and functionalities underlying the client/server model and computer networks in general. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420. Not available to pre-Computer Science majors. (F)

CS 4730 Computer Networking II 3
Focuses on client/server model, which is the dominant architectural model for today's computer systems. Emphasizes the specifics of the products of today's dominant network companies, which are currently Novell and Microsoft. Completion of this course prepares students for certification under such products. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 4720. Not available to pre-Computer Science majors. (Sp)

CS 4950 Undergraduate Research 1-4®
Participation in research projects, under supervision of a computer science faculty member. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420 and permission of instructor. Not available to pre-Computer Science majors. (F,Sp,Su)

CS 5000 Theory of Computability 3
Theory of computation, including presentation of computability, decidability, and complexity. Includes formal grammars, finite and pushdown automata, and turing machines. Prerequisites: 2.5 GPA; grade of *C-* or better in *both* CS 2420, MATH 3310. Not available to pre-Computer Science majors. (Sp)

CS 5050 Advanced Algorithms 3
Study of algorithms and their analysis, including: design by induction, algorithms involving sequences and sets, graph algorithms, geometric algorithms, algebraic algorithms, reductions, NP-completeness, and parallel algorithms. Prerequisites: 2.5 GPA; grade of *C-* or better in *both* CS 2420, MATH 3310. Not available to pre-Computer Science majors. (F,Sp)

CS 5070 Computer Science Capstone 1
Students develop a project that includes the use of a significant portion of the computer science topics presented in the core curriculum. Completion of the project requires an oral presentaion and a detailed written report. Prerequisites: 2.5 GPA; instructor permission. Not available to pre-Computer Science majors. (F,Sp,Su)

CS 5100 Graphical User Interfaces and Windows Programming 4
Design principles of GUIs and philosophy, structure, and programming in Windows environments. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420. Not available to pre-Computer Science majors. (Sp)

CS 5200 Distributed and Network Programming 4
Introduction to programming concepts and techniques for distributed and networked environments. Explores concurrency, process synchronization, network protocols, connectionless and connection-oriented communications, network architectures and topology, load balancing, and transmission media. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 3100. Not available to pre-Computer Science majors. (F)

CS 5300 Compiler Construction 4
Review of programming language structures, translation, loading, execution, and storage allocation. Compilation of declarations, expressions, statements, and procedures/functions. Organization and design of a compiler. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2810 and 4700. Not available to pre-Computer Science majors. (F)

CS 5370 Advanced Software Engineering 3
Advanced software engineering concepts, including the improvement process, requirements acquisition, development process models, object-oriented design, and software testing. Student cannot receive credit for both CS 5370 and CS 6370. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2450. Not available to pre-Computer Science majors. (F)

CS 5400 Computer Graphics I 4
Introduction to concepts of graphical techniques. Digital and pictorial representation of information. Prerequisites: 2.5 GPA; grade of *C-* or better in *all* of the following: CS 2420; MATH 1220; MATH 2250 or 2270. Not available to pre-Computer Science majors. (F)

CS 5450 Multimedia Systems* 4
Introduction to concepts and techniques underlying multimedia-based systems. Deals with both the hardware aspects of multimedia systems (e.g., transfer rates, capacities, resolution, etc.) and the software requirements of such systems. Each student required to develop a multimedia-based system. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420. Not available to pre-Computer Science majors. (Sp)

CS 5500 Parallel Algorithms 3
Examines basic techniques for designing parallel algorithms, such as balanced trees, pointer jumping, partitioning, pipelining, accelerated cascading, list ranking, and tree contraction. Consideration of classic parallel algorithms in graphs, merging, sorting, planar geometry, string matching, and randomized techniques. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420. Not available to pre-Computer Science majors. (Sp)

CS 5600 AI: Problem Solving and Expert Systems 3
Introduction to practical artificial intelligence methods for building problem solving and expert sytems. Covers search, knowledge representation, and reasoning. Students will develop projects in LISP and expert system shells. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420. Not available to pre-Computer Science majors. (F)

CS 5650 CVPRIP I: Computer Vision, Pattern Recognition, and Image Processing 3
Introduction to theories and techniques of machine intelligence, with emphasis on pattern recognition, computer vision, fuzzy logic, and neural networks. Prerequisites: 2.5 GPA; grade of *C-* or better in *all* of the following: CS 2420, MATH 2270, STAT 2000 or 3000. Not available to pre-Computer Science majors. (F)

CS 5660 Bioinformatics Tools and Techniques 3
Introduction to tools and techniques used in the study of bioinformatics, genomics, and computational biology. Explores usage of these tools and techniques for storage, retrieval (mining), processing, visualization, and analysis of biological information. Prerequisite: Permission of instructor. (F)

CS 5670 Computer Science Applications in Bioinformatics II 3
Builds on material presented in CS 5660, presenting more advanced topics in bioinformatics, such as data mining, machine learning, and evolutionary algorithms. Students *cannot* receive credit for *both* CS 5670 and 6670. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 5660. Not available to pre-Computer Science majors. (Sp)

CS 5700 Object-Oriented Software Development 3
Study of fundamental object-oriented principles, e.g., abstraction, encapsulation, classification, and inheritance. Application of these principles in all phases of software development, with emphasis on analysis, design, and testing. Introduction to software design patterns. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2450. Not available to pre-Computer Science majors. (F)

CS 5800 Introduction to Database Systems 3
Comparison of various database systems. Normal forms, protection, concurrency, security and integrity, and distributed and object-oriented systems. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420. Not available to pre-Computer Science majors. (F)

CS 5850 Systems Analysis 3
Theory and practice of analysis, design, and implementation of information systems. Students will construct an information system. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 5800. Not available to pre-Computer Science majors. (Sp)

CS 5890 Topics in Computer Science (Topic) 1-4®
Current topics in computer science as determined by advances in the field. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420 and permission of instructor. Not available to pre-Computer Science majors. (F,Sp,Su)

CS 5950 Independent Study 3®
Provides for independent study of selected topics. Prerequisites: 2.5 GPA; grade of *C-* or better in CS 2420 and permission of instructor. Not available to pre-Computer Science majors. (F,Sp,Su)

CS 6050 Computational Geometry: Algorithms and Applications 3
Computational geometry is the study of computation involving geometric objects, such as lines, polygons, and circles. It has application in bioinformatics, graphics,

robotics, CAD/CAM, etc. This course presents the algorithms, data structures, and techniques of computational geometry. Prerequisite: Permission of instructor. (Sp)

CS 6100 MultiAgent Systems 3
MultiAgent systems are composed of multiple interacting computing elements, known as agents. Agents are software systems with two important capabilities: first, autonomous actions; and second, interacting with other agents by engaging in cooperation, coordination, and negotiation. Prerequisites: 3.0 GPA and enrollment in Computer Science master's or PhD program. (F)

CS 6200 Distributed System Design* 3
Examines advanced design concepts related to development of distributed software systems. Students learn how to model and evaluate communication protocols and study techniques for time coordination, distributed process synchronization, object replication and migration, and distributed transaction processing. Students also learn about Common Object Request Broker Architecture (CORBA). Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5200 and enrollment in Computer Science master's or PhD program. (Sp)

CS 6220 Concurrent Systems* 3
Explores concurrency in its various forms, emphasizing debugging techniques, development techniques that guarantee correctness, and performance evaluation and tuning. Prerequisite: CS 5200. (F)

CS 6250 Cooperative Work Experience, Graduate 1-9®
Provides credit for students working at a participating firm under faculty supervision. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

CS 6300 Supercompilers for Sequential and Parallel Computers 3
Analysis and optimization for sequential and parallel computers, including loop restructuring, concurrency analysis, vector analysis, and optimizations for shared and distributed memory computers. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5300 and enrollment in Computer Science master's or PhD program. (Sp)

CS 6370 Software Engineering with a Project 3
Advanced software engineering concepts, including the improvement process, requirements acquisition, development process models, object-oriented design, and software testing. Students will work in teams, developing significant software products. Student cannot receive credit for both CS 5370 and CS 6370. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 2450 and enrollment in Computer Science master's or PhD program. (F)

CS 6400 Computer Graphics II* 3
Study of computer rendering of three-dimensional objects. Object representation, hidden surface removal, and shading. Ray tracing of synthetic scenes using mathematically defined surfaces. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5400 and enrollment in Computer Science master's or PhD program. (Sp)

CS 6450 Computer Security 3
Maintaining the integrity and security of computer systems is critical. Course explores aspects of system vulnerabilities and protection, attack categories and methodologies, the development of secure computer systems, etc. Prerequisites: 3.0 GPA; CS 2420 and enrollment in Computer Science master's or PhD program. (Sp)

CS 6500 Advances in Parallel Systems 3
Survey of current advances in parallel processing and concurrent systems. Review of current scientific literature to understand current issues, problems, and progress in advanced topics of parallel processing. Students read, summarize, report, and discuss up-to-date scientific papers in the field. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5500 and enrollment in Computer Science master's or PhD program. (F)

CS 6550 Parallel Computing Systems 3
Design of large-scale parallel systems. Explores machine organizations SIMD and/or MIMD modes of parallelism, emphasizing interconnection patterns among processors. Discussion of low-level parallel processing algorithms. Presents case studies of existing and proposed systems. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5500 and enrollment in Computer Science master's or PhD program. (F)

CS 6600 AI: Advanced Intelligent Systems 3
Investigation of advanced techniques for creating intelligent systems. Covers machine learning, reasoning under uncertainty, decision making, natural language understanding, and advanced knowledge representation. Students develop projects in LISP and expert system shells. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5600 and enrollment in Computer Science master's or PhD program. (Sp)

CS 6630 Fuzzy Logic and its Application 3
Introduces students to machine learning and problem solving techniques based on fuzzy logic. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 2420 and advanced standing, or instructor's permission; and enrollment in Computer Science master's or PhD program. (F)

CS 6650 Neural Networks and Evolutionary Algorithms 3
Advanced course in theories and techniques of machine intelligence, emphasizing pattern recognition, neural networks, and evolutionary algorithms. Prerequisites: 3.0 GPA; CS 2420 and advanced standing in computer science; or instructor's permission; and enrollment in Computer Science master's or PhD program. (Sp)

CS 6670 Computer Science Applications in Bioinformatics with a Project 3
Builds on material presented in CS 5660, presenting more advanced topics in bioinformatics, such as data mining, machine learning, and evolutionary algorithms. Students work in teams to develop a significant bioinformatics project. Students *cannot* receive credit for *both* CS 5670 and 6670. Prerequisite: CS 5660. (F)

CS 6690 AI: Advanced Topics in Artificial Intelligence (Topic) 3
Advanced course in selected theories and techniques of artificial intelligence. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (Sp)

CS 6700 Object-Oriented Models, Methods, and Tools 3
Study of object-oriented concepts, principles, techniques, development processes, and tools across all areas of software engineering, with special emphasis on current research topics. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5700 and enrollment in Computer Science master's or PhD program. (F)

CS 6800 Theory of Relational Databases 3
Graduate-level relational database course covering constraints and normal forms, mathematical models and provable properties, minimality, graphs, and synthesis. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5800 and enrollment in Computer Science master's or PhD program. (Sp)

CS 6890 Topics in Computer Science (Topic) 1-4®
Current topics in computer science as determined by advances in the field. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

CS 6900 Seminar 1
Series of one-hour seminars on current research topics presented by computer science faculty. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F)

CS 6950 Directed Readings in Computer Science 3®
Directed reading on advanced topics in computer science. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

CS 6970 Thesis and Research 1-9®
Graduate research in computer science. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

CS 6990 Continuing Graduate Advisement 1-6®
Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

CS 7100 Advanced MultiAgent Systems* 3
Advanced topics in multiAgent systems, including algorithms for finding solutions, social welfare with preferences and utilities, multiAgent learning, and distributed search problems. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 6100 (or permission of instructor) and enrollment in Computer Science master's or PhD program. (Sp)

CS 7350 Patterns in Computer Software Systems 3
Investigates patterns in computer software systems and how they can be better cataloged, understood, and reused to improve development productivity and quality. Includes readings of current literature, writing research papers, and participation in group discussions. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5700 and enrollment in Computer Science master's or PhD program. (Sp)

CS 7380 Software Testing* 3
Explores current issues, including testing object-oriented software, test data generation and sufficiency, domain-based testing, functional testing, and code-based testing. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F)

CS 7450 Advances in Computer Security Research* 3
Covers recent research directions in computer security. Reviews current state of the field, and explores possible research directions for further work. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 6450 and enrollment in Computer Science master's or PhD program. (F)

CS 7500 Fault-Tolerant Systems 3
Advanced study of design and implementation of operating systems for fault-tolerant parallel and distributed systems. Topics chosen will provide students with knowledge of current research issues, practices, and techniques for the design and development of such systems. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (Sp)

CS 7550 Interconnection Networks for Parallel Computer Systems 3
Explores the design of large-scale parallel processing systems generally suited for multi-microprocessor implementation. Emphasizes interconnection patterns among the processing elements in parallel processors. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F)

CS 7650 Advanced CVPRIP: Computer Vision, Pattern Recognition, and Image Processing 3
Investigates new developments in representation and processing of gray-level and color images, including thresholding, segmentation, curve detection, etc. Also examines visual perception, as well as statistical and syntactical pattern classification. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (Sp)

CS 7660 Robotics and Autonomous Systems 3
Surveys current advances in robotic and autonomous systems. Reviews current scientific literature in the field, with emphasis on understanding the problems solved and the approaches used. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F)

CS 7670 Data Mining and Machine Learning 3
Covers cutting-edge research in machine learning, data mining, and intelligent information retrieval. Focuses on how these topics relate to data mining. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (Sp)

CS 7680 Advanced Computer Vision* 3
Emphasizes current topics and research in the general area of computer vision. Focuses on detection, recognition, tracking, and analysis of human activity by using computer vision. Prerequisites: 3.0 GPA; grade of *B-* or better in CS 5650 and enrollment in Computer Science master's or PhD program. (Sp)

CS 7900 Seminar 2
Series of lectures and presentations on current topics in computer science. Students participate by giving presentations. As part of the course, students are expected to prepare their dissertation proposal. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (Sp)

CS 7910 Special Topics in Intelligent Systems (Topic) 3®
Discussion of current topics in intelligent systems, such as parallelism and software systems. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. Taught on demand. (F,Sp,Su)

CS 7920 Special Topics in Parallelism (Topic) 3®
Topics of current interest in the area of parallelism. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

CS 7930 Special Topics in Software Systems (Topic) 3®
Topics of current interest in the area of software systems. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

CS 7940 Brain Building 3
Examines the state of the techniques associated with the building of artificial brains. Prerequisites: 3.0 GPA; instructor's permission and enrollment in Computer Science master's or PhD program. (Sp)

CS 7950 Reading and Reports 3®
Directed reading on cutting-edge topics in computer science. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

CS 7960 Topics in Bioinformatics (Topic) 3
Topics of current interest in bioinformatics. Prerequisite: Permission of instructor. (F,Sp,Su)

CS 7970 Dissertation Research 1-15®
PhD dissertation research. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

CS 7990 Continuing Graduate Advisement 1-6®
Continuing PhD-level advisement. Prerequisites: 3.0 GPA; permission of instructor and enrollment in Computer Science master's or PhD program. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*This course is taught alternating years. Check with department for information about when course will be taught.

Dance West Summer, Dance Education (DE)

See Department of Health, Physical Education and Recreation, pages 321-331.

DE 1700W Jazz 1®
Provides training and experience in the styles of jazz, one of the popular forms of American dance. (Su)

DE 1800W Dance West Performance 1-3®
Students will learn dances to be performed in "The West: America's Odyssey." Prerequisite: Audition. (Su)

DE 1840W Beginning Classical Ballet 2®
A discipline in recognized classic form. Includes barre exercises, port de bras, and center practice in balance, jumping, and turns. (Su)

DE 1870W Beginning Classical Modern Dance 2®
Designed to develop coordination, ease, and poise in handling the body. Focuses on dance as an art using the body as a medium of expression. (Su)

DE 2850W Intermediate Classical Ballet 2®
Barre exercises, port de bras, and center practice in balance, jumps, beats, and turns with more emphasis on exactness and precision of line. Prerequisite: One year of ballet or permission of instructor. (Su)

DE 2880W Intermediate Classical Modern Dance 2®
Stresses alignment of the skeletal structure, freedom and movement of the torso, and technical work enabling the dancer to secure the natural axis of balance. Prerequisite: One year modern dance or permission of instructor. (Su)

DE 3800W Advanced Ballet 3®
Pointe and Pas de Deux. Intensified center floor work concentrating on longer adagio and allegro combinations. Prerequisite: Five years of ballet or permission of instructor. (Su)

DE 4500W American Character Ballet 3®
History through movement from seventeenth century European dance through contemporary styles. (Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Electrical and Computer Engineering (ECE)

See Department of Electrical and Computer Engineering, pages 253-259.

ECE 1000 Introduction to Electrical and Computer Engineering 2
(formerly ECE 1010)
Basic concepts and techniques for electrical and computer engineering majors. Introduction to analog and digital electronics with fundamental laboratory skills. One lecture and one lab. Prerequisites: MATH 1050 and 1060; or AP Calculus score of at least 3 on the AB test; or Math ACT score of at least 27. Enrollment limited to electrical engineering and computer engineering majors *only*. (F)

ECE 2210 Electrical Engineering for Nonmajors 4
(formerly ECE 2200)
Introduction to electrical engineering, including DC circuits, electronic circuits, digital circuits, and power circuits. Not for ECE majors. Three lectures, one lab. Prerequisite: MATH 1210. Concurrent enrollment in PHYS 2220 is suggested. (F,Sp)

ECE 2270 Electrical Circuits 4
(formerly ECE 2410)
Introduction to electrical circuits and basic circuit elements. Circuit theory, analysis techniques, and introduction to design. DC analysis. First-order inductive and capacitive circuits. Operational amplifiers. AC steady-state analysis. Introduction to computer-aided design and analysis. Three lectures, one lab. Corequisite or Prerequisite: MATH 2250. (F,Sp)

ECE 2700 Digital Circuits 4
(formerly ECE 2530)
Design of combinational and sequential logic circuits with discrete and programmable logic devices. Simulations and timing analysis. Use of CAD tools. Design of digital systems. Three lectures, one lab. (F,Sp)

ECE 3260 DSC/QI Science of Sound 3
Applications of principles of acoustics (study of sound) to everyday life. Explores physical acoustics, psychoacoustics, musical acoustics, and architectural acoustics. Uses algebra and reasoning to solve problems in acoustics. (F)

ECE 3410 Microelectronics I 4
Fundamentals of transistors, operational amplifiers, and other integrated circuits, along with their utilization in amplifiers, switches, and other applications. Laboratory work required. Prerequisite: ECE 2270. Prerequisite or corequisite: ECE 3620. (F,Sp)

ECE 3620 Circuits and Signals 3
Continuation of basic circuit concepts. Second-order response, time-domain analysis of higher-order systems. Impulse response and convolution. Transform domain analysis of circuits and other systems. Some lab and computational work required. Prerequisites: MATH 2250, ECE 2270, CS 1410. Corequisite or prerequisite: PHYS 2220. (F,Sp)

ECE 3640 Signals and Systems 3
Systems realizations. Time and transform domain analysis of discrete-time systems. Vector-space concepts and Fourier series. Fourier transforms in continuous and discrete time. Some lab and computational work required. Prerequisite: ECE 3620. (F,Sp)

ECE 3710 Microcomputer Hardware and Software 4
Synthesis of microcomputer systems, including interfacing, component analysis, signaling requirements, and programming. Covers architecture basics, including instruction sets, assembly language programming, loading, timing, and interrupts. Includes hands-on implementation. Three lectures, one lab. Prerequisites: ECE 2270, 2700, CS 1410. (F,Sp)

ECE 3720 Microcomputer Systems Progamming 3
Advanced assembly language and systems programming concerned with performance and I/O. Study of modern computer architecture issues, such as caching, pipelining, concurrent instruction execution, memory access time, and role and structure of device drivers. Prerequisite: ECE 3710. (Sp)

ECE 3820 CI Design I 2
Students work on an engineering project as part of a multidisciplinary team. Emphasizes engineering design, project management, technical writing, technical presentations, and project documentation. Prerequisite: Professional standing. (Sp)

ECE 3860 Transmission Lines 1
Covers transmission line analysis and high frequency effects, including reflections, standing waves and interference, VSWR, crosstalk, and coupling. Intended to be taken by computer engineers. Meets simultaneously with ECE 3870 during the first five weeks of the semester. Prerequisites: ECE 2270, PHYS 2220, MATH 2250. This course is not currently being offered. For information about when it may be offered, contact the department.

ECE 3870 Electromagnetics I 3
Discussion of Maxwell's equations, electromagnetic waves, power and energy, reflection and refraction processes, transmission lines, waveguides, and antennas. Explores electrostatic and magnetostatic fields produced by charge and current distributions, as well as electromagnetic forces and materials. Prerequisites: ECE 2270, MATH 2210, 2250, PHYS 2220. (F,Sp)

ECE 4250 Internship/Co-op 3®
Planned, career-related work experience in industry. Students must register with USU Co-op Office and have program approved by the ECE co-op advisor. Written report required. Prerequisite: Professional standing. (F,Sp,Su)

ECE 4650 Optics I 3
(dual listing 6650)
Topics include mathematics of wave motion, electromagnetic theory of light, light propagation, geometrical optics, and superposition of waves. For graduate (6000-level) credit, additional reading, recitation, use of optical-design software, and/or writing will be required. Also taught as PHYS 4650/6650. Prerequisite: ECE 3870. (F)

ECE 4680 Optics II 3
(dual listing 6680)
Topics include polarization, interference, diffraction, Fourier optics, coherence theory, and the quantum nature of light. For graduate (6000-level) credit, additional reading, recitation, use of optical-design software, and/or writing will be required. Prerequisite: PHYS/ECE 4650 or PHYS/ECE 6650. Also taught as PHYS 4680/6680. (Sp)

ECE 4740 Computer and Data Communications 3
Systems approach to computer and data communications. Includes transmission lines, hardware controllers, computer interfaces, and protocols relating to local and wide area networks. Prerequisite: ECE 3720. (F)

ECE 4840 CI Design II 3
Individual or team engineering project, including design, development, and testing. Interdisciplinary projects strongly encouraged. Design reviews and written progress reports required. Prerequisite: ECE 3820. (F,Sp,Su)

ECE 4850 CI Design III 2
Individual or team engineering project, including design, development, and testing. Interdisciplinary projects strongly encouraged. Written and oral reports required, describing technical details of design project. Prerequisite or corequisite: ECE 4840. (F,Sp,Su)

Course Descriptions

ECE 4930 Special Studies for Undergraduates 1-3®
Independent or group study of engineering problems not covered in regular course offerings. (F,Sp,Su)

ECE 5230 Spacecraft Systems Engineering 3
Spacecraft communications, telemetry systems, and command and data handling. Introduction to astrodynamics and orbit design. Electrical power generation and storage. Spacecraft subsystems (e.g., guidance, navigation, and control). Prerequisite: MATH 2250. (F)

ECE 5240 Space System Design 3
Students in teams perform a space system design involving all aspects, including technical, cost, and schedule. Class is linked to national design competitions and/or current USU spacecraft design projects. Prerequisite: ECE 5230 or MAE 5520. Also taught as MAE 5530. (Sp)

ECE 5310 Control Systems 3
Study of analog and computer controlled systems, classical and modern control system design methods, s-domain and z-domain transfer function models, state space, dynamics of linear systems, and frequency domain analysis and design techniques. Introduction to controllability and observability, and full-state pole placement controller design. Laboratory work required. Prerequisite: ECE 3640. (F)

ECE 5320 Mechatronics 4
Principles, modeling, interfacing, and signal conditioning of motion sensors and actuators. Hardware-in-the-loop simulation and rapid prototyping of real-time closed-loop computer control of electromechanical systems. Modeling, analysis, and identification of discrete-time or sampled-data dynamic systems. Commonly used digital controller design methods. Introduction to nonlinear effects and their compensation in mechatronic systems. Laboratory work and a design project required. Three lectures and one lab. Prerequisite: ECE 5310. (Sp)

ECE 5340 Mobile Robots 4
Hardware, including embedded processors, sensors, DC motors, interface electronics, wheeled platforms, and battery power. Software, including low-level device drivers and mobile rocket simulation. Algorithms, including reactive and planning approaches. Advanced sensors. Mobile robot kinematics, dynamics, and control. A project is required. (F)

ECE 5420 Microelectronics II 3
Design of electronic circuits for applications in instrumentation, communication, control, and power systems. Prerequisite: ECE 3410. (Sp)

ECE 5430 Applied CMOS Electronics 3
(dual listing 6430)
Analysis, design, and application of digital and analog MOS integrated circuits in electronic systems. Includes device-lever VLSI, fabrication technology, and semiconductor device physics. Prerequisites: ECE 3410 and 5530. (Sp)

ECE 5460 Digital VLSI System Design I 3
(dual listing 6460)
Team-oriented design of large digital systems using hardware description languages. Schematic capture and standard-cell libraries. Behavioral system modeling and simulation. Preparation of behavioral models for floor-planning, testability, and design synthesis. Extensive use of CAD tools. Design project. Prerequisite: ECE 5530. (Sp)

ECE 5470 Digital VLSI System Design II 3
(dual listing 6470)
Continuation of ECE 5460/6460. Logic synthesis, timing analysis, and structural simulation and back annotation. Design refinement to the point of final mask artwork production. Design validation through LVS, DRC, and gate-level or device-level simulation. Formal methods of circuit verification. Extensive use of CAD tools. Design project. Prerequisite: ECE 5460/6460. (F)

ECE 5480 Electromagnetic Compatibility 3
Introduces concepts and techniques of electromagnetic compatibility to students who will be designing and working with high-speed electronic systems. Prerequisites: ECE 3640, 3870. (Sp)[4]

ECE 5530 Digital System Design 3
Presents modern top-down, bottom-up approach to design of digital systems, emphasizing programmable devices. Extensive use of CAD tools. Designing with ABEL, and introduction to designing with Verilog HDL. Laboratory work required. Prerequisite: ECE 2700. (F,Sp)

ECE 5630 Introduction to Digital Signal Processing 3
Theory and principles of digital signal processing, including discrete-time signals and systems, Z-Transforms, Fourier analysis, FIR and IIR digital filter design, discrete Fourier transforms, and multi-rate processing. Laboratory work required. Prerequisite: ECE 3640. (F)

ECE 5640 Real-Time Processors 4
Real-time processor architectures and methods used for digital signal processing. Includes C and assembly language programming, modern DSP architectures, tools for real-time system development, and finite word-length effects. Laboratory includes implementation of hardware-based real-time systems. Three lectures, one lab. Prerequisites: ECE 3640 and 3710. (Sp)[3]

ECE 5660 Communication Systems I 3
Explores fundamentals of analog and digital communication systems. Focuses on modulation, demodulation, detection, and synchronization. Prerequisites: ECE 3640 and MATH 5710; or graduate standing. (Sp)

ECE 5740 Concurrent Programming 3
Analysis of problems associated with the use of multiple threads and processes (e.g., deadlock, livelock, and starvation) and methods for avoiding them. Proper usage of synchronization operations (mutual exclusion, critical sections, semaphores, and monitors) and communication operations (message passing, remote procedure calls, remote method invocation, and rendezvous). Extensive programming exercises in C and JAVA. (F)

ECE 5750 High-Performance Microprocessor Architecture 3
Modern architecture fundamentals, instruction set analysis and design, pipelined and superscalar architectures, software-hardware interaction, memory hierarchy, and virtual memory stresses processor-specific low-level code optimization. Prerequisite: ECE 3710 or equivalent. (Sp)

ECE 5770 Microcomputer Interfacing 4
Design of hardware and software interfaces to microcomputers for instrumentation and control applications. Three lectures, one lab. Prerequisite: ECE 3710. (Sp)

ECE 5780 Real-Time Systems 4
Real-time system design and implementation of basic concepts, including interrupts and controllers, context switch, concurrent processes, semaphores, message passing, rate monotonic and deadline scheduling, hardware system design and test issues, and typical engineering practice. Includes hands-on implementation. Three lectures, one lab. (F)

ECE 5800 Electromagnetics II 3
General plane wave solution of Maxwell's equations, potential functions, radiation, 2-D solution to Laplace's equation, and fundamental electromagnetic theory. Prerequisite: ECE 3870. (F)

ECE 5810 Microwaves I 3
Impedance matching, microwave network anaysis, waveguides, nonlinear elements, analysis and design of power dividers, filters, and ferromagnetic circuits. Laboratory work required. Prerequisite: ECE 5800. (Sp)

ECE 5820 Electromagnetics Laboratory 3
Measurement theory, practice, and safety. Design and characterization of microwave filters, amplifiers, and antennas. Also includes practical considerations. Prerequisites: ECE 3870 and 5420; or equivalent. (F)[5]

ECE 5850 Antennas I 3
Theory and application of electromagnetic radiation and radiating structures. Emphasis on antenna designs for modern wireless communications and radar systems. Prerequisite: ECE 3870. (F)

ECE 5870 Wireless Communication and Laboratory 3
Characteristics of the physical channel, fading and multipath, frequency reuse, interference, and system capacity. Equalization, diversity, and channel coding. Laboratory experiments focus on design issues and tradeoffs in a wireless communication system. Prerequisites: ECE 3870, 5660. (F)[1]

ECE 5930 Special Topics in Electrical and Computer Engineering 1-4®
Independent or group study of engineering problems not covered in regular course offerings. (F,Sp,Su)

ECE 6010 Stochastic Processes in Electronic Systems 3
Introduction to stochastic processes in communications, signal processing, digital and computer systems, and control. Topics include continuous and discrete random processes, correlation and power spectral density, optimal filtering, Markov chains, and queuing theory. Prerequisite: Graduate status. (F)

ECE 6030 Mathematical Methods for Signals and Systems 3
Signal representation using vector spaces. Linear algebraic techniques for signal modeling and estimation. Optimal detection and estimation algorithms, with applications. Prerequisite: Graduate status. (F)

ECE 6100 Electromagnetics Seminar 1®
Weekly seminar or colloquium for advanced electromagnetics students. Taught on demand. (Sp)

ECE 6240 Space Environment and Engineering 3
Study of space environment and models used for engineering analysis. Topics include considerations for engineering in the space environment, such as plasma interactions, debris, chemical reactions, radiation effects, and thermal issues. Prerequisite: MATH 2250. Corequisite: ECE 5230. Also taught as PHYS 6240. (F)

ECE 6250 Graduate Internship/Co-op 1-3
Planned work experience in industry. Detailed program; must have prior approval. Written report required. Prerequisite: Permission of instructor. (F,Sp,Su)

ECE 6320 Linear Multivariable Control 3
Modeling, analysis, and design of multi-input, multi-output control systems, including both state space and transfer matrix approaches, with an emphasis on stability. Prerequisite: ECE 5310 or MAE 5310. Also taught as MAE 6320. (F)

ECE 6340 Spacecraft Attitude Control 3
Spacecraft attitude dynamics and controls. Spin stabilized, three axis, and dual spin modes. Attitude determination techniques. Prerequisite: ECE 5310 or MAE 5310. Also taught as MAE 6340. (Sp)

ECE 6350 Robotics 3
Fundamentals of robotic systems, including kinetics, kinematics, sensors, actuators, control algorithms, motion planning, and computer systems. Integration of critical design components to develop complete systems. Robotic manipulator analysis and design. Applications in manufacturing. Mobile robots, including wheeled, legged, and alternative locomotion robots. Prerequisite: ECE/MAE 6320 or instructor approval. Also taught as MAE 6350. (Sp)

ECE 6430 Applied CMOS Electronics 3
(dual listing 5430)
Analysis, design, and application of digital and analog MOS integrated circuits in electronic systems. Includes device-lever VLSI, fabrication technology, and semiconductor device physics. Prerequisites: ECE 5420 and 5530. (Sp)

ECE 6460 Digital VLSI System Design I 3
(dual listing 5460)
Team-oriented design of large digital systems using hardware description languages. Schematic capture and standard-cell libraries. Behavioral system modeling and simulation. Preparation of behavioral models for floor-planning, testability, and design synthesis. Extensive use of CAD tools. Design project. Prerequisite: ECE 5530. (Sp)

ECE 6470 Digital VLSI System Design II 3
(dual listing 5470)
Continuation of ECE 6460/5460. Logic synthesis, timing analysis, and structural simulation and back annotation. Design refinement to the point of final mask artwork production. Design validation through LVS, DRC, and gate-level or device-level simulation. Formal methods of circuit verification. Extensive use of CAD tools. Design project. Prerequisite: ECE 6460/5460. (F)

ECE 6490 Radar I 3
Emphasizes the system aspects of radar. After introducing the basic concepts of radar, methods for the prediction of radar performance are developed and the principles of CW, FM, MTI, and tracking radars are presented. Prerequisites: ECE 3640 and 5800 or equivalent knowledge. (Sp)

ECE 6560 Spacecraft Navigation 3
Fundamentals of aircraft and spacecraft navigation systems. Techniques in celestial and inertial navigation. Global Positioning System (GPS) principles. Least squares estimation and Kalman filtering for optimal estimation of stochastic systems. Prerequisite: MAE 5310 or ECE 5310 or equivalent. Also taught as MAE 6560. (Sp)

ECE 6600 Computer Networking I 3
Topics include network topology, flow, capacity and queuing analysis, detailed description of the standard layers, and specific networking systems, including local area networks. Some lab work included. (F)

ECE 6620 Introduction to Digital Image Processing 3
Digital processing theory and techniques for two-dimensional signals. Topics include two-dimensional transforms, image perception, sampling, modeling, enhancement, and data compression. Prerequisites: ECE 5630 and 6010. (Sp)[4]

ECE 6650 Optics I 3
(dual listing 4650)
Topics include mathematics of wave motion, electromagnetic theory of light, light propagation, geometrical optics, and superposition of waves. For graduate (6000-level) credit, additional reading, recitation, use of optical-design software, and/or writing will be required. Also taught as PHYS 6650/4650. Prerequisite: ECE 3870. (F)

ECE 6670 Communication Systems II 3
Communication over bandlimited channels, equalization, multiple antenna systems, space-time codes, spread spectrum, CDMA, OFDM. Prerequisites: ECE 5660, 6010, 6030. (F)

ECE 6680 Optics II 3
(dual listing 4680)
Topics include polarization, interference, diffraction, Fourier optics, coherence theory, and the quantum nature of light. For graduate (6000-level) credit, additional reading, recitation, use of optical-design software, and/or writing will be required. Prerequisite: PHYS/ECE 4650 or PHYS/ECE 6650. Also taught as PHYS 6680/4680. (Sp)

ECE 6750 Concurrent Systems Engineering I* 3
Reliable and efficient software design for multiprocessor and multithreaded applications on real-time or embedded systems. Use of CASE tools to develop substantial concurrent programs for single and multiprocessor systems. Prerequisite: BS degree in Electrical and Computer Engineering or Computer Science. (Sp)

ECE 6760 Fault-tolerant Systems 3
Methods for design and implementation of fault-tolerant computer systems, emphasizing small real-time and embedded applications. Detection, assessment, confinement, and treatment of faults. Checkpointing, rollback, and secure protocols. Fault-tolerance on distributed systems. Prerequisite: BS degree in Electrical and Computer Engineering or Computer Science. (F)[2]

ECE 6780 Device Drivers 3
Design and implementation of UNIX and Windows device drivers. Includes hardware/software design tradeoffs in light of modern operating systems. Students implement working device drivers. Prerequisite: ECE 5780. (Sp)

ECE 6800 Electrical Engineering Colloquium 0.5®
Weekly seminars or colloquia. Students are normally required to enroll for two semesters. (F,Sp)

ECE 6830 Microwaves II 3
Microwave amplifier design for noise, gain, and power match; microwave semiconductor and vacuum-tube devices; microwave oscillators; and microwave system performance characterization. Laboratory work required. Prerequisite: ECE 5810 or equivalent. (F)[2]

ECE 6930 Special Topics in Electrical Engineering 1-6®
Independent or group study in electrical engineering topics, such as automated systems, optics and laser engineering, electro-acoustics, solid-state materials, devices, and intelligent systems engineering. (F,Sp,Su)

ECE 6950 Design Project 3®
(F,Sp,Su)

ECE 6970 Thesis Research, MS 1-6®
(F,Sp,Su)

ECE 6990 Continuing Graduate Advisement 1-6®
Prerequisite: Permission of Electrical and Computer Engineering Department. (F,Sp,Su)

ECE 7030 Detection and Estimation Theory 3
Foundations of detection theory, including Neyman-Pearson, Bayes, and Minimax Bayes detection. Maximum likelihood and Bayes estimation theory. Recursive estimation and Kalman filtering and smoothing. Expectation maximization and hidden Markov models. Prerequisites: ECE 6010, 6030. (Sp)[4]

ECE 7210 Spacecraft Instrumentation 3
Theory, engineering, and data reduction techniques of spacecraft instrumentation for space science and spacecraft systems. Prerequisite: ECE 6240. Also taught as PHYS 7210. (Sp)[4]

ECE 7330 Nonlinear and Adaptive Control 3
Methods of nonlinear and adaptive control system design and analysis. Includes qualitative and quantitative theories, graphical methods, frequency domain methods, sliding surface design, linear parameter estimation methods, and direct and indirect adaptive control techniques. Prerequisite: ECE/MAE 6320. Also taught as MAE 7330. (Sp)

ECE 7350 Intelligent Control Systems 3
Intelligent control strategies, including neural network, fuzzy logic, associated memory networks, and rule-based control systems. Prerequisite: ECE/MAE 6320 or instructor approval. Also taught as MAE 7350. (Sp)[4]

ECE 7360 Optimal and Robust Control 3
Advanced methods of control system analysis and design. Operator approaches to optimal control, including LQR, LQG, and L1 optimization techniques. Robust control theory, including QFT, H-infinity, and interval polynomial approaches. Prerequisite: ECE/MAE 6320 or instructor approval. Also taught as MAE 7360. (F)[6]

ECE 7390 Topics in Controls 3
Topics selected from advanced control theory. Taught on demand.

ECE 7610 Computer Networking II 4
Advanced TCP/IP protocols, routing strategies, major applications. Details of Unix systems for advanced use of BSD sockets and TLI/Streams. Prerequisite: ECE 6600. (Sp)

ECE 7620 Advanced Digital Image Processing 3
Advanced digital processing theory and techniques. Topics include image restoration, image reconstruction from projections (computed tomography), and data compression. Prerequisite: ECE 6620. (F)[5]

ECE 7630 Advanced Digital Signal Processing 3
Advanced digital signal processing theory and methods. Topics include optimal filter design (Wiener and Kalman filters), adaptive filtering, spectral estimation, and beamforming. Prerequisites: ECE 5630, 6010. (F)[2]

ECE 7640 Topics in Signal Processing 3
Topics in advanced signal or image processing. Taught on demand.

ECE 7670 Coding Theory and Practice in Communication 3
Examination of codes employed in digital communications, including discussion of error correction codes over finite fields. Reed-Solomon, convolutional, and trellis coding. Advanced coding techniques. Prerequisite: ECE 6010 or 6030. Prerequisite or corequisite: ECE 5660. (Sp)[3]

ECE 7690 Topics in Communication Theory 3
Topics selected from advanced communication theory. Taught on demand.

ECE 7710 Concurrent Systems Engineering II 3
Advanced work on the development of reliable and correct concurrent systems, including those with time constraints. Substantial experience with CASE tools and application development. Prerequisite: ECE 6750. (F)[1]

ECE 7750 Distributed Control Systems 3
Design and implementation issues concerning distributed control systems. Real-time processing, distributed stability methods, network techniques and standards, system development and management, smart sensors, and control actuators. Survey of current literature. Prerequisite: ECE/MAE 6320. Also taught as MAE 7750. (Sp)[3]

ECE 7760 Advanced Topics in Distributed Systems 3
Advanced topics in parallel and distributed computing, emphasizing small-scale real-time and embedded systems. Prerequisite: ECE 6750. Taught on demand.

ECE 7770 Advanced Topics in Real-Time Systems 3
Topics in real-time systems, such as scheduling analysis, adaptive scheduling, multiprocessor systems, fault tolerance, etc. Also design and implementation of real-time operating systems. Prerequisite: ECE 5780. Taught on demand.

ECE 7850 Antennas II 3
Topics include: apertures, reflectors and lens, finite and infinite arrays, broadband antennas, Fresnel Fraunhofer regions, and Huygens' principle. Concepts for synthetic aperture radar and radar cross section. Prerequisites: ECE 5800 and 5850. (Sp)[3]

ECE 7860 Computational Electromagnetics 3
Topics selected from advanced numerical methods including: finite element, finite difference, and mement method for solving differential and integral equations of electromagnetic radiation and scattering problems. Programming in C/C++ or MatLab required. Prerequisite: ECE 5800. (Sp)[4]

ECE 7890 Topics in Electromagnetics 3
Topics selected from advanced electromagnetics, microwave, and radar fields. Taught on demand.

ECE 7930 Special Topics in Electrical Engineering 1-6®
Independent or group study in electrical engineering topics, such as automated systems, laser engineering, electroacoustics, solid-state materials, devices, and intelligent systems engineering. (F,Sp,Su)

ECE 7970 Dissertation Research 1-12®
(F,Sp,Su)

ECE 7990 Continuing Graduate Advisement 1-9®
Prerequisite: Permission of Electrical and Computer Engineering Department. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
[1]Taught during even-numbered years, beginning with Fall 2006.
[2]Taught during odd-numbered years, beginning with Fall 2007.
[3]Taught during odd-numbered years, beginning with Spring 2007.
[4]Taught during even-numbered years, beginning with Spring 2008.
[5]Taught during even-numbered years, beginning with Fall 2006.
[6]Taught during odd-numbered years, beginning with Spring 2007.

Economics (ECON)

See Department of Economics, pages 240-250.

ECON 1500 BAI Introduction to Economic Institutions, History, and Principles 3©
Designed to build an understanding of economic institutions, history, and principles. Relationship between private and public sectors of U.S. economy. Analysis of major economic institutions, such as property rights, markets, business organizations, labor unions, money and banking, trade, and taxation. No prerequisites. (F,Sp)

ECON 1550 BSS Introduction to Environmental and Natural Resource Economics* 3
Introduction to the concepts of economics in the context of environmental and natural resource management. (F)

ECON 2010 BSS Introduction to Microeconomics 3©
Designed to build an understanding of the economics of the marketplace from the perspectives of individual consumer and producer or business. Development and application of microeconomic principles to demonstrate the role and limitations

of competitive markets in motivating socially efficient consumer, business, and public sector choices. Prerequisite: ECON 1500. (F,Sp)

ECON 3030 DSS Introduction to Agribusiness Marketing 3
Principles and practices used by agribusiness firms to market products. Topics covered include the use of futures markets, international trade, marketing orders, and commodity marketing problems. Prerequisite: ECON 1500. (F)

ECON 3050 DSS Introduction to Agribusiness Management 3
Application of principles and practices used by managers of agribusiness firms. Prerequisites: ECON 1500, ACCT 2010. (Sp)

ECON 3170 Law and Economics 3
Explains legal and political rules, the organization of government, and other institutional processes. Uses standard microeconomic tools and concepts, such as scarcity, choice, preferences, incentives, and supply and demand. Prerequisite: POLS 1100. Also taught as POLS 3170. (F)

ECON 3400 DSS International Economics for Business 3©
Primary issues in international economics as applied to contemporary business problems. Topics include trade patterns and policies, capital markets, and technology transfer. Prerequisite: ECON 2010. (F,Sp,Su)

ECON 3900 Independent Reading and Research 1-3®
(F,Sp,Su)

ECON 4010 DSS Managerial Economics 3©
Microeconomic principles applied to economic decision-making and policy formulation, with emphasis at the level of business firm and the individual consumer. Designed for undergraduate business and accounting majors. Credit will not be given for both ECON 4010 and 5010. Prerequisites: ECON 1550 or 2010; MATH 1100; STAT 2300. (F,Sp)

ECON 4020 Macroeconomics for Managers 3©
Macroeconomic analysis applied to forecasting and understanding fluctuations in the levels of income, employment, and production. Designed for undergraduate business and accounting majors. Credit will not be given for both ECON 4020 and 5000. Prerequisite: ECON 1500. (F,Sp)

ECON 4030 CI Agribusiness Finance 3
Financial considerations in organizing and operating farms, ranches, and agribusiness firms. Prerequisites: ECON 2010, or ECON 3030 and 3050; ACCT 2010. (F)

ECON 4310 QI Mathematical Methods for Economics 3
(dual listing 5310)
Review of single-variable calculus (differentiation and integration); multivariate calculus (including the chain rule and implicit differentiation); optimization (unconstrained and constrained); linear algebra and applications (including linear programming). Economic applications. Prerequisites: ECON 2010; MATH 1100 or its equivalent. (F)

ECON 4950H Senior Honors Thesis/Project 3
Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (Sp)

ECON 4990 Senior Seminar 1-3®
Introduces students to current research and special topics in economics. (F,Sp)

ECON 5000 Macroeconomics 3
Analysis of underlying causes of unemployment, economic instability, inflation, and economic growth. Credit will not be given for both ECON 4020 and 5000. Prerequisites: ECON 1500, MATH 1100, and STAT 2300. (F)

ECON 5010 Microeconomics 3
Analysis of behavior of consumers and business firms. Application of theory to the solution of real world problems. Credit will not be given for both ECON 4010 and 5010. Prerequisites: ECON 2010, MATH 1100, and STAT 2300. (Sp)

ECON 5020 CI Economics and Public Policy 3
A study of selected federal policies and their impacts on product and factor markets, with major focus on an economic analysis of public policy actions. Prerequisites: ECON 4020 or 5000, ECON 4010 or 5010. (Sp)

ECON 5030 Agricultural Marketing and Price Analysis 3
Agribusiness market strategies and price analysis. Designed for upper-division students. Prerequisite: ECON 4010 or 5010. (F)

ECON 5050 Farm and Ranch Planning and Analysis 3
Economic principles and tools in operation of farm and ranch enterprises. Designed for upper-division students. Prerequisites: ECON 4010 or 5010; and ECON 4030. (Sp)

ECON 5100 History of Economic Thought 3
Origin and development of economic theories of leading thinkers in western civilization. Prerequisite: ECON 2010. (Sp)

ECON 5110 DSS Economic History of the United States 3
Development of agriculture, industry, transportation, and finance from colonial times. Prerequisite: ECON 2010. (F)

ECON 5120 Economics of Russia and Eastern Europe, 9th Century to 21st Century 3
Development of the economics of Russia and Eastern Europe from earliest times to the present, emphasizing the interaction between economic forces and policies of the state. Prerequisite: ECON 2010. Also taught as POLS 5120. (F)

ECON 5150 DSS Comparative Economic Systems 3
History, economic theories, and comparative policies of communist, socialist, and capitalistic economies. Problems facing transition economies. Prerequisite: ECON 2010. (Sp)

ECON 5300 Industrial Organization—Game Theory 3
Emphasizes market structure, firm conduct, and economic efficiency. Topics include competition, game theory, monopoly, oligopoly, monopolistic competition, firm strategies, and anti-trust policy in the United States. Prerequisites: ECON 4020 or 5000, ECON 4010 or 5010. (F)

ECON 5310 QI Mathematical Methods for Economics 3
(dual listing 4310)
Review of single-variable calculus (differentiation and integration); multivariate calculus (including the chain rule and implicit differentiation); optimization (unconstrained and constrained); linear algebra and applications (including linear programming). Economic applications. Prerequisites: ECON 2010; MATH 1100 or its equivalent. (F)

ECON 5330 QI Applied Econometrics 3
Introduction to basic statistics, simple linear regression, multiple regression, and simultaneous equation models for economics. Prerequisites: STAT 2000 or 2300 or 3000. (Sp)

ECON 5350 CI Agribusiness, Cooperatives, and Management 3
Applications of economic and management principles to farm marketing and supply firms. Includes independent work on a set of case studies designed to enhance understanding of current issues in agribusiness and provide practice in solving everyday management problems. Prerequisites: ECON 3050, ECON 4010 or 5010, ECON 4020 or 5000. (Sp)

ECON 5400 International and Development Economics 3
Intermediate-level issues in international trade, international finance, and economic development. Topics include competitive and noncompetitive trade models, trade policy, balance of payments accounting, exchange rates, international lending and investment, economic growth, and poverty alleviation. Prerequisites: ECON 4020 or 5000; ECON 4010 or 5010. (F)

ECON 5500 Public Finance 3
Government fiscal institutions-expenditure programs, budget procedures, tax systems, debt issues, levels of government, and the issues surrounding their operations. Prerequisites: ECON 4020 or 5000, ECON 4010 or 5010. (F)

ECON 5560 Natural Resource and Environmental Economics 3
Economics of developing, managing, and conserving natural resources and the environment. Topics include resource use and conservation, environmental quality, public and private resource management, and valuation of nonmarket goods. Prerequisite: ECON 1550 or 2010. (Sp)

Course Descriptions

ECON 5600 Financial Economics 3
Introduction to development of our present system of money, banking, and financial institutions. Analysis of central bank policy, capital markets, speculative markets, and portfolio theory. Prerequisites: ECON 4020 or 5000, ECON 4010 or 5010. (Sp)

ECON 5660 Training and Organizational Development 2
Theoretical basis for training and development in organizations. Practical experience in the design and development of training and other educational programs in an organizational setting. Prerequisite: ECON 2010. (Sp)

ECON 5680 Labor Economics 3
Labor force development and behavior, occupational choice and mobility, human capital formation, labor market information and institutions, and manpower policies. Prerequisite: ECON 2010. (Sp)

ECON 5850 Regional and Community Economic Development* 3
Building on microeconomic theory, models for regional and urban structure and change are explored. Policy decision models are also developed. Prerequisites: ECON 4020 or 5000, ECON 4010 or 5010. (F)

ECON 5950 CI Senior Project 3
A current economic problem is identified and analyzed, bringing together other agricultural economics and economics course concepts and methods. (Sp)

ECON 6000 Macroeconomic Theory I 3
(dual listing 7230)
Lays a foundation of advanced macroeconomic analysis, integrating theory, data, and computational methods. Special attention given to real-world issues, with an emphasis on how economists use macro models and data to improve business and public policy decisions. Topics covered include neoclassical and endogenous growth theories, real business cycle and new Keynesian theories of economic fluctuations, monetary theory, macroeconomic policy, and open-economy macroeconomics. (F)

ECON 6030 Agricultural Marketing 3
Covers a variety of topics relating to price analysis for agricultural commodities. Explores econometric and time series modeling and forecasting of agricultural prices. Includes a section on futures and options on futures contracts, focusing on fundamental and technical analysis. Prerequisite: ECON 6330. (F)

ECON 6040 Agricultural Production/Policy 3
Includes analysis of marketing margins and a section on food demand and nutrition. Also explores food safety issues. Prerequisite: ECON 6030. (F)

ECON 6050 Fundamentals of Economics 3
Introduction of economic principles for students entering a master's degree in the College of Business. Prerequisite: Acceptance into a College of Business master's degree program. (Su)

ECON 6060 Research Methods 2
(dual listing 7060)
Provides introduction to application of scientific methods in economics, with an emphasis on proposal writing. (Sp)

ECON 6100 Microeconomic Theory I 3
Provides a rigorous introduction to graduate-level microeconomic theory. While the specific focus is on the theoretical construct of graduate-level microeconomic models, the broad objective of the class is to lay the foundation for empirical applications in microeconomics. To meet this broad objective, the course covers theory of the firm, consumer theory, market structure, theory of public goods and externalities, and welfare economics. (F)

ECON 6250 Graduate Internship 1-3®
Prerequisites: ECON 6000, 6100, 6330. (F,Sp,Su)

ECON 6300 Quantitative Analysis for Business and Policy Decisions 3
Provides an introduction to applied mathematical programming, operations research, simulation, risk analysis, adaptive management, and other decision theoretic tools used by government policy makers and managers of firms. (Sp)

ECON 6330 Applied Econometrics 3
Provides graduate-level introduction to applied regression tools, including: simple and multivariate regression analysis; linear, nonlinear, and qualitative dependent variable models; distributed lags; seemingly unrelated regression; and model specification and validation tests. Prerequisite: Background in statistics and calculus. (F)

ECON 6500 Introduction to Natural Resource Economics 3
Introduction to the legal and regulatory foundations of natural resource policy, with specific attention to water, minerals, rangelands, forests, fish, and off-site impacts of agricultural and industrial production. Topics include externalities, property rights, public goods, public choice, and public trust. Prerequisite: ECON 4010 or 5010 or 5560. (Sp)

ECON 6510 Introduction to Environmental Economics 3
Introduction to the foundations of environmental economics. Adaptation of market mechanisms to ameliorate pollution problems and provide amenity services. Methods for determining the value of nonmarketed goods and services. Topics include economic principles regarding social choice and market exchange, as well as current and historical issues involving pollution, environmental regulation, and the effects of environmental regulation on the profitability of private and public entities. Prerequisite: ECON 4010 or 5010 or 5560 or 6500. (F)

ECON 6520 Practicum in Environmental and Natural Resource Economics 3
Introduction to the application of regional economic models, cost-benefit analysis, and the valuation of amenity and other nonpecuniary resource services for Regulatory Impact Reviews, Environmental Impact Statements, etc. Prerequisite: ECON 5560 or 6500 or 6510. (F)

ECON 6700 Regional and Community Economic Development 3
Extension of microeconomic foundations of regional and urban economics to recent advances in economic growth and development, economic structure, land-use, public finance, housing, social welfare, environmental quality, and transportation. Prerequisite: ECON 6100. (Sp)

ECON 6710 Community Planning and Impact Analysis 3
Focuses on tools used by local and regional economic development specialists as they relate to planning and impact assessment. Specific topics will include I/O models, IMPLAN models, and computable CGE modeling approaches as they are used in a planning environment. Prerequisite: ECON 6700. (F)

ECON 6900 Readings and Conference 1-3®
Directed readings. Credits from this course toward any economics graduate degree require approval of the student's advisory committee, the department graduate committee, and the department head. Prerequisites: ECON 5000 and 5010. (F,Sp,Su)

ECON 6910 Independent Research 1-3®
Directed readings. Credits from this course toward any economics graduate degree require approval of the student's advisory committee, the department graduate committee, and the department head. Prerequisites: ECON 5000 and 5010. (F,Sp,Su)

ECON 6970 Thesis Research 1-9®
Master's level research. (F,Sp,Su)

ECON 6990 Continuing Graduate Advisement 1-9®
Master's level advisement. (F,Sp,Su)

ECON 7060 Research Methods 2
(dual listing 6060)
Provides introduction to application of scientific methods in economics, with an emphasis on proposal writing. (Sp)

ECON 7130 Microeconomic Theory I 3
Provides a rigorous introduction to graduate-level microeconomic theory. While the specific focus is on the theoretical construct of graduate-level microeconomic models, the broad objective of the class is to lay the foundation for empirical applications in microeconomics. To meet this broad objective, the course covers theory of the firm, consumer theory, market structure, theory of public goods and externalities, and welfare economics. (F)

ECON 7140 Microeconomic Theory II 3
Extends the theoretical foundations of microeconomics with an emphasis on model building in economics. Topics include static games of complete and incomplete information, dynamic games of complete and incomplete information, imperfectly competitive markets, risk and uncertainty, public goods, general equilibrium, and information economics. Prerequisites: ECON 7130, 7360. (Sp)

ECON 7150 Microeconomic Theory III 3
Explores the uses of microeconomic theory in fields such as Game Theory, Industrial Organization, and Labor Economics. Study of topics such as multi-stage and repeated games, bargaining, principal-agent models of economic behavior, auctions and bidding, labor market discrimination, price discrimination and two-part tariffs, and the labor-leisure choice. Course is based on both classic and contemporary papers in each of these fields. Prerequisite: ECON 7140. (F)

ECON 7230 Macroeconomic Theory I 3
(dual listing 6000)
Lays a foundation of advanced macroeconomic analysis, integrating theory, data, and computational methods. Special attention given to real-world issues, with an emphasis on how economists use macro models and data to improve business and public policy decisions. Topics covered include neoclassical and endogenous growth theories, real business cycle and new Keynesian theories of economic fluctuations, monetary theory, macroeconomic policy, and open-economy macroeconomics. (F)

ECON 7240 Macroeconomic Theory II 3
Extends the foundations of ECON 7230 with a more in-depth look at the theory and computational aspects of various models of economic growth and business cycles. Prerequisites: ECON 7230, 7360. (Sp)

ECON 7250 Macroeconomic Theory III 3
Focuses on emerging topics in macroeconomics, relying heavily on skills acquired in ECON 7230 and 7240. Topics to be covered include, but are not limited to, endogenous growth, real and monetary business cycle, capital theory, fiscal and monetary policy, and economic transition. Prerequisite: ECON 7240. (F)

ECON 7310 Econometrics I 3
Begins with a review of probability and statistics. Remainder of course is spent discussing the Classical linear regression model, least squares and maximum likelihood estimation, finite and asymptotic sample properties, inference, prediction, and nonlinear optimization. Prerequisite: ECON 7360. (Sp)

ECON 7320 Econometrics II 3
Extension of ECON 7310, covering topics such as nonspherical disturbances, panel data, simultaneous equations, time series and distributed lag models, and limited and qualitative dependent variable models. Prerequisite: ECON 7310. (F)

ECON 7330 Econometrics III 3
Provides in-depth coverage of current topics/techniques in applied econometric time series analysis, with an emphasis on econometric model development, estimation, and interpretation. Topics include difference equations, lag operators, stationary ARMA processes, modeling economic time series including trends and volatility, testing for trends and unit roots, vector autoregressions, the Kalman filter including the state space representation of a dynamic system, cointegration, and error-correction models. Prerequisite: ECON 7320. (Sp)

ECON 7350 Mathematical Economics I 3
Includes linear equations, matrix algebra, multivariate calculus, static optimization, comparative static analysis, constrained optimization, and Kuhn-Tucker conditions. (F)

ECON 7360 Mathematical Economics II 3
Extends the presentation of ECON 7350 by covering applications of constrained optimization, the envelope theorem and applications, differential equations, dynamic economics, and optimal control. Prerequisite: ECON 7350. (F)

ECON 7400 International Trade Theory and Policy I 3
Focuses on recent developments in the theory of trade and trade policy, including: (1) the incorporation of imperfect competition into the theory of international trade, (2) international factor movements, (3) the empirical investigation of trade flows, and (4) strategic trade policies. Prerequisites: ECON 7140, 7240. (Sp)

ECON 7410 International Trade Theory and Policy II 3
Focuses on the international monetary system and currency markets, with an emphasis on balance of payment adjustment and exchange rate determination. Different exchange rate regimes are introduced, and issues regarding exchange rate overshooting and currency substitution are addressed. Topics covered also include the international banking system, international investment decisions on funding and capital structure, foreign exchange risk hedging and management, and foreign exchange instruments and techniques. Prerequisites: ECON 7130, 7230, 7360. (F)

ECON 7500 Resource Economics 3
Focuses on formal economic models associated with optimal exploitation of renewable and nonrenewable resources. Applications to minerals, groundwater, energy resources, soil, forests, fisheries, rangelands, watersheds, wildlife, etc. Prerequisites: ECON 7140, 7240. (F)

ECON 7510 Environmental Economics 3
Covers the theory of environmental policy. Topics include, but are not limited to, externalities, uncertainty and the choice of policy instruments, market imperfections and the number of participants, nonconvexities in the production set, the charges and standards approach, marketable emission permits, the environment and development, international environmental issues, and ecological economics. Prerequisite: ECON 7500. (Sp)

ECON 7800 Development Economics 3
Focuses on a broad introduction to formalized economic models associated with developing regions/countries and theories of growth. Examines the interconnection between development and economic inequality, poverty and undernutrition, population growth, rural-urban migration, and agricultural development theories. Prerequisites: ECON 7140, 7240. (Sp)

ECON 7950 Department of Economics Graduate Seminar 1®
Exposes students to new developments in research and management in the field of economics. Features participation by students, faculty, and guest lecturers. (F,Sp)

ECON 7970 Dissertation Research 1-9®
PhD dissertation research. (F,Sp,Su)

ECON 7990 Continuing Graduate Advisement 1-9®
PhD-level advisement. (F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
© This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.

Education and Human Services (EDUC)

See College of Education and Human Services, pages 116-117.

EDUC 5000H Senior Honors Seminar 2
For students in the College of Education and Human Services to explore an honors interdisciplinary theme selected by the Honors Committee as a culmination of an honors experience. (Sp)

EDUC 5560 Special Topics 0.5-4®
(F,Sp,Su)

EDUC 6010 Introduction to Program Evaluation: Evaluation Models and Practical Guidelines 3
Alternative approaches and practical guidelines for conducting evaluation studies. Through case studies and simulations, addresses impact of social, political, and ethical issues on evaluation. Also taught as PSY 6010.

EDUC 6080 Leadership and the School Principal* 3
Focuses on the school principalship. Provides an overview of the roles and responsibilities of the principal, with emphasis placed on understanding leadership and instructional leadership. Introduces students to knowledge, dispositions, and skills required of successful school principals. (F,Sp,Su)

Course Descriptions

EDUC 6240 Introduction to Student Development Theory 3
Helps students gain an overall understanding of student development theories and how these theories should influence and inform practice. Students will be able to identify theories and suggest ways to apply them to enhance students' development. Course requirement for the Master of Social Sciences degree program in Human Resource Management.

EDUC 6250 History and Development of Higher Education and Student Services 3
Introduces students to the history and development of higher education and the student personnel field by acquainting them with the history of the profession, some of the profession's theoretical and organizational foundations, and basic issues faced by student services professionals. Course requirement for the Master of Social Sciences degree program in Human Resource Management.

EDUC 6260 Law and Higher Education: A Guide for Student Services Personnel Administrators 3
Helps students to become familiar with and gain a working knowledge of education law in postsecondary education, court litigation, scope of authority, liability risks, students' rights and responsibilities, discipline codes, risk management, federal laws affecting university programs, etc. Course requirement for the Master of Social Sciences degree program in Human Resource Management.

EDUC 6270 Organizational Administration/ Strategies in Student Services 3
Explores university governance models, resource acquisition and allocation, financial management, and administrative leadership. Critically examines history, current issues, and present trends in the field of student services organizational administration. Course requirement for the Master of Social Sciences degree program in Human Resource Management.

EDUC 6410 Educational Foundations 2
Examines current educational issues and trends within contexts of history, philosophy, and cultural foundations. (F,Su)

EDUC 6500 Public School Finance* 3
Background and understanding of public school finance. Principles and practices utilized in collecting, distributing, and managing district and school revenues, with emphasis on Utah. Collective bargaining practices and capital facilities development also emphasized. (F,Su)

EDUC 6550 Research for Classroom Teachers 3
Assists teachers in applying measurement issues and research methods to classroom problems; in locating, interpreting, and using research reports; and in writing research-related papers on teaching. (F,Sp,Su)

EDUC 6560 Special Topics 0.5-4®
(F,Sp,Su)

EDUC 6570 Introduction to Educational and Psychological Research 3
Provides introduction to research methods, including identification of research problem, review and evaluation of research literature, and design and implementation of research project. Prerequisite: PSY 2800. Also taught as PSY 6570. (F,Sp,Su)

EDUC 6600 Research Design and Analysis I 3
Research design and statistical concepts for research in education, human services, and psychology, with emphasis on the selection and interpretation of statistical analyses. Prerequisites: EDUC/PSY 6570, passing score on 6600 Pretest via WebCT, and permission of instructor. Also taught as PSY 6600. (F,Sp,Su)

EDUC 6700 (dual listing 7700) Single-Subject Research Methods and Designs 3
Examines single-subject research methodology for applied research in schools, including measurement, design, and analysis issues. Also taught as SPED 6700/7700. (F)

EDUC 6710 Diversity in Education 3
Provides educators with background and techniques for more effectively addressing the needs of students in culturally and linguistically diverse society. Diversity topics also include religion, socioeconomic class, ability differences, gender, and sexual orientation. (Sp,Su)

EDUC 6740 School Law* 3
Acquaints students with legal issues relating to public education. Considers rights and responsibilities of students, teachers, and educational practitioners. Relates these rights to school programs and operations as determined by state and federal laws and court decisions. (F,Su)

EDUC 6770 Qualitative Methods I 3
Introduction to qualitative research, including foundations; research designs and strategies of inquiry (case studies, ethnography, phenomenology, grounded theory, biographical, historical, participative inquiry); sampling; fieldwork and data collection; and analysis. Prerequisite: EDUC/PSY 6570. (F,Sp)

EDUC 6780 (dual listing 7780) Qualitative Methods II 3
Builds on and applies concepts covered in EDUC 6770, emphasizing analysis of data, critique of qualitative research, and design and implementation of qualitative research. Students registered for 7780 conduct a qualitative research project. Prerequisite: EDUC 6770. (Sp)

EDUC 6930 Supervision and Administrative Internship—Elementary 3
Jointly (with EDUC 6940) provides experience in supervision and administration in elementary school settings as they relate to the performances of the six Interstate School Leaders Licensure Consortium (ISLLC) Standards for School Leaders. Prerequisite: EDUC 6080. (F,Sp,Su)

EDUC 6940 Supervision and Administrative Internship—Secondary 3
Jointly (with EDUC 6930) provides experience in supervision and administration in secondary school settings as they relate to the performances of the six Interstate School Leaders Licensure Consortium (ISLLC) Standards for School Leaders. Prerequisite: EDUC 6080. (F,Sp,Su)

EDUC 6950 Leadership Portfolio Development 1
Creation of leadership portfolio as culminating activity for completion of Administrative/Supervisory Endorsement. Portfolio includes leadership vision, educational philosophy, and professional resume. (F,Sp,Su)

EDUC 7050 Theories of Instructional Supervision* 3
Principles and theoretical base of supervision as they relate to improving instructional practices. Emphasizes research findings and recommended practices. (F,Su)

EDUC 7080 Theories of Organizational Leadership in Education 3
Introduces prospective school administrator to theories of organizational behavior and practices of managing and leading people within the context of the school organization. (F,Sp,Su)

EDUC 7100 Practices of Instructional Supervision* 2
Application of instructional supervisory theories and practices of supervisory behaviors as they relate to improvement of instruction. Prerequisite: EDUC 7050. (Sp)

EDUC 7150 Curriculum Theory* 3
Examines the role interpretist/phenomenological, political, cultural, and theoretical perspectives play in the development of school curriculum. Prerequisite: ELED/SCED 6150. (Su)

EDUC 7300 Historical, Social, and Cultural Foundations of Education 3
Examines relationship of modern school in terms of historical, cultural, and social foundations of education. Prerequisites: EDUC 6410, ELED 6020/7020, or permission of instructor. (F)

EDUC 7310 Teaching-Learning Foundations in Education 3
Seminar in which learning theories and teaching models/skills are demonstrated, critically examined, and integrated. Prerequisite: Graduate course in educational psychology or equivalent. (Sp)

EDUC 7320 Instructional Leadership* 3
Emphasizes application of theory, research, and effective practice to instructional and curricular improvement. Examines educational change.

EDUC 7610 Research Design and Analysis II 3
Advanced treatment of research design and statistical concepts and issues in educational, human services, and psychological research. Prerequisite: EDUC/PSY 6600. Also taught as PSY 7610. (F,Sp,Su)

EDUC 7670 Literature Reviews in Education and Psychology 2
Advanced concepts in designing, writing, and critiquing literature reviews. Prerequisites: EDUC/PSY 6600 and consent of instructor. Also taught as PSY 7670. (Sp,Su)

EDUC 7700 (dual listing 6700) Single-Subject Research Methods and Designs 3
Examines single-subject research methodology for applied research in schools, including measurement, design, and analysis issues. Also taught as SPED 7700/6700. (F)

EDUC 7780 (dual listing 6780) Qualitative Methods II 3
Builds on and applies concepts covered in EDUC 6770, emphasizing analysis of data, critique of qualitative research, and design and implementation of qualitative research. Students registered for 7780 conduct a qualitative research project. Prerequisite: EDUC 6770. (Sp)

EDUC 7970 Dissertation Research 1-18®
Dissertation research for students in the Research and Evaluation specialization. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*This course is taught during alternate years. For information about when it will be taught, contact the College of Education and Human Services.

Elementary Education (ELED)

See Department of Elementary Education, pages 260-272.

ELED 1010 (formerly ELED 1000) Orientation to Elementary Education 3
Level I. Students assess themselves as prospective teachers. Students will also have an opportunity to do observations in the public schools (grades K-8) and complete volunteer service in other community educational settings. (F,Sp,Su)

ELED 3000 CI Foundation Studies and Practicum in Teaching and Classroom Management Level II 4-6®
Introduction to historical, philosophical, and social factors shaping contemporary educational practice in kindergarten, elementary, and middle school. Through these factors, students investigate various aspects of teaching and classroom management. Extensive practicum included. (F,Sp)

ELED 3005 Beginning Classroom Management 1
Explores essential principles of classroom motivation and management. Focuses on understanding a learning environment where children work well independently and collaboratively. Prerequisite: Admission to Level II of the SODIA teacher education program. (F,Sp)

ELED 3010 Practicum Remediation Level II 2-4
Students work to develop defensible teaching ideas and to translate these ideas into practical experiences in elementary classroom settings. Specific arrangements for scheduling, placement with a cooperating teacher, and course requirements are handled by professors from the program level recommending remediation and the Elementary Education Advising Office. (F,Sp)

ELED 3100 Teaching Reading I 3©
Focuses on variety of approaches to reading instruction and issues in reading curriculum development. Includes reading theories, stages of reading growth, and assessment practices. Prerequisite: Admission to teacher education. (F,Sp,Su)

ELED 4000 Teaching Science and Practicum Level III 3
Investigation and practical application of science programs, materials, and techniques of instruction for the teaching of science. Prerequisites: Admission to teacher education; completion of Level II and BIOL 1010 with a lab, or USU 1350; PHYX 1200 and GEOL 1100 or their equivalents. (F,Sp,Su)

ELED 4005 Intermediate Classroom Management 1
Explores essential principles of classroom motivation and management. Focuses on facilitating a learning environment where children work well independently and collaboratively, are self-governing, and make socially appropriate decisions. Prerequisite: Admission to Level III of the SODIA teacher education program. (F,Sp)

ELED 4010 Practicum Remediation Level III 2-4
Students work to develop defensible teaching ideas and to translate these ideas into practical experiences in elementary classroom settings. Specific arrangements for scheduling, placement with a cooperating teacher, and course requirements are handled by professors from the program level recommending remediation and the Elementary Education Advising Office. (F,Sp)

ELED 4030 CI Teaching Language Arts and Practicum Level III 3
Study of language development in children and its implications and application in a practicum setting. Curriculum development, instructional methods, and evaluation in the areas of listening, speaking, writing, and reading. Prerequisite: Admission to teacher education. (F,Sp,Su)

ELED 4040 CI Teaching Reading II and Practicum Level III 3
Examines developmental, content, and recreational components of classroom reading programs, including teacher read-aloud, SSR, decoding, shared reading, uses of children's literature, content area reading, assessment, adaptive strategies, and parent involvement. Prerequisite: Admission to teacher education, ELED 3100. (F,Sp,Su)

ELED 4050 Teaching Social Studies and Practicum Level III 3
Students develop necessary knowledge and skills to plan and implement an appropriate social studies program consistent with the nature of the child and our democratic society. Includes practicum work. Prerequisite: Admission to teacher education. (F,Sp,Su)

ELED 4060 Teaching Mathematics and Practicum Level III 3
Relevant mathematics instruction in the elementary and middle-level curriculum; methods of instruction, evaluation, remediation, and enrichment. Prerequisite: Admission to teacher education. (F,Sp,Su)

ELED 4250 Advanced Cooperative Work Experience 1-8®
Advanced or middle level career-related experience designed to integrate classroom study with practical work experience. Students must work a minimum of 50 hours per credit hour. (F,Sp,Su)

ELED 4410 Gifted Education in the Regular Classroom 3
Introduction to characteristics of gifted learners. Exploration of strategies for challenging gifted learners in regular classroom settings. (F)

ELED 4420 Multiple Talent Approach to Thinking 2
Explores one model for the teaching of creative and critical thinking embedded in regular curricula. Includes practical application requirements. Also taught as SCED 4420. (Su)

ELED 4480 Early Childhood Education Kindergarten through Grade 3 3
Study of early childhood (K-3) curriculum, methodology, and learning environments. (F,Sp)

ELED 4600 (dual listing 6600) Philosophy and Organization of the Middle Level School 3
Focuses on characteristics of young adolescents and how middle level schools can be organized to meet those characteristics through interdisciplinary teaming, advisory programs, and exploratory mini-courses. Taught fall of odd-numbered years. Also taught as SCED 4600/6600. (F)

Course Descriptions

ELED 4610 (dual listing 6610) Curriculum, Methods, and Assessment for the Middle Grades 3
Integrates current approaches to curriculum design with instructional models and assessment of learning appropriate for grades 5-9. Taught spring of even-numbered years. Also taught as SCED 4610/6610. (Sp)

ELED 4620 (dual listing 6620) Service Learning Applications for the Middle Grades 3
Examines literature related to service learning for the middle grades and application of service learning in curriculum. Also taught as SCED 4620/6620. (Su)

ELED 4630 (dual listing 6630) Methods for Teaching Middle-Level Mathematics 3**
Teaching methods course for elementary teachers seeking a middle-level (Level II) mathematics endorsement. Prerequisites: Satisfactory completion of MATH 1210 and ELED 4060 or an equivalent elementary mathematics methods course.

ELED 4710 Diversity in Education 3
Provides educators with background and techniques for more effectively addressing the needs of students in a culturally and linguistically diverse society. Diversity topics also include religion, socioeconomic class, ability differences, gender, and sexual orientation. Prerequisite: Admission into a teacher education program. Also taught as SCED 4710. (F,Sp,Su)

ELED 4730 (dual listing 6730) Educational Linguistics 3
Examines theoretical foundations, functions, and characteristics of first language acquisition and language variation in the Pre-K-12 classroom context. Also emphasizes social context of language in K-12 classroom interaction, instruction, and curriculum. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as SCED 4730/6730. (F,Su)

ELED 4740 (dual listing 6740) Second Language Acquisition in the Classroom 3
Explores the processes of second language acquisition, including the influences of linguistic, cognitive, and sociocultural factors, as well as the relationship to first language acquisition. Emphasizes implications for teaching in the K-12 classroom environment. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as SCED 4740/6740. (Sp,Su)

ELED 4760 (dual listing 6760) ESOL Instructional Strategies 3
Includes strategies for promoting oral language, reading, and writing for K-12 English language learners. Methods for integration for second language learners into the larger school community. Discussion of parental involvement. Prerequisite: Admission into a teacher education program. Also taught as SCED 4760/6760. (F,Sp)

ELED 4770 (dual listing 6770) ESOL Instructional Strategies in the Content Areas 3
Focuses on methods which help English language learners in content-area classrooms to increase academic learning and integration into the larger school community. Prerequisite: Admission into a teacher education program. Also taught as SCED 4770/6770. (F,Sp)

ELED 4780 (dual listing 6780) Assessment for Language Learners 3
Explores principles and techniques for developing, analyzing, and interpreting assessment measures for English language learners, including oral, writing, reading, and content-area assessment, as well as assessments used in public schools. Prerequisite: Admission into a teacher education program. Also taught as SCED 4780/6780. (F,Sp)

ELED 4900 Senior Project 1-5®
All honors students are required to submit a senior project for graduation from the Honors Program. Students work with a departmental advisor on a topic of their choice. (F,Sp)

ELED 4970 Senior Thesis 1-5®
An in-depth paper or project culminating in a formal presentation. Required of all students for graduation from the Honors Program in Elementary Education. (F,Sp)

ELED 5000 (dual listing 6000) Practicum in Improvement of Instruction 1-6®
Open topics course focusing upon effective teaching methods, teaching performance, curriculum decision-making, and characteristics of learners. Also taught as SCED 5000/6000. (F,Sp,Su)

ELED 5050 Student Teaching—Kindergarten 3-6
Constitutes 6 semester credit hours of student teaching in a kindergarten classroom. Student teachers need to demonstrate competency and professionalism in teaching. An understanding of developmentally appropriate curriculum is necessary. (F,Sp)

ELED 5100 Student Teaching—Primary Grades (1-3) 6
Constitutes 6 semester credit hours of student teaching in a primary grade (1-3). Student teachers will demonstrate competency in designing and implementing a developmentally appropriate learning environment. (F,Sp)

ELED 5150 Student Teaching—Elementary (Grades 4-6) 6
Constitutes 6 semester credit hours of student teaching at the upper elementary grade level. Student teachers need to demonstrate competency and professionalism in teaching. Students begin their transition from university student to professional teacher. (F,Sp)

ELED 5200 Student Teaching—Middle Level (Grades 7-8) 6
Constitutes 6 semester credits of student teaching at the middle school level. Student teachers need to demonstrate competency and professionalism in teaching. Students begin their transition from university student to professional teacher. (F,Sp)

ELED 5250 Student Teaching—Seminar 3
Designed to provide student teachers/interns with teaching skills and strategies that will assist them in the classroom. Accompanies one of ELED 5050, 5100, 5150, or 5200. Course content is implemented into the student teaching experience. (F,Sp)

ELED 5300 Associate Teaching—Level V 3-6
Designed to allow students who have completed student teaching to extend their teaching time in a classroom. In order to better prepare for their own classroom, students continue to develop individual teaching skills and competencies. (F,Sp)

ELED 5900 Independent Study 0.5-2®
(F,Sp,Su)

ELED 6000 (dual listing 5000) Practicum in Improvement of Instruction 1-6®
Open topics course focusing upon effective teaching methods, teaching performance, curriculum decision-making, and characteristics of learners. Also taught as SCED 6000/5000. (F,Sp,Su)

ELED 6020 (dual listing 7020) Foundations and Change in Early Childhood Education 3
Survey course designed to acquaint professionals with historical and philosophical foundations of early childhood education, leading to examination of contemporary trends and issues. (Sp)

ELED 6040 Designing and Interpreting Measurements for Assessing Student Learning 3
Teachers and instructional supervisors develop their talents for (a) designing and interpreting measurements for monitoring students' learning and (b) interpreting scores from standardized and government-mandated tests. Also taught as SCED 6040. (F,Su)

ELED 6100 Motivation and Management in Inclusive Settings 3
Leads in-service teachers to develop classroom management strategies for gaining and maintaining students'cooperation. Also taught as SCED 6100. (Sp,Su)

ELED 6150 Foundations of Curriculum 3
Examination of theories, principles, and foundations of curriculum, emphasizing program planning and current curriculum trends. Also taught as SCED 6150. (F,Su)

ELED 6190 Theories of Teaching and Learning 3
Demonstration, analysis, and evaluation of various models of teaching, emphasizing research-based principles of learning. Also taught as SCED 6190. (Sp,Su)

ELED 6200 Curriculum and Issues in Early Childhood Education 2
Examination of current issues and research topics in early childhood education important to the improvement of K-3 programs. (F)

ELED 6220 Workshop in Early Childhood Education 1-6
Exploration of current topics important in teaching young children. (Su)

ELED 6230 Literacy Learning in Early Childhood 3
Investigation of early literacy development and effective classroom practices in kindergarten and the primary grades. Relevant research is examined. (F,Su)

ELED 6240 Workshop in Science Education 1-6®
Exploration of current topics in science education. (Su)

ELED 6250 Graduate Cooperative Work Experience 1-10®
Cooperative education work experience at a professional level. Prior approval required. (F,Sp,Su)

ELED 6260 Supervised Practicum in Early Childhood Education 2
Encompasses approximately 125 hours of supervised practicum in a kindergarten classroom and observations in prekindergarten settings. Participants demonstrate their ability to integrate and apply early childhood theory and research in kindergarten.

ELED 6300 Workshop in Mathematics Education 1-6®
Exploration of current topics and methods in mathematics education. In the past, topics have included: relevant mathematics in rural settings, integration of mathematics and children's literature, and ethnomathematics. (Su)

ELED 6310 Content Area Reading and Writing 3
Practical approaches for teaching reading/writing and learning skills to elementary, middle, and high school students in all content areas. Also taught as SCED 6310. (Su)

ELED 6320 Literacy and Cognition 3
(dual listing 7320)
Examination of cognitive and sociocultural research related to K-12 students' acquisition and use of reading, writing, and learning strategies. Explores implications for school policies and classroom instruction. Also taught as SCED 6320/7320. (Sp)

ELED 6330 Utah Writing Project 1-6
Workshop, seminar, and institute experiences in the Utah Writing Project, focusing on writing process, principles, and research-based strategies for improving writing instruction in grades K-12. Also taught as SCED 6330. (Su)

ELED 6340 Issues and Trends in Literacy 2®
Exploration of current issues and instructional trends in the teaching of reading and writing. Emphasis on reading widely and critically in the professional literature. Prerequisites: ELED 3100, 4040; or teaching experience in elementary or middle school. Also taught as SCED 6340. (F,Su)

ELED 6350 Reading Assessment and Intervention 3
Covers the correlates and diagnosis of reading problems, as well as methods and materials for remedial reading instruction. Prerequisites: ELED 3100, 4040; or teaching experience in elementary, middle, or secondary school. Also taught as SCED 6350. (Sp)

ELED 6360 Research in Reading 3
Covers classical, historical, and contemporary research studies in reading, with an emphasis upon understanding and translating findings into classroom practices. Prerequisites: ELED 3100, 4040; or teaching experience in elementary or middle school. Also taught as SCED 6360. (Su)

ELED 6370 Supervised Internship in Reading and Writing 1-3
Individual practicum experience designed to allow graduate students to implement and focus on one or more aspects of reading and writing instruction in a classroom or clinical setting. Prerequisite: Consent of instructor. Also taught as SCED 6370.

ELED 6380 Improvement of Language Arts Instruction 3
Exploration of current topics and instructional practices in elementary language arts. Taught spring during one year, and then taught summer during the next year. (Sp,Su)

ELED 6390 Teaching with Tradebooks in the Elementary and Middle Level Classroom 3
Explores the use of trade books in the elementary and middle level classroom. Focuses on how teachers can use various genres to invite children to read and write. Prerequisites: ELED/SCED 6310 or 6360. Also taught as SCED 6390. (Su)

ELED 6400 Multiple Talent Approach to Teaching 2
Explores one model for embedding the teaching of creative and critical thinking in regular curricula. Includes practical application requirements. Also taught as SCED 6400. (Su)

ELED 6420 Education of Gifted and Talented Learners 2
Provides multiple cultural and historical perspectives on giftedness and talent. Explores characteristics of gifted individuals, with emphasis on identifying needs. Provides general overview of possible services for gifted learners. Must be taken concurrently with ELED/SCED 6430. Also taught as SCED 6420. (F)

ELED 6430 Practicum: Individual Case Study 1
Practicum experience in association with ELED/SCED 6420. Requires intensive supervised study of gifts and talents of individual child of student's choice. Must be taken concurrently with ELED/SCED 6420. Also taught as SCED 6430. (F)

ELED 6440 Creativity in Education 2
Exploration of theories, research, and strategies concerning creativity, and their application to personal creativity and to improvement of classroom practice. Also taught as SCED 6440. (Su)

ELED 6460 Identification and Evaluation in Gifted Education 2
Provides educators with theory and models for identifying students as gifted, creative, and talented. Presents models for evaluation of programs for gifted learners. Explores instruments for use in identification and evaluation. Must be taken concurrently with ELED/SCED 6470. Also taught as SCED 6460. (Sp)

ELED 6470 Practicum: Team Consultation 1
Practicum experience in association with ELED/SCED 6460. Requires participation, as part of a consultative team, to improve practice in an approved setting for a specific child, classroom, school, school district, or other educational entity. Must be taken concurrently with ELED/SCED 6460. Also taught as SCED 6470. (Sp)

ELED 6480 Methods and Materials in Gifted Education 2
Explores programming and curriculum models in gifted education, with special attention to the development of instructional materials for use with students. Must be taken concurrently with ELED/SCED 6490. Also taught as SCED 6480. (F)

ELED 6490 Practicum: Classroom Applications 1
Practicum experience in association with ELED/SCED 6480. Requires application of at least three curriculum, cognitive, or affective models in the student's current teaching assignment. Must be taken concurrently with ELED/SCED 6480. Also taught as SCED 6490. (F)

ELED 6500 Interdisciplinary Workshop 1-2®
(F,Sp,Su)

ELED 6550 Practicum in the Evaluation of Instruction 1-4®
Field-based research study contributing toward graduate degrees. Supervisory licensure related to assessment of ongoing or newly proposed program of instruction. (F,Sp,Su)

Course Descriptions

ELED 6560 Practicum in Improvement of Instruction 1-4®
Field-based program focusing upon characteristics of effective teaching methodologies, teaching performance, curriculum decision making, value guidelines, and the characteristics of the learner. (F,Sp,Su)

ELED 6570 Advanced Comprehension 3
Designed to enhance teachers' understanding of research and practice related to teaching vocabulary and reading comprehension and fostering motivation for reading. Prerequisite: ELED/SCED 6310 or 6360. Also taught as SCED 6570. (Alt years)

ELED 6580 Character and Values Education 2
Overview of research, theory, and practical approaches to values education, emphasizing processes of moral development and socialization. Also taught as SCED 6580. (Su)

ELED 6590 Supervising School Reading Program 2
Examines strategies for improving school reading programs. Emphasizes simulations, guided practice, and small group discussions. Prerequisites: ELED/SCED 6350 and 6360. Also taught as SCED 6590. (Sp)

ELED 6600 (dual listing 4600) Philosophy and Organization of the Middle Level School 3
Focuses on characteristics of young adolescents and how middle level schools can be organized to meet those characteristics through interdisciplinary teaming, advisory programs, and exploratory mini-courses. Graduate students have additional course requirements for design and implementation of a project. Taught fall of odd-numbered years. Also taught as SCED 6600/4600. (F)

ELED 6610 (dual listing 4610) Curriculum, Methods, and Assessment for the Middle Grades 3
Integrates current approaches to curriculum design with instructional models and assessment of learning appropriate for grades 5-9. To receive credit for 6610, graduate students design and implement an action research project related to curricular or pedagogical interests, then share their findings in class. Project will include review of literature related to student's interest. Prerequisite: ELED/SCED 6600. Taught spring of even-numbered years. Also taught as SCED 6610/4610. (Sp)

ELED 6620 (dual listing 4620) Service Learning Applications for the Middle Grades 3
Examines literature related to service learning for the middle grades and application of service learning in curriculum. Also taught as SCED 6620/4620. (Su)

ELED 6630 (dual listing 4630) Methods for Teaching Middle-Level Mathematics 3**
Teaching methods course for elementary teachers seeking a middle-level (Level II) mathematics endorsement. Prerequisites: Satisfactory completion of MATH 1210 and ELED 4060 or an equivalent elementary mathematics methods course.

ELED 6700 Improvement of Science Instruction 3
For practicing elementary and middle-school teachers or those seeking alternative licensure in science education. Survey of current research in science education and strategies for implementing best practice in classroom settings. Considers a Science/Technology/Society approach to teaching science, as well as the use of action research to improve practice. (F)

ELED 6720 Practicum in Science Instruction 1
Optional practicum to be taken semester following enrollment in ELED 6700. (Sp)

ELED 6730 (dual listing 4730) Educational Linguistics 3
Examines theoretical foundations, functions, and characteristics of first language acquisition and language variation in the Pre-K-12 classroom context. Also emphasizes social context of language in K-12 classroom interaction, instruction, and curriculum. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as SCED 6730/4730. (F,Su)

ELED 6740 (dual listing 4740) Second Language Acquisition in the Classroom 3
Explores the processes of second language acquisition, including the influences of linguistic, cognitive, and sociocultural factors, as well as the relationship to first language acquisition. Emphasizes implications for teaching in the K-12 classroom environment. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as SCED 6740/4740. (Sp,Su)

ELED 6750 Improvement of Mathematics Instruction 2
Examines advanced concepts in curriculum theory and methods of teaching mathematics in the elementary and middle school. Prerequisite: ELED 4060 or teaching experience in elementary or middle school. (Sp)

ELED 6760 (dual listing 4760) ESOL Instructional Strategies 3
Includes strategies for promoting oral language, reading, and writing for K-12 English language learners. Methods for integration for second language learners into the larger school community. Discussion of parental involvement. Prerequisite: Admission into a teacher education program. Also taught as SCED 6760/4760. (F,Sp)

ELED 6770 (dual listing 4770) ESOL Instructional Strategies in the Content Areas 3
Focuses on methods which help English language learners in content-area classrooms to increase academic learning and integration into the larger school community. Prerequisite: Admission into a teacher education program. Also taught as SCED 6770/4770. (F,Sp)

ELED 6780 (dual listing 4780) Assessment for Language Learners 3
Explores principles and techniques for developing, analyzing, and interpreting assessment measures for English language learners, including oral, writing, reading, and content-area assessment, as well as assessments used in public schools. Prerequisite: Admission into a teacher education program. Also taught as SCED 6780/4780. (F,Sp)

ELED 6800 Improvement of Social Studies Instruction 3
Emphasizes study of newer concepts in curriculum and methods of instruction for elementary social studies programs. Designed for experienced teachers. Prerequisite: ELED 4050 or teaching experience in elementary or middle school.

ELED 6840 Workshop: Intermountain Conference on Education of the Gifted and Talented 1-2®
Provides instruction by leading national authorities in gifted and talented education, as well as networking with educators of the gifted from throughout the Intermountain West. Also taught as SCED 6840. (Su)

ELED 6900 Independent Study 0.5-3®
(F,Sp,Su)

ELED 6910 Independent Research 0.5-3®
(F,Sp,Su)

ELED 6940 Supervision and Administration Internship 3
Provides experience in supervision and administration in school systems. (F,Sp,Su)

ELED 6960 Master's Creative Project 3®
Provides students with opportunity to design and carry out a creative project closely related to area of teaching specialty. Requires written report. (F,Sp,Su)

ELED 6970 Thesis 1-9®
Master's level research and thesis writing with guidance and criticism. (F,Sp,Su)

ELED 6990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

ELED 7020 (dual listing 6020) Foundations and Change in Early Childhood Education 3
Survey course designed to acquaint professionals with historical and philosophical foundations of early childhood education, leading to examination of contemporary trends and issues. (Sp)

ELED 7050 Internship in Program Evaluation 1-4®
Experience in practical aspects of program evaluation through planned, supervised evaluation project participation approved by student's supervisory committee. (F,Sp,Su)

ELED 7060 Internship in Research 1-4®
Experience in conducting research through planned, supervised research project participation approved by student's supervisory committee. (F,Sp,Su)

ELED 7120 Student Teaching Supervision 1-3®
Considers ways and means of providing desirable experiences for student teachers in the public schools. Analysis of roles of classroom teacher and college supervisor. (F,Sp)

ELED 7320 Literacy and Cognition 3
(dual listing 6320)
Examination of cognitive and sociocultural research related to K-12 students' acquisition and use of reading, writing, and learning strategies. Explores implications for school policies and classroom instruction. Also taught as SCED 7320/6320. (Sp)

ELED 7330 Supervision Internship 2-9®
Provides extensive supervisory experience for doctoral students. Internship is for period of time to be specified by department and cooperating agency. (F,Sp,Su)

ELED 7350 Internship in Curriculum Development 1-4®
Internship with recognized leaders in the development, implementation, and evaluation of curricular programs and activities at early childhood, elementary, and/or middle education levels. (F,Sp,Su)

ELED 7500 Interdisciplinary Workshop 1-2®
(F,Sp,Su)

ELED 7550 Evaluation of Supervisory Performance 1-4®
Program for graduate students to become acquainted with and demonstrate competency in supervision. (F,Sp,Su)

ELED 7810 Research Seminar 1-3®
Identification of research problems and critical issues, consideration of critical issues and research methods, and application of data analysis procedures under faculty direction. (F,Sp,Su)

ELED 7900 Independent Study 0.5-3®
(F,Sp,Su)

ELED 7910 Independent Research 0.5-3®
(F,Sp,Su)

ELED 7970 Dissertation 1-9®
Individual work on research problems in PhD or EdD program. Emhasizes writing and editorial techniques. (F,Sp,Su)

ELED 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
© This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.

English (ENGL)

See Department of English, page 278-292.

ENGL 0010 Writing Tutorial 3
Provides additional instruction for students whose score on the ACT is 16 or less, or who are advised into the course on the basis of writing diagnosis given the first day of class in ENGL 1010. (F,Sp,Su)

ENGL 1010 CL1 Introduction to Writing: Academic Prose 3
Students learn skills and strategies for becoming successful academic readers, writers, and speakers: how to read and write critically, generate and develop ideas, work through multiple drafts, collaborate with peers, present ideas orally, and use computers as writing tools. (F,Sp,Su)

ENGL 1020 Individualized Writing Instruction 1-3®
For students in Distance Education international programs who need further practice in specific areas of writing. (F,Sp,Su)

ENGL 1110 English Orientation 1
Introduction to English as a profession. Reviews career opportunities for English majors. (F,Sp)

ENGL 1120 Elements of Grammar 3©
Introduction to the study of the English sentence. Discussion of punctuation and usage to facilitate editing, as well as clarity and precision in writing. (F,Sp)

ENGL 1600 American Cultures in Film 3
Introduction to major ethnic groups in America and their treatment in recent feature films. Also taught as HIST 1600. (F)

ENGL 2010 CL2 Intermediate Writing: Research Writing in a Persuasive Mode 3
Writing of reasoned academic argument supported with appropriately documented sources. Focuses on library and Internet research, evaluating and citing sources, oral presentations based on research, and collaboration. Prerequisites: Completion of 30 credits, and one of: ENGL 1010 or AP score of 3 or ACT score of 29. (F,Sp,Su)

ENGL 2140 British Literary History: Anglo-Saxon to 18th Century 3©
Survey of British literature from the Anglo-Saxon period through the 18th century. (F,Sp)

ENGL 2150 British Literary History: Romanticism to Present 3
Survey of British literature from Romanticism to the present. (F,Sp)

ENGL 2160 American Literary History: Colonialism to 1865 3
Survey of American literature from the colonial period to 1865. (F,Sp)

ENGL 2170 American Literary History: 1865 to Present 3
Survey of American literary history from 1865 to the present. (F,Sp)

ENGL 2200 BHU Understanding Literature 3
(formerly ENGL 1030 BHU)
Introduction to fiction, drama, and poetry of different periods and cultures. (F,Sp)

ENGL 2210 BHU Introduction to Folklore 3
(formerly ENGL 1710 BHU)
Introduction to major genres of folklore (folk narrative, custom, folk music and song, vernacular architecture and arts), folk groups (regional, ethnic, occupational, familial), and basic folklore research method (collecting and archiving). Also taught as ANTH 2210 and HIST 2210. (F,Sp)

ENGL 2300 BHU Introduction to Shakespeare 3
(formerly ENGL 2030 BHU)
Introduction to comedies, histories, tragedies, and nondramatic poetry for nonmajors. (F)

ENGL 2600 Literary Analysis 3
(formerly ENGL 2100)
Writing-intensive course in literary analysis and research. Introduces English majors to techniques and problems of critical interpretation. (F,Sp)

ENGL 2630 BHU American Culture and the Environment 3
Introduces a broad selection of American literary, artistic, and cultural works that investigate the relationship between human culture and the environment, relying upon contemporary eco-critical theory and exploring roots in Western and world civilizations. (F,Sp)

ENGL 2720 Survey of American Folklore* 3
Principal ethnic, regional, and occupational folk groups in America. Relations between folklore and American history, literature, and society. Key genres in American folklore (narrative, art, song, etc.) and their role in American culture. Also taught as ANTH 2720 and HIST 2720. (F,Sp)

ENGL 3020 DHA Perspectives in Linguistics* 3
In-depth study of linguistics for nonmajors. Topics vary according to faculty expertise. (Sp)

Course Descriptions

ENGL 3030 DHA Perspectives in Literature 3
In-depth study of literature for nonmajors. Topics vary according to faculty expertise. (F,Sp,Su)

ENGL 3040 DHA Perspectives in Writing and Rhetoric 3**
In-depth study of rhetoric and writing for nonmajors. Topics vary according to faculty expertise. (F,Sp)

ENGL 3050 DHA Masterpieces of World Literature 3
In-depth study of masterpieces of world literature from the earliest times to the present. For nonmajors. (F,Sp)

ENGL 3060 DHA British and Commonwealth Cultures 3
In-depth study of literatures and cultures from the British Isles and the Commonwealth nations. Topics vary according to faculty expertise. Taught alternate years.

ENGL 3070 DHA Perspectives in Folklore 3®**
In-depth study of folklore for nonmajors. Topics vary according to faculty expertise. Also taught as HIST 3070. (F,Su)

ENGL 3080 CI Introduction to Technical Communication 3
Introduces students to a variety of technical documents and improves their written and oral communication skills. Available to nonmajors as a technical communication service course. Prerequisite: ENGL 2010. (F,Sp)

ENGL 3300 Period Studies in American Literature 3®
Exploration of single period or movement in literary history of the United States, or a comparative study of a topic during various periods. Periods and topics will vary. (F,Sp)

ENGL 3310 Period Studies in British Literature 3® ©
Exploration of single period or movement in British literary history, or a comparative study of a topic during various periods. Periods and topics will vary. (F,Sp)

ENGL 3320 Period Studies in World Literature 3®
Exploration of single period or movement in literary history outside the United States and Great Britain, or a comparative study of a topic during various periods. Periods and topics will vary. (F,Sp)

ENGL 3330 Literary Theory 3
Covers a range of different critical approaches to literature, helping students to analyze literature from a variety of theoretical perspectives and preparing them for upper-division English major coursework. (F,Sp)

ENGL 3400 CI Professional Writing 3
Introduces students to workplace writing as a profession, emphasizing transition from writing for academic audiences to writing for readers of workplace documents. Students learn to design and write professional documents for science, industry, business, and/or government. Enrollment limited to English majors *only*. (F,Sp)

ENGL 3410 Professional Writing Technology 3
Examines technologies of professional writing. Students examine digital environments (computers, LANs, WANs, and the Internet), as well as the software studied while progressing through the Professional and Technical Writing emphasis curriculum. Enrollment limited to English majors *only*. (F,Sp)

ENGL 3420 Fiction Writing 3
Covers basic elements of writing fiction: form, structure, plot, theme, characterization, dialogue, point of view, and imagery. (F)

ENGL 3430 Poetry Writing 3
Covers basic elements of writing poetry: language, detail, voice, tone, literal and figurative imagery, rhythm, open and closed form, structure, and theme. (F,Sp)

ENGL 3440 Creative Nonfiction Writing 3
Focuses on the essay as creative nonfiction, emphasizing persona, audience, purpose, tone, and style. Students study difference between fiction and nonfiction. Goal is to write publishable nonfiction. (F,Sp)

ENGL 3450 Reading Theory for Writers 3
Provides thorough understanding of reading from the perspective of writers. Students learn how readers process written texts, how reading assists writing, how readability is measured, and how online texts affect reading. (F,Sp)

ENGL 3460 Modern Rhetorical Theory 3
Teaches students to analyze rhetoric (the art of using language to influence other people) as it operates in a variety of texts. Students learn to define and understand rhetorical situations and to evaluate rhetorical strategies chosen by other writers. (F,Sp)

ENGL 3510 Young Adult Literature 3
Study of a variety of genres written specifically for adolescent audience. Intended for those interested in teaching secondary school English. (F,Sp)

ENGL 3520 Multicultural American Literature 3
Introduction to study of diverse literatures of the United States, including Native American, Asian American, Hispanic/Latino, and African American. (F,Sp)

ENGL 3530 Children's Literature* 3©
Study of aesthetic merit of poetry and prose available for children, ages 1-12. Intended for those interested in teaching or writing for children. (Sp)

ENGL 3620 Native American Studies* 3
Multidisciplinary introduction to study of Native Americans, emphasizing folklore, history, anthropology, literature, traditions, and contemporary issues such as the environment. (F,Sp)

ENGL 3700 CI Regional Folklore* 3
Study of folklore and folklife as they relate to regional cultures. Also taught as HIST 3700. (F,Sp)

ENGL 3710 CI Folklore Colloquium 3®
Issues, problems, and methodologies in folklore study. Focus and instructor variable. Also taught as HIST 3710. (Sp)

ENGL 4200 Linguistic Structures 3
Introduction to linguistic science: phonetics, phonology, morphology, and syntax, especially as relating to English. Exposure to other aspects of linguistic analysis, including language origins and linguistic diversity. (F,Sp,Su)

ENGL 4210 History of the English Language 3
Introduction to linguistic history of English, beginning with its Indo-European roots and continuing through Old English and Middle English to Modern English. Covers sociolinguistic aspects of English use, as well as strict grammatical history. (Sp)

ENGL 4220 Ethnic Literacy 3
Examines the diversity of literacy skills in American ethnic groups and explores appropriate teaching methods. Topics include effects of socio-economic status, child-rearing practices, first and second language acquisition, American dialects, etc. (F,Sp)

ENGL 4230 Language and Society 3**
Covers sciences of sociolinguistics and anthropological linguistics. Indroduces concepts dealing with relationship of language to society and culture, and interaction of language with society and culture. (F)

ENGL 4250 Playwriting 3
Study of dramatic theory and sample plays, combined with practice in writing short plays. Students must write a minimum of three plays. Prerequisite: THEA 1210. Also taught as THEA 4250. (F)

ENGL 4300 Shakespeare 3®
Selected works of William Shakespeare, with attention to biographical and cultural contexts. (F,Sp)

ENGL 4310 American Writers 3®**
Selected works of either a single author or a closely related group of authors based in the United States, with attention to biographical and cultural contexts. (F,Sp)

ENGL 4320 British Writers* 3®
Selected works of either a single author or a closely related group of authors based in Great Britain, with attention to biographical and cultural contexts. (F,Sp)

ENGL 4330 World Writers* 3®
Selected works of either a single author or a closely related group of authors based outside the United States, with attention to biographical and cultural contexts. (F)

ENGL 4340 Studies in Prose Fiction 3®**
Analysis of the genre of prose fiction, emphasizing nature and evolution of specific forms. (Sp)

ENGL 4350 Studies in Poetry* 3®
Analysis of the genre of poetry, emphasizing nature and evolution of specific forms. (F)

ENGL 4360 Studies in Drama/Film* 3®
Analysis of dramatic and cinematic genres, emphasizing nature and evolution of specific forms. (Sp)

ENGL 4370 Studies in Nonfiction Prose** 3®
Analysis of the genre of nonfiction prose, emphasizing nature and evolution of specific forms. (F)

ENGL 4400 CI Professional Editing 3
Editing of technical and scientific documents, working with deadlines, different levels of editing, editing marks, working with groups of editors and clients, and total document design, including graphics. Prerequisites: Admittance to program and completion of ENGL 3400 and 3410 with grades of *B*- or better. (F)

ENGL 4410 Document Design and Graphics 3
Explores elements of page layout, graphic design, type fonts, and design of documents to suit client's needs. Prerequisites: Admittance to program and completion of ENGL 3400 and 3410 with grades of *B*- or better. (F,Sp)

ENGL 4420 Advanced Fiction Writing 3®
Offers advanced study in art and skill of writing publishable fiction. Relies on workshop method. Prerequisite: ENGL 3420 or equivalent. (Sp)

ENGL 4430 Advanced Poetry Writing 3®
Provides course for undergraduate students desiring to write publishable poetry. Relies on workshop method. Prerequisite: ENGL 3430 or equivalent. (Sp)

ENGL 4440 Advanced Nonfiction Writing 3®
Offers advanced study in the art and skill of writing publishable literary or creative nonfiction. (Sp)

ENGL 4500 CI Teaching Writing 3
Prepares students to teach writing at secondary level. Teaches appropriate pedagogical techniques for teaching writing for a variety of purposes and contexts to diverse students. Techniques taught include designing effective writing assignments, responding constructively to student writing, assessing student writing, and incorporating technology into writing courses. (F,Sp)

ENGL 4510 CI Teaching Literature 3
Prepares students to teach literature through a variety of texts. Explores multiple pedagogical strategies for teaching diverse literary traditions to students of various backgrounds and developmental levels. (F,Sp)

ENGL 4610 Western American Literature** 3
Examines major themes and important writers (both "popular" and "literary") in western regional writing. Investigation of significance of environment, history, gender, and ethnicity in a variety of genres. Appropriate for American Studies majors and minors. (F,Sp)

ENGL 4620 CI Advanced Seminar in American Studies 3
Practical introduction to theories and methods of American Studies, utilizing interdisciplinary research around a central theme, subject, or text(s). Strongly recommended for American Studies majors and American Studies minors. Open to students who have taken three courses in literature and/or history. Also taught as HIST 4620. (F,Sp)

ENGL 4630 American Nature Writers* 3
Interdisciplinary study of historical, social, literary, and environmental contexts of nature writing. Examines key authors, major theories, enduring concerns (e.g., conservation, preservation, and management), and current issues (including gender and ethnicity). Appropriate for American Studies majors and minors. (F,Sp)

ENGL 4640 CI Studies in the American West 3
Interdisciplinary course in American Studies, exploring the region of the West through the analysis of literary texts, historical sources, and socio-cultural materials. Also taught as HIST 4640. (F,Sp)

ENGL 4700 Folk Material Culture** 3
Study of folk objects and their connections with culture and history. Also taught as HIST 4700. (Sp)

ENGL 4750 Advanced Folklore Workshop: Fife Conference 3®
Focuses on a theme or topic in folklore, and offers lectures from nationally prominent scholars in the area. Taught during one week, every day and all day. Also taught as HIST 4750. (Su)

ENGL 4900 Internship/Cooperative Work Experience 1-15®
Offers credit for professional experience obtained outside the classroom, prior to graduation. Requires statement of professional goals and summary report following the experience. Prerequisite: Departmental approval. (F,Sp,Su)

ENGL 4910 Tutoring Practicum 1®
Inservice training class for first-semester Writing Center staff members. Repeatable for up to 2 credits. (F,Sp)

ENGL 5210 Topics in Linguistics* 3®
Provides students with opportunity to study topics which are not regularly taught, but which are designed to enrich understanding of linguistics. Typical topics include Old English, roots of English in Germanic, discourse analysis, and English as a world language. (F)

ENGL 5300 CI Literature and Gender 3®
Exploration of cultural relations between literature and gender. Topics vary. (F,Sp)

ENGL 5320 CI Literature and Cultural Difference 3®
Exploration of relations between literature and cultural difference. Topics vary. (Sp)

ENGL 5340 CI Studies in Literary and Cultural Theory 3®
Applications in literary and cultural studies. Topics vary. (F)

ENGL 5350 CI Literary Studies Capstone 3
Communicative intensive capstone course in which students synthesize and assess their knowledge of the discipline. Should be taken during the senior year. Enrollment limited to English majors *only*. (Sp)

ENGL 5400 Specialized Documents 3®
Students in the Professional and Technical Writing emphasis prepare documents frequently encountered in business and government, including proposals, environmental impact statements, brochures, and newsletters. Prerequisites: Admittance to program and completion of ENGL 3400 and 3410 with grades of *B*- or better. (F,Sp)

ENGL 5410 Interactive Media 3®
Students in the Professional and Technical Writing emphasis examine process of publishing online documents, studying multimedia, hypermedia, and hypertext environments. Topics vary and include building complex CD-ROM environments, help file authoring, and designing websites. Prerequisites: Admittance to program and completion of ENGL 3400 and 3410 with grades of *B*- or better. (F,Sp)

ENGL 5420 Publications Production 3
Students in the Professional and Technical Writing emphasis examine process of publishing printed documents, beginning with idea and ending with hard copy, printed and bound. Prerequisites: Admittance to program and completion of ENGL 3400 and 3410 with grades of *B*- or better. (Sp)

ENGL 5430 CI Professional Writing Capstone 3
Capstone course for students in Professional and Technical Writing emphasis, in which students develop a professional portfolio of their own writing. Should be taken during the senior year. Prerequisites: Admittance to program and completion of ENGL 3400 and 3410 with grades of *B*- or better. (F,Sp)

ENGL 5450 Creative Writing Capstone 3
Students synthesize and assess their knowledge of literary writing, compose a portfolio of creative work in their chosen genre, and consider and assess their experience in the creative writing process. (Sp)

ENGL 5490 Usability Studies: Theory and Practice 3®
Study of current approaches to improving user experiences with technologies and their related texts through research-based changes to product design and documentation. Prerequisite: ENGL 3450 or 3460. (F,Sp)

Course Descriptions

ENGL 5550 English Teaching Capstone 3
Students synthesize and assess their knowledge of the field and their teaching, reading, and writing strengths; and evaluate the program through formal reflection on their own professional growth. Enrollment limited to English majors *only*. (Sp)

ENGL 5690 CI American Studies Capstone Seminar 3
Required for students majoring in American Studies. Enables students to synthesize American Studies theory and methods with interdisciplinary cognate courses. Supports senior thesis design and writing, allowing topics to reflect individual programs of study. Also taught as HIST 5690. (Sp)

ENGL 5700 Folk Narrative 3
Forms and functions of folk narrative genres: myth, legend, folktale, memorate, and ballad. Also taught as ANTH 5700 and HIST 5700. (Sp)

ENGL 5900 Senior Honors Seminar 1-3®
Capstone course for students enrolled in English Honors Program. Prerequisite: Enrollment in English Honors Program. (F,Sp,Su)

ENGL 5910 CI Senior Honors Thesis 1-6®
Students work in conjunction with English faculty member to write a thesis. Prerequisite: Enrollment in English Honors Program. (F,Sp,Su)

ENGL 5920 Directed Study 1-3®
Provides students with opportunity to work individually with faculty member. Contract for work to be completed must be signed by faculty member and student, then filed with English Department. (F,Sp,Su)

ENGL 6320 Literary Theory 3®
Introduces students to advanced literary theories and provides training in sophisticated critical methods. (F,Sp)

ENGL 6330 Topics in Literary Studies 3®
Allows in-depth study of specific literary topics and theoretical questions. (F,Sp)

ENGL 6340 British Literature and Culture 3®
Explores British literature and provides training in literary and cultural criticism. Promotes research and writing skills. (F,Sp)

ENGL 6350 American Literature and Culture 3®
Explores American literature and provides training in literary and cultural criticism. Promotes research and writing skills. (F,Sp)

ENGL 6360 World Literature and Culture 3®
Explores world literature and provides training in literary and cultural criticism. Promotes research and writing skills. (F,Sp)

ENGL 6400 Advanced Editing 3
(dual listing 7400)
Examines complex roles editors assume in creating technical and nontechnical documents. Principal components include working with substance of documents, mediating the writer-reader relationship, and exemplifying the application of rhetorical theory in editing. (F,Sp)

ENGL 6410 Theory and Research in
(dual listing 7410) Professional Communication 3
Introduction to contemporary theories of written discourse. Emphasizes the implications of these theories for research in professional communication. (F,Sp)

ENGL 6420 Usability Studies and Human Factors
(dual listing 7420) in Professional Communication 3®
Examines concepts and practices of usability studies and human factors in the design and production of print and online documents. Emphasizes developing objectives, criteria, and measures for conducting tests in the lab and field. (F,Sp)

ENGL 6430 Publications Management 3
(dual listing 7430)
Covers processes for developing and producing publications, including information development cycles, supervision, and budgets. (F,Sp)

ENGL 6440 Studies in Culture and
(dual listing 7440) Professional Communication 3®
Covers topics in rhetorical, critical, and cultural theory, emphasizing their application to contemporary practices in professional communication. (F,Sp)

ENGL 6450 Reading Theory and Document Design 3
(dual listing 7450)
Examines how reading theory interacts with rhetoric of graphics, layout, and type to influence the way documents are designed for maximum information and readability. (F,Sp)

ENGL 6460 Studies in Digital Media 3®
(dual listing 7460)
Focuses on the production of advanced digital media documents. Examination of theories underlying such publications, plus the related hardware and software. Topics vary. (F,Sp)

ENGL 6470 Studies in Specialized Documents 3®
(dual listing 7470)
Focuses on writing and design of specific genres in professional communication. Genres include environmental impact statements, software documentation, proposals, manuals, annual reports, newsletters, and fact sheets. Topics vary. (F,Sp)

ENGL 6480 Studies in Technology and Writing 3®
(dual listing 7480)
Study of theoretical aspects of technologies affecting writing in professional contexts. Course topics may include an examination of the history of computing, rhetorics of hypertext, or theories of communication in virtual space. Topics vary. (F,Sp)

ENGL 6490 Portfolio 3
Design and preparation of a portfolio containing at least five documents, each accompanied by a justification and discussion.

ENGL 6600 American Studies Theory and Method 3
Provides students with theory and method of graduate-level research in American Studies. Also taught as HIST 6600. (F)

ENGL 6610 Seminar on the American West 3-4®
Readings and research on topics in the American West. Interdisciplinary focus suitable for graduate students in History and American Studies. Also taught as HIST 6610. (F)

ENGL 6620 Seminar in Native American Studies 3-4®
Readings and research on topics in Native American history and culture. Interdisciplinary focus suitable for graduate students in History and American Studies. Also taught as HIST 6620. (F)

ENGL 6630 Studies in Film and Popular Culture 3®
Offered annually on a rotating basis by professors in folklore and English (Cultural Studies, Literature, British and Commonwealth). Topics and theoretical approaches vary, but the primary focus is on feature films. Also taught as HIST 6630. (Sp)

ENGL 6700 Folklore Theory and Method 3
Serves as orientation for new graduate students in folklore. Introduces students to comparative annotation, folklore indices, oral-formulaic theory, performance theory, contextual analysis, and other approaches. Also taught as HIST 6700. (F)

ENGL 6710 Regional Folklore 3
Study of folklore and folklife as a regionalizing process. Regions examined through their folk culture range. Also taught as HIST 6710. (Sp)

ENGL 6720 Folklore Fieldwork 3
Basic methodology class for folklorists and oral historians. Students learn interviewing techniques and other methods for observing and recording the performance of tradition and traditional history. Also taught as HIST 6720. (Sp)

ENGL 6730 Public Folklore 3
Provides history and analysis of governmental involvement in protecting, promoting, and otherwise manipulating and utilizing cultural heritage. Also taught as HIST 6730. (F)

ENGL 6740 Folk Narrative 3
Covers principal narrative genres in folk tradition (myth, tale, legend, ballad) and the basic theories for their analysis and discussion. Also taught as HIST 6740. (Sp)

ENGL 6750 Advanced Folklore Workshop (the Fife Conference) 3
Intensive workshop focusing on a topic in folklore. Brings in nationally known experts as lecturers and discussants. Students attend all sessions, then write a critical paper during the summer semester. Also taught as HIST 6750. (Su)

ENGL 6760 Cultural and Historical Museums 3
Examines outdoor cultural and historical museums, examining their function in modern multi-cultural societies. Also taught as HIST 6760. (Sp)

ENGL 6770 Seminar in Folklore and Folklife 3®
Conducts close, professional-level study of major areas of folklore and folklife research. Also taught as HIST 6770. (F)

ENGL 6800 Theory and Practice of Online
(dual listing 7800) Education in Writing 3®
Examination of principles and their implementation in online writing instruction. Emphasis placed on writing instruction within English departments. (Sp)

ENGL 6810 Introduction to Composition Studies 3
Introduces students to scholarship in the field of composition studies. Students become acquainted with scholars, forums, themes, and methods of the field. (F,Sp)

ENGL 6820 Practicum in Teaching English 3
Introduction to teaching writing, designed specifically for graduate instructors teaching in the English Department writing program. Focuses on theory and practice of teaching writing, specifically ENGL 1010, but also prepares graduate instructors for further teaching responsibilities. Not offered online. (F)

ENGL 6830 Rhetorical Theory 3
(dual listing 7830)
Covers intellectual traditions of rhetoric from classical times to the present. As students study major theories, theoreticians, and controversies in the field, they come to understand rhetoric as the study of relations between discourse, knowledge, and power. (F,Sp)

ENGL 6850 Advanced Studies in the Teaching of English 3®
Provides a critical approach to English pedagogy. Prepares students to teach English classes such as literature, composition, and creative writing. (F,Sp)

ENGL 6860 Teaching Technical Writing 3
(dual listing 7860)
Prepares students to teach general purpose technical writing courses at the undergraduate level. Students read and discuss articles on technical writing and practice writing a series of technical documents. (F,Sp)

ENGL 6880 Topics in Creative Writing 3®
Course changes topics as follows: poetry, fiction, and nonfiction. In each topic, students learn to write at an advanced level and learn to evaluate creative writing using workshop and peer group methods. Prerequisite: Permission of instructor. Enrollment limited to graduate students *only*.

ENGL 6890 Studies in Writing and Rhetoric 3®
(dual listing 7890)
Allows in-depth study of specific rhetorical topics and theoretical questions. (F,Sp)

ENGL 6900 Graduate Internship 1-15®
Format and credit limit vary for different programs in the department. See program advisor for details and approval to enroll in this course. (F,Sp,Su)

ENGL 6920 Directed Study 1-6®
(F,Sp,Su)

ENGL 6970 Thesis 1-6®
(F,Sp,Su)

ENGL 6990 Continuing Graduate Registration 1-6®
(F,Sp,Su)

ENGL 7000 Advanced Research Methods in Professional Communication 3
Survey of major research methods (qualitative and quantitative) for conducting professional communication research in academic and nonacademic settings. Coursework will culminate in a formal proposal to conduct a discipline-appropriate study in the workplace. (Sp)

ENGL 7400 Advanced Editing 3
(dual listing 6400)
Examines complex roles editors assume in creating technical and nontechnical documents. Principal components include working with substance of documents, mediating the writer-reader relationship, and exemplifying the application of rhetorical theory in editing. (F,Sp)

ENGL 7410 Theory and Research in
(dual listing 6410) Professional Communication 3
Introduction to contemporary theories of written discourse. Emphasizes the implications of these theories for research in professional communication. (F,Sp)

ENGL 7420 Usability Studies and Human Factors
(dual listing 6420) in Professional Communication 3®
Examines concepts and practices of usability studies and human factors in the design and production of print and online documents. Emphasizes developing objectives, criteria, and measures for conducting tests in the lab and field. (F,Sp)

ENGL 7430 Publications Management 3
(dual listing 6430)
Covers processes for developing and producing publications, including information development cycles, supervision, and budgets. (F,Sp)

ENGL 7440 Studies in Culture and
(dual listing 6440) Professional Communication 3®
Covers topics in rhetorical, critical, and cultural theory, emphasizing their application to contemporary practices in professional communication. (F,Sp)

ENGL 7450 Reading Theory and Document Design 3
(dual listing 6450)
Examines how reading theory interacts with rhetoric of graphics, layout, and type to influence the way documents are designed for maximum information and readability. (F,Sp)

ENGL 7460 Studies in Digital Media 3®
(dual listing 6460)
Focuses on the production of advanced digital media documents. Examination of theories underlying such publications, plus the related hardware and software. Topics vary. (F,Sp)

ENGL 7470 Studies in Specialized Documents 3®
(dual listing 6470)
Focuses on writing and design of specific genres in professional communication. Genres include environmental impact statements, software documentation, proposals, manuals, annual reports, newsletters, and fact sheets. Topics vary. (F,Sp)

ENGL 7480 Studies in Technology and Writing 3®
(dual listing 6480)
Study of theoretical aspects of technologies affecting writing in professional contexts. Course topics may include an examination of the history of computing, rhetorics of hypertext, or theories of communication in virtual space. Topics vary. (F,Sp)

ENGL 7800 Theory and Practice of Online
(dual listing 6800) Education in Writing 3®
Examination of principles and their implementation in online writing instruction. Emphasis placed on writing instruction within English departments. (Sp)

ENGL 7860 Teaching Technical Writing 3
(dual listing 6860)
Prepares students to teach general purpose technical writing courses at the undergraduate level. Students read and discuss articles on technical writing and practice writing a series of technical documents. (F,Sp)

ENGL 7890 Studies in Writing and Rhetoric 3®
(dual listing 6890)
Allows in-depth study of specific rhetorical topics and theoretical questions. (F,Sp)

ENGL 7900 Research Internship 6
Application of workplace field research and methods in an actual workplace setting. Prerequisite: ENGL 7000. (F)

ENGL 7970 Dissertation Research 1-12®
(F,Sp,Su)

ENGL 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.

Engineering (ENGR)

See College of Engineering, pages 118-122.

ENGR 1000 Introduction to Engineering Design 2
(formerly ENGR 1010)
Introduction to engineering design, problem solving, and computer application skills. Orients students to college programs, academic advising, student services, professional societies, ethics, and engineering careers. A background in trigonometry is strongly recommended. (F)

ENGR 1940 Women in Engineering Seminar 1
Designed for incoming female freshman engineering students. Speakers selected from practice share their knowledge and experience about the many career options available in engineering. Discussions center on ways in which women balance their professional and personal lives. Provides information and strategies for the academic and interpersonal skills needed for women to succeed in engineering. (F)

ENGR 2010 Engineering Mechanics Statics 2
(formerly ENGR 2000)
Force and position vectors; equilibrium of particles; rigid bodies; equivalent system of forces; equilibrium; free body diagrams; static analysis of trusses, frames, and machines; centroids and centers of gravity; friction; and moments of inertia. Prerequisites: MATH 1210, 1220. (F,Sp)

ENGR 2030 Engineering Mechanics Dynamics 3
(formerly ENGR 2020)
Equations of motion, kinetics of particles, kinetics of rigid bodies, work and energy, impulse and momentum, three-dimensional kinematics, and vibrations. Prerequisites: ENGR 2010, MATH 1210, 1220. (F,Sp)

ENGR 2140 Strength of Materials 2
(formerly ENGR 2040)
Stress, strain, and deflection due to axial loads; moment and torsion; shear and moment diagrams; and equations of equilibrium and compatibility. Prerequisite: ENGR 2010. (F,Sp)

ENGR 2200 Engineering Numerical Methods I 3
Introduction to use of digital computers and elementary numerical analysis, with emphasis on practical applications and software development. Prerequisite: MATH 1220. Prerequisite or corequisite: MATH 2250. (F)

ENGR 2450 Engineering Numerical Methods II 2
(formerly ENGR 2210)
Numerical solution techniques for solving ordinary and partial differential equations, emphasizing practical applications and software development. Prerequisite: ENGR 2200. (Sp)

ENGR 2930 Special Problems 1-18
Independent or group student study of engineering problems not covered in regular course offerings. (F,Sp,Su)

ENGR 5500 High Performance Computing for Engineers 3
Introduction to high performance computing on Beowulf clusters with distributed memory paradigm. Hands-on design and profiling of algorithms and software to solve large scale problems in engineering. Topics in scientific visualization. Prerequisites: MAE 2210 or CS 1410. (F)

Environment and Society (ENVS)

See Department of Environment and Society, pages 293-302.

ENVS 1990 Professional Orientation for Environment and Society 2
Introduces new students to university scholarship and citizenship, careers in environmental and natural resources science and management, development of leadership and team skills, and analysis of issues relating to the diverse relationships between society and the natural environment. (F)

ENVS 2250 Introductory Internship/Co-op 1-3®
Introductory-level educational experience in internship/cooperative education position approved by department. Prerequisite: Permission of department. (F,Sp,Su)

ENVS 2340 BSS Natural Resources and Society 3
Examines human values, uses, and management of natural settings at the individual, community, and societal levels. Topics include: psychological responses to nature, history of U.S. park and natural resource management, environmental sociology and politics, and nature in non-Western cultures. (F,Sp)

ENVS 3000 Natural Resources Policy and Economics 4
Introduction to natural resource policy and economics. Policy components include models, processes, participants, laws, and tools for decision-making and policy implementation. Economics components include theory, interest calculations, financial analysis, nonmarket valuation, and regional impact analysis. (F)

ENVS 3300 Fundamentals of Recreation Resources Management 3
Principles of wildland recreation management including: characteristics of recreation use and users, introduction to planning concepts, management of wildland recreation facilities and infrastructure, and integration with other natural resource uses. (F)

ENVS 3330 Environment and Society 3
Emphasizes how human actions modify the physical environment and how physical systems affect human systems and the changes occurring in the meaning, use, and importance of resources at a global and regional scale. (Sp)

ENVS 3500 QI Quantitative Assessment of Environmental and Natural Resource Problems 3
Overview of analytical and sampling methods used for collecting, organizing, and interpreting numeric data to evaluate problems and monitor conditions relating to relationships between environment and society. Prerequisites: STAT 2000 or 3000; MATH 1050; and passing score on the Computer and Information Literacy (CIL) Exam. (F)

ENVS 3600 DSC Living With Wildlife 3
Reviews history and development of wildlife management programs in the United States. Explores diversity of attitudes toward wildlife, which affect development and evolution of wildlife management programs. Development and analysis of case histories of contemporary and controversial wildlife management decisions. (Sp)

ENVS 4000 DSS Human Dimensions of Natural Resource Management 3
Focuses on balancing science and social values in ecosystem management and decision-making. Topics include environmental justice, communication and behavior change strategies, landscape perception and attitudes, resource-dependent communities, public involvement, and conflict management. (F)

ENVS 4110 Fisheries and Wildlife Policy
(dual listing 6110) and Administration* 3
Examination of policy issues and administrative approaches in fish and wildlife management, with particular emphasis on nonbiological issues facing wildlife managers and administrators. (F)

ENVS 4130 Recreation Policy and Planning 3
Examines the historical, legal, and political context of outdoor recreation policy on public lands; government agency culture, regulation, and partnering; relationship of outdoor recreation to tourism; and theory and application of principal planning tools for outdoor recreation settings. (Sp)

ENVS 4250 Advanced Internship/Co-op 1-9®
Directed and evaluated cooperative education or work experience for undergraduates in public and private organizations. Prerequisite: Permission of department. (F,Sp,Su)

ENVS 4400 Economic Applications in Natural Resource Management 4
Applied economics course exposing students to tools used in natural resource decision-making. Includes principles and techniques of nonmarket valuation, linear programming, budgeting, benefit-cost analysis, and regional economic analysis as encountered by natural resource managers. Prerequisites: ENVS 3000, MATH 1050 or higher, and passing score on Computer and Information Literacy (CIL) exam. (Sp)

ENVS 4440 Stegner Center Annual Symposium 1®
(dual listing 6440)
Offered through the University of Utah College of Law. Topics vary each year, but always focus on natural resource policy-related issues. (Sp)

ENVS 4500 CI Wildland Recreation Behavior 3
Social, psychological, and geographic influences on human behaviors in wildland recreation settings. Emphasis on critical problems affecting public land recreation management. (F)

ENVS 4600 Natural Resource Interpretation 3
Planning processes and techniques for providing interpretive programs developed for wildland recreation areas and visitor centers. Evaluation and planning of visitor information efforts. (F)

ENVS 4920 Special Projects in Recreation Management 1-3®
Participation in special projects to assist public recreation agencies or nonprofit organizations, while gaining hands-on experience in recreation management, planning, and monitoring. Many experiences entail intensive, short-duration efforts away from campus. Prerequisite: Permission of department. (F,Sp,Su)

ENVS 4950 Special Topics 1-3®
Individual study and research upon selected environmental and societal problems. Prerequisite: Permission of department. (F,Sp,Su)

ENVS 4960 Directed Readings 1-3®
Individual reading research on selected environmental and societal readings. Prerequisite: Permission of department. (F,Sp,Su)

ENVS 4970 Undergraduate Research 1-3®
Individual or team research. Prerequisite: Permission of department. (F,Sp,Su)

ENVS 4980 Undergraduate Seminar 1
Intended to bring upperclassmen up-to-date on environmental and societal topics. (Sp)

ENVS 4990 Environmental and Natural Resource Professionalism Seminar 2
Introduces concepts of professionalism in natural resources, including ethical issues in science and management, organizational culture, and workplace expectations. Analyzes current issues with practicing professionals. Reinforces leadership and team-building skills. Prerequisites: ENVS 1990, 3000. (F)

ENVS 5000 Collaborative Problem-Solving for Environment and Natural Resources 3
Project-based capstone course for environmental studies majors. Students work in teams to develop plans and alternative solutions relevant to actual issues or land areas, integrating knowledge from a range of environmental and natural resource disciplines. Prerequisites: Senior standing; ENVS 3000, 4000. (Sp)

ENVS 5110 Environmental Education 3
Covers teaching about the environment, and using the environment and the natural world to teach other subjects, with a strong emphasis on participation and on practicing teaching techniques. (Sp)

ENVS 5300 Natural Resources Law and Policy* 2
Legal and administrative regulation of forests and associated resources (water, air, fish, wildlife, and scenery). Emphasis on agency organizational culture, federal legislation, court cases, administrative procedures, and federal natural resources agencies' interactions with tribal, state, and local governments. (Sp)

ENVS 5320 Water Law and Policy in the United States 3
Introduction to policies, laws, institutions, and practices guiding western water allocation, emphasizing how to efficiently and equitably allocate increasingly scarce supplies. Explores reserved water rights, water markets, stream adjudication, public trust doctrine, basinwide management, and riparian management. (Sp)

ENVS 5550 Sustainable Development* 3
(dual listing 6550)
Examines the challenges and opportunities humanity faces in sustainably managing human resources. Provides a global perspective on the status of both renewable and nonrenewable resources, as well as the impact of globalization and policies designed to meet long-term human needs. (Sp)

ENVS 5570 Sustainable Living 3
Theories and techniques for decision-making about environmental impacts of consumer decision-making, and about alternatives for a sustainable future. Incorporates meanings of sustainable living, relationships between lifestyle choices and the environment, and feasible steps toward ecological sustainability. (Sp)

ENVS 5640 Conflict Management in
(dual listing 6640) Natural Resources 3
Introduction to conflict management techniques for those involved in natural resource management. Also taught as SOC 5640/6640. (Sp)

ENVS 5800 Field Studies in Collaborative Natural Resource Stewardship 3
Two-week field course introduces students to methods and philosophical approaches incorporated in Tehabi, a summer-long internship program focusing on collaborative stewardship of natural resources. Enrollment limited to students accepted into the Tehabi program. (Su)

ENVS 5810 Internship in Collaborative Natural Resource Stewardship 3
Mentored internship involving participation in the Tehabi program, which teaches collaborative stewardship of natural resources within a federal, state, or nonprofit agency. Enrollment limited to students accepted into the Tehabi program. (Su)

ENVS 6000 Theoretical Foundations in
(dual listing 7000) Human Dimensions of Ecosystem Science and Management 3
Overview of interdisciplinary theories and frameworks concerning how human societies affect, and are affected by, ecosystem processes at local, regional, and global scales. Focuses on systems theory, social and environmental sustainability, and scientific integration for ecosystem planning, policy, and management. (F)

ENVS 6110 Fisheries and Wildlife
(dual listing 4110) Policy and Administration* 3
Examination of policy issues and administrative approaches in fish and wildlife management, with particular emphasis on nonbiological issues facing wildlife managers and administrators. (F)

ENVS 6130 Policy Aspects of Wildland Recreation 3
Political, legal, and economic bases for wildland recreation management. Relationship between outdoor recreation and tourism. Lectures concurrent with ENVS 4130. Also includes weekly discussion session focusing on relevant scientific research and policy analyses. (Sp)

ENVS 6200 Bioregional Analysis and Planning 5
Compilation and analysis of data for assessing biophysical and socio-economic features of landscapes, and for evaluating impacts of land-use policies across both landscapes and time. Provides real-world learning experience in working with stakeholders and agency decision-makers. (F)

Course Descriptions

ENVS 6210 Bioregional Management and Policy 5
Continuation of ENVS 6200. Assessment of land-use policies across landscapes and time, with an emphasis on evaluating consequences of community growth via the generation and analysis of future development and management alternatives. Prerequisite: ENVS 6200. (Sp)

ENVS 6240 Graduate Internship/Co-op 1-9®
Graduate-level educational experience in internship/cooperative education position approved by department. (F,Sp,Su)

ENVS 6300 Social and Environmental
(dual listing 7300) Psychology of Natural Resources 3**
Examines how people respond as individuals to nature and environmental phenomena, drawing on theory and research from social psychology, environmental psychology, and behavior analysis. Emphasizes applications to knowledge, attitude, and behavior change strategies for improving environmental sustainability. (Sp)

ENVS 6400 Ecological Aspects of
Wildland Recreation* 3
Assessment of current knowledge and knowledge gaps concerning impacts of wildland recreation on wildlife, plants, soil and water resources, and processes. Strategies for coexistence of recreation visitors and nonhuman ecosystem elements. (Sp)

ENVS 6440 Stegner Center Annual Symposium 1®
(dual listing 4440)
Offered through the University of Utah College of Law. Topics vary each year, but always focus on natural resource policy-related issues. (Sp)

ENVS 6500 Behavioral Aspects of Wildland Recreation 3
Social and psychological analysis of visitor behavior in outdoor recreation settings. Sources of recreation management problems and practical and theoretical basis for management practices. Lectures concurrent with ENVS 4500. Separate discussion sessions focus on research concerning recreation behavior. (F)

ENVS 6530 Natural Resources Administration 2**
Organizational structures and processes common in natural resources administration on federal and state levels, and how they impact career development and land management. (Sp)

ENVS 6550 Sustainable Development* 3
(dual listing 5550)
Examines the challenges and opportunities humanity faces in sustainably managing human resources. Provides a global perspective on the status of both renewable and nonrenewable resources, as well as the impact of globalization and policies designed to meet long-term human needs. (Sp)

ENVS 6600 Advanced Natural Resource
Interpretation 3
Planning processes, techniques, and evaluation procedures for using information and education to influence human behavior and increase benefits to visitors in natural settings. Leadership of teams involved in producing interpretive plans and materials. (F)

ENVS 6640 Conflict Management in
(dual listing 5640) Natural Resources 3
Introduction to conflict management techniques for those involved in natural resource management. Also taught as SOC 6640/5640. (Sp)

ENVS 6700 Research Approaches in Human Dimensions
(dual listing 7700) of Ecosystem Science and Management 3
Experience conceptualizing and prioritizing research problems involving human societies and ecosystems. Reviews approaches for creating and testing interdisciplinary hypotheses pertaining to human-ecosystem interactions. Explores methods for integrating social and biophysical data. (Sp)

ENVS 6800 Environment and Society
(dual listing 7800) Departmental Seminar 1®
(F,Sp)

ENVS 6810 Research Techniques in Human Dimensions
(dual listing 7810) of Ecosystem Science and Management* 3
Experience using various quantitative and qualitative techniques and tools to collect and analyze data in research projects focused on human-ecosystem interactions. Topics range from survey sampling to use of simulation models and spatial statistics involving Geographic Information Systems (GIS). (Sp)

ENVS 6840 Graduate Introductory Seminar for
(dual listing 7840) Environment and Society 1
Each faculty member meets with first-year graduate students in a seminar format to review and discuss in depth the faculty member's area of academic specialization. (F)

ENVS 6870 Ecology Seminar 1®
The Ecology Center schedules regular seminars throughout the school year with ecological scientists from other institutions participating. Ecology majors are required to attend a minimum of 10 such lectures. Students should register for fall semester, but attend through spring semester. Also taught as AWER 6870, BIOL 6870, and FRWS 6870. (F)

ENVS 6900 Graduate Special Topics 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

ENVS 6910 Directed Study 1-6®
(F,Sp,Su)

ENVS 6960 Graduate General Ecology 5
General concepts, history, and issues in all major areas of the science of ecology including: environmental biophysics; and physiological, behavioral, evolutionary, community, ecosystem, and applied ecology in both terrestrial and aquatic enviroments. Also taught as AWER 6960, BIOL 6960, and FRWS 6960. (F)

ENVS 6970 Thesis Research 1-12®
(F,Sp,Su)

ENVS 6990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

ENVS 7000 Theoretical Foundations in
(dual listing 6000) Human Dimensions of Ecosystem
Science and Management 3
Overview of interdisciplinary theories and frameworks concerning how human societies affect, and are affected by, ecosystem processes at local, regional, and global scales. Focuses on systems theory, social and environmental sustainability, and scientific integration for ecosystem planning, policy, and management. (F)

ENVS 7300 Social and Environmental
(dual listing 6300) Psychology of Natural Resources 3**
Examines how people respond as individuals to nature and environmental phenomena, drawing on theory and research from social psychology, environmental psychology, and behavior analysis. Emphasizes applications to knowledge, attitude, and behavior change strategies for improving environmental sustainability. (Sp)

ENVS 7700 Research Approaches in Human Dimensions
(dual listing 6700) of Ecosystem Science and Management 3
Experience conceptualizing and prioritizing research problems involving human societies and ecosystems. Reviews approaches for creating and testing interdisciplinary hypotheses pertaining to human-ecosystem interactions. Explores methods for integrating social and biophysical data. (Sp)

ENVS 7800 Environment and Society
(dual listing 6800) Departmental Seminar 1®
(F,Sp)

ENVS 7810 Research Techniques in Human Dimensions
(dual listing 6810) of Ecosystem Science and Management 3**
Experience using various quantitative and qualitative techniques and tools to collect and analyze data in research projects focused on human-ecosystem interactions. Topics range from survey sampling to use of simulation models and spatial statistics involving Geographic Information Systems (GIS). (F)

ENVS 7840 (dual listing 6840) Graduate Introductory Seminar for Environment and Society 1
Each faculty member meets with first-year graduate students in a seminar format to review and discuss in depth the faculty member's area of academic specialization. (F)

ENVS 7900 Graduate Special Topics 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

ENVS 7910 Directed Study 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

ENVS 7970 Dissertation Research 1-12®
(F,Sp,Su)

ENVS 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008

Engineering and Technology Education (ETE)

See Department of Engineering and Technology Education, pages 273-277.

ETE 1000 Orientation to Engineering and Technology Education 1
Introduction to the technology education teaching profession, including programs, facilities, goals, and opportunities. (F)

ETE 1010 Communications Technology 3
Introduction to tools, materials, equipment, and processes used to transmit and receive messages. Major emphasis on hardware, software, communications, and the digital age. (F)

ETE 1020 Energy, Power, Transportation Systems Control Technology 3
Exploration of the concepts and processes relating to the control and automation (both hard and programmable) of technical systems in the areas of energy and power, transportation, and agricultural and related biotechnologies. (Sp)

ETE 1030 Material Processing Systems 3
Introduction to properties of industrial materials (metallic, polymeric, ceramic, and composite), processes used to produce standard stock and finished products, and the use of precision measuring instruments in manufacturing. (F,Sp)

ETE 1040 Construction and Estimating 3
Overview of construction industry and its practices. Reviews four major parts of construction industry, including: (1) Inputs: materials; (2) Process: design and building of structures; (3) Outputs: sites, buildings, etc.; and (4) Feedback: effects of building systems. Provides prospective technology education teachers with opportunity to study and perform activities related to the field of construction and estimating. At completion of course, students should be able to demonstrate knowledge and skills required to implement a construction technology program. (Sp)

ETE 1200 Computer-Aided Drafting and Design 3
Provides students with ability to accurately produce basic engineering, 2-D, and pictorial drawings using traditional and computer-aided drafting techniques. Introduction to drafting fundamentals and equipment associated with the drafting industry, including drawings, reproductions, and computer-aided techniques. (F,Sp)

ETE 1640 Introduction to Welding 3
Theory of Oxy-Acetylene Welding, Shielded-Metal Arc Welding, and Gas Metal Arc Welding. (F)

ETE 2030 Wood-Based Manufacturing Systems 3
Focuses on the instructional strategy of establishing a manufacturing enterprise utilizing woodworking equipment and techniques. Topics include management; finance and marketing strategies; and the design of product, tooling, and production systems. Prerequisite: ETE 1030. (F)

ETE 2240 Analog Devices and Circuits 3
Study of differential amplifiers; operational amplifiers; regulators; and generator instrumentation amplifier, multiplier, and active filters. Prerequisites: ETE 2310; ETE 2400 (must be taken concurrently). (F)

ETE 2270 Computer Engineering Drafting 2
Provides students with ability to accurately produce computer-aided drafting software. Since there are no drafting prerequisites for this course, drafting fundamentals are also introduced. (F,Sp,Su)

ETE 2300 QI Electronic Fundamentals 4
Study and application of DC and AC concepts, semiconductors, digital electronics, and microcomputers. Prerequisite: MATH 1050. (F,Su)

ETE 2310 AC/DC Circuits 2
Study of AC/DC principles beyond those taught in ETE 2300. Includes network theorems, capacitance, inductance, impedance, reactance, resonance, and transformers. Prerequisite: ETE 2300. (Sp)

ETE 2320 Electronic Drafting 2
Study of electronic drafting practices. Students exposed to various areas of electronic drafting and fabrication. Prerequisite: ETE 2300. (F)

ETE 2360 Digital Circuits 3
Logic circuits, combinational and repeated circuits, counters, shifts registers, state tables, PLD's, and digital computer simulations. Prerequisite: ETE 2300 or equivalent. (Sp)

ETE 2370 Computer and Microprocessor Programming 3
Introduction to microprocessors and computers. Study of machine language programming, assemblies and cross assemblies, emulators, and input and output devices. Prerequisite: ETE 2300. (Sp)

ETE 2400 Active Devices and Circuits 3
Study of diodes; transistor principles, including semiconductor theory, bipolar, and field effect device characteristics; and modern thyristor devices. Prerequisite: ETE 2310. (F)

ETE 2660 Principles of Engineering Education 3
Prepares students to teach pre-engineering in the high school environment. Topics include the engineering design process and reliability, engineering systems, statics and dynamics, and materials. Prerequisites: MATH 1060 (or equivalent), ETE 1200 (or equivalent). (Sp)

ETE 2850 Statics and Strength of Materials 3
Engineering technology course covering resultants and equilibrium of force systems; moments of inertia; method of work; stress, strain, and deflection due to tension, compression, and torsion; and Mohr's circle for stress and strain. Prerequisites: MATH 1050, 1060. (F)

ETE 3030 Computer-Integrated Manufacturing Systems 3
Introduction to principles, operations, and applications of computer-controlled manufacturing systems, including: CNC, CAD/CAM, robotics, programmable logic controllers, bar code readers, etc. Prerequisite: ETE 1030. (Sp)

ETE 3040 Engineering Systems 3
Prepares students to teach engineering at the secondary level. Includes basic overview of math concepts needed to successfully teach engineering, problem solving, teamwork, design, technical communication, and engineering fundamentals. Through use of open-ended problem solving methodologies, students receive hands-on experience while teaching concepts of statics, dynamics, thermodynamics, electrical circuits, and engineering economics. (F,Sp)

ETE 3050 Computer Systems and Networking 3
Introduction to modern graphic and electronic communication systems. Emphasizes design, development, production, and dissemination of both electronic and graphic messages. Covers major concepts, including desktop publishing, and audio and video production techniques. (Sp)

Course Descriptions

ETE 3070 K-8 Engineering and Technology Education 3
Introduction to technology education and to science, technology, and society (STS) curricula for elementary schools, emphasizing teaching, developing, and managing technology-based activities. (F)

ETE 3200 Methods of Teaching Engineering and Technology Education I 3
Classroom laboratory practicum for design, practice, and performance of technology education demonstrations and lab activities. Prerequisites: ETE 1000; ETE 3300 (must be taken concurrently). (F)

ETE 3220 Architecture and Construction Systems 3
Basics of architectural computer-aided drafting. Includes introduction to principles of construction. Explores residential and commercial systems, emphasizing construction codes. Prerequisites: ETE 1200, MATH 1010. (F)

ETE 3230 Machine and Production Drafting 3
Teaches students to accurately produce both design drawings and working drawings. Explores techniques, symbols, and conventions used to represent gears, cams, jigs, and fixtures. Also includes advanced techniques of production drawing, emphasizing Geometric Dimensioning and Tolerancing. Prerequisites: ETE 1200, MATH 1050, or equivalent. (F)

ETE 3240 Technical Illustration 3
In-depth study of technical illustration. Includes preparation of pictorial drawings with rendering added. Explores industrial and architectural environments. Introduces rendering and animation software, emphasizing three-dimensional modeling. Prerequisite: ETE 1200. (Sp)

ETE 3270 Advanced Computer-Aided Drafting 3
Designed to enhance CADD productivity, encourage customization, and introduce students to advanced CADD techniques, including programming and introduction to parametric design. Prerequisite: ETE 1200. (Sp)

ETE 3300 Clinical Experience I 1
Field-based experiences in secondary schools. Students complete 30 hours of tutoring students and assist teachers with managerial, clerical, and other professional tasks. Prerequisites: ETE 1000; ETE 3200 (must be taken concurrently). (F)

ETE 3380 Microprocessor and Computer Interfacing 3
Microcomputer interface applications, including digital system interface, serial and parallel interfacing, and D/A and A/D converters. Prerequisites: ETE 2240, 2370. (Sp)

ETE 3390 Microcontrollers 3
Study of microcontrollers and applications. Includes programming and building circuits. Prerequisite: ETE 3380. (F)

ETE 3400 Communication Circuits 3
Introduction to radio frequency communication circuits. Includes oscillators, modulation, transmitters, receivers, transmission lines, antennas, RF propagation, digital signal processing, GPS, and spread spectrum. Prerequisites: ETE 2300 and 2400. (Sp)

ETE 3440 DSC Science, Technology, and Modern Society 3
Designed to challenge students from all academic majors to develop an understanding of the dynamic interaction between science, technology, and society. Explores responsibility of humans for directing the utilization of technology as a creative enterprise. Also taught as ASTE 3440. (F,Sp)

ETE 3510 Introduction to Networking 3
Study of hardware and software required to build, install, maintain, and support a local area network. Emphasizes laboratory applications. Prerequisite: BIS 5400 (may be taken concurrently). (F)

ETE 3710 Electronics/Computer Design I 1
Students select and plan a senior project. Requires written proposal, including technical description of the project and management plans. Prerequisite: ETE 2320 (may be taken concurrently). (F)

ETE 3740 Facility and Equipment Maintenance 3
Systems approach to facility, equipment, and tool maintenance, including principles of woodworking, machine construction, adjustment, and sharpening.

ETE 3900 Principles and Objectives of Career and Technical Education 3
Comprehensive study of philosophy and purposes of career and technical education programs and their place in the total program of modern education.

ETE 3930 Evaluation of Career and Technical Education 2
Factors for evaluation of attitudes, skills, work habits, technical information, and instrument construction.

ETE 4300 Clinical Experience II 1
Field-based experience, in which students complete 30 hours of teaching-related experiences in the classroom. Prerequisites: ETE 3200, 3300; ETE 4400 (must be taken concurrently). (Sp)

ETE 4310 Corrosion and Corrosion Control 2
(dual listing 6310)
Analysis of corrosion mechanisms for ferrous metals, nonferrous metals, and nonmetallic materials, as well as the control of corrosion. Prerequisites: CHEM 1110 and MATH 1060. (Sp)

ETE 4400 Methods of Teaching Engineering and Technology Education II 3
Techniques of teaching as applied to individual and group instruction. Students apply various methods in presenting lessons. Prerequisites: ETE 3200, 3300; ETE 4300 (must be taken concurrently). (Sp)

ETE 4440 Technology and Society 3
(dual listing 6440)
Challenges students to develop an understanding of the dynamic interaction between science, technology, and society. Explores the responsibility of humans to direct the utilization of technology as a creative enterprise. Students critically investigate technological innovations, issues, and impacts on society from a global perspective. (F,Sp)

ETE 4700 Student Teaching in Postsecondary Schools 4
Planning, presenting, and evaluating instruction for students in postsecondary industrial and technical programs under the supervision of an experienced teacher. Enrollment by permission only.

ETE 4710 CI Electronics/Computer Design II 3
Execution and completion of a team or individual project. Requires design reviews and written reports. Prerequisite: ETE 3710. (Sp)

ETE 4930 Independent Study 1-4®
Upon application, students may propose and complete work above and beyond regular coursework to support or supplement their major. (F,Sp,Su)

ETE 4940 Related Industrial Experience 1-12®
Provision for enrollment in industry schools conducted on university level. Approved by department upon application for trade competency examination and work experience in industry. (F,Sp,Su)

ETE 5040 Manufacturing Enterprise 3
Focuses on management technology used to establish a manufacturing enterprise, engineer a product and production system, finance the operation, and market the product. Prerequisite: ETE 1030.

ETE 5220 CI Program and Course Development 3
Review of basic principles and practices of curriculum and course development used in applied technology and technology education. Emphasizes components needed to develop a curriculum guide. Prerequisites: ETE 3200, 3300. (Sp)

ETE 5230 Technical Training Innovative Program 1-4®
Prepares prospective and incumbent teachers to implement and conduct contemporary programs. Includes skill development and the philosophy needed for curriculum innovation.

ETE 5240 Principles of Technology 2-3
Introduction to applied technology principles forming the basis for today's society.

ETE 5500 Student Teaching Seminar 2
Focuses on observations and problems arising during student teaching. Includes review of teaching plans, procedures, adaptive classroom practices, and evaluation. Prerequisite: ETE 5630 (must be taken concurrently). (F)

ETE 5630 Student Teaching in Secondary Schools 10
Candidates assigned to cooperating teachers in public secondary schools within their major and minor subjects. Students have professional responsibilities with teaching. Prerequisite: ETE 5500 (must be taken concurrently). (F)

ETE 5800 Seminar—Technology Education 1-3®
Provides opportunity for students to participate in variety of enriching experiences, such as guest speakers, field trips, demonstrations, and conferences.

ETE 5900 Workshop in Engineering and Technology Education 1-4®
Special workshops for education or industry. May be repeated providing content varies.

ETE 5910 Special Problems in Engineering and Technology Education 1-4®

ETE 5920 Related Technical Training 1-12®

ETE 6090 Program Design 3
Study of contemporary program design and development in technology and industrial education. Reviews complete curriculum developmental process. (F,Sp,Su)

ETE 6100 Contemporary Issues 3
Study of present and future foundational professional developments in technology and industrial education. Students identify and investigate contemporary trends and issues affecting and facing technology and industrial education. (F,Sp,Su)

ETE 6150 Evaluation and Assessment 3
Study of various methods used to measure and evaluate student achievement, including cognitive, affective, and psychomatic. Reviews principles of learning and teaching, and of evaluation of instruction. (F,Sp,Su)

ETE 6200 Composite Manufacturing Processes and Repair 3
Composite manufacturing processes, composite materials survey, tooling design and fabrication, autoclave processes, vacuum bag techniques, filament winding processes, equipment requirements, materials cutting and storage, and composite materials testing. (Sp)

ETE 6250 Internship 1-6
Advanced instruction through supervised work experience in teaching, supervising, or administering educational or industrial program. (F,Sp,Su)

ETE 6310 Corrosion and Corrosion Control 2
(dual listing 4310)
Analysis of corrosion mechanisms for ferrous metals, nonferrous metals, and nonmetallic materials, as well as the control of corrosion. Prerequisites: CHEM 1110 and MATH 1060. (Sp)

ETE 6440 Technology and Society 3
(dual listing 4440)
Challenges students to develop an understanding of the dynamic interaction between science, technology, and society. Explores the responsibility of humans to direct the utilization of technology as a creative enterprise. Students critically investigate technological innovations, issues, and impacts on society from a global perspective. (F,Sp)

ETE 6450 Administration and Organization 3
Administrative and supervisory techniques for successful operation of technology education and applied technology education programs. (F,Sp,Su)

ETE 6520 Explorations of Industry 3
Study of contemporary industry, business, and service through a series of site visits. Includes various management and finance methods and techniques. (F,Sp,Su)

ETE 6750 Research Methods and Design 3
Introduction to practical research planning and design. Guides students from proposal selection to completed proposal to final research report. (F,Sp,Su)

ETE 6800 Seminar 1-2
(F,Sp,Su)

ETE 6900 Readings and Conference 1-3
Advanced individualized study on selected topics in technology and industrial education. Scheduled consultation with faculty member. (F,Sp,Su)

ETE 6910 Experimental Laboratory 3
Introduction to elements of a research report through selection and development of experimental study utilizing tools, equipment, materials, and processes for improving programs and teaching techniques. (F,Sp,Su)

ETE 6930 Independent Study 1-6
Advanced educational experience through individual investigation. (F,Sp,Su)

ETE 6960 Master's Project 3-6®
Development of creative project emphasizing a thoroughly developed plan of action. Includes proposal, project paper, and final presentation. (F,Sp,Su)

ETE 6970 Thesis Research 1-9
(F,Sp,Su)

ETE 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

ETE 7010 The Role of Cognition in Engineering and Technology Education 3
Study of cognitive science and research relating to engineering and technology education. (F)

ETE 7020 Design Thinking in Engineering and Technology 3
Engineering design as applied to technology education. (Sp)

ETE 7030 Engineering Design and Analysis for Technology Education 3
Engineering design methodology for technology education teacher educators. Focuses on science principles and predictive mathematics comprising the engineering sciences needed to solve problems in a design framework that is analytical, predictive, and repeatable. (F)

ETE 7040 Dynamic and Network Engineering Processes for Technology Education 3
Examines dynamic and network processes in engineering through the use of simulation software. Students use these techniques to develop standards-based engineering curricular modules for use in grades 6 through 12. (Sp)

ETE 7230 Foundations of Technology 3
Study of the objectives, legislative foundations, principles, philosophy, impact, and organization of technology and industrial education. (F,Sp,Su)

ETE 7400 Occupational Analysis and Curriculum Development* 3
Students learn techniques for conducting an occupational analysis (both job and task analysis) and for developing performance-based or competency-based curriculum. Explores industrial and educational applications for this style of curriculum development.

ETE 7460 Finance and Grant Writing 3
Procedures in financial administration of industrial education monies. Budget preparation, budget operation and control, and school accounting. In-depth review of steps and techniques needed for grant writing. (F,Sp,Su)

ETE 7500 Internationalizing Institutions of Higher Education 3
Explores the need and methodology of internationalizing higher education institutions, with the purpose of understanding the global society and delivering education worldwide. (F,Sp,Su)

ETE 7600 Academic Issues and Politics in Higher Education 3
Study of higher education in Utah, the social political impacts, and the role of faculty members in higher education institutions. (F,Sp,Su)

ETE 7810 Research Seminar 1-6
Identification of research problems, consideration of research strategies and methods, application of research and statistical concepts in departmental focus, and interaction with faculty. (F,Sp,Su)

ETE 7900 Independent Study* 1-3
Individually directed reading and conference. Departmental approval required before registration. (F,Su)

ETE 7970 Dissertation Research 1-15®
(F,Sp,Su)

ETE 7990 Continuing Graduate Advisement 1-3®

*This course is taught alternating years. Check with department for information about when course will be taught.
®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Family, Consumer, and Human Development (FCHD)

See Department of Family, Consumer, and Human Development, pages 303-314.

FCHD 1100 Critical Issues in Family, Consumer, and Human Development 1©
Introduction to the majors, minors, emphases, and disciplines in family, consumer, and human development. Emphasizes career opportunities and how scholars in this field address critical social issues. Available online *only*. (F,Sp,Su)

FCHD 1500 BSS Human Development Across the Lifespan 3©
Overview of human development across the lifespan, from conception to death. (F,Sp)[1]

FCHD 2400 BSS Marriage and Family Relationships 3©
Overview of couple and family relationships, including marriage, child bearing and rearing, intergenerational relationships, and alternative family forms. (F,Sp)[1]

FCHD 2450 BSS The Consumer and the Market 3
Explores how the marketplace operates, including factors influencing consumer purchases, current consumer problems, and assistance provided to consumers by federal and state agencies, businesses, and other organizations. (F,Sp)

FCHD 2500 Child Development Associate Workshop 3®
Training provided by an approved instructor and following an approved curriculum that leads to the fulfillment of requirements for the National Child Development Associate (CDA) credential. Elective credits granted for this course. (F,Sp,Su)

FCHD 2550 Child Development Associate Training and Practicum 6
During and after the coursework associated with FCHD 2500, students fulfill a practicum. At the conclusion of FCHD 2500, the CDA advisor/trainer conducts a comprehensive observation of the CDA candidate and the CDA observation instrument is completed and included as part of application materials submitted for the final assessment by the CDA granting organization (Council for Early Childhood Professional Recognition). When the CDA candidate receives the CDA credential, then he or she receives credit for FCHD 2550. Prerequisite: FCHD 2500. (F,Sp,Su)

FCHD 2600 Seminar in Early Childhood Education 2 (formerly FCHD 2250)
Orientation to the profession of early childhood education, current philosophies, teaching techniques, and approaches to curricula found in programs for young children. Must be taken concurrently with FCHD 2630. Prerequisite: Admission to teacher education or instructor's permission. (F,Sp)

FCHD 2610 Child Guidance 3©
Review of parenting styles and child guidance philosophies with emphasis on principles and techniques. (F,Sp,Su)[1]

FCHD 2630 Practicum in Early Childhood Education 2 (formerly FCHD 2250)
Students participate in developmentally appropriate preschool programs as classroom aides. Must be taken concurrently with FCHD 2600. Prerequisite: Admission to teacher education or instructor's permission. (F,Sp)

FCHD 3100 Abuse and Neglect in Family Context 3©
Causes, treatment, and laws regarding family violence, including child abuse and neglect, partner abuse, and elder abuse. Prerequisites: Sophomore standing, FCHD 1500, 2400. (F,Sp)[1]

FCHD 3110 Human Sexuality 3
Development and expression of human sexual values, attitudes, and behaviors in family and cultural contexts. Prerequisites: FCHD 1500, 2400. (F,Su)

FCHD 3130 QI Research Methods 3
Common methodologies used in current family and human development research. Emphasis on becoming a knowledgeable and informed consumer of research. Enrollment limited to FCS and FCHD majors *only*. Prerequisite: STAT 1040. (F,Sp)

FCHD 3210 CI Families and Cultural Diversity 3
Similarities and differences in family patterns and functions in terms of race and ethnicity, gender, social class, and international development. Prerequisites: FCHD 1500, 2400, ENGL 2010. Enrollment limited to FCHD majors *only* (F,Sp)

FCHD 3280 Economic Issues for Individuals and Families 3
Focuses on issues related to economic well-being of individuals and families, with special emphasis on income and wealth, poverty, consumption and saving, work and leisure, human capital investment, and aging. (Sp)

FCHD 3310 Consumer Policy 3
Examines different tools for policy analysis. Provides conceptual and analytical framework for understanding the role of consumer sciences professionals as political actors and the potential to influence the shaping of public policy, particularly consumer and government policies. (Sp)

FCHD 3340 Housing: Societal and Environmental Issues 3
Studies housing in the contemporary U.S., including affordability, access, expectations, aesthetic considerations, and effects of public and private policies on housing choices. (F)

FCHD 3350 DSS/QI Family Finance 3
Achieving personal and family financial goals, including financial planning and record keeping, different types of insurance, taxes, use of credit, investments, retirement, and estate planning. Prerequisite: Choose one of MATH 1030, 1050, or STAT 1040. **Note:** Effective Fall Semester 2007, this course will have *no prerequisites* and will *no longer* fulfill the Quantitative Intensive (QI) University Studies requirement. (F,Sp,Su)[1]

FCHD 3450 Consumer Credit Problems 3
Consumer credit problems, debt reduction strategies, credit collection policies and practices, bankruptcy, and government assistance programs. Prerequisite: FCHD 3350. (F)

FCHD 3510 Infancy and Early Childhood 3
Development and growth of the child from conception to five years. Physical, social, and emotional growth; and parenting skills. Prerequisites: Junior standing and FCHD 1500, 2610. (F,Sp)[1]

FCHD 3520 Children in the Middle Years 3
Growth and development of normal children. Guidance principles related to behavior of children at these age levels. Prerequisites: Junior standing and FCHD 1500, 2610. (F,Sp)

FCHD 3530 Adolescence 3
Social, psychological, and physical aspects of adolescence in modern societies. Social and cultural expectations and influences on adolescents stemming from the family, peers, school, and the community. Prerequisites: Junior standing and FCHD 1500. (F,Sp)

FCHD 3540 Adult Development and Aging 3
Interdisciplinary perspective on developmental issues in adulthood and old age. Biosocial, cognitive, and psychosocial changes in older adults in family, community, cultural, and socio-political contexts. Prerequisites: Junior standing and FCHD 1500. (F,Sp)

FCHD 3550 Infant Lab 1
Practical experience in laboratory setting with children birth through two years of age. Lab supplements/complements course content of FCHD 3510. Prerequisites: Junior standing, FCHD 1500, 2610. Corequisite: FCHD 3510. (F,Sp)

FCHD 3560 Middle Childhood Lab 1
Practical experience in laboratory setting with children in the middle years. Lab supplements/complements course content of FCHD 3520. Prerequisites: Junior standing, FCHD 1500, 2610. Corequisite: FCHD 3520. (F,Sp)

FCHD 4220 Family Crises and Interventions 3
Normative and nonnormative stressors provoking individual and family crises. Principles and techniques for family interventions. Prerequisites: Junior standing, FCHD 2400. (F,Su)

FCHD 4230 Families and Social Policy 3
Local, state, and federal policies with implications for individuals and families across the lifespan. Prerequisites: Junior standing and FCHD 2400. (F,Sp)

FCHD 4240 Social and Family Gerontology 3
Social, cultural, and family contexts of aging. Intergenerational family relations in later life. Social policies and services affecting older adults and their families. Prerequisites: Junior standing and FCHD 2400, 3540. (F,Sp)

FCHD 4330 Family Finance Career Seminar 1
Exploration of career options through readings, guest lecturers, interviews of practitioners, and development of an internship and career plan. Prerequisite: FCHD 3350. (F)

FCHD 4350 Advanced Family Finance 3
Managing personal and family financial resources to achieve goals relating to investments, retirement, and estate planning. Prerequisite: FCHD 3350. (Sp)

FCHD 4460 Financial Counseling 3
Development and application of financial counseling and presentation skills. Analysis of various financial problems and development of appropriate solutions and resources. Prerequisites: FCHD 3350, 3450. Enrollment limited to FCHD majors with a Family Finance Emphasis. (Sp)

FCHD 4550 Preschool Methods and Curriculum 3
Use of materials, equipment, and activities in planning and implementing curricula for preschool children. Prerequisites: Junior standing and FCHD 1500. (F,Sp)

FCHD 4800 Senior Honors Thesis/Project 3
Thesis/project in area of student's choice, selected and prepared in consultation with an advisor drawn from the FCHD faculty. Includes oral presentation and discussion of senior thesis/project. Prerequisite: Senior standing. (F,Sp,Su)

FCHD 4900 CI Pre-Practicum Skills 3
Acquisition and integration of interpersonal skills, conflict resolution, and ethical decision-making for active participation in FCHD practica. Enrollment limited to FCHD majors *only*. Prerequisites: Junior standing, FCHD 2610, 3100, and ENGL 2010. (F,Sp)

FCHD 4940 Gerontology Integration 1
Integration of gerontology coursework and practicum. Written paper requires approval by FCHD Gerontology Coordinator. (F,Sp,Su)

FCHD 4950 Practicum: Consumer Science 1-12®
Placement experience in applying skills and knowledge in community agencies. Prerequisites: Junior standing, completion of 24 credits in major. Enrollment limited to Family and Consumer Sciences majors who have at least junior standing, or to FCHD majors with a Family Finance Emphasis, who have completed at least 30 credits in the major. The application deadlines are: February 15 for fall semester, June 15 for spring semester, and October 15 for summer semester. (F,Sp,Su)

FCHD 4960 Practice Teaching in Child Development Laboratories 3 or 6
Intensive teaching practicum in the Child Development Lab program. Students must sign up at least three full semesters in advance in FL 214. Prerequisites: Junior standing, FCHD 4550, and departmental permission. (F,Sp,Su)

FCHD 4970 Gerontology Practicum 1-3®
Placement experience in gerontology settings. Practical opportunities to apply theory, knowledge, and skills. Prerequisites: Senior standing and FCHD 3540, 4240. Apply one semester in advance. The application deadlines are: February 15 for fall semester, June 15 for spring semester, and October 15 for summer semester. (F,Sp,Su)

FCHD 4980 Practicum 1-12®
Placement experience in applying skills and knowledge in community agencies. Enrollment limited to FCHD majors *only*. Prerequisites: Junior standing and FCHD 4900; must have completed a total of 30 FCHD credits and the practicum application. The application deadlines are: February 15 for fall semester, June 15 for spring semester, and October 15 for summer semester. (F,Sp,Su)

FCHD 4990 Readings and Conference 1-6®
Directed independent study of topics preselected by faculty and student. Instructor permission required before registration. (F,Sp,Su)

FCHD 5340 Housing Finance and Regulations 3
Exploration of mortgage loan industry, with in-depth examination of various lending products and procedures. Study of regulations affecting housing, including Fair Housing, predatory lending, and mortgage default. Prerequisites: FCHD 3340, 3350. Enrollment limited to Family, Consumer, and Human Development majors and Family and Consumer Sciences majors. (Sp)

FCHD 5540 Family Life Education Methods 3
Introductory course focused on theory, principles, and skills necessary to prepare, present, and evaluate family life education programs and workshops. Prerequisites: Junior standing, FCHD 1500 and 2400. Enrollment limited to Family, Consumer, and Human Development majors *only*. (F,Sp)

FCHD 5550 Interdisciplinary Workshop 1-3®
(F,Sp,Su)

FCHD 5950 Financial Counseling Practicum 3®
Students apply their knowledge by conducting one-on-one counseling sessions, observing other counselors, and teaching workshops. Students develop valuable management, communication, and counseling skills. Students should sign up as far in advance as possible after being admitted to the Family Finance emphasis. Prerequisites: FCHD 4220, 4460, 5340 (may be taken concurrently). Enrollment limited to FCHD majors with a Family Finance Emphasis. The application deadlines are: February 15 for fall semester, June 15 for spring semester, and October 15 for summer semester. (F,Sp,Su)

FCHD 6010 Survey of Family Relations Research 3
Overview and critique of substantive areas of research in marriage and the family. Prerequisite: FCHD 2400 or equivalent. (F)

FCHD 6020 Survey of Human Development Research 3
Examines contemporary research and developmental issues. Highlights social development from social-historical and social change framework. Prerequisite: FCHD 1500 or equivalent. (Sp)

FCHD 6030 Research Methods 3
Overview of methods for studying family relations and human development, including sampling, measurement, research design, and data analyses/ interpretations. Research proposal required. Prerequisite: FCHD 3130 or equivalent. (Sp)

Course Descriptions

FCHD 6040 Survey of Consumer Science Research 3
Examination of contemporary research in consumer science. (Sp)

FCHD 6050 Consumer Science Theories 3
Critical review and assessment of theories in consumer science. (F)

FCHD 6060 Human Development Theories 3
Overview of major developmental theories, including contributions from philosophical, personality, and learning thoeries. Explores epistemology, ethology, and systems theories relating to human development. Prerequisite: FCHD 1500 or equivalent. (F)

FCHD 6070 Family Theories 3
Critical review and assessment of theories in family research, along with construction and application of family theory. Prerequisite: FCHD 2400 or equivalent. (F)

FCHD 6080 Professional Development 3
(dual listing 7080)
Capstone course for graduate students, emphasizing issues related to professional development (e.g., grant writing, publishing, vitae development, interview skills, developing a research agenda, networking, ethics, professional conduct, teaching, etc.). (F)

FCHD 6200 Topical Seminar in Family Relations 3®
Selected issues in family relations. Usually offered once per year. Semester taught will vary.

FCHD 6310 Survey of Marriage and Family Therapy 3
Overview of marriage and family therapy models. Historical development of marriage and family therapy as a profession and a practice. Enrollment limited to FCHD Marriage and Family Therapy master's students *only*. (F)

FCHD 6320 Foundations of Marriage and Family Therapy 3
Epistemological and philosophical directions of marriage and family therapy, beginning with early applications of General Systems theories and cybernetics through constructivist and postmodern frameworks. (F)

FCHD 6330 Marriage and Family Therapy Practice I: Traditional Approaches 3
Traditional approaches to marriage and family therapy, with a focus on individual and couple issues, including sexuality and personality issues within a systems framework. Prerequisite: FCHD 3110 or equivalent. (Sp)

FCHD 6340 Marriage and Family Therapy Practice II: Contemporary Approaches 3
Contemporary approaches to marriage and family therapy. Focuses on couple and family interaction issues, including conflict, parenting, and other common family problems. (Sp)

FCHD 6350 Clinical Practice in Marriage and Family Therapy 3®
Selected clinical issues in marriage and family therapy. (Sp)

FCHD 6360 Ethical and Professional Development in Marriage and Family Therapy 3
Ethical, legal, and professional issues in marriage and family therapy. (F)

FCHD 6370 Assessment in Marriage and Family Therapy 3
Development, application, and interpretation of major individual and family assessment techniques used in marriage and family therapy practice and research. (Sp)

FCHD 6380 Topical Seminar in Marriage and Family Therapy 1-3®
Selected issues in marriage and family therapy. (F,Sp,Su)

FCHD 6390 Practicum in Marriage and Family Therapy 1-6®
Supervised clinical experience in marriage and family therapy. Prerequisites: Admission to Marriage and Family Therapy specialization and instructor's permission. (F,Sp,Su)

FCHD 6400 Topical Seminar in Consumer Science 3®
(dual listing 7400)
Selected issues in consumer science. Usually offered once per year. Semester taught will vary.

FCHD 6500 Topical Seminar in Human Development 3®
Selected issues in human development. Usually offered once per year. Semester taught will vary.

FCHD 6900 Topical Seminar in Family and Human Development 3®
Selected issues in family and human development. Usually offered once per year. Semester taught will vary.

FCHD 6960 Readings and Conference 1-6®
Directed independent study of topics preselected by faculty and student. Prerequisite: Instructor's permission. (F,Sp,Su)

FCHD 6970 Thesis Research 1-6®
Research for master's thesis, arranged with advisor. Prerequisite: Advisor's permission. (F,Sp,Su)

FCHD 6980 Graduate Practicum 1-9®
Application of family and human development skills and knowledge in a supervised setting, as arranged by advisor. Prerequisite: Advisor's permission. (F,Sp,Su)

FCHD 6990 Continuing Graduate Advisement 1-9®
Continuing registration to complete thesis requirements. Prerequisite: Six credits of FCHD 6970. (F,Sp,Su)

FCHD 7050 Advanced Research and Theory in Consumer Science 3
Critical review of research and theories in consumer science. Prerequisite: FCHD 6050. (Sp)

FCHD 7060 Advanced Research and Theory in Human Development* 3
Critical review of research and theories in human development. Prerequisite: FCHD 6060 or equivalent. (F)

FCHD 7070 Advanced Research and Theory in Family Relations 3**
Critical review of research and theories in marriage and family relationships. Prerequisite: FCHD 6070 or equivalent. (Sp)

FCHD 7080 Professional Development 3
(dual listing 6080)
Capstone course for graduate students, emphasizing issues related to professional development (e.g., grant writing, publishing, vitae development, interview skills, developing a research agenda, networking, ethics, professional conduct, teaching, etc.). (F)

FCHD 7200 Topical Seminar in Family Relations 3®
Selected issues for advanced professionals in family relations. Usually offered once per year. Semester taught will vary.

FCHD 7400 Topical Seminar in Consumer Science 3
(dual listing 6400)
Selected issues for advanced professionals in consumer science. Usually offered once per year. Semester taught will vary.

FCHD 7500 Topical Seminar in Human Development 3®
Selected issues for advanced professionals in human development. Usually offered once per year. Semester taught will vary.

FCHD 7900 Topical Seminar in Family and Human Development 3®
Selected issues for advanced professionals in family and human development. Usually offered once per year. Semester taught will vary.

FCHD 7960 Readings and Conference 1-6®
Directed independent study of topics preselected by faculty and student. Prerequisite: Instructor's permission. (F,Sp,Su)

FCHD 7970 Dissertation Research 1-9®
Research for dissertation, as arranged with advisor. Prerequisite: Advisor's permission. (F,Sp,Su)

FCHD 7980 Advanced Graduate Practicum 1-9®
Professional supervision of doctoral students, applying general principles from the study of research in family and human development. Prerequisite: Advisor's permission. (F,Sp,Su)

FCHD 7990 Continuing Graduate Advisement 1-9®
Continuing registration to complete dissertation requirements. Prerequisite: Twenty credits of FCHD 7970. (F,Sp,Su)

*Taught 2006-2007.
**Taught 2007-2008.
[1]This course is also available online. For more information, contact department or see current semester *Schedule of Classes*.
® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
© This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Family and Consumer Sciences Education (FCSE)

See Department of Agricultural Systems Technology and Education, pages 138-145.

FCSE 1140 Introductory Sewing 2
Introductory-level sewing techniques geared toward beginning sewing students. Includes use of sewing machines and sergers. No previous sewing experience needed. (F,Sp)

FCSE 2040 Clothing Production Principles 3
Intermediate-level clothing construction techniques, pattern alteration and fitting, and use of sewing machine and serger. Previous sewing experience recommended. (F,Sp)

FCSE 2510 Orientation to Family and Consumer Sciences Education 3
Overview of the integrated Family and Consumer Sciences Education system. Students learn how family and human development, nutrition, finance, clothing production, and consumerism is planned, implemented, and evaluated through FCSE programs in the public schools. Enrollment limited to FCSE majors *only*. (Sp)

FCSE 3030 DSC Textile Science 4
Study of fibers, yarns, fabric constructions, and finishes as related to appreciation, selection, use, and care of current textiles. Evaluation of physical, economic, and aesthetic properties of textile products to determine suitability for desired end use. (Sp)

FCSE 3040 Advanced Clothing Production Principles 3
Develops skills in flat pattern design and tailoring techniques. Prerequisite: FCSE 2040. (F)

FCSE 3060 DSS/CI Human Behavior Related to Dress 3
Analyzes economic, historic, psychological, social, and cultural contexts shaping individual and group dress and appearance. Prerequisite: Completion of a course having University Studies Breadth Social Sciences (BSS) designation. (F)

FCSE 3080 Dress and Humanity 3
Explores relationship of dress and humanity. Collaborative group assignments, discussions of history related to dress, cultures as related to dress, and the influence dress has in today's society. (F,Su)

FCSE 3300 Family and Consumer Sciences Education Clinical Experience I 1
Provides on-site experience for students to model a secondary family and consumer sciences education teacher. Students are expected to learn teaching and classroom management principles. Must be taken concurrently with FCSE 3400. Prerequisite: Admission to Secondary Education Professional Education Component. (Sp)

FCSE 3400 Family and Consumer Sciences Education Methods I 3
Methods of successfully planning and maintaining family and consumer sciences work education programs in secondary schools. History and philosophy of applied technology education. Prerequisite: Admission to Secondary Education. FCSE 3400 and 3300 must be taken concurrently. (Sp)

FCSE 4250 Internship in Family and Consumer Sciences Education 1-12®
Midmanagement-level experience in a position approved by the department. One credit earned for each 60 hours of experience. Prerequisite: Junior standing. (F,Sp,Su)

FCSE 4300 Family and Consumer Sciences Education Clinical Experience II 1
Provides on-site experience for students to model a secondary family and consumer sciences education teacher. Students expected to learn teaching and classroom management principles. Prerequisites: FCSE 3300, 3400. (F)

FCSE 4400 Family and Consumer Sciences Education Methods II 3
Development of competency in curriculum planning, and skill and sensitivity in the use of various teaching-learning strategies and resources. Includes assessment for vocational education. Prerequisites: FCSE 3300, 3400. (F)

FCSE 4900 Independent Study in Family and Consumer Sciences Education 1-5®
Prior to registration, students must identify a project of interest and discuss the project with instructor. Prerequisite: Junior standing and approval of faculty. (F,Sp,Su)

FCSE 5500 Student Teaching Seminar 2
Taken during student teaching in secondary schools to complement school experience. Focuses upon problems arising during student teaching. Includes teaching plans, procedures, adaptive classroom practices, and evaluation. Prerequisites: FCSE 4300, 4400. Must be taken concurrently with FCSE 5600. (Sp)

FCSE 5550 Workshop Topics in Family and Consumer Sciences Education 0.5-3®
Concentrated offerings to increase knowledge, skills, or creative expression in current Family and Consumer Sciences Education topics or curriculum areas. (F,Sp,Su)

FCSE 5630 Student Teaching in Secondary Schools 10
After assignment to a cooperating family and consumer sciences educator, students are given professional responsibilities associated with teaching. Prerequisites: FCSE 4300, 4400. Must be taken concurrently with FCSE 5500. (Sp)

FCSE 6210 Using and Interpreting SPSS to Analyze Social Research Data 3**
Explores the use of SPSS for descriptive statistics, contingency tables, ANOVA models, and multiple regression. Discussion of syntax, procedure options, and interpretation of output. (Sp)

FCSE 6240 Graduate Topics in Family and Consumer Sciences Education 1-3®
Surveys selected topics in family and consumer sciences education. Topics will be unique each time course is offered. (F,Sp,Su)

FCSE 6250 Graduate Internship in Family and Consumer Sciences Education 1-6®
Designed for graduate students who wish to acquire or upgrade their experience in an occupational field related to their area of study. One credit earned for each 60 hours of experience. Repeatable for up to 6 credits. Prerequisite: Instructor approval prior to enrollment. (F,Sp,Su)

FCSE 6280 Research Methods in Family and Consumer Sciences Education 2
Explores techniques and tactics for designing and analyzing social science human behavior research. Emphasizes designs and instrumentation. Prospectus required. This course is currently inactive. Contact department for information about when this course may be taught.

FCSE 6290 Current Issues in Family and Consumer Sciences Education* 3
Investigation and reporting of current issues related to family and consumer sciences education research. (F)

FCSE 6520 Administration and Supervision in Education and Extension 3
Application of research and theory of administration and supervision to define and clarify the role of leadership in formal education and extension situations. (F)

FCSE 6530 Classroom Management, Student Motivation, and Guidance 3
Multiple-strategy approach for increasing teachers' effectiveness and satisfaction in family and consumer sciences classroom management and discipline. (Sp)

FCSE 6540 Program Development, Testing, and Evaluation in Career and Technical Education 3**
Examines current trends in curriculum and program development related to specific educational outcomes. Includes curriculum development process. (F)

FCSE 6550 Family and Consumer Sciences Education Topics 3®**
Explores advanced application of teaching strategies and theory, as well as the creation of innovative classroom materials. (F)

FCSE 6560 Mentoring New Professionals* 3
Explores the role of mentoring in the success of new teaching professionals. Reviews four components of professional practice. Examines techniques for observation and conferencing. Students reflect upon their own teaching/ mentoring exeriences and the impact upon professional practice. (Sp)

FCSE 6570 Adult Education and Volunteer Programs 3
Explores current program formats and instructional materials developed for adult education. Emphasizes program and course development and teaching strategies suitable for adults. This course is currently inactive. Contact department for information about when this course may be taught.

FCSE 6900 Graduate Independent Study in Family and Consumer Sciences Education 1-4®
Independent study in the areas of family and consumer sciences education, including clothing and merchandising, consumer sciences, and interior design. For approval of project and allowable credits, students should check with committee. (F,Sp,Su)

FCSE 6970 Master's Thesis Research in Family and Consumer Sciences Education 1-6®
Repeatable for up to 6 credits. (F,Sp,Su)

FCSE 6990 Continuing Advanced Graduate Advisement in Family and Consumer Sciences Education 1-3®
(F,Sp,Su)

*Taught 2006-2007.
**Taught 2007-2008.
® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

French (FREN)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

Lower Division

FREN 1010 French First Year I 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Not open to those with more than one year high school French or equivalent. (F,Sp)

FREN 1020 French First Year II 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: FREN 1010 or equivalent. (F,Sp)

FREN 1030 Beginning French for Everyday Communication 3
Development of basic conversational skills, communication strategies, and cultural knowledge through immersion in a French-speaking environment. Offered only through USU's study abroad program in France. Cannot be substituted for FREN 1010 or 1020. (Su)

FREN 1050 French First Year I Study Abroad 4
Intensive first-year language course designed to increase proficiency in the four language skills and in intercultural knowledge. Offered only through USU's summer study abroad program in France. Not open to those with more than one year high school French or equivalent. (Su)

FREN 1150 French First Year II Study Abroad 4
Intensive first-year language course designed to increase proficiency in the four language skills and in intercultural knowledge. Offered only through USU's summer study abroad program in France. Prerequisite: FREN 1010 or 1050. (Su)

FREN 1820 Beginning Independent Study: Experiencing Paris 2
Beginning-level independent study project focusing on the city of Paris, its history, culture, and patterns of life. Offered only through USU's summer study abroad program in France. (Su)

FREN 2010 French Second Year I 4
Continued development of communicative competencies in the four language skills, with more emphasis on communication through reading and writing and continued exposure to cultures and customs. Prerequisite: FREN 1020 or equivalent. (F,Sp)

FREN 2020 French Second Year II 4
Continued development of communicative competencies in the four language skills, with more emphasis on communication through reading and writing and continued exposure to cultures and customs. Prerequisite: FREN 2010 or equivalent. (F,Sp)

FREN 2030 Intermediate French for Everyday Communication 3
Development of intermediate-level conversational skills, communication strategies, and cultural knowledge through immersion in a French-speaking environment. Offered only through USU's study abroad program in France. Cannot be substituted for FREN 2010 or 2020. (Su)

FREN 2050 French Second Year I Study Abroad 4
Intensive second-year language course designed to increase proficiency in the four language skills and in intercultural knowledge, with more emphasis on communication through reading and writing. Offered only through USU's summer study abroad program in France. Prerequisite: FREN 1020 or equivalent. (Su)

FREN 2150 French Second Year II Study Abroad 4
Intensive second-year language course designed to increase proficiency in the four language skills and in intercultural knowledge, with more emphasis on communication through reading and writing. Offered only through USU's summer study abroad program in France. Prerequisite: FREN 2010 or 2050 or equivalent. (Su)

FREN 2820 Intermediate Independent Study: Experiencing Paris 2
Intermediate-level independent study project focusing on the city of Paris, its history, culture and patterns of life. Offered only through USU's summer study abroad program in France. (Su)

FREN 2880 Individual Readings 3®
Individual study of selected readings in French. Cannot be substituted for FREN 2010 or 2020. Prerequisite: Instructor's permission. (Su)

Upper Division

Upper-division French courses (3000-level and above) are available *only* to students who have completed FREN 2020 or who can demonstrate equivalent proficiency through testing. (**Exception:** FREN 3500, Topics in French Literature in Translation, does *not* require the 2020-level prerequisite, and *will not count* toward the Bachelor of Arts degree language requirement.)

FREN 3030 Advanced French for Everyday Communication 3
Development of advanced conversational skills, communication strategies, and cultural knowledge through immersion in a French-speaking environment. Offered only through USU's study abroad program in France. Cannot be applied to requirements for the major or minor in French. (Su)

FREN 3060 CI French Conversation 3
Designed to develop effective communication skills, to increase vocabulary, and to teach students to express and justify facts, opinions, ideas, and emotions in French. Not open to students with foreign experience. Designed for students who have not had extended residence in a francophone country or extended exposure to a francophone environment. (F)

FREN 3070 Advanced French Language Study Abroad I 4
Intensive upper-division language course combining grammar review, phonetics, advanced conversation and composition, and the study of culture, with an emphasis on current affairs. Offered only through USU's summer study abroad program in France. (Su)

FREN 3080 Advanced French Language Study Abroad II 4
Intensive upper-division language course combining grammar review, phonetics, advanced conversation and composition, and the study of culture, with an emphasis on current affairs. Offered only through USU's summer study abroad program in France. (Su)

FREN 3090 CI French Intermediate Written Communication 3
Provides students with intensive practice in various types of writing (e.g., summary, description, narration, letter-writing, etc.) based on a process approach. Involves discussion, writing, and revising. Stresses grammar review. (F)

FREN 3500 DHA Topics in French Literature in Translation 3
Reading, analysis, and discussion of important French literature in English translation. Topics and texts may vary. (F,Sp,Su)

FREN 3510 CI Business French* 3
Study of vocabulary, idioms, and expressions used in French business communications and an introduction to French business practices. (F)

FREN 3550 DHA French Civilization 3**
Study of historical, social, political, economic, and cultural conditions and institutions of France from early to modern times. (F)

FREN 3570 France Today 3
Study of contemporary life in France, the French people, their daily habits, and their surroundings. What makes the French French. Extensive use of videos, films, and slides. Prerequisite: FREN 2020 or equivalent. (Sp)

FREN 3600 Textual Analysis 3®
Introduction to the methods, terminology, and practice of textual analysis. Development of critical thinking and writing skills through the analysis of selected literary and nonliterary texts from different periods and genres, ranging from poetry, novels, and plays to film, painting, music, and art. Course may be repeated once for credit with different content. (F)

FREN 3820 Advanced Independent Study: Experiencing Paris 2
Advanced-level independent study project focusing on the city of Paris, its history, culture, and patterns of life. Offered only through USU's summer study abroad program in France. (Su)

FREN 3880 Individual Readings 1-4®
Individual study of selected readings in French. Instructor's permission required. (F,Sp,Su)

FREN 3900 Topics in French and Francophone Studies 3®**
Studies through literature, media, and film on specific topics or themes. Discussion, analysis, and interpretation of selected literary and/or nonliterary works. Occasionally taught in English. (F)

FREN 4060 CI Advanced French Conversation 3
Designed for students who have already reached advanced proficiency in speaking through foreign experience, but need to continue the development of their conversational skills. Prerequisite: FREN 3060 or permission of instructor. (Sp)

FREN 4090 CI Advanced Written Communication 3
Continued development of French written communication skills based on a process approach. Includes the more advanced concepts of French grammar and extensive writing practice in variety of genres. Prerequisite: FREN 3090 or permission of instructor. (F)

FREN 4200 Applied French Linguistics and Phonetics* 3
First part analyzes phonological and phonetic patterns of French. Second part deals with selected morphological and syntactic features of French. (Sp)

FREN 4520 Information Technologies in French 3
Practices, theoretical issues, and policy concerns of information technologies resulting from microcomputers, networking, and videodisk. Use of microcomputer with French programs. Taught in French. (F)

FREN 4610 DHA Period Studies in French Literature* 3
Examination of a particular period or century. Involves close reading, discussion, analysis, and interpretation of selected literary and nonliterary texts. Sample topics include: The Medieval Period, The Renaissance, Classicism, Baroque, Romanticism, Naturalism, and Contemporary French Literature. Prerequisite: FREN 3600 or instructor's permission. (Sp)

FREN 4620 DHA Genre Studies in French Literature 3**
Examination of a particular genre or body of works from a variety of periods and authors (e.g., novel, play, poetry, short story, film). Involves close reading, discussion, analysis, and interpretation of selected literary and nonliterary texts. Sample topics include: Romance Novels from the Middle Ages to the Present, From Classical to Contemporary French Theatre, French poetry from Baudelaire to Ponge, The Nouveau Roman, New Wave French Cinema, and The Negritude Movement. Prerequisite: FREN 3600 or instructor's permission. (F)

FREN 4880 Individual Readings 1-4®
Readings in scientific, technical, or literary French. Prerequisite: Permission of instructor. (F,Sp)

FREN 4900 Seminar in French and Francophone Studies 3®**
In-depth exploration of issues central to understanding language, literature, and culture. Critical reading and viewing of written and nonwritten texts with emphasis on student presentations, independent research, and the completion of extended projects. Seminar topics may focus on authors, literary periods, important historical events and social movements, and aspects of francophone cultures. Used periodically for literature in translation. (Sp)

FREN 4920 French Language Tutoring 1®
Allows students to develop tutoring skills by assisting professors in lower-division courses or fulfilling instructional duties for a comparable amount of time in the language laboratory, public schools, or similar activities with departmental approval. May be repeated to a maximum of 3 credits. Prerequisite: Permission of instructor. (F,Sp,Su)

FREN 6200 French Linguistics and Phonetics 3
Analysis of selected phonological, morphological, syntactic, and semantic features of contemporary French, including a study of colloquial French, comparing pronunciation, vocabulary, and grammar with standard forms. Prerequisite: FREN 2020, another 3000-level or higher FREN course, or demonstrated proficiency through testing. (Sp)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008.

Course Descriptions

Forest, Range, and Wildlife Sciences (FRWS)

See Department of Wildland Resources, pages 541-547.

Note: Effective Spring Semester 2007, courses listed with the FRWS prefix will use the Wildland Resources (WILD) prefix.

FRWS 2000 Introduction to Forest, Range, and Wildlife Sciences 1
With a combination of field trips, computer lab exercises, and classroom discussions, students gain an overview of forest, range, and wildlife sciences, including a review of career opportunities for students completing a BS degree in forest, range, or wildlife. (F,Sp)

FRWS 2200 BLS Ecology of Our Changing World 3©
Foundations of ecological and evolutionary relationships of organisms with other organisms and with the physical environment, emphasizing populations, communities, and ecosystems. Integration of basic science with applications of science to understanding human interactions with the environment. (F,Sp)

FRWS 2250 Introductory Internship/Co-op 1-3®
Introductory-level educational experience in internship/cooperative education position approved by department. Prerequisite: Departmental signature. (F,Sp,Su)

FRWS 2300 Mushroom Identification 1
Lecture course covering taxonomy, ecology, and importance of macro and micro fungi. Also taught as BIOL 2300. (F)

FRWS 2310 Mushroom Identification Lab 1-2®
Lab course acquainting students with basic fungal taxonomic groups. Students collect, preserve, and identify fungi they collect. Edible fungi prepared and eaten. Also taught as BIOL 2310. (F)

FRWS 2500 Computer Applications in Natural Resources 3
Advanced spreadsheet, graphics, aerial photography, and Geographic Information Systems for natural resource management. (F)

FRWS 3300 Management Aspects of Wildlife Behavior 3
Principles, concepts, and mechanisms of animal behavior, emphasizing behavioral ecology, development, and comparative aspects of special relevance to management of fish and wildlife. (Sp)

FRWS 3600 Wildland Plant Ecology and Identification 4
Autecology and identification of dominant grass, forb, and woody plants of the Intermountain West. Emphasizes native species; however, introduced or noxious weeds are included. Explores plant structure and function, as related to the environment. Enrollment limited to FRWS Department majors. Department authorization required for all nonmajors. (F)

FRWS 3610 Wildland Animal Ecology and Identification 4
Autecology and identification of important mammals, birds, reptiles, and amphibians of the Intermountain West. Emphasizes native species distribution and habitat requirements in relation to the environment. Prerequisite: NR/BIOL 2220. Enrollment limited to FRWS Department majors. Department authorization required for all nonmajors. (F)

FRWS 3700 CI Inventory and Assessment in Natural Resource and Environmental Management 3
Lectures, laboratory exercises, and field-based projects introduce students to the concepts, strategies, and analytical methods of natural resource and environmental inventory and assessment. Prerequisites: BIOL/NR 2220; MATH 1100 or higher; STAT 2000 or 3000; and passing score on the University Studies Computer and Information Literacy (CIL) exam. (F)

FRWS 3710 Monitoring and Assessment in Natural Resource and Environmental Management 3
Lectures, case studies, laboratory exercises, and field-based projects introduce students to the concepts, strategies, and analytical methods of science-based assessment of natural resources. Prerequisite: FRWS 3700 or permission of instructor. (Sp)

FRWS 3800 Wildland Ecosystems 3
Structure, function, and dynamics of terrestrial ecosystems in response to natural and anthropogenic impacts, with emphasis on the Intermountain West and Great Plains. Prerequisites: NR/BIOL 2220; and SOIL 3000 (or concurrent enrollment). (Sp)

FRWS 3810 Plant and Animal Populations 3
Basics of plant and animal population ecology, including population regulation, life histories, single and multi-species interactions, and metapopulations. Case studies will cover topics of both management and conservation concern. Prerequisites: NR/BIOL 2220, MATH 1100 or higher. (Sp)

FRWS 3850 Vegetation and Habitat Management 3
Applying ecological principles and concepts to manipulate the composition, structure, and productivity of wildland vegetation for a range of objectives, including the creation and maintenance of wildlife habitat, using biological, chemical, and mechanical methods, as well as fire. Prerequisites: SOIL 3000; FRWS 3600 (may be taken concurrently). (F)

FRWS 3900 Managing Dynamic Ecological Systems 4
Emphasizes how people from diverse natural resource disciplines benefit from integrating Eastern and Western philosophical and cultural beliefs with behavioral principles and processes to manage dynamic systems with due consideration for the ecological, cultural, and economic values of societies. (Sp)

FRWS 4000 Principles of Rangeland Management 3
Modern principles of rangeland management, including history of the profession, ecology, plant physiology, impacts of grazing on individual plants and plant communities, grazing management, range animal nutrition, rangeland watersheds, and the economics and planning of rangeland practices. Also introduces range-wildlife relations and vegetation manipulation. (Sp)

FRWS 4050 Urban Fish and Wildlife Management 3©
Concentrates on: understanding impacts of urbanization on wildlife and habitat; developing basic understanding of wildlife needs; completing urban wildlife habitat inventory; and preparing urban wildlife conservation and management plan. (F,Sp,Su)

FRWS 4250 Advanced Internship/Co-op 1-9®
Advanced-level educational experience in internship/cooperative education position approved by department. Prerequisite: Departmental signature. (F,Sp,Su)

FRWS 4500 Principles of Wildlife Management 3
Provides students with a working knowledge of the application of basic concepts in ecology and animal behavior to the management of wildlife resources to achieve diverse objectives of conservation, control, or cropping. Prerequisites: FRWS 3610 and 3810. (Sp)

FRWS 4520 Wildland Fire Behavior 3
Comprehensive examination of fuels, weather, and topography and how they interact to determine wildland fire behavior, including rate of spread, energy release, and intensity. This course is not currently being offered. For information about when it may be offered, contact the department.

FRWS 4540 Forest Harvest and Utilization 2
Elements of timber harvest systems, including policies and practices for minimizing biophysical impacts. Utilization of wood resources. (F)

FRWS 4600 Conservation Biology* 3
Patterns and processes creating biological diversity. Causes and consequences of diversity losses from genes to ecosystems, including habitat fragmentation and exotic invasion. Conservation laws and organizations. Approaches to conserving diversity loss, including reserve design, corridors, and species reintroductions. Prerequisite: NR/BIOL 2220. (Sp)

FRWS 4700 Ecological Foundations of Restoration 3
Explores meanings of "restoration," use of reference communities, restoration of processes versus structure, species reintroductions, managing natural processes to meet restoration goals, and fundamentals of physiological, population, community, and ecosystem ecology from a restoration perspective. Prerequisites: NR/BIOL 2220, FRWS 3850. (Sp)

FRWS 4810 Directed Reading in Wildlife Damage Management 2©
Focuses on wildlife damage management, especially as it reflects on both positive and negative human-wildlife interactions. For this reading course, students work with instructor to develop appropriate and rigorous reading program. (F,Sp,Su)

FRWS 4880 Genetics in Conservation and Management 3
Introduces principles of modern genetics, with applications, examples, and assignments related to ecology and management issues. Emphasizes genetic marker systems, gene flow, genetic drift, and adaptation. Prerequisites: CHEM 1110 or 1220; BIOL 1210. (F)

FRWS 4950 Special Topics 1-3®
Individual study and research upon selected problems. Prerequisite: Departmental permission. (F,Sp,Su)

FRWS 4960 Directed Readings 1-3®
Individual reading research on forest, range, and wildlife science readings. Prerequisite: Departmental approval. (F,Sp,Su)

FRWS 4970 Undergraduate Research 1-3®
Individual or team research. Prerequisite: Departmental permission. (F,Sp,Su)

FRWS 4980 Undergraduate Seminar 1®
Intended to bring upperclassmen up-to-date on topics in forest, range, and wildlife sciences. (F,Sp)

FRWS 5000 Predator Ecology and Management* 3
Reviews biology, ecology, theory, management, and policy issues involving large vertebrate predators. Uses case histories to explore predation theory, population ecology, natural history, and management strategies. (Sp)

FRWS 5070 Range Wildlife Relations 3
(dual listing 6070)
Explores interactions on rangelands between wild and domestic ungulates, as well as other wildlife forms around the world, but with emphasis on western North America. Prerequisite: FRWS 3610 or permission of instructor. (F)

FRWS 5100 Wildlife Management Laboratory 3
Familiarizes students with variety of wildlife management and research techniques and strategies, including techniques to catch, mark, and restrain wild animals; monitoring wildlife populations; measuring physiological parameters; measuring habitat variables; assessing and preventing wildlife damage; and interpreting and analyzing biological data. (F)

FRWS 5220 Community-based Conservation
(dual listing 7220) Partnerships 3**
Seeks to infuse ecology with applied conservation and management approaches. Conservation and management of natural resources requires an understanding of ecological relationships and strategies for working with diverse stakeholders. PhD-level students present their research. (Sp)

FRWS 5300 Wildlife Damage Management Principles 3
(dual listing 7300)
Explains current legal, ethical, and biological principles for the control and/or management of problem vertebrate species. (Sp)

FRWS 5350 Wildland Soils 3
(dual listing 6350)
Application of basic principles of soil science to wildland ecosystems. Effects of disturbance and land use on wildland soil properties. Role of soils in natural resource management. Prerequisites: CHEM 1110; SOIL 3000, and one additional upper-division Soils course, or permission of instructor. Also taught as SOIL 5350/6350. (Sp)

FRWS 5420 CI Forest and Shade Tree Pathology 3
Nature, cause, and management of forest diseases. Also taught as BIOL 5420 and PLSC 5420. (Sp)

FRWS 5430 Advanced Forest Pathology 2
In-depth exploration of forest pathology issues, focusing on ecosystem-level processes. (Sp)

FRWS 5460 Avalanche and Snow Dynamics 2
Fundamentals of snow and avalanche dynamics. Avalanche safety, forecasting, hazard evaluation, and control. (Sp—first half)

FRWS 5510 Forest Entomology 2
Basic insect taxonomy, life histories, structure, and function. Ecological relationships, recognition, and management of insects of economic importance to forestry. This course is not currently being offered. For information about when it may be offered, contact the department.

FRWS 5650 Urban/Community Forestry 3
Social, biological, and administrative aspects of managing urban/community forests, including field and classroom exercises and a management planning project. Also taught as PLSC 5650. (Sp)

FRWS 5700 Forest Assessment and Management 3
Detailed analysis of forest stand structure and growth. Development of silvicultural prescriptions to meet specific objectives. Analysis of costs and benefits of alternative forest management strategies. Emphasizes forest management to achieve a broad range of objectives. (Sp)

FRWS 5710 Wildland Disturbance: Ecology and Management 3
Examines causes, effects, and management options for selected biotic and abiotic agents of disturbance in wildland ecosystems. (F)

FRWS 5750 Applied Remote Sensing 3
(dual listing 6750)
Covers the application of remote sensing to landcover mapping and resource monitoring at a quantitative level. Students instructed on the effects of atmosphere and surface interaction on the reflectance collected by electro-optical sensors, as well as on the proper use and interpretation of various calibration and classification algorithms. (F)

FRWS 5860 Poisonous Range Plants Affecting Livestock 3**
Poisonous plants of rangelands and their effects on grazing animals, especially livestock. Management practices to reduce or prevent poisoning. Also taught as ADVS 5860. (Sp)

FRWS 6000 Grazing Systems 2**
Overview and analysis of various strategies for managing grazing on rangelands. Special attention given to ecological mechanisms by which a particular grazing system may benefit livestock production or the sustainability of rangeland resources. (Sp)

FRWS 6050 Rangeland Fire Ecology and Fire Prescription Development 3
Provides understanding of the role prescribed and natural fires have in western U.S. rangeland plant communities, and when fire can be used to achieve a specific plant community. Students learn basics of fire behavior and ignition techniques, and how to write prescribed fire use plans. This course is not currently being offered. For information about when it may be offered, contact the department.

FRWS 6070 Range Wildlife Relations 3
(dual listing 5070)
Explores interactions on rangelands between wild and domestic ungulates, as well as other wildlife forms around the world, but with emphasis on western North America. Prerequisite: FRWS 3610 or permission of instructor. (F)

FRWS 6180 Molecular Population Genetics Laboratory 5
Application of molecular techniques to population genetics, ecology, and systematics. Includes experimental and sampling design, and data analysis. Prerequisite: BIOL 5170/6170 or permission of instructor. Also taught as BIOL 6180. (F)

FRWS 6200 Biogeochemistry of Terrestrial Ecosystems 3**
Inputs, outputs, and cycling patterns of major nutrients. Emphasis on mechanisms for transformations, factors influencing process rates, and the impacts of management and global change on nutrient cycles and air and water quality. Prerequisites: BIOL 1220, SOIL 3000, CHEM 2300 or 2310, or permission of instructor. Also taught as BIOL 6200 and SOIL 6200. (F)

Course Descriptions

FRWS 6240 Graduate Internship/Co-op 1-9®
Graduate-level educational experience in internship/cooperative education position approved by department. (F,Sp,Su)

FRWS 6270 Advanced Silviculture 3
In forestry, there is a trend toward more complex silviculture to implement increasingly complex stand-level objectives. This course covers important techniques used in the development and implementation of silvicultural prescriptions for this sort of stand management. Prerequisite: Permission of instructor. (Sp)

FRWS 6350 Wildland Soils 3
(dual listing 5350)
Application of basic principles of soil science to wildland ecosystems. Effects of disturbance and land use on wildland soil properties. Role of soils in natural resource management. Prerequisites: CHEM 1110; SOIL 3000, and one additional upper-division Soils course, or permission of instructor. Also taught as SOIL 6350/5350. (Sp)

FRWS 6400 Ecology of Animal Populations* 4
Growth, fluctuation, balance, and control of animal populations. Prerequisite: NR/BIOL 2220 or equivalent. (F)

FRWS 6420 Vegetation Sampling Design 4
Advanced intrastand vegetation sampling design and elementary (nonmultivariate) between stand comparisons, primarily for research purposes. Prerequisites: STAT 5200; FRWS 6770. (Su)

FRWS 6500 Biometry: Design and Analysis of Ecology Research 4
Examines research design from statistical perspective, showing how data analysis is largely determined by research design and its implementation. Reviews statistical tools for analysis of ecological data in the context of design. Prerequisite: Graduate standing. (F)

FRWS 6510 Topics in Spatial Ecology 1-3®**
Seminars on analysis and interpretation of spatially explicit ecological data. Topics vary yearly, and range from spatial statistics to assessing uncertainty in environmental information systems to spatial analyses of plant and animal populations. Prerequisites: Graduate-level course in statistics and permission of instructor. (Sp)

FRWS 6610 Regional Terrestrial Ecosystems 4
Synthesis of structural functional and regulatory processes and their interactions with humans in terrestrial ecosystems found in the Intermountain West and Great Plains. Prerequisites: NR/BIOL 2220, SOIL 3000; or equivalent courses. This course is not currently being offered. For information about when it may be offered, contact the department.

FRWS 6710 Landscape Ecology 3
(dual listing 7710)
Focuses on landscape-scale patterns and processes, and ways of understanding ecological complexity. Explores conceptual underpinnings of larger-scale ecology. Emphasizes understanding of current peer-reviewed literature. (Sp)

FRWS 6720 Advanced Conservation Biology* 3
(dual listing 7720)
Examines cases and consequences of population and species declines, including activities such as habitat fragmentation and introduction of exotic species, as well as natural causes due to genetics and demography. (Sp)

FRWS 6740 Physical Processes in Remote Sensing 3
Assures that students are well-versed in the science and technology of remote sensing. Covers various algorithms and their ability to extract biophysical information from remotely sensed images. Helps students gain firm knowledge of the capabilities and limitations of these algorithms and their use in understanding landscape level biophysical interactions. (Sp)

FRWS 6750 Applied Remote Sensing 3
(dual listing 5750)
Covers the application of remote sensing to landcover mapping and resource monitoring at a quantitative level. Students instructed on the effects of atmosphere and surface interaction on the reflectance collected by electro-optical sensors, as well as on the proper use and interpretation of various calibration and classification algorithms. (F)

FRWS 6770 Plant Community Ecology* 3
Theory and concepts of plant community ecology. Plant community composition, distribution in space, and dynamics in time. Species environmental response models, competition theory, statistical predictive models, and concepts of multivariate analysis in plant ecology. Prerequisites: NR/BIOL 2220 or equivalent; and ecology core courses (may be taken concurrently). (Sp)

FRWS 6800 Forest, Range, and Wildlife
(dual listing 7800) Sciences Departmental Seminar 1®
Review of current research by graduate students and faculty. (F,Sp)

FRWS 6850 Population Ecology 3
(dual listing 7850)
Using framework of mathematical modeling, reviews basic ecological processes (e.g., competition, predation, and environmental stresses) that determine numbers of individuals in plant and animal populations. This course is not currently being offered. For information about when it may be offered, contact the department.

FRWS 6870 Ecology Seminar 1®
The Ecology Center schedules regular seminars throughout the school year with ecological scientists from other institutions participating. Ecology majors are required to attend a minimum of 10 such lectures. Students should register for fall semester, but attend through spring semester. Also taught as AWER 6870, ENVS 6870, and BIOL 6870. (F,Sp)

FRWS 6880 Current Issues in Conservation
(dual listing 7880) Genetics and Management* 2
Reviews variety of topics in fast-moving field of conservation genetics. Explores management applications and implications, with particular emphasis on current primary literature. Recommended prerequisite: Prior course in genetics. (Sp)

FRWS 6900 Graduate Special Topics 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

FRWS 6910 Directed Study 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

FRWS 6960 Graduate General Ecology 5
General concepts, history, and issues in all major areas of the science of ecology including: environmental biophysics; and physiological, behavioral, evolutionary, community, ecosystem, and applied ecology in both terrestrial and aquatic environments. Also taught as AWER 6960, BIOL 6960, and ENVS 6960. (F)

FRWS 6970 Thesis Research 1-12®
Original research for MS degree on a problem in rangeland resources. (F,Sp,Su)

FRWS 6990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

FRWS 7000 Theory and Applications of Rangeland Ecosystem Management 3
Application of range management principles, new theory, and public policy to on-the-ground decision-making in public and private lands. Field trips required. (F)

FRWS 7030 Plant-Herbivore Interactions* 3
Emphasizes principles of self-organization as applied to plant (tolerance and avoidance of herbivory) and herbivore (food and habitat selection) behavior. Stresses importance of history and ongoing interactions with the environment in understanding the dynamics of plant-herbivore interactions. (Sp)

FRWS 7200 Plant Physiological Ecology 3**
Plant response to environmental factors; includes environmental biophysics, physical and physiological factors influencing productivity, water use, resistance to stress, reproduction, establishment of plants, and competition with neighboring plants. (F)

FRWS 7220 Community-based Conservation
(dual listing 5220) Partnerships 3**
Seeks to infuse ecology with applied conservation and management approaches. Conservation and management of natural resources requires an understanding of ecological relationships and strategies for working with diverse stakeholders. PhD-level students present their research. (Sp)

FRWS 7300 Wildlife Damage Management Principles 3
(dual listing 5300)
Explains current legal, ethical, and biological principles for the control and/or management of problem vertebrate species. (Sp)

FRWS 7400 Plant Population Ecology* 3
Dynamics of plant populations as influenced by interactions with their abiotic and, especially, biotic environments. Topics include dormancy and germination strategies, intra- and interspecific competition, facilitation, disturbance, herbivory, pathogenic and mutualistic fungi, pollination, seed dispersal, and vegetative reproduction. (F)

FRWS 7420 Analysis of Ecological Communities 5**
Advanced treatment of classification and ordination of ecological communities, emphasizing ecological data structures and methods of common use in ecological research. Prerequisite: STAT 3000 or FRWS 6500 or consent of instructor. (Sp)

FRWS 7710 Landscape Ecology 3
(dual listing 6710)
Focuses on landscape-scale patterns and processes, and ways of understanding ecological complexity. Explores conceptual underpinnings of larger-scale ecology. Emphasizes understanding of current peer-reviewed literature. (Sp)

FRWS 7720 Advanced Conservation Biology* 3
(dual listing 6720)
Examines cases and consequences of population and species declines, including activities such as habitat fragmentation and introduction of exotic species, as well as natural causes due to genetics and demography. (Sp)

FRWS 7800 Forest, Range, and Wildlife
(dual listing 6800) Sciences Departmental Seminar 1®
Review of current research by graduate students and faculty. (F,Sp)

FRWS 7850 Population Ecology 3
(dual listing 6850)
Using framework of mathematical modeling, reviews basic ecological processes (e.g., competition, predation, and environmental stresses) that determine numbers of individuals in plant and animal populations. This course is not currently being offered. For information about when it may be offered, contact the department.

FRWS 7880 Current Issues in Conservation
(dual listing 6880) Genetics and Management* 2
Reviews variety of topics in fast-moving field of conservation genetics. Explores management applications and implications, with particular emphasis on current primary literature. Recommended prerequisite: Prior course in genetics. (Sp)

FRWS 7900 Graduate Special Topics 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

FRWS 7910 Directed Study 1-6®
Offers credit for special assignments, reading, and seminars beyond regularly scheduled courses. (F,Sp,Su)

FRWS 7970 Dissertation Research 1-12®
Original research and study for PhD degree. (F,Sp,Su)

FRWS 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.

Geology (GEO)
(formerly GEOL)

See Department of Geology, pages 315-320.

GEO 1010 BPS Geology of National Parks:
Introduction to Geology 3©
(formerly GEOL 1100 BPS)
Plate tectonics and internal and external earth processes, using national parks for examples. Emphasizes mineral and rock identification, as well as recognition of basic geologic features. Two lectures per week and seven weeks of lab. (F,Su)

GEO 1060 BPS Introduction to Environmental Geoscience 3
(formerly GEOL 1200 BPS)
Explores the earth's internal and external processes. Interprets the roles these processes play in human habitation of the planet. Evaluates the interplay occurring between humans and the earth, as in the distribution of resources and the development of civilization. (Sp)

GEO 1110 BPS The Dynamic Earth: Physical Geology 4
(formerly GEOL 1150 BPS)
Physical processes, both internal and external, shaping the Earth. Igneous, metamorphic, and sedimentary environments and products. Emphasizes geology as an applied science, relying on other basic sciences as tools for interpretation and understanding. Three lectures and one two-hour lab per week. (F,Sp)

GEO 1120 Geology of National Parks Field Trip 1
(formerly GEOL 1110)
One weekend field trip to a western national park, allowing students to observe geologic features and processes, and to gain hands-on practice in rock identification. Limited to 30 participants. Requires some strenuous hiking. Prerequisite or corequisite: GEO 1010. (F,Su)

GEO 2250 Introductory Internship/Co-op 1-4®
Introductory educational work experience. (F,Sp,Su)

GEO 2500 Geology Field Excursions 1®
Geologic features and processes observed in the field. Prerequisite: GEO 1010 or 1110. (F,Sp)

GEO 3100 DSC Natural Disasters 3
Hazardous geologic processes affecting humans. Cause, prediction, avoidance, and frequency of natural disasters, including earthquakes, volcanic eruptions, tsunamis, landslides, floods, subsidence, meteorite impacts, and global changes. Topics discussed in the context of earth systems and cycles. Three lectures per week. Prerequisite: One Breadth Physical Sciences (BPS) course. (Sp)

GEO 3200 DSC The Earth Through Time 4©
Investigates dynamic nature of Earth's physical and biological processes, and how these processes have shaped Earth's 4.5 billion-year history. Emphasis on interpretation of the story of the geologic record (rocks and landforms) and Earth's sequential physical and biological changes. Three lectures and one two-hour lab per week. Prerequisite: GEO 1010 or 1110. (Sp)

GEO 3300 DSC Geology of the World's Oceans 3
Geologic evidence for the development of ocean basins and continental margins through plate tectonic processes. Also, the interaction of the geo- and biospheres and their effect on the evolution of the oceans and atmosphere. Discussion of shoreline and marine environments, the organisms inhabiting them, and the physical and chemical processes in operation therein. Three lectures per week. Prerequisite: One University Studies Breadth Physical Sciences (BPS) course. (Sp)

GEO 3500 Mineralogy and Crystallography 4
Introduction to crystallography, crystal chemistry, and descriptive mineralogy. Three lectures and one three-hour lab per week. Prerequisites: CHEM 1210 and GEO 1110. (F)

GEO 3520 Optical Mineralogy and Petrography 2
Introduction to the theory of optical crystallography. Determination of minerals using the petrographic microscope. One lecture and one lab per week. Prerequisite: GEO 3500. (Sp)

Course Descriptions

GEO 3550 CI Sedimentation and Stratigraphy 4
Classification and analysis of sedimentary rocks and structures, with an emphasis on the interpretation of ancient sedimentary environments. Controls on sedimentary processes over time. Principles of stratigraphic correlation. Three lectures and one lab per week. Prerequisite: GEO 3200. (F)

GEO 3600 Geomorphology 4
Geomorphic processes, origin of landforms and surficial deposits. Emphasizes fluvial and hillslope landscape elements, and surficial geologic mapping. Three one-hour lectures and one three-hour lab per week. Prerequisite: GEO 1010 or 1110 or GEOG 1000. Also taught as AWER 3600. (F)

GEO 3700 Structural Geology 4
Examines the mechanisms, mechanics, and geometrics of deformed rocks. Basic principles of rock deformation, stress and strain, fault and fold classifications, and the mechanisms by which rocks deform. Lab presents applications and techniques important for accurately describing and representing deformed rocks in maps and cross-sections, and how to interpret and present data on rock structures. Three lectures and one three-hour lab per week. Prerequisite: GEO 3550. (Sp)

GEO 4250 Advanced Internship/Co-op 1-4®
Advanced educational work experience. (F,Sp,Su)

GEO 4500 Igneous and Metamorphic Petrology* 4
Origin, processes of formation, classification, and identification of igneous and metamorphic rocks. Study of igneous and metamorphic rocks in hand specimens and thin sections. Three lectures and one three-hour lab per week. Prerequisite: GEO 3500; corequisite: GEO 3520. (Sp)

GEO 4700 CI Geologic Field Methods* 3
Collection, recording, and interpretation of geologic deposits and processes in the field. Written reports with geologic maps, cross-sections, and graphs are required. Two extended lab periods per week, weekend day trips, and one lecture per week. Fieldwork will end early. Prerequisite: GEO 3700. (F)

GEO 4900 Special Problems 1-4®
Directed study of selected topics. Written report required. Prerequisite: Permission of instructor. (F,Sp)

GEO 5150 Fluvial Geomorphology 3
(dual listing 6150)
Focuses on physical processes in streams that control their shape, plan form, slope, bed material, and distribution of channel bars. Emphasizes field analysis of these topics, and application of geomorphology to aquatic ecology and environmental restoration. Prerequisite: GEO/AWER 3600. Also taught as AWER 5150/6150. (F)

GEO 5170 Fluvial Geomorphology Lab 2
(dual listing 6170)
Field analysis focuses on physical processes in streams which control their shape, plan form, slope, bed material, and distribution of channel bars. Application of geomorphology to aquatic ecology and environmental restoration. Prerequisite: GEO/AWER 3600. Also taught as AWER 5170/6170. (F)

GEO 5200 Geology Field Camp* 5
Integrative approach to examining geologic relationships in the field, deciphering geologic evolution of map regions, and interpreting the structure and distribution of rocks. Results presented in reports, maps, cross-sections, and graphical formats. Requires 40-45 hours of lab per week for 3.5-4.0 weeks. Prerequisites: GEO 3500, 3550, 3600, 3700, 4700. (Su)

GEO 5410 Introduction to Clay Mineralogy* 2
(dual listing 6410)
Introduction to and application of techniques, such as X-ray diffraction, differential thermal analysis, and chemical analysis, to study of clay minerals. Examination of the effects of clay mineral structures on physical and chemical properties. Three lectures and one lab per week; half semester. Prerequisite: GEO 3500. (Sp)

GEO 5420 Metallic Mineral Deposits* 4
Origin and occurrence of metallic mineral deposits, study of representative ore suites, and field trips to active mines. Three lectures and one lab per week. Prerequisite: GEO 4500. (Sp)

GEO 5430 Paleontology* 2
Survey of prominent microfossil and invertebrate taxa, including their diagnostic morphologic features, stratigraphic ranges, and environmental tolerances. Equips students with the necessary information and techniques to enable them to recognize and utilize fossils in stratigraphic and paleoenvironmental interpretation. Three lectures and one lab per week. Half semester; may be paired with GEO 5440. Prerequisite: GEO 3200. (F)

GEO 5440 CI Paleoecology* 2
(dual listing 6440)
Interrelationships between various organisms and between organisms and their environment. Provides field, laboratory, and quantitative techniques for the interpretation of ancient environments and the analysis of past biotic interrelationships. Three lectures and one lab per week. Half semester; may be paired with GEO 5430. Prerequisite: GEO 5430. (F)

GEO 5460 Advanced Physical Sedimentology* 3
(dual listing 6460)
Detailed interpretation of sedimentary rocks, based on petrography and sedimentary characteristics. Source terranes, tectonic settings, depositional environments, and diagenetic changes during burial. Three lectures and two labs per week. Half semester. Prerequisites: GEO 3500 and 3550. (F)

GEO 5470 Chemical Sedimentary Rocks* 2
(dual listing 6470)
Application of field observations, hand-sample, thin-section, and X-ray diffraction analyses to the interpretation of chemical sedimentary rocks. Emphasizes determination of depositional environment and evaluation of diagenetic changes. Three lectures and one lab per week. Half semester. Prerequisites: GEO 3500 and 3550. (Sp)

GEO 5480 Sedimentary Basin Analysis 3
(dual listing 6480)
Detailed coverage of techniques of sedimentary basin analysis, including depositional systems, provenance, basin modeling, and fluid and heat flow history. Survey of types of sedimentary basins worldwide. Prerequisites: GEO 3500 and 3550. (F)

GEO 5500 Advanced Igneous Petrology* 4
(dual listing 6500)
Advanced concepts in the origin and evolution of magmatic systems, effects of different tectono thermal regimes on magma genesis, magma dynamics, and phase equilibria in magmatic systems. Concepts illustrated by rock suites from classic locations. Three lectures and three laboratory hours each week. Prerequisite: GEO 4500 or equivalent. (F)

GEO 5510 QI Groundwater Geology 3
Provides graduate students and senior undergraduates with understanding of fundamental principles of groundwater geology and hydrology, and helps prepare them for careers in hydrogeology or environmental geology. Three lectures per week. Prerequisites: GEO 1110 and MATH 1210 or permission of instructor; GEO/AWER 3600 recommended. (F)

GEO 5520 CI Techniques of Groundwater Investigations 3
(dual listing 6520)
Survey of techniques used in groundwater investigations for collecting physical and chemical data. Includes well drilling and construction; water level, flow rate, and discharge measurements; hydraulic and tracer tests; and groundwater sampling. Prerequisite: GEO 5510 or permission of instructor. (Sp)

GEO 5530 QI Petroleum Systems: Principles of Exploration and Development* 3
Analysis of the petroleum system from source to trap. Examines processes of generation, migration, and accumulation of oil and gas. Overview of petroleum economics and technology. Prerequisites: GEO 3550 and 3700; or permission of instructor. (Sp)

GEO 5540 QI Quantitative Methods in Geology* 3
(dual listing 6540)
Application of various quantitative methodologies to geologic problems. Two lectures and one lab per week. (F)

GEO 5550 (dual listing 6550) Geochemical Application of Electron Microprobe and X-Ray Fluorescence Analysis* 4
Theory and application of X-ray fluorescence spectrometry and the electron microprobe to problems in geochemistry and materials analysis. Two hours lecture and six hours laboratory per week. Prerequisite: CHEM 1210 or equivalent, or permission of instructor. (Sp)

GEO 5560 Subsurface Analyses: Principles and Techniques* 1
Survey of techniques used to characterize subsurface geologic environments. Includes map and three-dimensional depictions, well-log analyses, reflection seismology, and volumetric and risk analysis. Prerequisites: GEO 3550, 3700, or permission of instructor. (Sp)

GEO 5600 Geochemistry 3
Application of thermodynamics, solution chemistry, phase diagrams, and both radioactive and stable isotopes to the understanding of earth processes. Three lectures per week. Prerequisite: GEO 3500. (F)

GEO 5610 (dual listing 6610) Tectonic Evolution of North America* 3
Survey of tectonic styles and processes along plate margins, using the tectonic evolution of western North America as the prime example. Two lectures and one lab per week. Prerequisite: GEO 3700.

GEO 5620 QI (dual listing 6620) Global Geophysics* 3
Application of physics to understanding geologic processes, the earth's interior, and the theory of plate tectonics. Two lectures and one two-hour lab per week. Prerequisites: GEO 3700 and PHYX 2220.

GEO 5630 Photogeology* 2
Interpretation of geologic features on aerial photographs. Three two-hour labs per week. Half semester; may be paired with GEO 4700. Prerequisites: GEO 3600, 3700.

GEO 5650 Senior Thesis 1-4®
Prerequisite: Permission of instructor. (F,Sp)

GEO 5680 (dual listing 6680) Paleoclimatology* 3
Covers climate through the past four billion years of geologic time. Explores driving forces behind climate changes. Examines data and methods used in paleoclimate research. Includes discussion of literature and stresses local paleoclimate records. Three lectures per week, along with field trips. Prerequisite: GEO/AWER 3600 or permission of instructor. Also taught as AWER 5680/6680. (Sp)

GEO 5900 Topics for Teachers 1-4®
Special topics in geology for elementary and secondary science teachers to provide an understanding of the geology of Utah and the Western United States. Emphasis on field and lab activities. Prerequisite: Introductory geology course or permission of instructor.

GEO 6050 (dual listing 7050) Graduate Seminar in Tectonics (Topic) 1-3®
Advanced topics of current interest in tectonics and orogenesis. (F,Sp)

GEO 6100 (dual listing 7100) Graduate Seminar in Geomorphology (Topic) 1-3®
Advanced topics of current interest in geomorphology and landscape evolution. (F,Sp)

GEO 6120 (dual listing 7120) Advanced Geomorphology* 3
Process geomorphology seminar focusing on hillslope, tectonic, and climatic geomorphology research. (Sp)

GEO 6150 (dual listing 5150) Fluvial Geomorphology 3
Focuses on physical processes in streams that control their shape, plan form, slope, bed material, and distribution of channel bars. Emphasizes field analysis of these topics, and application of geomorphology to aquatic ecology and environmental restoration. Prerequisite: GEO/AWER 3600. Also taught as AWER 6150/5150. (F)

GEO 6160 Hillslope and Landscape Geomorphology* 3
Includes basics of hillslope weathering, transport, and hydrologic processes. Surveys classic and recent literature on hillslope-scale and landscape-scale geomorphic research. Three lectures and several Saturday field trips. Prerequisite: GEO/AWER 3600. Also taught as AWER 6160. (Sp)

GEO 6170 (dual listing 5170) Fluvial Geomorphology Lab 2
Field analysis focuses on physical processes in streams which control their shape, plan form, slope, bed material, and distribution of channel bars. Application of geomorphology to aquatic ecology and environmental restoration. Prerequisite: GEO/AWER 3600. Also taught as AWER 6170/5170. (F)

GEO 6200 (dual listing 7200) Graduate Seminar in Geochemistry (Topic) 1-3®
Advanced topics of current interest in geochemistry. (F,Sp)

GEO 6240 Structural Analysis of Deformed Geological Materials* 3
Explores how rocks, sediments, ice, and soils deform. By examining the geometry, kinematics, mechanics, and mechanisms of deformation, students learn how to interpret deformed materials in the field and laboratory.

GEO 6250 Mechanics and Processes in Earth Sciences* 3
Fundamentals of solid and fluid mechanics with applications to the earth sciences. Applications to rock deformation, fluid flow, glacier movement, and slope stability. Designed for graduate students in earth sciences and engineering. Two lectures, one lab per week. Prerequisites: GEO 3700, MATH 1210; or permission of instructor. (F)

GEO 6300 (dual listing 7300) Graduate Seminar in Petrology (Topic) 1-3®
Advanced topics of current interest in petrology of igneous, metamorphic, or sedimentary rocks. (F,Sp)

GEO 6350 (dual listing 7350) Graduate Seminar in Paleontology and Paleoecology (Topic) 1-3®
Advanced topics in paleontology, paleoecology, and the evolution of ancient life. (F,Sp)

GEO 6400 (dual listing 7400) Graduate Seminar in Sedimentary Geology (Topic) 1-3®
Advanced topics of current interest in sedimentary geology, depositional systems, and basin evolution. (F,Sp)

GEO 6410 (dual listing 5410) Introduction to Clay Mineralogy* 2
Introduction to and application of techniques, such as X-ray diffraction, differential thermal analysis, and chemical analysis, to study of clay minerals. Examination of the effects of clay mineral structures on physical and chemical properties. Three lectures and one lab per week; half semester. Prerequisite: GEO 3500. (Sp)

GEO 6440 (dual listing 5440) Paleoecology* 2
Interrelationships between various organisms and between organisms and their environment. Provides field, laboratory, and quantitative techniques for the interpretation of ancient environments and the analysis of past biotic interrelationships. Three lectures and one lab per week. Half semester; may be paired with GEO 5430. Prerequisite: GEO 5430. (F)

GEO 6460 (dual listing 5460) Advanced Physical Sedimentology* 3
Detailed interpretation of sedimentary rocks, based on petrography and sedimentary characteristics. Source terranes, tectonic settings, depositional environments, and diagenetic changes during burial. Three lectures and two labs per week. Half semester. Prerequisites: GEO 3500 and 3550. (F)

GEO 6470 (dual listing 5470) Chemical Sedimentary Rocks* 2
Application of field observations, hand-sample, thin-section, and X-ray diffraction analyses to the interpretation of chemical sedimentary rocks. Emphasizes determination of depositional environment and evaluation of diagenetic changes. Three lectures and one lab per week. Half semester. Prerequisites: GEO 3500 and 3550. (Sp)

GEO 6480 Sedimentary Basin Analysis 3
(dual listing 5480)
Detailed coverage of techniques of sedimentary basin analysis, including depositional systems, provenance, basin modeling, and fluid and heat flow history. Survey of types of sedimentary basins worldwide. Prerequisites: GEO 3500 and 3550. (F)

GEO 6500 Advanced Igneous Petrology* 4
(dual listing 5500)
Advanced concepts in the origin and evolution of magmatic systems, effects of different tectono thermal regimes on magma genesis, magma dynamics, and phase equilibria in magmatic systems. Concepts illustrated by rock suites from classic locations. Three lectures and three laboratory hours each week. Prerequisite: GEO 4500 or equivalent. (F)

GEO 6510 Graduate Seminar in Hydrology (Topic) 1-3®
(dual listing 7510)
Advanced topics of current interest in hydrology. (F,Sp)

GEO 6520 Techniques of Groundwater Investigations 3
(dual listing 5520)
Survey of techniques used in groundwater investigations for collecting physical and chemical data. Includes well drilling and construction; water level, flow rate, and discharge measurements; hydraulic and tracer tests; and groundwater sampling. Prerequisite: GEO 5510 or permission of instructor. (Sp)

GEO 6540 Quantitative Methods in Geology* 3
(dual listing 5540)
Application of various quantitative methodologies to geologic problems. Two lectures and one lab per week.

GEO 6550 Geochemical Application of Electron
(dual listing 5550) Microprobe and X-Ray Fluorescence Analysis* 4
Theory and application of X-ray fluorescence spectrometry and the electron microprobe to problems in geochemistry and materials analysis. Two hours lecture and six hours laboratory per week. Prerequisite: CHEM 1210 or equivalent, or permission of instructor. (Sp)

GEO 6600 Graduate Seminar in
(dual listing 7600) Geophysics (Topic) 1-3®
Advanced topics of current interest in geophysics. (F,Sp)

GEO 6610 Tectonic Evolution of North America* 3
(dual listing 5610)
Survey of tectonic styles and processes along plate margins, using the tectonic evolution of western North America as the prime example. Two lectures and one lab per week. Prerequisite: GEO 3700.

GEO 6620 Global Geophysics* 3
(dual listing 5620)
Application of physics to understanding geologic processes, the earth's interior, and the theory of plate tectonics. Two lectures and one two-hour lab per week. Prerequisites: GEO 3700 and PHYX 2220.

GEO 6680 Paleoclimatology* 3
(dual listing 5680)
Covers climate through the past four billion years of geologic time. Explores driving forces behind climate changes. Examines data and methods used in paleoclimate research. Includes discussion of literature and stresses local paleoclimate records. Three lectures per week, along with field trips. Prerequisite: GEO/AWER 3600 or permission of instructor. Also taught as AWER 6680/5680. (Sp)

GEO 6700 Graduate Seminar in
(dual listing 7700) Structural Geology (Topic) 1-3®
Advanced topics of current interest in structural geology. (F,Sp)

GEO 6800 Seminar 1-4®

GEO 6900 Graduate Internship/Co-op Experience 1-6
Graduate educational work experience. Prerequisite: Approval of contract between student and department prior to enrollment. (F,Sp,Su)

GEO 6970 Thesis 1-9®
(F,Sp,Su)

GEO 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

GEO 7050 Graduate Seminar in Tectonics (Topic) 1-3®
(dual listing 6050)
Advanced topics of current interest in tectonics and orogenesis. (F,Sp)

GEO 7100 Graduate Seminar in
(dual listing 6100) Geomorphology (Topic) 1-3®
Advanced topics of current interest in geomorphology and landscape evolution. (F,Sp)

GEO 7120 Advanced Geomorphology* 3
(dual listing 6120)
Process geomorphology seminar focusing on hillslope, tectonic, and climatic geomorphology research. (Sp)

GEO 7200 Graduate Seminar in
(dual listing 6200) Geochemistry (Topic) 1-3®
Advanced topics of current interest in geochemistry. (F,Sp)

GEO 7300 Graduate Seminar in
(dual listing 6300) Petrology (Topic) 1-3®
Advanced topics of current interest in petrology of igneous, metamorphic, or sedimentary rocks. (F,Sp)

GEO 7350 Graduate Seminar in Paleontology
(dual listing 6350) and Paleoecology (Topic) 1-3®
Advanced topics in paleontology, paleoecology, and the evolution of ancient life. (F,Sp)

GEO 7400 Graduate Seminar in
(dual listing 6400) Sedimentary Geology (Topic) 1-3®
Advanced topics of current interest in sedimentary geology, depositional systems, and basin evolution. (F,Sp)

GEO 7510 Graduate Seminar in Hydrology (Topic) 1-3®
(dual listing 6510)
Advanced topics of current interest in hydrology. (F,Sp)

GEO 7600 Graduate Seminar in
(dual listing 6600) Geophysics (Topic) 1-3®
Advanced topics of current interest in geophysics. (F,Sp)

GEO 7700 Graduate Seminar in
(dual listing 6700) Structural Geology (Topic) 1-3®
Advanced topics of current interest in structural geology. (F,Sp)

GEO 7800 Graduate Seminar Series 1®
(F,Sp,Su)

GEO 7970 Dissertation Research 1-12®
(F,Sp,Su)

GEO 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

*This course is taught alternating years. Check with department for information about when course will be taught.
®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Geography (GEOG)

See Department of Environment and Society, pages 293-302.

GEOG 1000 BPS Physical Geography 3©
(formerly GEOG 1130 BPS)
Geographic analysis of physical processes and spacial distribution of natural elements (i.e., the atmosphere, hydrosphere, lithosphere, and biosphere). (F,Sp,Su)

GEOG 1005 Physical Geography Lab 1
(formerly GEOG 1140)
Laboratory exercises in natural physical geography. Provides initial field and laboratory experiences in the earth system. Required for all geography majors. Prerequisite: GEOG 1000 (may be taken concurrently). (F,Sp)

GEOG 1300 BSS World Regional Geography 3©
(formerly GEOG 1030 BSS)
Survey of world cultural regions, with an analysis of political, economic, and resource patterns in their physical setting. (F)

GEOG 1400 BSS Human Geography 3
(formerly GEOG 2030 BSS)
Spatial study within selected socio-cultural settings, including cultural landscapes, rural-urban linkages, languages, religions, politics, and economic activities. (Sp)

GEOG 2130 Population Geography 3
Spatial analysis of demographic data emphasizing global distribution, population growth, measures of density, migration, settlement, and economic development. (Sp)

GEOG 3430 Political Geography 3
Study of relationship between Earth, people, and the state. Global political phenomena studied from a geographic perspective. Explores impact of natural resources territorial seas and the nature of the state. Also taught as POLS 3430. (Sp)

GEOG 3610 Geography of Rural/Urban Planning* 3
Analysis of the organization and interrelationships of urban-city and rural space. Emphasizes spatial planning of rural-urban environments to improve quality of life, internal structure of cities, and applied principles and practices of community planning. Field trips and applied class projects integrated into lectures and demonstrations. (F)

GEOG 3850 Map, Air Photo, and GIS Interpretation 4
Introduces students to theoretical and practical nature of maps, basic mapping processes, issues of scale, basic photogrammetry, interpretation of remotely sensed imagery, geographic referencing strategies, and geographic information systems. Includes weekly laboratory sessions. (F)

GEOG 4200 CI Regional Geography 3® ©
Analysis of physical and cultural geography for a variety of regions. Can be repeated for each different region as offered (e.g., Pacific Rim, Africa, Middle East, Europe, Asia, Latin America, and North America). (F,Sp,Su)

GEOG 4300 Geography Education
(dual listing 6300) Classroom Practicum 1-3®
Allows geography education students to participate in actual geography classroom teaching with experienced geography teachers. Students observe, work with individuals and groups of students, team-teach lesson(s) with the teacher, and self-teach individual lesson(s). (F,Sp,Su)

GEOG 4800 Teaching Geography 3
(dual listing 6800)
Designed specifically for geography education/social studies education students preparing to teach grades K-12. Exploration of national and state standards and core curriculum, as well as state-of-the-art geography education technology and teaching resources. Students develop teaching lessons, and gain classroom teaching experience with local geography teachers. (F)

GEOG 4850 Cartographic Design* 3
Techniques used in design and construction of maps, charts, and map projections. (Sp)

GEOG 5130 Geography Education Field Practicum 1-6
(dual listing 6130)
Specifically designed for undergraduate students and graduate students (teachers) who need specific classroom teaching experience in order to improve their quality of teaching and/or to carry out special classroom curriculum research as part of their geography education degrees. (F,Sp,Su)

GEOG 5650 DSS Developing Societies 3
(dual listing 6650)
Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. Also taught as ANTH 5650/6650 and SOC 5650/6650. (F)

GEOG 5810 Geography Education Inservice Workshop 3
(dual listing 6810)
Assists classroom teachers in broadening their perspective of Geography Education through increased knowledge, improving their geographic techniques, methods, and teaching resources for their classrooms. (F,Sp,Su)

GEOG 5900 Graduate Special Topics 1-4®
(dual listing 6900)
Designed for geography students involved in field research and/or internships. Provides opportunity for students to gain practical applied experience in their specialized academic emphasis in geography. (F,Sp,Su)

GEOG 5970 Classroom Technology
in Geography Education 3
Design, development, and application of contemporary technologies and multimedia classroom teaching resources for preservice and inservice geography education teachers. (F,Su)

GEOG 6130 Geography Education Field Practicum 1-6
(dual listing 5130)
Specifically designed for undergraduate students and graduate students (teachers) who need specific classroom teaching experience in order to improve their quality of teaching and/or to carry out special classroom curriculum research as part of their geography education degrees. (F,Sp,Su)

GEOG 6200 Advanced Regional Geography 3®
Critical analysis of world's regions, focusing on analysis and synthesis of a region's economic, political, population, and cultural themes in the context of physical environment and global processes. Repeatable for different regions. (F,Sp,Su)

GEOG 6300 Geography Education
(dual listing 4300) Classroom Practicum 1-3®
Allows geography education students to participate in actual geography classroom teaching with experienced geography teachers. Students observe, work with individuals and groups of students, team-teach lesson(s) with the teacher, and self-teach individual lesson(s). (F,Sp,Su)

GEOG 6650 Developing Societies 3
(dual listing 5650)
Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. Also taught as ANTH 6650/5650 and SOC 6650/5650. (F)

GEOG 6800 Teaching Geography 3
(dual listing 4800)
Designed specifically for geography education/social studies education students preparing to teach grades K-12. Exploration of national and state standards and core curriculum, as well as state-of-the-art geography education technology and teaching resources. Students develop teaching lessons, and gain classroom teaching experience with local geography teachers. (F)

GEOG 6810 Geography Education Inservice Workshop 3
(dual listing 5810)
Assists classroom teachers in broadening their perspective of Geography Education through increased knowledge, improving their geographic techniques, methods, and teaching resources for their classrooms. (F,Sp,Su)

GEOG 6900 Graduate Special Topics 1-4®
(dual listing 5900)
Designed for geography students involved in field research and/or internships. Provides opportunity for students to gain practical applied experience in their specialized academic emphasis in geography. (F,Sp,Su)

*Taught 2006-2007.
®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

German (GERM)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

Lower Division

GERM 1010 German First Year I 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Not open to those with more than one year high school German or equivalent. (F,Sp)

GERM 1020 German First Year II 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: GERM 1010 or at least one (but not more than two) years of German in high school or equivalent. (F,Sp)

GERM 1800 German I Study Abroad 1-4®
Intensive study in a German-speaking country, advancing proficiency in the four language skills and multicultural knowledge at the beginning level. No prerequisites. (Su)

GERM 2010 German Second Year I 4
Further development of first-year competencies with emphasis on language structure, vocabulary expansion, reading, writing, and conversation in the context of cross-cultural analysis. Prerequisite: GERM 1020 or equivalent. (F,Sp)

GERM 2020 German Second Year II 4
Further development of first-year competencies with emphasis on language structure, vocabulary expansion, reading, writing, and conversation in the context of cross-cultural analysis. Prerequisite: GERM 2010 or equivalent. (F,Sp)

GERM 2550 German Civilization* 3
Covers the most important developments in German-speaking countries from the High Middle Ages to the present. Deals with political, social, literary, historical, and artistic expressions of an emerging culture. Taught in English. (F)

GERM 2570 Contemporary Germany 3**
Covers the most important elements of contemporary German culture in its literary, social, and artistic manifestations, and the political and historical dimensions of agents of change. Taught in English. (Sp)

GERM 2800 German II Study Abroad 1-4®
Intensive study in a German-speaking country, advancing proficiency in the four language skills and multicultural knowledge at the second-year level. (Su)

GERM 2880 Individual Readings 1-4®
Individual study of selected readings in German. Prerequisite: Instructor's permission. (F,Sp)

Upper Division

Upper-division German courses (3000 level and above) are available *only* to students who have completed GERM 2020 or who can demonstrate equivalent proficiency through testing. All upper-division courses are taught in German, unless otherwise indicated.

GERM 3000 DHA Introduction to German Studies 3
Introduction to the discipline of German Studies (history, literature, the arts, philosophy, science, economics, politics, etc.), addressing information resources, research methods, student career goals, and practice. Advances oral and written language proficiency. (F)

GERM 3040 CI Advanced German Grammar and Composition 3
GERM 3050 CI Advanced German Grammar and Composition 3
Thorough review of German grammar and style. Application of rules of writing to compositions. Oral presentations of contemporary topics with graded difficulty. (F) (Sp)

GERM 3300 DHA Contemporary German Speaking Cultures 3
Multidisciplinary examination of current trends in contemporary cultures. Written, oral, visual, and electronic texts from the post-World War II period will be analyzed and placed in sociopolitical, economic, historical, and literary contexts. Emphasis on Germany as a multicultural society, and on related popular and minority cultural discourse. Interactive format. (Sp)

GERM 3510 CI Business German* 3
Study of current German business and commercial practices, terminology, and business-related communications skills in a multi-disciplinary and global world context. Advances the four language skills. (Sp)

GERM 3540 CI Techniques in Translating German Texts* 3
Approaches to translation. Specialized vocabulary, reference materials, and aids. Translation theory. Practical exercises. (F)

GERM 3550 DHA Cultural History of German Speaking Peoples 3**
Overview and critical analysis of cultural, historical, and intellectual developments that have shaped the civilizations of German-speaking peoples from 800 A.D. until the end of World War II. Examination of written, oral, visual, and electronic texts integrated in the context of Western philosophy and humanist thought. Interactive format. (F)

GERM 3600 DHA Survey of German Literature I 3**
Overview, with selected readings, of the major literary trends in German-speaking cultures from the medieval period to the early nineteenth century, including the study of genres, epochs, styles, and theories in the context of evolving cultures. (F)

GERM 3610 DHA Survey of German Literature II 3**
Overview, with selected readings, of the major literary trends in German-speaking cultures from the early nineteenth century to the present, including the study of genres, epochs, styles, and theories in the context of evolving cultures. (Sp)

GERM 3800 German III Study Abroad 1-4®
Intensive study in a German-speaking country, advancing proficiency in the four language skills and multicultural knowledge at the third-year level. (Su)

GERM 3880 Individual Readings 1-4®
Individual study of selected readings in German. Prerequisite: Instructor's permission. (F,Sp)

GERM 4200 Applied German Linguistics and Phonetics 3**
Discussion of syntactical and morphological problems of German, principles of language learning, and analysis of phonological and phonetic patterns. (Sp)

GERM 4600 Faust's Legacy 3**
Examination of the legendary figure of Faust through historical and contemporary perspectives. Analysis of the Faust theme and character as presented in literature, films, stage productions, and musicals. Taught in English. (F)

GERM 4610 German Narratives 3**
Readings from a wide range of narrative texts representing various historical periods. Focus on literary traditions within historical contexts. Examination of styles, motifs, and the theory of the novel. (Sp)

GERM 4650 DHA Trends in Modern German Literature* 3
Study of literary movements, topics, and styles of modern (twentieth century) German literature. Concentration on texts representing a variety of aesthetic expressions, central to experiences of twentieth-century life. (F)

GERM 4800 German IV Study Abroad 1-4®
Intensive study in a German-speaking country, advancing proficiency in the four language skills and multicultural knowledge at the fourth-year level. (Su)

GERM 4880 Individual Readings 1-4®
Readings in technical, scientific, and literary German. Prerequisite: Instructor's permission. (F,Sp)

GERM 4900 Special Topics* 3®
Selected critical topics and themes relating to German literature, culture, film, pedagogy, linguistics, and associated theories. Includes readings in English and German. Content determined by student need and interest. (Sp)

GERM 4910 German for Special Purposes 3**
Advances German communicative proficiency in the fields of business, science, and pedagogy. Promotes professional applications of German terminologies and procedures for science and commerce, as well as teaching methodology. Discipline-interactive projects advance the four language skills. (Sp)

GERM 4920 German Language Tutoring 1®
Allows students to develop tutoring skills by assisting professors in lower-division courses or fulfilling instructional duties for a comparable amount of time in the language laboratory, public schools, or similar activities with departmental approval. May be repeated to a maximum of 3 credits. Prerequisite: Permission of instructor. (F,Sp,Su)

GERM 6200 German Linguistics and Phonetics 3
Discussion of syntactical and morphological problems of German and principles of language learning. Phonological and phonetic patterns of the German language also discussed. Prerequisite: GERM 2020, another 3000-level or higher GERM course, or demonstrated proficiency through testing. (Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008.

Greek (GRK)

See Department of History, pages 332-337.
Also see Classics Minor, page 220.

GRK 1010 Beginning Ancient Greek I 5
Basics of Greek grammar and vocabulary. Beginning readings. Prerequisites: LATN 1010, 1020. (F)

GRK 1020 Beginning Ancient Greek II 5
Intermediate concepts of Greek grammar and vocabulary. Intermediate readings. Prerequisite: GRK 1010. (Sp)

GRK 3300 Intermediate Greek Prose 3
Readings in ancient Greek prose. Prerequisite: Minimum grade of *C*+ or higher in GRK 1020. (F)

GRK 3330 Intermediate Greek Poetry 3
Readings in Greek poetry. Prerequisite: Minimum grade of *C*+ or higher in GRK 1020. (Sp)

GRK 4300 Advanced Greek Readings 3®
Readings in Ancient Greek poetry and/or prose. Prerequisite: Minimum grades of *C* or higher in GRK 3300 and 3330. (F,Sp)

GRK 4930 Directed Readings in Greek Poetry and Prose Authors 1-3
Directed readings in advanced Greek poetry and prose authors. Prerequisite: Successful completion of at least three semesters of Greek. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Humanities, Arts, and Social Sciences (HASS)

See College of Humanities, Arts, and Social Sciences, pages 123-125.

HASS 1250 Interdisciplinary Workshop 1-5®
(F,Sp,Su)

HASS 2250 Introductory Internship/Co-op 1-5®
Introductory-level educational work experience in an internship or cooperative education position approved by the College of Humanities, Arts, and Social Sciences. (F,Sp,Su)

HASS 4250 Advanced Internship/Co-op 1-15®
Internship or cooperative education position of a more professional level, with increased complexity, approved by the College of Humanities, Arts, and Social Sciences. (F,Sp,Su)

HASS 4910 Study Abroad 1-20
A semester study abroad experience through a student exchange program. Prerequisite: Approval from the Study Abroad Office. (F,Sp,Su)

HASS 5250 Interdisciplinary Workshop 1-5®
(F,Sp,Su)

HASS 6250 Graduate Internship/Co-op 1-15®
Internship or cooperative education position approved by the department and/or the College of Humanities, Arts, and Social Sciences. (F,Sp,Su)

HASS 6910 Study Abroad 1-12
A semester study abroad experience through a student exchange program. Prerequisite: Approval from the Study Abroad Office. (F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Health Education Professional (HEP)

See Department of Health, Physical Education and Recreation, pages 321-331.

HEP 2000 First Aid and Emergency Care 2
Provides instruction and practical experience for the development of first aid knowledge, skills, and personal judgment. Focuses on recognizing emergencies, activating EMS, and providing direct care. (F,Sp,Su)

HEP 2300 Cardiopulmonary Resuscitation 1[1]
Techniques and skills of adult, child, and infant airway management and cardiopulmonary resuscitation for the lay person (one rescuer). Taught according to current standards. (Arr)

HEP 2500 Health and Wellness 2
Designed to enable students to enhance personal wellness by gaining understanding about the social, physical, spiritual, and emotional dimensions of health, and by applying different strategies for improving personal health behaviors. (F,Sp,Su)

HEP 3000 Drugs and Human Behavior 3
Students evaluate the historical and modern use, misuse, and abuse of drugs in relation to current concepts of physical, social, and emotional wellness. Special emphasis on educational and community strategies for prevention of drug-related problems. (F,Su)

HEP 3100 School Health Programs 3
Essentials of the existing paradigm of Comprehensive School Health Programs and their development in relation to current child health status. Assessment, planning, implementation, and evaluation. Prerequisite: Formal acceptance into the School Health Education Emphasis or School Health Minor or consent of instructor. (F)

Course Descriptions

HEP 3200 Consumer Health 3
Focuses on helping students become discriminating consumers of health information, health products, and health services. (F,Su)

HEP 3300 Clinical Experience I 1
Clinical experience in school health education. Prerequisite: Acceptance into School Health major or minor. (F,Sp)

HEP 3400 Stress Management 3
Concepts and principles of personal stress management, with special emphasis on effective stress management coping strategies, maximizing positive stress outcomes, and minimizing negative stress effects, to aid in obtaining and maintaining a balanced health homeostatic condition. (F,Sp)

HEP 3500 Elementary School Health Education 2
Explores child health status and the vital roles that the school/elementary teacher plays in enabling children to acquire healthful lifestyle behaviors while increasing their potential for academic success. (F,Sp)

HEP 3600 CI Introduction to Community Health 3
Introduction to agencies, facilities, and programs playing a role in protection and promotion of health in the community. Special emphasis on competencies necessary for the health educator to function in a variety of community settings. (F)

HEP 3800 Grant Proposal Writing 3
Teaches practical skills needed to plan and write proposals for federal, state, local, and private funding. Students develop proposals in area in which they have developed expertise, and coordinate with a local agency for funding. Prerequisites: HEP 2500, ENGL 2010, and passing score on Computer and Information Literacy (CIL) Exam. (Sp)

HEP 3900 Social Marketing in Health Education 3
Explores social marketing techniques used in health promotion and examines the marketing process, which includes formative research, target audience analysis and segmentation, marketing mix, marketing strategies, pretesting, implementation, and evaluation. Prerequisites: HEP 2500 and passing score on Computer and Information Literacy (CIL) Exam. (Sp)

HEP 4100 Foundations of Community Health 3
Professional preparation course for health education majors. Primary emphasis on ethical issues, behavioral and sociological theories used in the profession, philosophical issues, technology, and health education methodologies. Prerequisite: HEP 2500. (Sp)

HEP 4200 QI Planning and Evaluation for Health Education 3
Provides indepth study of planning, implementation, and evaluation of school and community health education programs. Students obtain hands-on experience planning a health education program. Prerequisites: HEP 3600; MATH 1030 or STAT 1040. (F)

HEP 4250 Advanced Cooperative Work Experience 1-15®
Professional-level cooperative education work experience as student advances toward completion of the program. Prerequisite: Consent of instructor. (F,Sp,Su)

HEP 4300 Clinical Experience II 1
Clinical experience in school health education. Prerequisite: Acceptance into School Health major or minor. (F,Sp)

HEP 4400 Creative Methods in Teaching Health Education 3
Planning, designing, and evaluating comprehensive school health education curricula and instruction for secondary school students, utilizing various creative instructional strategies and materials. Participation in peer teaching experiences. Prerequisite: Junior standing and acceptance into School Health Education. (F,Sp)

HEP 4500 Sexuality Education Within the Schools 3
Emphasizes broad understanding of human sexuality, with specific focus on adolescent sexuality/behavior, age and topic appropriate instruction, state law, and effective curriculum/strategies for human sexuality education within the secondary schools. Prerequisite: Formal acceptance into the School Health Education emphasis or School Health minor, or consent of instructor. (Sp)

HEP 4600 Field Work in Health Education 1-9®
Supervised student participation in school or community health programs or directed projects. Prerequisites: HEP 3600, 4100, and consent of instructor. (F,Sp,Su)

HEP 4700H Honors Senior Thesis 1-6
Requirements for the honors thesis include: (1) a detailed review of scholarly literature on the health topic of interest to the student, and (2) the collection of primary data on the topic of interest (e.g., through interviews, surveys, focus groups, etc.), which must include references. The student must meet regularly with the faculty mentor, who will help with the development of the honors thesis. (F,Sp,Su)

HEP 5000 CI Race, Culture, Class, and Gender Issues in Health 3
Focuses on how multicultural issues affect health status and health choices. Special emphasis on how race, ethnicity, culture, socioeconomic status, and gender impact health status and access to health care. Prerequisite: Junior standing. (Sp)

HEP 5100 CI Cultural and Complementary Medicine 3
Provides in-depth view into health beliefs, traditions, and practices of various cultures and of the major minority groups in the U.S. Emphasizes ancient, eastern, and native health practices collectively known as complementary medicine and healing modalities. (Arr)[1]

HEP 5200 International Health 3
Explores meaning of "health" through the lens of different cultures. Provides an international comparison of health status, including morbidity and mortality data. Evaluates different programs, policies, and strategies for addressing international health problems. Prerequisite: Junior standing. (Arr)[1]

HEP 5500 Student Teaching Seminar 2
Weekly seminar dealing with the professional practice of school health education. Prerequisite: HEP 4400. (F,Sp)

HEP 5630 Student Teaching 10
Practical experience teaching health in the public school system. Prerequisite: HEP 4400. (F,Sp)

HEP 5700 Special Topics in Health 1-6®
In-depth review and discussion of special topics in health. (Arr)[1]

HEP 5900 Independent Study 1-3®
Prerequisite: Consent of instructor. (F,Sp,Su)

HEP 5950 Independent Research 1-3®
Prerequisite: Consent of instructor. (F,Sp,Su)

HEP 6000 Evaluating Health-Promotion Programs 3
Students learn to develop and carry out a health-promotion program evaluation, interpret the results of an evaluation, and identify implications for future program planning. (Sp)

HEP 6100 Current Trends in Health Promotion 3
Focuses on trends and issues in the promotion of health behaviors in a variety of settings. Analyzes and challenges prevailing assumptions and philosophies in relation to health promotion. (F)

HEP 6250 Graduate Cooperative Work Experience 1-15
Professional level of education work experience in a cooperative education position for graduate students. Prerequisite: Consent of instructor. (F,Sp,Su)

HEP 6300 Stress Management 3
Explores concepts and principles of personal stress management, with special emphasis on effective stress management coping strategies, maximizing positive stress outcomes, and minimizing negative stress effects, thus aiding in obtaining and maintaining a balanced, healthy homeostatic condition. (Arr)[1]

HEP 6600 Field Work in Health Education 3®
Supervised student participation in school or community health projects or directed projects. Prerequisite: Consent of instructor. (F,Sp,Su)

HEP 6700 Special Topics in Health 1-6®
In-depth review and discussion of special topics in health. (Arr)[1]

HEP 6800 Seminar in Health Behavior 3
Explores current theoretical perspectives in relation to behaviors. Students critically examine theories commonly used in health education. Focuses on practical application of theory in health promotion programs. (F)

HEP 6900 Independent Study 1-3®
Prerequisite: Consent of instructor. (F,Sp,Su)

HEP 6950 Independent Research 1-3®
Prerequisite: Consent of instructor. (F,Sp,Su)

HEP 6970 Thesis 1-9®
(F,Sp,Su)

HEP 6990 Continuing Graduate Advisement 1-12®
(F,Sp,Su)

[1]This class is not taught on a regular basis. See department for further information.
®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

History (HIST)

See Department of History, pages 332-337.

HIST 1060 BHU Introduction to Islamic Civilization 3
Survey of Islamic civilization from the Prophet Muhammed to the present.

HIST 1100 BHU Foundations of Western Civilization: Ancient and Medieval 3
(formerly HIST 1040 BHU)
Survey of institutions and developments of early and medieval Western civilization from its Mediterranean origins to the beginning of the early modern period. (F,Sp,Su)

HIST 1110 BHU Foundations of Western Civilization: Modern 3
(formerly HIST 1050 BHU)
Survey of the institutions and developments in Western civilization from 1500 to the present. (F,Sp,Su)

HIST 1500 BHU Cultural and Economic Exchange in the Pre-Nineteenth Century World 3©
(formerly HIST 1020 BHU)
Surveys pre-Nineteenth Century cultural and economic interactions in important zones of exchange. Regional focus determined by instructor. Themes may include: trade, religious conversion, migration, slavery, warfare, and other types of cross-cultural exchange. (F,Sp)

HIST 1510 BHU The Modern World 3©
(formerly HIST 1030 BHU)
Survey of world history from the beginning of the nineteenth century to the present. (F,Sp,Su)

HIST 1600 American Cultures in Film 3
Introduction to major ethnic groups in America and their treatment in recent feature films. Also taught as ENGL 1600. (F,Sp)

HIST 1700 BAI American Civilization 3©
Fundamentals of American civilization. Covers history, political system, and economic institutions of the United States. Fulfills American Institutions requirement.

HIST 2010 Special Topics Seminar 3
Study of special cross-cultural topics, including Imperial Paris, British India, Slavery in America, and Ute History.

HIST 2210 BHU Introduction to Folklore 3
(formerly HIST 1710 BHU)
Introduction to major genres of folklore (folk narrative, custom, folk music and song, vernacular architecture and arts), folk groups (regional, ethnic, occupational, familial), and basic folklore research method (collecting and archiving). Also taught as ANTH 2210 and ENGL 2210. (F,Sp)

HIST 2700 BAI United States to 1877 3
Survey of the development of American society, economy, culture, and politics to 1877. (F,Sp,Su)

HIST 2710 BAI United States 1877-Present 3
Survey of the development of American society, economy, culture, and politics since 1877. (F,Sp,Su)

HIST 2720 Survey of American Folklore 3
Principal ethnic, regional, and occupational folk groups in America. Relations between folklore and American history, literature, and society. Key genres in American folklore (narrative, art, song, etc.) and their role in American culture. Also taught as ENGL 2720 and ANTH 2720. (Sp)

HIST 3070 DHA Perspectives in Folklore 3®
In-depth study of folklore for nonmajors. Topics vary according to faculty expertise. Also taught as ENGL 3070. (F,Su)

HIST 3110 DHA/CI Ancient Near East 3
Survey of history and civilization of ancient Mesopotamia, Egypt, and Israel, from prehistory to 500 B.C. Writing intensive. Prerequisite: ENGL 2010 or equivalent. Also taught as ART 3110.

HIST 3130 DHA/CI Greek History 3
History of Greece from Neolithic period to modern times. Special emphasis on politics, art, literature, and civilization. Writing intensive. Prerequisite: ENGL 2010 or equivalent.

HIST 3140 Greek Intellectual History: Tradition, Challenge, and Response 3
Through reading and discussing Greek literature and philosophy, attempts to understand the major Greek philosophers, in the context of the major literary authors of the period and contemporary political developments.

HIST 3150 CI Roman History 3
History of Rome from Neolithic era to "fall" of the Western Empire. Special emphasis on politics, art, literature, and civilization. Writing intensive. Prerequisite: ENGL 2010. (Sp)

HIST 3220 DHA/CI Medieval European Civilization, 500-1500 3
Provides students with overview of major themes in medieval European history from 500 to 1500 A.D. Also introduces major historiographical problems related to this period. Writing intensive and document based. Prerequisite: ENGL 2010 or equivalent.

HIST 3230 Early Modern Europe 3
Explores major themes of early modern European history, such as secularization, the rise of the nation state, the Reformation, and the birth of capitalism. Introduces major historiographical issues of the period. Reading and writing intensive. Prerequisite: ENGL 2010 or equivalent.

HIST 3240 Modern Europe from 1789 to the Present 3
Historical survey of Europe from the French Revolution to the present, with special emphasis on political and cultural implications of imperialism. Prerequisite: HIST 1050.

HIST 3250 DHA/CI Renaissance Europe 1300 to 1520 3
Emphasizing writing and primary sources, covers significant changes in Europe in government, society, and intellectual life caused by the Black Death, the humanist revolution in arts and literature, and the centralizing efforts of popes and monarchs. (F,Sp)

HIST 3260 History of Spain and Portugal 3
History of Iberian peninsula from fifteenth century to the present. Age of Exploration, conquest and colonization in the Americas and Africa, eighteenth century reforms, constitutional monarchies, civil wars, and twentieth century dictatorships. Writing intensive. Prerequisite: ENGL 2010 or equivalent.

HIST 3280 East Central Europe Since 1520 3
Examines history of East Central Europe, with special emphasis on growth of nationalism and establishment of the states of Czechoslovakia, Hungary, and Poland. Emphasizes research and writing.

Course Descriptions

HIST 3310 Balkans Since 1389 3
Examines history of Balkan peninsula, with special emphasis on growth of nationalism and establishment of Bulgaria, Albania, Greece, Romania, and Yugoslavia. Emphasizes research and writing.

HIST 3320 Tsarist Russia 3
Political, economic, and cultural development of Russian people to 1917. Writing and computer intensive.

HIST 3330 The Soviet Union and its Heirs 3
Beginning with the Russian Revolution, surveys political, cultural, and economic history of the Soviet Union and the regional states emerging in its wake. Writing and computer intensive.

HIST 3410 The Modern Middle East 3
Examines history of the Middle East (Arabian peninsula, Fertile Crescent, Egypt, Iran, and Turkey), with special emphasis on social and political currents which have shaped the area's history.

HIST 3460 Comparative Asian History 3
Surveys history of Asian continent, analyzing common patterns in the cultures of West, South, Southeast, and East Asia.

HIST 3480 History of China 3
Development of traditional Chinese culture and effect on that culture of the growth of Western influence. Writing and computer intensive.

HIST 3510 Africa and the World 3
Explores foundation of Africa's contemporary problems. Surveys Africa's history of interactions with Asia and Europe. In addition to writing several short essays covering readings and films, students investigate an aspect of cultural, political, or economic interaction and prepare a short research paper.

HIST 3530 African Environmental History 3
Surveys changing historical relationship between Africans and their physical environment. Readings cover ecological change in arid, savanna, rain forest, and montane environments. Students also survey and evaluate the methods and sources used by environmental historians to explain environmental stress, degradation, and rehabilitation.

HIST 3620 History of Colonial Latin America 3
Surveys art, culture, religion, and social organization of the Aztecs, Incas, and Mayas, and of the European dominated post-conquest. Introduces students to major historiographical problems in the field. Prerequisite: ENGL 2010 or equivalent.

HIST 3630 History of Modern Latin America 3
Introduces history and historiography of Latin America from the wars of independence to the contemporary era. Writing intensive.

HIST 3640 History of Social Movements in Latin America 3
Examines the changing nature of social movements in Latin America from the nineteenth century to the present. Topics include social movements concerning citizenship, religion, unions, feminism, torture, poverty, indigenous rights, and environmentalism. Prerequisite: ENGL 2010.

HIST 3650 Caribbean History 3
Surveys the Caribbean from pre-Columbian cultures to the present, with special emphasis on slavery, colonialism, piracy, immigration, independence and revolutionary movements, nation-building, artistic creation, and tourism. Prerequisite: ENGL 2010.

HIST 3660 History of Mexico 3
Surveys Mexico from the rise of indigenous states to the present, with special emphasis on indigenous culture, colonialism, independence, the U.S.-Mexican War, the French Intervention, the Mexican Revolution, political reform, everyday life, globalization, and border issues. Prerequisite: ENGL 2010.

HIST 3670 Slavery in the Atlantic World 3
Examines slavery in the Americas from the Atlantic perspective (including Africa and Europe) from the Fifteenth Century until abolition, with special emphasis on the slave trade, the plantation system, daily life, slavery and race, resistance, the Haitian Revolution, and abolition in the Americas. Prerequisite: ENGL 2010.

HIST 3700 CI Regional Folklore* 3
Study of folklore and folklife as they relate to regional cultures. Also taught as ENGL 3700. (F,Sp)

HIST 3710 CI Folklore Colloquium 3®
Issues, problems, and methodologies in folklore study. Focus and instructor variable. Also taught as ENGL 3710. (Sp)

HIST 3720 Colonial America 3
Advanced survey of North American Colonies, emphasizing British experience, from their founding to 1763. Addresses major issues of interpreting America's beginnings. (F)

HIST 3730 The New American Nation 3
Advanced survey of American history from 1763 to 1800, with special emphasis on historiography of the Revolution, creation of a Republic, and efforts to define the New Nation. (Sp)

HIST 3740 United States in the Age of Jefferson and Jackson 3
Examines history of United States from 1800 to 1846, from election of Jefferson to outbreak of war with Mexico. Prerequisite: ENGL 2010. (F)

HIST 3750 Civil War and Reconstruction 3©
Analysis of most trying period in U.S. history, with special emphasis on the course and results of the war. Prerequisite: ENGL 2010. (Sp)

HIST 3760 DHA/CI The United States, 1900-1945 3
Analyzes scholars' approaches to U.S. history in the early twentieth century, with attention to socio-economic change, political reform, and transforming impact of American involvement in two world wars. Writing intensive. Prerequisite: ENGL 2010 or equivalent. (Sp)

HIST 3770 Contemporary America, 1945-Present 3©
Domestic and foreign policy since World War II. Emphasizes Cold War, Civil Rights, and the political and social developments of contemporary United States. Contains intensive writing component. (F)

HIST 3840 Twentieth Century American West 3
Considers emerging scholarly literature about the American West in the twentieth century, with attention to economic, environmental, and demographic questions. (Sp)

HIST 3850 DHA/CI History of Utah 3©
Prehistory to the present. Examines environment and peoples of Utah, emphasizing use of primary documents to view and interpret Utah's past. Reading and writing intensive. Requires use of USU Special Collections and Archives. Prerequisite: ENGL 2010. (Sp)

HIST 3950 DHA/CI Environmental History 3
Surveys writings from a relatively new genre of historical scholarship that attempts to explain the relationship between human society and the natural world. Readings focus on North America, but students also have opportunity to survey materials from the non-Western world. Course is reading and writing intensive, and requires students to conduct a research project in which they construct the history of a particular landscape.

HIST 4210 Celtic Europe 3
History of Celtic peoples in British Isles, Scandinavia, and continental Europe, from Neolithic times to the Norman Conquest in 1066. Computer intensive. (F,Sp)

HIST 4230 DHA/CI The History of Christianity in the West 3
Introduces students to history of Christian spirituality, asking how Christianity has been lived and how it has shaped lives over two thousand years. Uses original sources to introduce both the history and the historiographical problems surrounding the Christian religion. Writing intensive.

HIST 4250 The Reformation in Britain: 1450-1688 3
Focuses on major research questions in the field of early modern studies. Explores causes and consequences of English Reformation and British Civil War. Writing and research intensive.

HIST 4290 Europe and the French Revolution, 1700-1815 3
Examines causes and consequences of the French Revolution, introducing students to major themes in its interpretation.

HIST 4310 History of Nationalism 3
Examines development of nationalism. Addresses different theories of nationalism, and then tests these theories with various case studies. Emphasizes research and writing.

HIST 4320 DHA History of Scientific Thought 3
Examination of key episodes in the history of science and associated ideas about the nature of scientific knowledge and how it may be acquired. Also taught as PHIL 4320. (Sp)

HIST 4330 Modern Germany with Special Emphasis on the Twentieth Century 3
Historical survey of Germany beginning with Frederick the Great of Prussia, and considering the parallel history of the Habsburg empire and the Germany of the Kleinstaaterei. Considers wars and economic and political developments beginning in 1871, which produced the Nazi period. Prerequisite: HIST 1050.

HIST 4390 British Imperialism from 1688 to the Present 3
Topical survey of British Imperialism from 1688 to the present. Topics include the interaction of British imperialism with foreign policy; social, economic, and political institutions; the life of the mind and senses; and non-European cultures. Prerequisite: HIST 1050.

HIST 4400 DHA History of Aeronautics 3
Traces aeronautics from its origins to the present day. Examines selected topics concerning flight within the earth's atmosphere from an international perspective, with particular emphasis on the United States of America.

HIST 4550 DHA/CI Women and Gender in America 3
Writing intensive course drawing on film, primary documents, and readings to trace the history of women, emphasizing race, class, and gender influences of each era. Also taught as WGS 4550. (F)

HIST 4600 DHA/CI The History of the American West 3
Traces major themes in nineteenth century history of the land between the Mississippi River and the Pacific Coast. In a writing intensive course, students use primary documents and secondary materials to discover the race, class, and gender issues that shaped the American West.

HIST 4610 Themes and Methods in Economic History 3
Themes and methods in economic history, drawing on various societies and time periods. Designed to prepare future historians to work in their field. Prerequisite: MATH 1030 or STAT 1040.

HIST 4620 CI Advanced Seminar in American Studies 3
Practical introduction to theories and methods of American Studies, utilizing interdisciplinary research around a central theme, subject, or text(s). Strongly recommended for American Studies majors and American Studies minors. Open to students who have taken three courses in literature and/or history. Also taught as ENGL 4620. (F,Sp)

HIST 4630 The History of Mexican Americans 3
Reading-intensive and writing-intensive course, examining the historical experiences of Mexican Americans, from prior to the U.S. annexation of Northern Mexico in 1848 to the present. Special emphasis given to immigration and migration, labor, gender, race and ethnicity, and the social and cultural evolution of Mexican Americans within American society.

HIST 4640 CI Studies in the American West 3
Interdisciplinary course in American Studies, exploring the region of the West through the analysis of literary texts, historical sources, and socio-cultural materials. Also taught as ENGL 4640. (F,Sp)

HIST 4700 Folk Material Culture 3**
Study of folk objects and their connections with culture and history. Also taught as ENGL 4700. (Sp)

HIST 4710 American Indian History 3
Prehistory to the present. Emphasizes ethnohistory and the Western U.S., focusing on intercultural contacts, subsistence and environmental change, and contemporary political and economic issues, while analyzing primary documents and secondary readings. (F)

HIST 4720 CI/DHA The Civil Rights Movement 3
Traces struggle of black Americans for equality since emancipation, with emphasis on the post-World War II period. Focuses on the individuals and social trends that laid the groundwork for change by the mid-Twentieth Century. Prerequisite: ENGL 2010 (F,Sp)

HIST 4730 CI History of Black America 3
Study of African-American experience from slavery to freedom, as well as the difficult quest for democracy and equality in contemporary America. Includes both creative and research writing components. (Sp)

HIST 4740 American Immigration History 3
Examines history of immigration to the United States from Europe, Africa, Latin America, and Asia. Requires library research, especially in government documents, and use of oral history techniques. (F)

HIST 4750 Advanced Folklore Workshop: Fife Conference 3®
Focuses on one theme or topic in folklore, and offers lectures from nationally prominent scholars in the area. Taught during one week, every day and all day. Also taught as ENGL 4750. (Su)

HIST 4780 DHA American Financial History from the Nineteenth Century to the Present 3
Explores American financial history from the nineteenth century to the present. Covers historical development of the U.S. banking system, the stock market, coins and currency, the Federal Reserve system, accounting practices, credit, monetary policy, taxation, and personal finance. (Sp)

HIST 4790 American Religious History 3**
Varieties of American religious experience from settlement to the present.

HIST 4800 The Supreme Court and American Constitutional History 3
Examines many of the major arguments made about the Constitution, which were presented before the Supreme Court of the United States. Also taught as POLS 4800.

HIST 4810 American Military History 3
Covers evolution of the military in American history and society from 1775 to the present.

HIST 4820 World War II in Europe 3
Focuses exclusively on World War II developments in the ETO. That is, the efforts of the Allied forces, mainly the United States, Britain, the Soviet Union, Free France, Canada, and resistance fighters and British Commonwealth soldiers against the expansion and occupation of most of Eurasia by Nazi Germany and/or Fascist Italy. Covers the chronology of 1939 to 1945. Included in the course's scope is the Holocaust. (Sp)

HIST 4821 World War II in Asia 3
Focuses on Japanese and Allied fighting in the Pacific and the Asian mainland from 1937 to 1945. British, French, and Dutch losses in Asia to Japan, as well as efforts to recover them. U.S.-Japanese conflict in the Pacific Theater. (Sp)

HIST 4830 DHA Structure of Engineering Revolutions 3
Provides an integrated approach to the history of engineering practice. Students research the life cycle of a major engineering project from historical, political, and economic perspectives, while using original sources and conducting interviews. Prerequisites: Completion of CIL exams; STAT 1040 or MATH 1050; ENGL 2010. (Sp)

HIST 4850 Interpreting the Past for Teachers 3
Focuses on nonformal educational experiences open to secondary school students outside of the classroom. Interpretive modes examined include historical film, documentaries, living history programs, history fairs and festivals, and historical novels and magazines. (F,Sp)

Course Descriptions

HIST 4860 Teaching History 3
Designed to introduce history teaching majors to ethical and methodological issues arising in history classroom. (F)

HIST 4870 Teaching World History: Themes, Approaches, and Materials 3
For history teaching majors and minors *only*. Introduces students to a number of approaches to the study and teaching of world history. Students survey theoretical and pedagogical literature, then assemble a course package, which is presented to their peers. (Sp)

HIST 4880 History Workshop: Special Topics 1-3®
Focuses on a theme or topic in history. (F,Sp,Su)

HIST 4910 Special Studies in History 3®
Examination of special areas and themes in history. (F,Sp,Su)

HIST 4930 Directed Readings 1-3®
Directed readings in any special historical field. For each credit granted, minimum of four books must be read. Prerequisite: Instructor's approval.

HIST 4940 Historical Internship 1-3®
Directed internship involving participation in a historical research or cultural management project. (F,Sp,Su)

HIST 4990 CI Special Topics in History 3®
Senior history seminar emphasizing historiographical literacy, research, and writing skills in relation to a specific historical topic. Prerequisites: Lower- and upper-division courses in areas relating to topic in question. (F,Sp,Su)

HIST 5690 CI American Studies Capstone Seminar 3
Required for students majoring in American Studies. Enables students to synthesize American Studies theory and methods with interdisciplinary cognate courses. Supports senior thesis design and writing, allowing topics to reflect individual programs of study. Also taught as ENGL 5690. (Sp)

HIST 5700 Folk Narrative 3
Forms and functions of folk narrative genres: myth, legend, folktale, memorate, and ballad. Also taught as ENGL 5700.

HIST 6000 Historical Methods and Research 3
Introduction to the historical profession, emphasizing research and writing skills, as well as the critical assessment of scholarly works. Should be taken at beginning of student's graduate program. Required for history master's students. (F)

HIST 6010 History and Theory 3®
Examination of major works that have influenced the theory and practice of historical writing. History master's students are required to complete HIST 6010, 6020, or another theory-enriched course.

HIST 6020 Approaches to History 3®
Uses readings in particular instructor's field to underscore theories and methods different historians bring to their subject. History master's students are required to complete HIST 6010, 6020, or another theory-enriched course.

HIST 6030 Research Seminar 3®
Research in primary sources for graduate students.

HIST 6100 Special Topics: Ancient History 3®
Intensive readings and group discussions of selected topics in ancient history.

HIST 6130 Special Topics: Early Modern European History 3®
Intensive readings and group discussions of selected topics in early modern European history.

HIST 6160 Special Topics: Modern European History 3®
Intensive readings and group discussions of selected topics in modern European history.

HIST 6200 Special Topics: Comparative World History 3®
Intensive readings and group discussions of selected topics in comparative world history.

HIST 6230 Special Topics: Middle Eastern History 3®
Intensive readings and group discussions of selected topics in middle eastern history.

HIST 6260 Special Topics: Asian History 3®
Intensive readings and group discussions of selected topics in Asian history.

HIST 6300 Special Topics: African History 3®
Intensive readings and group discussions of selected topics in African history.

HIST 6330 Special Topics: Latin American History 3®
Intensive readings and group discussions of selected topics in Latin American history.

HIST 6400 Special Topics: American History 3®
Intensive readings and group discussions of selected topics in American history.

HIST 6430 Special Topics: Western American History 3®
Intensive readings and group discussions of selected topics in Western American history.

HIST 6460 Seminar in Environmental History 3
Focuses on historical writings seeking to explain relationship between society and nature. Many of assigned readings are set in the non-Western world.

HIST 6500 Archiving Internship 2-4®
Directed internship at a regional archive. Internship should reflect eight to sixteen hours of work per week during the semester. (F,Sp,Su)

HIST 6520 Editing Internship 2®
Training in requirements of editorial work in scholarly journals and books. Emphasis placed on editing techniques and mechanics of editorial work. Can be repeated once for credit. (F,Sp,Su)

HIST 6540 Museum Internship 2-4®
Directed internship at a regional museum. Internship should reflect eight to sixteen hours of work per week during the semsester. (F,Sp,Su)

HIST 6560 Professional Internship 2-4®
Directed internship involving participation in a historical research project for a government agency, corporation, municipality, or some other entity. (F,Sp,Su)

HIST 6580 Teaching Internship 2®
Involves working with the teacher of an upper-division undergraduate course. Intern prepares, explains, and grades one of the written assignments in the course, as well as completing work required of the undergraduates. Can be repeated once for credit. (F,Sp,Su)

HIST 6600 American Studies Theory and Method 3
Provides students with theory and method of graduate-level research in American Studies. Also taught as ENGL 6600. (F)

HIST 6610 Seminar on the American West 3-4®
Readings and research on topics in the American West. Interdisciplinary focus suitable for graduate students in History and American Studies. Also taught as ENGL 6610. (F)

HIST 6620 Seminar in Native American Studies 3-4®
Readings and research on topics in Native American history and culture. Interdisciplinary focus suitable for graduate students in History and American Studies. Also taught as ENGL 6620. (F)

HIST 6630 Studies in Film and Popular Culture 3®
Offered annually on a rotating basis by professors in folklore and English (Cultural Studies, Literature, British and Commonwealth). Topics and theoretical approaches vary, but the primary focus is on feature films. Also taught as ENGL 6630. (F)

HIST 6700 Folklore Theory and Method (3)
Serves as orientation for new graduate students in folkore. Introduces students to comparative annotation, folklore indices, oral-formulaic theory, performance theory, contextual analysis, and other approaches. Also taught as ENGL 6700. (F)

HIST 6710 Regional Folklore 3
Study of folklore and folklife as a regionalizing process. Regions examined through their folk culture range. Also taught as ENGL 6710. (Sp)

HIST 6720 Folklore Fieldwork 3
Basic methodology class for folklorists and oral historians. Students learn interviewing techniques and other methods for observing and recording the performance of tradition and traditional history. Also taught as ENGL 6720. (F,Sp)

HIST 6730 Public Folklore 3
Provides history and analysis of governmental involvement in protecting, promoting, and otherwise manipulating and utilizing cultural heritage. Also taught as ENGL 6730. (F,Sp)

HIST 6740 Folk Narrative 3
Covers principal narrative genres in folk tradition (myth, tale, legend, ballad) and the basic theories for their analysis and discussion. Also taught as ENGL 6740. (Sp)

HIST 6750 Advanced Folklore Workshop (the Fife Conference) 3
Intensive workshop focusing on a topic in folklore. Brings in nationally known experts as lecturers and discussants. Students attend all sessions, then write a critical paper during the summer semester. Also taught as ENGL 6750. (Su)

HIST 6760 Cultural and Historical Museums 3
Examines outdoor cultural and historical museums, examining their function in modern multi-cultural societies. Also taught as ENGL 6760. (Sp)

HIST 6770 Seminar in Folklore and Folklife 3®
Conducts close, professional-level study of major areas of folklore and folklife research. Also taught as ENGL 6770. (F,Sp,Su)

HIST 6800 Paleography 3
Skills course covering subjects such as technology of writing, interpretation of hands, and mastery of abbreviations. Useful to any student working with old manuscripts, it is essential for those writing theses in medieval or early modern European history.

HIST 6820 Writing Scholarly Reviews 3
Prepares students for writing, editing, and publishing reviews in their chosen discipline. Taught by book review editors at *Western American Literature* and *Western Historical Quarterly*.

HIST 6840 Archives Management 3
Study of management of archival collections. Emphasis on processing and conservation of manuscript and photographic materials. Case studies in identification, processing, and preservation.

HIST 6860 Historical Criticism: Practicum 1-3
Preparation of critiques for student-presented projects entered into Utah History Fair state-wide competition. Operation of one-day workshop for History Fair finalists.

HIST 6880 Special Topics: Advanced History Workshop 1-3®
From teaching values of democracy in public school setting to writing publishable biographies, Department of History sponsors advanced credit workshops on a range of subjects.

HIST 6900 Directed Studies 1-3®
Directed readings in any special historical field. For each credit granted, a minimum of four books must be read. Instructor signature required. (F,Sp,Su)

HIST 6970 Thesis Research 1-6®
(F,Sp,Su)

HIST 6990 Continuing Graduate Advisement 1-6®
(F,Sp,Su)

*Taught 2006-2007.
**Taught 2007-2008.
® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
© This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Honors (HONR)

See Honors Program, page 338.

HONR 1300H BAI U.S. Institutions 3
Interdisciplinary course providing basic understanding of history, principles, form of government, and economic system of the United States. Open only to students enrolled in USU Honors Program. (F)

HONR 1320H BHU Civilization: Humanities 3
Interdisciplinary course providing basic understanding of broad range of themes cutting across human history and continuing to be important in contemporary society. Covers both Western and non-Western civilization. Open only to students enrolled in USU Honors Program. (F)

HONR 1330H BCA Civilization: Creative Arts 3
Interdisciplinary course exploring questions such as: "What is art, and how do you judge it?" and "How does artistic expression vary across cultures?" Covers several forms of art. Students attend concerts, visit galleries, and attend theatrical performances. Open only to students enrolled in USU Honors Program. (F,Sp)

HONR 1340H BSS Social Systems and Issues 3
Interdisciplinary course that considers how a society of self-interested individuals can live together in peace and harmony. Topic explored from perspectives of different disciplines. Open only to students enrolled in USU Honors Program. (F,Sp)

HONR 1350H BLS Integrated Life Science 3
Interdisciplinary course focusing on basic concepts of life science. Demonstrates role of modeling, prediction, and observation in the process of scientific discovery, which occurs within an historical and social context. Open only to students enrolled in USU Honors Program. (F)

HONR 1360H BPS Integrated Physical Science 3
Interdisciplinary course focusing on basic concepts of physical science, including structure of matter and magnitude and character of the forces of nature. Demonstrates role of modeling, prediction, and observation in the process of scientific discovery, which occurs within an historical and social context. Open only to students enrolled in USU Honors Program. (F)

HONR 2000H Scholars Forum 1
Includes orientation to the Honors Program and to undergraduate research. Taught online. (F)

HONR 2100H Honors Inquiry Seminar 1
Introduces students to the nature of inquiry. Assists students in planning their undergraduate education to enable them to graduate with Honors. Prerequisite: Admission to Honors Program. (Sp)

HONR 2200H Honors Enrichment 0.5®
Provides opportunity for Honors students to enhance their academic experience by attending and reflecting on a series of colloquia, as well as cultural and arts events. During the semester, students attend activities chosen from a menu prepared by the Honors Program. Each event affords an opportunity to react in writing, as well as orally during the bimonthly seminars. Grading based on attendance, participation, and written work. Prerequisite: Admission to Honors Program. (F,Sp)

HONR 3010H DSC Special Topics: Life and Physical Sciences 3®
Focuses on basic scientific concepts and methods of inquiry used by scientists. Considers science from a broad perspective, showing how various disciplines are related. Open only to students enrolled in USU Honors Program. (Sp)

Course Descriptions

HONR 3020H DHA Special Topics: Humanities/Creative Arts 3®
Humanities section focuses on important historical and contemporary cultural themes, both Western and non-Western. Creative Arts section examines one or more art forms across cultures. Covers several forms of art. Students attend concerts, visit galleries, and attend theatrical performances. Open only to students enrolled in USU Honors Program. (F)

HONR 3030H DSS Special Topics: Social Sciences 3®
Examines one or more social institutions and asks how we live within these structures from the perspectives of different disciplines. Open only to students enrolled in USU Honors Program. (Sp)

HONR 3900H Independent Study 1-3
Independent research, library and/or laboratory work, or creative effort working in a one-to-one relationship with a faculty member. Limited to students actively pursuing an Honors degree. (F,Sp)

HONR 4000H Reading Seminar 1®
Opportunity to read, discuss, and write about classic books. Open only to students enrolled in USU Honors Program. (F,Sp)

HONR 4700H Honors Fellows 0.5®
Junior or senior Honors students assist in leading Honors seminars and tutorials. (F,Sp)

HONR 4800H Thesis/Project Seminar 1
Oral presentation and discussion of Honors senior theses/projects. Guest presentations focus on essential contrasts and similarities in "ways of knowing" among various academic specialties. (F,Sp)

HONR 4900H Senior Thesis/Project 1-3®
All Honors students are required to submit a senior thesis/project for graduation with an Honors degree. Thesis/project may be in any area of student's choice, prepared in cooperation with an advisor drawn from the faculty at large. (F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Health Sciences (HS)

See Weber State University/Utah State University Nursing Program, pages 434-435.

HS 2230 Introductory Pathophysiology 3
An introduction to the nature of disease and its effect on body systems. (Su)

Interior Design (ID)

See Interior Design Program, pages 344-346.

ID 1700 Interior Design Professional Seminar 1®
Weekly seminars to provide an orientation to the professional aspects of interior design. Exploration of related careers and professional societies. Invited participation by outside speakers. Repeatable for up to eight credits. (F,Sp)

ID 1750 BCA Design in Everyday Living 3
Investigation of the basic elements and principles of design related to everyday living experiences and the practical application of relevant theory. (Su)

ID 1790 BCA Interior Design Theory 3
Explores basic philosophy of interior design. Analyzes design elements and principles when applied to interior spaces. Evaluation of contemporary design theories as factors influencing design trends. (Sp)

ID 2710 Architectural Graphics I 4
Competency development in use of drafting tools, symbols, and techniques used in interior design presentation. Includes communication skills related to techniques and approaches to graphic presentations of interior design solutions: floor plans, elevations, sections, axonometrics, details, and dimensioning. (F)

ID 2720 Architectural Graphics II 4
Introduction to three-dimensional drawing: isometric and perspective. Development of methods of rapid graphic communication techniques and approaches to complete professional presentations. Exploration of various types of media and presentation methods. Prerequisite: ID 2710. (Sp)

ID 2730 Interior Space Planning and Human Dimensions 4
Focuses on physical, psychological, and human factors influencing design of interior space. Includes research, programming, analysis, and design of residential and nonresidential spaces. Prerequisite: ID 2710. (Sp)

ID 2750 Computer Aided Drafting and Design I 3
Introduction to computer aided drafting and design for design students. Prerequisite: BIS 1400 or passing grade on Computer and Information Literacy (CIL) Exam. (F)

ID 2760 Computer Aided Drafting and Design II 3
Advanced exploration and study of computer aided design, creative applications, and proficiencies. Prerequisite: ID 2750. (Sp)

ID 3730 Interior Materials and Construction 3
Identification of current interior materials; their characteristics, use, and care. Experience in specification estimation, workroom procedures, and development of a working resource file. Prerequisite: ID 2730. (F)

ID 3740 DHA History of Interior Furnishings and Architecture I 3
Identification of historical architectural styles and elements in interior furnishings and materials, dating from ancients, middle ages, Italian renaissance, the Hispanic periods, and the French periods. (F)

ID 3750 DHA/CI History of Interior Furnishings and Architecture II 3
Identification of historical architectural styles and elements in interior furnishings and materials, including the English period and the American period, Victorian through the present. (Sp)

ID 3760 Commercial Design Studio 4
Studio projects of various complexity and type, having commercial focus. May include hospitality, retail, medical, office, and other commercial and institutional design opportunities. Prerequisite: ID 2730. (F)

ID 3770 Residential Design Studio 4
Studio projects of various complexity and type, having residential focus. Analysis of various approaches to problem solving. Graphic and verbal presentation, emphasizing high-end design evaluation. Prerequisite: ID 3760. (Sp)

ID 3780 Design Detailing 3
Detailing of interior components. Preparation of detail drawings for use by the trades for interior components. Student develops construction documents and prepares scale model for senior exhibit. (Sp)

ID 3790 Architectural Systems 3
Study of architectural systems in contemporary buildings. Investigation of construction drawings and their interpretation. Includes related codes and professional terminology. (F)

ID 4700 Topics in Interior Design 3®
Current topics associated with interior design. Prerequisites: Approval of instructor and junior class standing. (F,Sp,Su)

ID 4710 Interior Design Advanced Internship I 1-12®
Placement experience in applying skills and knowledge in businesses and community agencies. One credit for each 50 hours of experience. Prerequisites: Approval of instructor and junior class standing. (F,Sp,Su)

ID 4720 Interior Design Advanced Internship II 1-12®
Placement experience in applying skills and knowledge in businesses and community agencies. One credit for each 50 hours of experience. Prerequisite: ID 4710. (F,Sp,Su)

ID 4740 CI Business and Professional Practices in Interior Design 2
Overview of business practices and principles for interior design, including: salesmanship, marketing, client and trade relationships, establishing an interior design practice, and fee structure. (Sp)

ID 4750 Senior Design Studio I 3
Interior design projects focusing on research, programming, schematics, space planning, project specifications, and presentation. Prerequisites: Senior ranking in Interior Design and ID 3780. (F)

ID 4760 Senior Design Studio II 3
Interior design projects include finish selections, specifications, construction document development, and project presentation. Prerequisite: ID 4750. (Sp)

ID 4770 Senior Exhibit 1
Analysis and review of student work in preparation for formal exhibition. (Sp)

ID 4780 Interior Design Travel Course 1-3®
Travel experiences geared toward the examination of design in various geographical locations, both within the United States and abroad. (F,Sp,Su)

ID 4900 Independent Study in Interior Design 1-5®
Focused independent activities. Students must identify a project or topic of interest and discuss with proposed instructor. Prerequisite: Junior class standing and approval of faculty. (F,Sp,Su)

ID 4910 Creative Projects 1-4®
Creative project or practicum conducted under direction of faculty member. Topic may be initiated by student or faculty. Prerequisites: Junior class standing and approval of faculty. (F,Sp,Su)

ID 6700 Graduate Topics in Interior Design 1-3®
(F,Sp,Su)

ID 6710 Graduate Internship in Interior Design 1-3®
(F,Sp,Su)

ID 6720 Research Methods in Interior Design 2
(F)

ID 6750 Readings in Interior Design 1-3®
Readings about the creative process, post-occupancy evaluation, culture and environment, and design forecasting. Repeatable for up to 3 credits. (F,Sp)

ID 6760 Computer Applications of Modeling in Interior Design 3
Application of software to produce a model of interior spaces, using contemporary modeling software. Prerequisite: ID 2760. (Sp)

ID 6770 Facilities Planning and Management 3
Facilities management process in large-scale organizations. Formation of facilities policies, procedures, and standards. The facilities data base, space allocations, and management process. (Sp)

ID 6780 Design Methodologies in Interior Design 3
Identifies and defines various design methodologies, with regard to design solutions for interior environments. (F)

ID 6790 Master's Seminar in Interior Design 3®
(F,Sp,Su)

ID 6970 Master's Thesis Research in Interior Design 1-6®
Repeatable for up to 6 credits. (F,Sp,Su)

ID 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Intensive English Language Institute (IELI)

See Intensive English Language Institute, page 341.

IELI 1120 Writing I 4
Develops writing skills. Focuses on description, narration, and canonical word order at sentence and paragraph levels. (F,Sp)

IELI 1160 Reading I 4
Builds reading skills. Students read texts individually and collaboratively. Focuses on active reading (e.g., making use of background knowledge, predicting, and critically assessing reading passages). (F,Sp)

IELI 1220 Writing from Sources 4
Focuses on sentence and paragraph writing. Students gather information from various sources, transform and organize it, and present it in both verbal and written form. (F,Sp,Su)

IELI 1230 Cross-Cultural Talk 3®
Multilevel course designed to improve oral communication through small group work and one-on-one conversation with American undergraduate teaching fellows. Emphasizes interactive language fluency. Repeatable for credit for students who place at the basic level on the IELI placement exam. (F,Sp,Su)

IELI 1240 Integrated Skills 3®
Multilevel speaking and listening course designed to develop basic to intermediate language skills through content-based instruction. Repeatable for credit for students who place at the basic level on the IELI placement exam. (F,Sp,Su)

IELI 1260 Reading II 4
Builds low intermediate to intermediate level reading skills. Students distinguish main ideas from supporting ideas. Extensive vocabulary work. Focuses on active reading, summarizing, and vocabulary attack skills. (F,Sp,Su)

IELI 2310 Comprehending Academic Discourse 3
Introduction to listening strategies and note-taking, focusing on organization and information. Develops strategies for listening to authentic passages, such as news and documentaries. (F,Sp,Su)

IELI 2320 Writing Authentic Texts 4
Assists students in developing more sophisticated writing skills, from more complex sentences to coherent paragraphs and various kinds of compositions. Students learn to use the library and the Internet to find resources for their writings. (F,Sp,Su)

IELI 2330 Spoken Discourse and Cultural Communication 3
Emphasizes interpersonal communication and academic tasks with American undergraduate teaching fellows. Focuses on the dynamics of assuming various roles in small group discussions and presentations. (F,Sp,Su)

IELI 2360 Reading Authentic Texts 4
Introduces strategies for reading several genres typical of university assignments, including excerpts from textbooks in several disciplines and popular magazine articles having academic value. Brief overview of scholarly journals. Introduction to strategies and exercises for vocabulary development. (F,Sp,Su)

IELI 2410 Comprehending Lecture Discourse 3
Develops techniques for understanding the planned and spontaneous academic discourse of university classrooms. Focuses on information processing. (F,Sp,Su)

IELI 2420 Writing from Academic Sources 4
Introduction to various academic writing demands. Students gather information from various sources, including interviews, surveys, and academic texts (textbooks, journals, etc.); analyze and summarize the information; and write documented essays and reports. (F,Sp,Su)

IELI 2440 Academic Discourse 3
Designed to assist students in developing oral competency, with emphasis on comprehensibility in individual and group academic presentations. (F,Sp,Su)

IELI 2450 Topics for ESL 4®
Introduction to contemporary topics in culture and language. Focuses on language development through content-based instruction. Repeatable for up to 12 credits. (F,Sp,Su)

IELI 2460 Reading from Academic Sources 4
Focuses on processes and strategies for a variety of academic and disciplinary genres; strategies for learning from lengthy and complex texts; and vocabulary, speed, and comprehension development. (F,Sp,Su)

IELI 2470 Cross-Cultural Perspectives of American Culture 4
Provides understanding of what culture is and how it influences behavior and beliefs. Provides cross-cultural perspectives on value systems and institutions. (F,Sp,Su)

IELI 7920 College Teaching Seminar 1-3®
Workshop designed for international students who will hold teaching assistantships at the University. To be accepted into the workshop, students must take a qualifying language test. (F,Sp)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Instructional Technology (INST)

See Department of Instructional Technology, pages 339-340.

INST 1000 Information Literacy 3
Designed to develop ability to locate, evaluate, and use information. Develops competencies needed for lifelong pursuits of information through the use of libraries and electronic resources. (F,Sp)

INST 3000 Principles and Practices of Technology for Secondary Teachers 2
Integrated experience for pre-service secondary teachers to apply instructional design principles in their instruction. Hands-on experience using a wide variety of technological tools in practical learning environments. Application of technology as both process and product. Prerequisite: Admittance to teacher education. Students completing their degrees under *previous requirements* may take INST 3000 *instead of* INST 5200. Students should consult with their advisor to determine which of these two courses they should complete.

INST 3500 Technology Tools for Secondary Teachers 1
Integration of technology into the teaching/learning environment. Practical, hands-on experience for pre-service secondary teachers. Use of a variety of technological tools. Introduction to current standards for teachers. Application of technology as both process and product. Prerequisite: Admittance to teacher education. (F,Sp,Su)

INST 4010 Principles and Practices of Technology for Elementary Teachers 3
Integrated experience for pre-service elementary teachers to apply instructional design principles in their instruction. Hands-on experience using a wide variety of technological tools in practical learning environments. Application of technology as both process and product. Prerequisite: Admittance to teacher education. (F,Sp,Su)

INST 4210 Information Access and Literacy Skills 2
Information problem-solving skills basic to lifelong information access in today's networked world. Used as part of the Engineering and Technology Education/ Instructional Technology minor program. Taught off campus through special programs. (Sp)

INST 4230 Introduction to Adult Learning 3
Covers philosophical and theoretical foundations of adult education, as well as practical applications for incorporating them into current educational settings. Used as part of the Engineering and Technology Education/Instructional Technology minor program. Taught off campus through special programs. (Sp)

INST 4250 Instructional Design I 3
Guided experience in analysis, design, and development of instructional product development utilizing the ADDIE model. Used as the first project experience for the Engineering and Technology Education degree and the Instructional Technology undergraduate minor. Taught off campus through special programs. (Su)

INST 4260 Instructional Design II 3
Guided experience in development, implementation, and evaluation of instructional product development utilizing the ADDIE model. Used as the first project experience for the Engineering and Technology Education degree and the Instructional Technology undergraduate minor. Taught off campus through special programs. (Su)

INST 4290 Applying Instructional Design 3
Individual experience in instructional product development utilizing the ADDIE model. Used as the capstone experience for the Engineering and Technology Education degree and the Instructional Technology undergraduate minor. Taught off campus through special programs. (F)

INST 4300 Clinical Experience in School Library Media 1
School library media clinical observation experience. Students involved in observing management and assisting in middle and secondary library media centers, arranged by department. Minimum of 40 hours of observation experience required. (Sp)

INST 4500 Integration and Innovation of Technology in Education 1
Based on current educational standards, and using appropriate tools, students design and create an electronic/digital portfolio specific to content area(s) of their anticipated teaching license. Emphasizes integration of technology as both product and process. Prerequisite: Admittance to teacher education. (F,Sp,Su)

INST 4910 Undergraduate Research and Creative Opportunity 1-3®
Cooperative process of discovery, investigation, research, or creativity between faculty and one or more students. (F,Sp,Su)

INST 5000 Foundations of Library Media Programs 3
(dual listing 6060)
Introduction to historical and philosophical foundations of library media programs for teachers, administrators, and media specialists. Examines role of library media programs in schools and their contributions to the curriculum. Taught off campus through Utah Education Network. (F)

INST 5010 Information Organization
(dual listing 6110) and Management 3
Explores functions of information technology including circulation, cataloging, automation tools, and technical services within school library media program. Also considers policies and techniques for facilitating access to information in a school library media center. Taught off campus through Utah Education Network. (F)

INST 5020 Collection Development 3
(dual listing 6020)
Focuses on building and maintaining collections for library media programs. Discusses policy development for selection, protecting intellectual freedom, and reviewing, evaluating, and maintaining materials in all formats. Evaluation of school library collections also investigated. Taught off campus through Utah Education Network. (Sp)

INST 5030 Information Access 3
(dual listing 6030)
Introduction to finding information and resources using print and electronic sources. Emphasizes reference services, knowledge of basic reference/ information sources, and resource sharing; and teaching information retrieval strategies within a school library media program. Taught off campus through Utah Education Network. (Sp)

INST 5040 Library Media Center Administration 3
(dual listing 6040)
Includes study of organization, personnel, budgets, programs, and management of a library media center. Students define their role within a school setting and in relation to that of the principal and teachers. Prerequisite: INST 5000/6060 or approval of instructor. Taught off campus through Utah Education Network. (Su or Arr)

INST 5050 Library Media Programs 3
(dual listing 6050)
Presents a wide variety of activities which are integral to a school library media program, including reading guidance, instructional development, curriculum development, media skill instruction, and information literacy. Prerequisite: INST 5040/6040 or approval of instructor. Taught off campus through Utah Education Network. (Su or Arr)

INST 5100 Management and Maintenance
(dual listing 6100) of Information Technologies 1
Introductory course in basic operation of technology tools used in school setting. Includes operation of video equipment, video cameras, Internet sites, CD-ROM, satellite receiving equipment, computer scanners, computer networks, and computer presentation systems. Taught off campus through Utah Education Network. (Arr)

INST 5190 Library Media Practicum 1-6®
(dual listing 6190)
Observation and guided field experience in a library media center under professional library media specialists and instructional technology professionals. Bridge of theory into practice for students seeking licensure. This course is required for those having limited or no school library media experience, as evaluated by their faculty advisor. Prerequisites: INST 5040/6040, 5050/6050; or approval of instructor. (F,Sp,Su)

INST 5200 Principles and Practices of
Technology for Secondary Teachers 2
Integrated experience for pre-service secondary teachers to apply instructional design principles in their instruction. Hands-on experience using a wide variety of technological tools in practical learning environments. Application of technology as both process and product. Prerequisite: Admittance to teacher education. (F,Sp)

INST 5210 Digital Audio-Video Production* 3
Fundamental theories and practice in camera and computer-based audio and video production, including recording, editing, and digitizing audio and video segments for education and training applications. (F,Su)

INST 5230 Instructional Graphic Production* 3
Fundamental practices of using the computer to design and produce a wide variety of instructional graphics and animations. (F,Su)

INST 5240 Producing Distance
Education Resources 3**
Focuses on production of Internet-based instructional resources for use in distance, flexible, and open learning. (Sp,Su)

INST 5250 Computer-Based
Instruction Authoring 3**
Fundamentals of programming computer-based instruction utilizing the Authorware authoring system. Prerequisite: Basic computer competencies. (Sp,Su)

INST 5260 Learning and Applying HTML 3
Asynchronous online course, teaching web publishing using HTML (Hyper-Text Markup Language). Explores current web technologies and includes design and evaluation. (F,Sp,Su)

INST 5270 Multimedia Special Topic Studio 1 3®
Selected special topics related to the development of multimedia products for instruction and training. (F,Sp,Su)

INST 5280 Multimedia Special Topic Studio 2 3®
Selected special topics related to the development of multimedia products for instruction and training. (F,Sp,Su)

INST 5300 Multimedia Production for
Instruction and Training 3
Students use knowledge acquired in prerequisite courses to design, produce, and master a multimedia instructional product. Prerequisites: INST 5210, 5220, 5230, 5240. (Sp)

INST 5400 Computer Applications for
Instruction and Training 3
Introduction to use of computer applications, with special emphasis on software used in instruction and training. (F,Sp,Su)

INST 5520 Learning and Teaching at a Distance 3
Focuses on issues and methods of teaching and learning in distance education. Students develop strategies for effectively integrating technologies and facilitating learning at a distance. (Sp)

INST 5550 Practicum in Distance Learning 3
Students demonstrate effective practice by applying instructional development principles for designing, implementing, and evaluating instruction for distant learners. Prerequisite: INST 5520. (Su)

INST 5600 Designing Instruction for
Students At-Risk 1-4®
Participants use information technologies for ongoing problem solving during and after the course. Competencies emphasized include the design, implementation, and evaluation of specific effective instructional practices appropriate for all students, and particularly for students at risk of academic failure. (F,Sp,Su)

INST 5750 Instructional Technology Workshop 1-4®
Special training and experience in latest concepts and innovations in instructional technology. Content changes to reflect most recent topics and problems facing the profession. (Su)

INST 5900 Independent Study 1-4®
Individually directed study and projects. Prerequisite: Departmental permission. (F,Sp,Su)

INST 6000 Foundations of Instructional Technology 3
Considers the present, past, and future of instructional technology, while helping individual student to develop personal understanding of and orientation to the field. Prerequisite: Matriculation into Instructional Technology master's program. (F)

INST 6010 Technology and its Role in the
Transformation of Education 1-3
Explores the critical role of educational technology as one tool in the transformation of education. Involves students in change-related projects in the local environment. Taught off-campus through EDNET. (F)

INST 6020 Collection Development 3
(dual listing 5020)
Focuses on building and maintaining collections for library media programs. Discusses policy development for selection, protecting intellectual freedom, and reviewing, evaluating, and maintaining materials in all formats. Evaluation of school library collections also investigated. Taught off campus through Utah Education Network. (Sp)

INST 6030 Information Access 3
(dual listing 5030)
Introduction to finding information and resources using print and electronic sources. Emphasizes reference services, knowledge of basic reference/ information sources, and resource sharing; and teaching information retrieval strategies within a school library media program. Taught off campus through Utah Education Network. (Sp)

INST 6040 Library Media Center Administration 3
(dual listing 5040)
Includes study of organization, personnel, budgets, programs, and management of a library media center. Students define their role within a school setting and in relation to that of the principal and teachers. Prerequisite: INST 6060/5000 or approval of instructor. Taught off campus through Utah Education Network. (Su or Arr)

INST 6050 Library Media Programs 3
(dual listing 5050)
Presents a wide variety of activities which are integral to a school library media program, including reading guidance, instructional development, curriculum development, media skill instruction, and information literacy. Prerequisite: INST 6040/5040 or approval of instructor. Taught off campus through Utah Education Network. (Su or Arr)

Course Descriptions

INST 6060 (dual listing 5000) Foundations of Library Media Programs 3
Introduction to historical and philosophical foundations of library media programs for teachers, administrators, and media specialists. Examines role of library media programs in schools and their contributions to the curriculum. Taught off campus through Utah Education Network. (F)

INST 6100 (dual listing 5100) Management and Maintenance of Information Technologies 1
Introductory course in basic operation of technology tools used in school setting. Includes operation of video equipment, video cameras, Internet sites, CD-ROM, satellite receiving equipment, computer scanners, computer networks, and computer presentation systems. Taught off campus through Utah Education Network. (Arr)

INST 6110 (dual listing 5010) Information Organization and Management 3
Explores functions of information technology including circulation, cataloging, automation tools, and technical services within school library media program. Also considers policies and techniques for facilitating access to information in a school library media center. Taught off campus through Utah Education Network. (F)

INST 6150 Communication, Instruction, and the Learning Process 3
Examination of learning theory and communication theory, and their implications for instruction. Taught off-campus through EDNET. (Sp)

INST 6190 (dual listing 5190) Library Media Practicum 1-6®
Observation and guided field experience in a library media center under professional library media specialists and instructional technology professionals. Bridge of theory into practice for students seeking certification. This course is required for those having limited or no school library media experience, as evaluated by their faculty advisor. Prerequisites: INST 6040/5040, 6050/5050; or approval of instructor. (F,Sp,Su)

INST 6210 Digital Video Disc Design and Production 3**
Fundamental theories and practice in the design and development of Digital Video Disc (DVD) based instructional resources. (F,Su)

INST 6240 Instructional Analysis 2
Introduces front-end analysis state of instructional design and development. Examines processes for conducting instructional needs assessment, audience analysis, learning environment analysis, and instructional task analysis. Prerequisite: Matriculation into Instructional Technology master's program. (F)

INST 6250 Instructional Design 2
Examines theory and practice of designing instruction. Emphasizes practical applications of design principles and techniques for creating instructional materials. Prerequisite: Matriculation into Instructional Technology master's program. (F)

INST 6260 Learning Theory 3
Detailed study of communication and learning theories as applied to the instructional design process. Examines principles and research upon which instructional design and instructional technology are based. Prerequisite: Matriculation into Instructional Technology master's program. (F)

INST 6270 Implementation and Management of Instruction 2
Focuses on techniques and methods for putting well-designed instruction and training into use in both traditional and nontraditional settings. Prerequisite: Matriculation into Instructional Technology master's program. (Sp)

INST 6280 Instructional Evaluation 2
Examines theories and implementation of both formative and summative evaluation of instruction. Includes expert and learner feedback, rapid prototyping, and cost analysis. Prerequisite: Matriculation into Instructional Technology master's program. (Sp)

INST 6300 Professional Development Seminar 1
Geared toward assisting master's students in completing their degrees. Provides continuity from the first semester and encourages continued professional development in the discipline. (F,Sp,Su)

INST 6350 Instructional Design Process 3
Examines key techniques in design of instruction. Applies principles to specific design problems. Introduces techniques for developing instructional products according to completed designs. Taught off-campus through EDNET. (F)

INST 6360 Computers in Education for In-service Teachers 3
Introduction to microcomputer applications in education for in-service teachers. Includes hands-on experiences with range of software tools for design, production, and administration. Taught off-campus through EDNET. (Sp)

INST 6370 Design and Development of Computer-Based Instruction 3
Overview of computer-based design issues, including interface/screen design, instructional strategy and interaction, and computer program logic. Includes hands-on experience with authoring systems. Taught off-campus through EDNET. (F)

INST 6380 Distance Learning—K-12 3
Designed for classroom teachers. Discusses technologies and applications of distance education to elementary and secondary school settings. Focuses on instructional strategies for effective teaching and learning at a distance. Taught off-campus through EDNET. (Sp)

INST 6390 Planning and Implementation for Technology 3
Principles and practice of implementing innovations into real-world settings and evaluating their effectiveness. Taught off-campus through EDNET. (Sp)

INST 6400 Resources for Technology 3
Acquisition and management of resources for technological innovation: proposal writing, financing of technological change, management of technology resources, and conduct of resource-related projects. Taught off-campus through EDNET. (Sp)

INST 6450 Instructional Development 2
Application of theory, principles, and practice of instructional technology to the design of instructional products. Prerequisite: Matriculation into Instructional Technology master's program. (F)

INST 6460 Distance Education 3
Application of theory, principles, and practice, providing instruction to learners separated from the instructor by distance and/or time. Addresses characteristics, technologies, and current issues of distance education. (Sp)

INST 6470 Performance Systems 3
Application of theory, principles, and practice of organizational systems and human competence in designing performance support systems, job aids, and just-in-time instruction. (F)

INST 6480 Instructional Simulations 3
Application of theory, principles, and practice of instructional technology in designing model-centered experiential instruction. (F)

INST 6490 Instructional Technology in Adult Education 3
Application of theory, principles, and practice of instructional technology in providing instruction to adult learners. (Sp)

INST 6500 Instructional Development Tools 3
Detailed study of processes, tools, and techniques for guiding and aiding the instructional design process. Emphasizes tools for project management, analysis, and design. (Sp)

INST 6510 Research and Evaluation in Instructional Technology 3
Detailed study of methodologies for needs assessment, product evaluation, validation, and research. Includes methodological models, data collection, and data interpretation for both formative and summative evaluation. Prerequisite: Permission of instructor. (F)

INST 6750 Instructional Technology Workshop 1-4®
Special training and experience in the latest concepts and innovations in instructional technology. Content changes reflecting the most recent topics and problems facing the profession. (Su)

INST 6770 Practicum in the Improvement of Instruction 1-4®
A field-based program focused upon characteristics of effective teaching methodologies, teaching performance, curriculum decision making, value guidelines, and the characteristics of the learner. Taught on demand.

INST 6780 Instructional Technology Programs 1-3®
Designed primarily as an in-service experience for teachers, trainers, administrators, and instructional technology personnel to improve local programs and services. Taught on demand.

INST 6790 Instructional Technology in Education and Training 1-3®
Offered on request to instructional designers, teachers, administrators, and media personnel who have special needs related to instructional technology and seek assistance in improving their local programs. Taught on demand.

INST 6800 Projects in Instructional Technology 6
Guided experience in the development of instructional products. Includes several small, complete projects including analysis, design, development, implementation, and evaluation. Integrates teamwork, project management, and public presentation skills. Prerequisite: INST 6250 and matriculation into Instructional Technology master's program. (F)

INST 6810 Research Seminar 1®
Provides opportunity for exchange of ideas by Instructional Technology master's students pursuing a Plan A option. Includes discussion of publications and products. (F,Sp,Su)

INST 6820 Instructional Technology Design and Development Studio 1 6®
Provides students with opportunity to work in teams with clients and leaders in the field on cutting-edge design and development projects. Students should plan to spend at least 20 hours per week working on the assigned project. Prerequisite: INST 6800. (Sp)

INST 6870 Current Issues Seminar 1-3®
Allows exploration of new cutting-edge topics in the field. Topics vary and are announced the semester prior to registration. Topics may be theory or practice based. (Arr)

INST 6900 Independent Study 1-6®
Individually directed study and projects. Prerequisite: Departmental permission. (F,Sp,Su)

INST 6910 Independent Research 1-6®
Individually directed research. Prerequisite: Departmental permission. (F,Sp,Su)

INST 6940 Internship 1-6®
An on-site experience in which the student applies knowledge and skills in a work environment. Used as culminating experience for the MS, Plan C. (F,Sp,Su)

INST 6960 Creative Project 1-6®
Individual experience in instructional product development. May be used as the culminating experience for the MEd and MS Plan C. (F,Sp,Su)

INST 6970 Thesis 1-6®
Individual work in MS thesis and Plan B report writing with guidance and criticism. (F,Sp,Su)

INST 6990 Continuing Graduate Advisement 1-8®
Allows students access to faculty and facilities to complete graduate thesis, project, and papers. (F,Sp,Su)

INST 7000 Pro-seminar I in Instructional Technology 3
Lectures and discussions on advanced topics in instructional technology and related disciplines. Required for Instructional Technology EdS and PhD students. (F)

INST 7010 Pro-seminar II in Instructional Technology 3
Continuation of INST 7000. Lectures and discussions on advanced topics in instructional technology and related disciplines. Required for Instructional Technology EdS and PhD students. Prerequisite: INST 7000. (Sp)

INST 7150 Advanced Seminar in Instructional Technology 3®
In-depth study of various topics including learning theory, instructional design, instructional theory, instructional development tools, production techniques, and instructional applications in different cultures. Specific topics for each semester will be announced. (F,Sp,Su)

INST 7200 Quantitative and Design Research in Instructional Technology* 3
Examines current trends, applications, methods, and research questions that are appropriate to the use of quantitative and design research within the field of instructional technology. (F)

INST 7300 Qualitative and Interpretive Research in Instructional Technology 3
Examines current trends, applications, methods, and research questions that are appropriate to the use of qualitative and interpretive research within the field of instructional technology. (Sp)

INST 7450 Internship in Program Evaluation 1-4®
Experience in practical aspects of program evaluation through planned, supervised evaluation project. Participation must be approved by student's supervisory committee. (F,Sp,Su)

INST 7460 Internship in Research 1-4®
Experience in conducting research through planned, supervised evaluation project. Participation must be approved by student's supervisory committee. (F,Sp,Su)

INST 7820 Practicum in Instructional Technology 2®
Preparation of project funding proposal for submission to a funding agency. Prerequisite: Permission of instructor. Enrollment limited to Instructional Technology EdS and PhD students *only*. (F,Sp,Su)

INST 7870 Current Issues Seminar 1-3®
Allows exploration of new cutting edge topics in the field. Topics vary and are announced the semester prior to registration. Topics may be theory or practice based. (Arr)

INST 7900 Independent Study 1-6®
Individually directed study and projects. Prerequisite: Departmental permission. (F,Sp,Su)

INST 7910 Independent Research 1-6®
Provides for individually directed research. Prerequisite: Departmental permission. (F,Sp,Su)

INST 7920 College Teaching Seminar 1-3
Develops skills and knowledge necessary for college teaching. Activities are designed to help participants in a variety of areas, including instructional development and presentation skills development. (Arr)

INST 7960 Practicum, Educational Specialist 1-9®
Culminating project/externship in partial fulfillment of the Educational Specialist degree. (F,Sp,Su)

INST 7970 Dissertation 1-18®
Individual work on research problems in the PhD program. (F,Sp,Su)

INST 7990 Continuing Graduate Advisement 1-9®
Allows graduate students access to faculty and facilities to complete graduate dissertation. (F,Sp,Su)

*Taught 2006-2007.
**Taught 2007-2008.
® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Course Descriptions

Italian (ITAL)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

ITAL 1010 Italian First Year I 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Native speaker instructor. Self-study with tutorial assistance. (F)

ITAL 1020 Italian First Year II 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Native speaker instructor. Self-study with tutorial assistance. Prerequisite: ITAL 1010 or equivalent. (Sp)

ITAL 2010 Italian Second Year I 4
Second-year overview of speaking, listening, reading, and writing, with exposure to cultures and customs. Native speaker instructor. Self-study with tutorial assistance. Prerequisite: ITAL 1020 or equivalent. (F)

ITAL 2020 Italian Second Year II 4
Second-year overview of speaking, listening, reading, and writing, with exposure to cultures and customs. Native speaker instructor. Self-study with tutorial assistance. Prerequisite: ITAL 2010 or equivalent. (Sp)

Interdisciplinary Studies (ITDS)

See Interdisciplinary Studies Major, pages 342-343.

ITDS 4900 Senior Thesis/Project 3
Students majoring in Interdisciplinary Studies are required to complete a 3-credit thesis or project as part of the major. The thesis or project must be *either* a research paper *or* a creative activity appropriate to the theme of the Interdisciplinary Studies major. Each student works with his or her faculty advisor to determine an appropriate topic of study or a project. The student and advisor outline the protocol and parameters of the thesis or project. Prerequisite: Instructor's permission. (F,Sp,Su)

Japanese (JAPN)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

JAPN 1010 Japanese First Year I 5
First course in beginning Japanese. Proficiency in the recognition of the basic Japanese sound system by learning Hiragana and Katakana. Communicative mastery of sentences having polite and plain forms of verbs, adjectives, and copula. Exposure to Japanese culture and customs. (F)

JAPN 1020 Japanese First Year II 5
Second course in beginning Japanese. Introduction to the basic 100 Kanji. Mastery of more complicated sentences, including conditional temporal, volitional, and potential expressions. Exposure to Japanese culture and customs. Prerequisite: JAPN 1010 or equivalent. (Sp)

JAPN 2010 Japanese Second Year I 5
First course in intermediate Japanese. Proficiency in reading and writing 150 additional Kanji. Mastery of the last basic grammar topics, such as passive, causative, passive causative, and giving/receiving expressions. Introduction to honorific/humble expression. Exposure to Japanese culture and customs. Prerequisite: JAPN 1020 or equivalent. (F)

JAPN 2020 Japanese Second Year II 5
Second course in intermediate Japanese. Proficiency in reading 150 additional Kanji and writing 200 additional Kanji. Mastery of frequently used idioms and expressions. Exposure to more authentic reading materials. Competency in writing short essays. Exposure to Japanese culture and customs. Prerequisite: JAPN 2010 or equivalent. (Sp)

JAPN 3010 Japanese Third Year I 4
First segment of the third-year Japanese reading/writing course. Proficiency in reading and writing an additional 500 Kanji. Prerequisite: JAPN 2020 or equivalent. (F)

JAPN 3020 Japanese Third Year II 4
Second segment of the third-year Japanese reading/writing course. Proficiency in reading and writing an additional 500 Kanji. Prerequisite: JAPN 3010 or equivalent. (Sp)

JAPN 3050 Japanese Calligraphy 1®
Study of Japanese writing system through practicing the art of calligraphy. No prerequisites. Also taught as ART 3050. (Sp)

JAPN 3100 Readings in Contemporary Japanese Culture 3
Introduction to contemporary Japanese culture through readings from newspapers and other source materials. Prerequisites: JAPN 3010 and 3020. (F)

JAPN 3510 Japanese for the Business Environment 3
Mastery of technical terms related to Japanese business and its environment. Communicative competency in contemporary Japanese society. Prerequisite: JAPN 3020. (Sp)

JAPN 3560 Studies in Japanese Film 3
Offers an introduction to the historical and theoretical study of Japanese cinema. Course screenings include some of the films made by well-known directors during the 1960s and 1970s, as well as the cutting-edge of contemporary films. (Sp)

JAPN 4250 Internship/Coop 3-9
Cooperative education through internship programs provided by companies in Japan. Intended for students participating in the U.S.-Japan internship program. Prerequisites: JAPN 3010, 3020, and 3510. (Su)

JAPN 4920 Japanese Language Tutoring 1®
Allows students to develop tutoring skills by assisting professors in lower-division courses or fulfilling instructional duties for a comparable amount of time in the language laboratory, public schools, or similar activities with departmental approval. May be repeated to a maximum of 3 credits. Prerequisite: Permission of instructor. (F,Sp)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Journalism and Communication (JCOM)

See Department of Journalism and Communication, pages 350-355.

JCOM 1130 Beginning Newswriting for the Mass Media 3
(formerly JCOM 1110)
Techniques of writing news for various media. News values, philosophy, and practice. Elementary news-gathering and interviewing skills. Practice in various newswriting forms. Structures of the news industries and work place. Prerequisites: ENGL 1010 or equivalent, English Proficiency Test. (F,Sp,Su)

JCOM 1500 BSS Introduction to Mass Communication 3
(formerly JCOM 1000 BSS)
History, philosophy, structures, and functions of the mass media (newspapers, magazines, TV and radio, advertising, and public relations) and their intersection with other social institutions. Media economics and the impacts of new technologies on media institutions and society. (F,Sp)

JCOM 2010 BSS Media Smarts: Making Sense of the Information Age 3
(formerly JCOM 2000 BSS)
Critical analysis of the roles and performance of mass media content and messages, and their influence on society. Emphasizes critical reading of news, entertainment, and advertising content regarding women, minorities, children, and other groups. Basic mass media ethics and law. Prerequisite: ENGL 1010. (F,Sp)

JCOM 2160 CI Introduction to Online Journalism 2
(formerly JCOM 2110 CI)
Use of interactive computer networks, databases, and other electronic resources for news reporting and writing. Practice in research and information evaluation for news stories and features in news and public relations contexts. Prerequisites: Minimum grades of *C*+ in JCOM 1130, 1500, and 2010. (F,Sp)

JCOM 2170 CI Reporting Public Affairs 3
(formerly JCOM 2120 CI)
Theory and practice of reporting public affairs, community news, and features. Emphasizes advanced news gathering techniques, understanding local political structures, news and feature writing skills, interviewing, media law, ethics, and cultural sensitivity. Prerequisites: Minimum grades of *C*+ in JCOM 1130, 1500, and 2010. (F,Sp)

JCOM 2180 Beginning Photojournalism 3
(formerly JCOM 2150)
Theory and practice of photojournalism. Roles and functions of photographic images in the news media, both print and electronic. Practice in use of cameras and in darkroom techniques. Students furnish cameras and some materials. (F,Sp)

JCOM 2220 Introduction to Video Media 3
(formerly JCOM 2200)
Introduction to the theories and practice of video production and functions in broadcasting and the electronic mass media, including concepts, techniques, and impacts of various video approaches. Prerequisites: Minimum grades of *C*+ in JCOM 1130, 1500, and 2010. (F,Sp)

JCOM 2230 Writing for Electronic Media 3
(formerly JCOM 2210)
Theory and practice of reporting public affairs for broadcast and electronic media. Emphasizes news gathering, understanding local political structures, news and feature writing, commercial and continuity writing, interviewing, media law, ethics, and cultural sensitivity. Prerequisites: Minimum grades of *C*+ in JCOM 1130, 1500, and 2010. (F)

JCOM 2300 Introduction to Public Relations 3
Survey of theories and practice of public relations in a variety of business, corporate, governmental, and nonprofit organizational settings. Elements of promoting organizational messages and communicating with various publics. Prerequisites: Minimum grades of *C*+ in JCOM 1130, 1500, and 2010. (F,Sp)

JCOM 2310 CI Writing for Public Relations 3
Theory and practice of information-gathering for public relations, including basic news releases, features, speeches, annual reports, newsletters and brochures, broadcasting, and other forms. Emphasizes advanced news gathering techniques, interviewing, media law, ethics, and cultural sensitivity. Prerequisites: Minimum grades of *C*+ in JCOM 1130, 1500, and 2010. (F,Sp)

JCOM 3010 Communication Research Methods 3
Analysis of communication theories and their application in research settings. Basics of communication research methods and analysis of research results in mass media and public relations contexts. This course is not currently being offered. For information about when it may be offered, contact the department.

JCOM 3110 CI Beyond the Inverted Pyramid 3
Theory and practice of longer literary forms for newspapers and magazines. Feature writing, investigative and interpretive journalism, emphasizing advanced information-gathering and writing skills. Prerequisite: Minimum grade of *C* in JCOM 2170 or permission of instructor. (F,Sp)

JCOM 3120 CI Copy Editing and Publication Design 3
Editing and preparation of news stories and artwork for publication. Principles and practice of publication layout and design. Prerequisites: Minimum grades of *C* in JCOM 2170, 2230, or 2310; or permission of instructor. (F,Sp)

JCOM 3140 DSS Opinion Writing 3
Study and practice of persuasive editorial and opinion writing for the mass media. (F,Sp)

JCOM 3300 DSS Strategic Research Methods in Public Relations 3
Quantitative and qualitative research methods standard to real-life applications in public relations problems and campaigns, including survey methods, focus groups, case analysis, and strategic assessments. Prerequisite: Minimum grade of *C* in JCOM 2310 or permission of instructor. (F,Sp)

JCOM 3400 DSS Gender and Communication 3
Processes through which various forms of communication create gender roles and ideals for women and men, resulting in different gender-based communication patterns. Social implications and emphasis on gender in media professions. This course is not currently being offered. For information about when it may be offered, contact the department.

JCOM 3410 DSS Film as Cultural Communication 3
Analysis of the economic, ideological, political, and cultural constraints influencing film content. (F,Sp)

JCOM 4000 Senior Seminar in Mass Communication 1
Capstone seminar required of all majors. Includes small discussion groups to pull together and synthesize experiences of students in all emphases. Examination of fundamental mass communication issues. Preparation for mass media careers. Prerequisite: Senior standing. (F,Sp)

JCOM 4010 DSS Mass Communication Ethics 3
(dual listing 6440)
Study of ethical systems and philosophies and their applications to the practice of mass communication. Prerequisite: Junior standing. (Sp)

JCOM 4020 DSS Mass Media and Society 3
Study of theories and practice of the impact of mass media in conjunction with other social institutions: political, social, cultural, ideological, economic, and religious. Prerequisite: Junior standing.

JCOM 4030 DSS Mass Media Law 3
(dual listing 6430)
Principles and theories of constitutional and case law governing the mass media, including libel and privacy, copyright, press freedom, broadcast regulation, and press responsibility. Prerequisite: Junior standing or permission of instructor. (F,Sp)

JCOM 4100 Hard News Café 3
Advanced reporting and writing for student news website. Includes advanced reporting techniques, photojournalism, and posting of news reports and materials to interactive website. Prerequisite: Minimum grade of *C* in JCOM 3110 or permission of instructor. Will be first taught during Spring Semester 2006. (F,Sp,Su) ®

JCOM 4110 CI Computer-Assisted Reporting 3
Advanced computer-based investigative and in-depth information-gathering and newswriting, including intensive use of computer databases to collect and analyze data. Prerequisites: Minimum grades of *C* in JCOM 2170 or 2230 or 2310; or permission of instructor. (Sp)

JCOM 4120 CI Sports Writing 3
Information-gathering and writing of news and feature stories about sports for print and electronic mass media. Prerequisites: Minimum grades of *C* in JCOM 2170 or 2230 or 2310; or permission of instructor. (F,Sp)

JCOM 4150 Advanced Digital Photojournalism 3
Advanced lab work in the use of cameras and photographic production techniques, photo imaging, and manipulation. Concludes with student exhibition of work. Prerequisite: Minimum grade of *C* in JCOM 2180 or permission of instructor. (F,Sp)

JCOM 4210 CI Newscast I 4
Basics of electronic newsgathering and writing for electronic news media. Use of electronic video equipment for creation of on-air newscast and other visual news materials. Prerequisite: Minimum grade of *C* in JCOM 2220. (F,Sp)

JCOM 4220 CI Newscast II 4
Newsroom organization and practice in electronic and video news production, including directing and producing, writing for video news, use of studio equipment, use of video production equipment, staff management, and control room operations. Prerequisites: Minimum grades of *C* in JCOM 2230 and 4210. (F,Sp)

JCOM 4230 Corporate Video 3
Project-based lab work in studio video productions for real-world clients. Use of video field equipment and production facilities. Completion of video packages.

Prerequisites: Minimum grades of *C*+ in JCOM 1130, 1500, and 2010; or permission of instructor. (F,Sp)

JCOM 4500 Projects in Communication 1-5®
Individualized directed study in communication topics, based upon student proposal to instructor. Prerequisite: Permission of instructor. Repeatable for up to 6 credits. (F,Sp,Su)

JCOM 4510 Communication Internship 1-3®
Supervised, real-world training and practice in communication work places, including news and business environments. Prerequisite: Permission of instructor. Maximum of 6 credits may count toward the student's major. (F,Sp,Su)

JCOM 4520H Senior Thesis 1-3
Planning and execution of an in-depth research paper or project, as approved by the instructor, culminating in a formal public presentation. Required of all journalism and communication students for graduation in Honors Program. Students must also complete HONR 4800H. (F,Sp)

JCOM 4530 Special Topics in Communication 3®
Advanced study in specialized communication topic areas. A maximum of 5 credits may be applied toward the major. (F,Sp,Su)

JCOM 5010 Mass Media Historiography 3
(dual listing 6010)
Survey of the history and development of the mass media, and their influence on other social institutions. Theory and practice of historical research, with heavy emphasis on use of databases, archival, and other primary sources to conduct original historical research. (F,Sp)

JCOM 5020 Mass Communication Theory 3
(dual listing 6020)
Advanced study of major mass communication theories and issues, and their evidence in case studies. Application of theory to significant societal problems. (F)

JCOM 5030 International Communications Problems 3
(dual listing 6030)
Study of mass communication influences and effects within and between nations. Systems and techniques of mass communication as functions of national identity and development. (F,Sp)

JCOM 5110 CI Literary Journalism 3
(dual listing 6110)
In-depth analysis and practice of literary and stylistic elements of long-form journalistic and other nonfiction writers. (F)

JCOM 5210 Website Design and Production 3
(dual listing 6210)
Principles and practice of planning, designing, and programming professional Web pages, including Internet communication analysis and planning, graphic design, and development using industry-standard programming languages and design applications. Prerequisite: Permission of instructor. (F,Sp)

JCOM 5220 Advanced Video Production 3
(dual listing 6220)
Training and practice in advanced techniques of video production, including computer graphics generation, nonlinear video editing, and other specialized professional techniques for electronic video materials. Prerequisite: Minimum grade of *C* in JCOM 4220 or 4230; or permission of instructor. (F)

JCOM 5230 Advanced Video Documentary Production 3®
(dual listing 6230)
Advanced production of long-form video productions and packages, including writing scripts, directing and production, control room applications, and advanced video production techniques. Prerequisite: Minimum grade of *C* in JCOM 4220 or 4230; or permission of instructor. (Sp)

JCOM 5300 CI Case Studies in Public Relations 3
(dual listing 6300)
Advanced study and practice in public relations cases, processes, techniques, campaigns, and marketing communications strategies. Analysis of approaches to corporate reputation issues, organizational positioning, and use of mass media strategies. Prerequisite: Minimum grade of *C* in JCOM 3300. (F,Sp)

JCOM 5310 Mass Media Management 3
(dual listing 6310)
Examines theories, methods, and practice of management of mass media businesses, including personnel, marketing, and market positioning. Prerequisite: Permission of instructor. (F,Sp)

JCOM 5320 Public Relations Agency 3®
(dual listing 6320)
Advanced hands-on experience in real-world workings of professional public relations agency, including client communications needs analysis, communications planning, strategies, market positioning, publicity, and campaign execution. Prerequisite: Permission of instructor. (F,Sp)

JCOM 5400 Mass Media Criticism 3
(dual listing 6400)
Critical analysis of mass media content, emphasizing the media's social, cultural, and political impacts. Use of advanced research techniques. Senior standing required for enrollment in JCOM 5400; permission of instructor required for enrollment in JCOM 6400. (Sp)

JCOM 5410 Gender and the Mass Media 3
(dual listing 6410)
Examines the nature of gender-based images in a variety of mass media, from advertising to magazines, television, and film. Analysis of gender stereotypes and portrayals in news and entertainment media, along with resulting social impacts. Senior standing required for enrollment in JCOM 5410; permission of instructor required for enrollment in JCOM 6410. (F,Sp)

JCOM 5420 The Mass Media and Politics 3
(dual listing 6420)
Examination of the role of the mass media in the political process, including both campaigns and governance. Examination of political advertising, news coverage, polling, opinion formation strategies, and politicians' use of new media technologies. (F)

JCOM 6000 Introduction to Graduate Study in Mass Communication 3
Overview of mass communication theories and research methodologies designed to prepare the student for the graduate course of study and to assist in planning research agenda. (F)

JCOM 6010 Mass Media Historiography 3
(dual listing 5010)
Survey of the history and development of the mass media, and their influence on other social institutions. Theory and practice of historical research, with heavy emphasis on use of databases, archival, and other primary sources to conduct original historical research.

JCOM 6020 Mass Communication Theory 3
(dual listing 5020)
Advanced study of major mass communication theories and issues, and their evidence in case studies. Application of theory to significant societal problems. (F)

JCOM 6030 International Communications Problems 3
(dual listing 5030)
Study of mass communication influences and effects within and between nations. Systems and techniques of mass communication as functions of national identity and development. (F,Sp)

JCOM 6040 Seminar in Mass Media Research Methods 3®
Introduction to the major theoretical perspectives and methodologies in mass communication research. Repeatable for credit with departmental permission. (Sp)

JCOM 6050 Seminar in Mass Media Issues and Problems 3®
Variable topic seminar concerning research of issues and problems in mass media principles and practice. Repeatable for credit with departmental permission. (F,Sp)

JCOM 6110 Literary Journalism 3
(dual listing 5110)
In-depth analysis and practice of literary and stylistic elements of long-form journalistic and other nonfiction writers. (F)

JCOM 6210 Website Design and Production 3
(dual listing 5210)
Principles and practice of planning, designing, and programming professional Web pages, including Internet communication analysis and planning, graphic design, and development using industry-standard programming languages and design applications. Prerequisite: Permission of instructor. (F,Sp)

JCOM 6220 Advanced Video Production 3
(dual listing 5220)
Training and practice in advanced techniques of video production, including computer graphics generation, nonlinear video editing, and other specialized professional techniques for electronic video materials. Prerequisite: Minimum grade of *C* in JCOM 4220 or 4230; or permission of instructor. (F)

JCOM 6230 Advanced Video Documentary
(dual listing 5230) Production 3®
Advanced production of long-form video productions and packages, including writing scripts, directing and production, control room applications, and advanced video production techniques. Prerequisite: Minimum grade of *C* in JCOM 4220 or 4230; or permission of instructor. (Sp)

JCOM 6300 CI Case Studies in Public Relations 3
(dual listing 5300)
Advanced study and practice in public relations cases, processes, techniques, campaigns, and marketing communications strategies. Analysis of approaches to corporate reputation issues, organizational positioning, and use of mass media strategies. Prerequisite: Minimum grade of *C* in JCOM 3300. (F,Sp)

JCOM 6310 Mass Media Management 3
(dual listing 5310)
Examines theories, methods, and practice of management of mass media businesses, including personnel, marketing, and market positioning. Prerequisite: Permission of instructor. (F,Sp)

JCOM 6320 Public Relations Agency 3®
(dual listing 5320)
Advanced hands-on experience in real-world workings of professional public relations agency, including client communications needs analysis, communications planning, strategies, market positioning, publicity, and campaign execution. Prerequisite: Permission of instructor. (F,Sp)

JCOM 6400 Mass Media Criticism 3
(dual listing 5400)
Critical analysis of mass media content, emphasizing the media's social, cultural, and political impacts. Use of advanced research techniques. Permission of instructor required for enrollment in JCOM 6400; senior standing required for enrollment in JCOM 5400. (Sp)

JCOM 6410 Gender and the Mass Media 3
(dual listing 5410)
Examines the nature of gender-based images in a variety of mass media, from advertising to magazines, television, and film. Analysis of gender stereotypes and portrayals in news and entertainment media, along with resulting social impacts. Permission of instructor required for enrollment in JCOM 6410; senior standing required for enrollment in JCOM 5410. (F,Sp)

JCOM 6420 The Mass Media and Politics 3
(dual listing 5420)
Examination of the role of the mass media in the political process, including both campaigns and governance. Examination of political advertising, news coverage, polling, opinion formation strategies, and politicians' use of new media technologies. (F)

JCOM 6430 Mass Media Law 3
(dual listing 4030)
Principles and theories of constitutional and case law governing the mass media, including libel and privacy, copyright, press freedom, broadcast regulation, and press responsibility. (F,Sp)

JCOM 6440 Mass Communication Ethics 3
(dual listing 4010)
Study of ethical systems and philosophies and their applications to the practice of mass communication. (Sp)

JCOM 6500 Special Projects in Mass Communication Research and Practice 1-3®
Directed study into specified research or real-world problems in the mass media and mass communication industries. Prerequisite: Departmental permission. Repeatable for credit with departmental permission. (F,Sp,Su)

JCOM 6510 Directed Readings in Mass Communication 1-12®
Directed readings, tutorial or experiential learning/project in mass communication. Prerequisite: Instructor and department head approval. (F,Sp,Su)

JCOM 6600 Internship 1-6
Supervised training in selected communication work places. Prerequisite: Permission of graduate supervisory committee. (F,Sp,Su)

JCOM 6970 Thesis Research 1-3®
Prerequisite: Departmental permission. Repeatable for credit with departmental permission. (F,Sp,Su)

JCOM 6990 Continuing Graduate Advisement 1-3®
Prerequisite: Departmental permission. Repeatable for credit with departmental permission. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Korean (KOR)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

KOR 1010 Korean First Year I 5
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. (F)

KOR 1020 Korean First Year II 5
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: KOR 1010 or equivalent. (Sp)

KOR 2010 Korean Second Year I 5
Development of grammatical knowledge and writing skills. Prerequisite: KOR 1020 or equivalent. (F)

KOR 2020 Korean Second Year II 5
Development of advanced reading comprehension skill through discussions and summaries of a variety of texts. Prerequisite: KOR 2010 or equivalent. (Sp)

KOR 3010 Korean Third Year I 4
Development of advanced reading, writing, and conversational skills. Prerequisite: KOR 2020 or equivalent. (F)

KOR 3020 Korean Third Year II 4
Continuous development of advanced reading, writing, and conversational skills. Prerequisite: KOR 3010 or equivalent. (Sp)

KOR 3510 Business Korean 3
Designed to help students acquire a broad knowledge of business Korean and relevant Korean culture. Develops language skills and cultural knowledge useful for performing basic functions within the Korean business environment. Focuses on important business terms, phrases, and business etiquette. Prerequisite: KOR 2010 or equivalent language proficiency. (F)

KOR 4920 Korean Language Tutoring 1®
Allows students to develop tutoring skills by assisting professors in lower-division courses or fulfilling instructional duties for a comparable amount of time in the language laboratory, public schools, or similar activities with departmental approval. May be repeated to a maximum of 3 credits. Prerequisite: Permission of instructor. (F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Course Descriptions

Landscape Architecture and Environmental Planning (LAEP)

See Department of Landscape Architecture and Environmental Planning, pages 356-363.

LAEP 1030 BCA Introduction to Landscape Architecture 3©
Environment as a basis for land use and design decisions. Topics discussed include environmental awareness, the planning and design process, and design related to open space, communities, and the region. Three one-hour lectures per week. (F,Sp,Su)

LAEP 1200 Basic Graphics in Landscape Architecture 4
Graphic techniques for landscape architectural drawings, including plans, elevations, isometrics, perspective, rendering, and model construction. Various media explored for preparing drawings and sketches for presentation. Two three-hour studios per week. (F)

LAEP 1350 Theory of Design 4
Basic elements of design with emphasis upon their relationship to landscape architecture. Form and spatial relationships are stressed through student development of two- and three-dimensional design models. Design theory applied to materials of landform, vegetation, water, and architecture. Two three-hour studios per week. Prerequisite: LAEP 1200. (Sp)

LAEP 2250 Internship and Cooperative Education 1-5®
Course credit for professional experience outside the classroom prior to graduation. A statement of professional goals and a summary report following the experience are required.

LAEP 2300 History of Landscape Architecture 3
An examination of landscape change in the context of its history from ancient to present times, with a primary emphasis on the visual qualities of designed landscapes. Three one-hour lectures per week. (F)

LAEP 2600 QI Landscape Construction I 4
Introduction to site engineering, grading, cut and fill calculation, stormwater drainage, and erosion control. Two one-hour lectures and two two-hour studios per week. Prerequisite: LAEP 1200 (may be taken concurrently). (F)

LAEP 2650 Architecture and the Built Environment 4
Exploration of architectural form and structure in exterior environments. Emphasis placed on space created by architectural forms and their relationship to the surrounding landscape. Energy and water conservation measures with respect to the built environment. Prerequisite: LAEP 1200. (Sp)

LAEP 2700 CI Site Analysis and Design 5
Site survey, analysis, and design synthesis. Focuses on human behavior and natural resources as design considerations for future land use planning. Student teams survey and analyze sites' landscape and cultural resources for future land use planning. (F)

LAEP 2720 Site Planning and Design 5
Serves as a lower-division capstone course, synthesizing lower-division landscape architecture coursework and applying that knowledge to site scale design projects. Includes units on design methodology, site planning and circulation, and creative problem solving. Three three-hour studios per week. Prerequisite: LAEP 2700 or 6370. (Sp)

LAEP 3100 Recreation/Open Space 5
Focuses on regional and urban open space planning and design including project scale recreation design. Includes design seminars, field trips, and guest lecturers. Three three-hour studios per week. Prerequisites: Matriculation in Bachelor of Landscape Architecture (BLA) degree; LAEP 2720 or permission of instructor. (F)

LAEP 3120 Residential Planning and Design 5
Focuses on large-scale residential projects, planned unit developments, and community facilities. Three three-hour studios per week. Prerequisite: LAEP 3100. (Sp)

LAEP 3300 Advanced Computer Applications in Landscape Architecture 4
Emphasizes the major analytical and technical components of resource planning and design using computer techniques. Two three-hour studios per week. Prerequisite: LAEP 2720 or instructor's permission. (F)

LAEP 3500 Planting Design 2-4
Emphasizes plant and environment relationships and plant community dynamics as they relate to planting design. In addition, basic planting design principles will be introduced. Involves application of planting design principles to a variety of project types. One segment will focus on land reclamation planting in nonirrigated landscapes. Two three-hour studios per week. Prerequisite: PLSC 2620. (F)

LAEP 3610 Landscape Construction II 4
Introduction to construction materials, wood construction, and free-standing and retaining walls. Introduction to layout and dimensioning, basic theory and technical aspects of roadway alignment, and theory and design of sprinkler irrigation. Two three-hour studios per week. Prerequisites: LAEP 2600, MATH 1050. (Sp)

LAEP 3700 City and Regional Planning 3
Introduction to historic and current theory and methods of city and regional planning. Includes legislative, administrative, and implementation practices of the general comprehensive plan. Three lectures per week. (Sp)

LAEP 4100 Urban Theory, Systems, and Design 5
Focuses on urban environment for design expression and processes associated with the creation of cities. Explores different aspects of urban theories and design approaches (conceptual, perceptual, and analytical) as applied to large urban areas and site-specific spaces. Prerequisite: LAEP 3120. (F)

LAEP 4110 Construction Document Preparation 4
Design project through detail design development and completion of the working drawings and specifications. Two three-hour studios per week. Prerequisites: LAEP 3120 and 3610. (F)

LAEP 4120 Emerging Areas in Landscape Architecture I 2
Exploration of new and emerging areas in the profession of landscape architecture. National and international issues in regional landscape planning, landscape restoration/bioengineering, and visual resource management are among several issues which may be examined. Three three-hour studios per week. Prerequisite: LAEP 3120. (F,Sp,Su)

LAEP 4130 Emerging Areas in Landscape Architecture II 2
Exploration of new and emerging areas in the profession of landscape architecture. National and international issues in regional landscape planning, landscape restoration/bioengineering, and visual resource management are among several issues which may be examined. Three three-hour studios per week. Prerequisite: LAEP 3120. (F,Sp,Su)

LAEP 4250 Internship and Cooperative Education 1-5®
Course credit for professional experience outside the classroom prior to graduation. Statement of professional goals and a summary report following the experience are required. (F,Sp,Su)

LAEP 4350 Travel Course 1-3®
(dual listing 6550)
Major field trip to examine a variety of projects in planning and design. (F,Sp,Su)

LAEP 4810 Tutorial 1®
Directed readings and discussions of landscape issues. Prerequisite: Instructor's permission. (F,Sp,Su)

LAEP 4900 Special Problems 1-5®
Selected problems to meet individual needs for students' completion of professional education. Hours arranged. Prerequisite: Instructor's permission. (F,Sp,Su)

LAEP 4920 CI Professional Practice 2
Readings and reports on current topics and trends in professional practice. Also covers contracts, specifications, professional ethics, and general office management. (Sp)

LAEP 4950 Seminar 1
Directed readings and reports on current and emerging areas of the profession. One recitation hour per week. (F,Sp,Su)

LAEP 5400 Low Water Landscaping 3
(dual listing 6400)
Examines arid ecosystems, emphasizing the Intermountain West, and recreating such ecosystems in a range of amenity landscapes. Also covers procurement, propagation, establishment, and maintenance of plants appropriate for low water landscapes. Also taught as PLSC 5400/6400. (F)

LAEP 6100 Regional Landscape Analysis and Planning 5
Focuses on the challenges and opportunities inherent in conducting landscape planning and analysis on a broad scale. Students integrate a variety of landscape planning project scales through literature review, selected case studies, and a major applied studio project. Prerequisites: LAEP 6740, 6750. (F)

LAEP 6110 Landscape Planning for Wildlife 3
Application of principles of landscape ecology to planning for wildlife in urban, suburban, and exurban landscapes. Discussion of restoration of disturbed habitats in these environments. Includes real-world projects and field trips. Addresses issues of landscape restoration and bioengineering. (Sp)

LAEP 6120 Regional Landscape Policy and Implementation 2
Case studies and/or implementation strategies for planning alternatives developed in LAEP 6100. Prerequisites: LAEP 6740, 6750. (Sp)

LAEP 6160 Professional Practice 2
Assigned readings and reports on current topics and trends in the practice of landscape architecture and environmental planning. (Sp)

LAEP 6250 Internship and Cooperative Education Program 1-5®
Course credit given for professional experience outside the classroom prior to graduation. Statement of professional goals and summary report following the experience are required. Prerequisite: LAEP 6100. (F,Sp,Su)

LAEP 6310 Recreation and Open Space Planning and Design 5
Focuses on planning and design of open space and recreational areas, as well as facilities of various types and scales. Students develop skills in analysis, research, planning strategy, and design technique to create functional spaces based on client needs and site limitations. Prerequisite: LAEP 2720 or permission of instructor. (F)

LAEP 6320 Residential Planning and Design 5
Studio course introducing methods for the planning and design of residential projects of various types and scales. Students develop skills in critical analysis, design technique, and planning strategy to create functional spaces based on client needs and site requirements. Prerequisite: LAEP 6310. (Sp)

LAEP 6350 Planting Design for Sustainability 4
Emphasizes plant/environmental relationships, as well as plant community dynamics, aesthetics, function, and sustainability. Includes lectures, readings, projects, and papers. (F)

LAEP 6370 City and Regional Planning 3
Introduction to historic and current theory and methods of city and regional planning. Includes legislative, administrative, and implementation practices within the planning process. Emphasizes public transportation and mobility issues. (Sp)

LAEP 6400 Low Water Landscaping 3
(dual listing 5400)
Examines arid ecosystems, emphasizing the Intermountain West, and recreating such ecosystems in a range of amenity landscapes. Also covers procurement, propagation, establishment, and maintenance of plants appropriate for low water landscapes. Also taught as PLSC 6400/5400. (F)

LAEP 6410 Redefining the Urban Landscape 5
Focuses on urban environment for design expression and processes associated with the creation of cities. Explores different aspects of urban design theories and design approaches (conceptual, perceptual, and analytical), as applied to large urban areas and site-specific spaces. (F)

LAEP 6550 Travel Course 1-3®
(dual listing 4350)
Major field trip to examine a variety of projects in planning and design. (F,Sp,Su)

LAEP 6740 Planning Theory and Implementation Issues 3
Explores theoretical underpinnings of planning and landscape theory, from the rational model to contemporary alternatives. Leads to discussions of issues of sprawl, sustainability, and transportation, including their effects on the built environment, agricultural lands, and open-space systems. (F)

LAEP 6750 Implementation and Regulatory Techniques in Planning 3
Review and analysis of the legal basis and techniques for land use and resource planning, including historic and visual resources at the federal, state, and local levels. Relies on readings in case law and specific case studies, as well as research focused on the evaluation of planning processes and strategies. Prerequisite: Graduate standing. (F,Sp)

LAEP 6860 Faculty/Interdisciplinary Seminar 1
Landscape architecture and environmental planning program options and research potential presented by departmental faculty. Also introduces students to other interdisciplinary programs and faculty within the University. Prerequisite: Graduate standing. (F)

LAEP 6890 Seminar on Research Methods and Thesis Proposals 2
Explores various research methods from both case studies and faculty presentations. Also includes preparation of thesis proposals and abstracts, and discussion of graduate degree completion requirements. Prerequisite: Graduate standing. (Sp)

LAEP 6900 Special Problems 1-5®
Selected problems to meet individual student interests and areas of concentration. Registration by permission of departmental faculty. Prerequisite: Graduate standing. (F,Sp,Su)

LAEP 6910 Reading Seminar I 1
Selected readings directed by department faculty. Prerequisite: Graduate standing. (F)

LAEP 6930 Reading Seminar II 1
Selected readings directed by department faculty. Prerequisite: Graduate standing. (Sp)

LAEP 6960 Master's Project 1-6®
Requires research, analysis, and production of a given subject area, including its final planning, design, and documentation. Prerequisite: Graduate standing. (F,Sp,Su)

LAEP 6970 Thesis Research 1-6®
Prerequisite: Graduate standing. (F,Sp,Su)

LAEP 6990 Continuing Graduate Advisement 1-3®
Prerequisite: Graduate standing. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Language (LANG)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

LANG 3550 DHA Culture of East Asia 3
Helps students explore and appreciate the culture of three East Asian countries: China, Japan and Korea. Students gain sincere view and understanding of these East Asian cultures through readings, hands-on cultural activities, viewing video materials, writing, and discussions. Topics include: major historical and social events, customs and traditions, thoughts and beliefs, people, food, contemporary issues, art, literature, and film. (F,Sp)

LANG 3990 Special Topics 1-5®
Additional readings or research done beyond the material covered in other language courses. May be repeated for credit if different topic is covered. Prerequisite: Instructor's permission. (F,Sp,Su)

LANG 4200H Senior Honors Seminar 1
Credit for completing and presenting a senior honors thesis project. Requirement may be fulfilled by publishing the thesis in an academic journal, defending the thesis before a faculty committee, presenting the thesis at an academic conference, or presenting the thesis in the languages session during Scholar's Day. (Sp)

LANG 4210H Senior Honors Thesis 1-4®
Independent study research credits for preparation of a senior honors thesis to fulfill requirements for a degree in languages with departmental honors. Prerequisite: Permission of instructor prior to enrollment. (F,Sp)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Liberal Arts (LAS)

See Liberal Arts Major, pages 381-382.

LAS 4900 Independent Study/Workshop 1-3 ®
Independent, interdisciplinary study resulting in an original work. After obtaining permission from a Liberal Arts advisor to take this course under the supervision of a particular instructor, the student must also obtain the instructor's permission. (F,Sp,Su)

Latin (LATN)

See Department of History, pages 332-337.
Also see Classics Minor, page 220.

LATN 1010 Beginning Latin I 5
Basics of Latin grammar and vocabulary. Beginning readings. (F)

LATN 1020 Beginning Latin II 5
Intermediate concepts of grammar and vocabulary. Intermediate readings. Prerequisite: Grade of *B* or better in LATN 1010. (Sp)

LATN 3100 Intermediate Latin Prose 3
Readings in Latin prose. Prerequisite: Minimum grade of *C* or higher in LATN 1020.

LATN 3130 Intermediate Latin Poetry 3
Readings in Latin poetry. Prerequisite: Minimum grade of *C* or higher in LATN 1020.

LATN 4100 Advanced Latin Readings 3®
Readings in Latin poetry and/or prose. Prerequisite: Minimum grade of *C* or higher in LATN 3100 and 3130. (F,Sp)

LATN 4930 Directed Readings in Latin Poetry and Prose Authors 1-3
Directed readings in advanced Latin poetry and prose authors. Prerequisite: Successful completion of at least three semesters of Latin. (F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Latin American Studies (LATS)

See Latin American Studies Minor, page 380.

LATS 2200 Introduction to Latin America 3
Interdisciplinary course examining Latin American geography, culture, history, literature, music, society, politics, and economics. (F)

Linguistics (LING)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

LING 2250 Cooperative Education 1-3®
Course credit for professional experience outside the classroom. Statement of professional goals and a summary report following the experience are required. (F,Sp,Su)

LING 3300 Clincial Experience I 1
First clinical practicum in middle and secondary schools. Arranged by special methods instructor. Required at Level I. Corequisite: LING 4400 or 6400. Prerequisites set by Secondary Education Department. (F,Sp)

LING 4100 The Study of Language 3
Investigates ways in which human languages are structured, how they change, how they reflect the cultures in which they are used, and how they are learned. Also taught as ANTH 4100. (F,Sp)

LING 4250 Cooperative Education 1-3®
Course credit for professional experience outside the classroom. Statement of professional goals and a summary report following the experience are required. (F,Sp,Su)

LING 4300 Clincial Experience II 1
Second clinical practicum in middle and secondary schools. Arranged by special methods instructor. Required at Level II. Corequisite: LING 4400 or 6400. Prerequisites set by Secondary Education Department. (F,Sp)

LING 4400 Teaching Modern Languages 3
Methods course for teaching majors or minors in any of the modern languages. Considers the context of the present secondary language classroom, effective teaching techniques that can be used in that context, and significant trends in teaching and learning languages. Taken concurrently with LING 4300. Prerequisite: Permission of instructor. (F,Sp)

LING 4520 Technology for Language Teaching 3**
(dual listing 6520)
Web- and disk-based technology for developing electronic course modules for the language learning classroom. (Su)

LING 4900 Analysis of Cross-Cultural Difference 3
Develops awareness of what culture is and how it shapes perceptions and attitudes. Through interactive student-centered activities, students learn to analyze cultural differences. (Sp)

LING 4920 Practicum in Language Tutoring 1®
Allows language students to develop tutoring skills by assisting professors daily in lower-division courses or fulfilling instructional duties for a comparable amount of time in the language laboratory, public schools, or similar activities with departmental approval. May be repeated for up to a maximum of 3 credits. (F,Sp,Su)

LING 5500 Student Teaching Seminar 2
Capstone seminar focused upon student teaching issues, professional development, and principles of effective instruction, with emphasis on reflective teaching. (F,Sp)

LING 5630 Student Teaching in Secondary Schools 10
Thirteen-week culminating practicum experience in which students assume full-time teaching responsibilities under direction of cooperating teachers in their major and minor fields. Prerequisites set by Secondary Education Department. (F,Sp)

LING 6010 Research in Second Language Learning 3
Readings in current SLL literature evaluated in terms of their implications for classroom practice. (F)

LING 6300 Clincial Experience I 1
First clinical practicum in middle and secondary schools for Master of Second Language Teaching students. Arranged by special methods instructor. Required at Level I. Corequisite: LING 6400. Prerequisites set by Secondary Education Department. (F,Sp)

LING 6310 Clincial Experience II 1
Second clinical practicum in middle and secondary schools for Master of Second Language Teaching students. Arranged by special methods instructor. Required at Level II. Corequisite: LING 6400. Prerequisites set by Secondary Education Department. (F,Sp)

LING 6400 Second Language Teaching: Theory and Practice 3
Survey of theories about memory, assigning meaning to recall, and methods L2 teachers and learners use to apply meaning to their teaching and learning. Central to all course topics are social dynamics in the L2 classroom and issues of schooling students of diverse backgrounds. (Sp)

LING 6410 Teaching Modern Languages 3
Methods course for graduate students seeking teacher licensure in any of the modern languages. Considers the context of the present secondary language classroom, effective teaching techniques that can be used in that context, and significant trends in teaching and learning languages. Taken concurrently with LING 6310. Prerequisite: Permission of instructor. (F,Sp)

LING 6510 Linguistic Analysis 3
Comparative study of linguistic patterns across languages. Linguistic structures and language typology for teachers of modern languages. (Sp)

LING 6520 Technology for Language Teaching 3**
(dual listing 4520)
Web- and disk-based technology for developing electronic course modules for the language learning classroom. (Su)

LING 6800 Topics in Second Language Acquisition 3®
Advanced seminar in the acquisition and teaching of languages. (Sp)

LING 6900 Culture Teaching and Learning: Theory and Practice 3
Examines culture learning and connection between development of communicative and cultural competence in the second language learner. Reviews theory, research, and practice in the field of intercultural communication as relating to second language learning and teaching. (Sp)

LING 6910 Exploring the Portfolio 1
Investigation of the portfolio process, including distinguishing qualities of superior portfolios. Students write their teaching philosophy and gather artifacts for their portfolio. Must be taken during the first semester of the Master of Second Language Teaching program. First of a sequence of three required courses. (F,Sp,Su)

LING 6920 Developing the Portfolio 1
Further development of the portfolio including revision of the student's teaching philosophy, given insights from courses taken. Reexamination and revision of artifacts gathered, as well as addition of new artifacts. Prerequisite: LING 6910. (F,Sp,Su)

LING 6930 Finishing the Portfolio 1
Further work toward completion of the portfolio, including careful development of main themes in the teaching philosophy and artifacts; addition of final artifacts; and revision for coherence, clarity, and brevity. Must be taken during the final semester of the Master of Second Language Teaching program. Prerequisite: LING 6920. (F,Sp,Su)

LING 6940 Independent Study 1-3®
Individually directed readings and conference. Departmental permission required before registration. Prerequisite: Approval of instructor. (F,Sp,Su)

LING 6990 Continuing Graduate Advisement 1-9®
Allows students access to faculty and facilities to complete graduate thesis, project, and papers. (F,Sp,Su)

**Taught 2007-2008.

Mechanical and Aerospace Engineering (MAE)

See Department of Mechanical and Aerospace Engineering, pages 400-406.

MAE 1200 Engineering Graphics 2
Introduction to technical sketching, solid modeling, and engineering graphics. Concurrent engineering design process applied to a project. Students start with hand sketches, then move through variational geometry solid models, with tolerance analysis and control, until they have produced a complete set of manufacturing drawings conforming to the ASME standard. Prerequisite: MATH 1060. (F,Sp)

MAE 2160 Material Science 3
(formerly MAE 2060)
Study of atomic and microscopic structures of metals, polymers, ceramics, and composite materials, and how these structures affect material properties. Prerequisites: CHEM 1210 and ENGR 2140 (both may be taken concurrently). (F,Sp)

MAE 2200 Engineering Numerical Methods I 2
Introduction to computational methods, emphasizing software development using FORTRAN 95. Prerequisite: MATH 1220. (F)

MAE 2250 Cooperative Practice 3
Planned work experience in industry. Detailed program must have prior approval. Written report required. (F,Sp,Su)

MAE 2300 Thermodynamics I 3
(formerly MAE 2400)
First and second laws of thermodynamics; analysis of open and closed systems; equations of state; power and refrigeration cycles; and problem solving methodology. Prerequisites: MATH 1220; MATH 2210 (may be taken concurrently). (Sp,Su)

MAE 2450 Engineering Numerical Methods II 3
(formerly MAE 2210)
Explores basic tools of numerical analysis, solution to ordinary and partial differential equations, software development using FORTRAN 95, and applications using computer algebra packages. Prerequisites: MAE 2200; MATH 2210, 2250 (may be taken concurrently). (Sp)

MAE 2650 Manufacturing Processes 3
(formerly MAE 2600)
Introduction to manufacturing processes and CAD/CAM. Material forming, machining, finishing, and joining. Integration of manufacturing and CAD, plus the fundamentals and application of statistical process control. (Sp)

MAE 3040 Mechanics of Solids 3
Stress, strain, and deflection due to flexure and shear. Combined stresses, instability, nonsymmetric bending, torsion, and energy methods. Prerequisite: ENGR 2140. (F)

MAE 3320 Advanced Dynamics 3
Particle and rigid body dynamics. Work and kinetic energy, conservation of energy, impulse-momentum, conservation of linear and angular momentum. Kinematics and kinetics in 2-D and 3-D. Newtonian and Lagrangian Mechanics. Prerequisites: ENGR 2030; MAE 2200 (may be taken concurrently). (F)

MAE 3340 Instrumentation and Measurements 3
Principles and application of mechanical instrumentation and experimentation. Sensing elements, signal conditioning, data acquisition, statistical analysis of data, and instrumentation system design. Prerequisites: ENGR 2140, ECE 2210, MAE 3400, 3420. (Sp)

MAE 3400 Thermodynamics II 3
Second law analysis, power and refrigeration cycles, property relations, gas mixtures, psychrometrics, chemical reactions, chemical equilibrium, introduction to heat transfer, steady state and transient conduction. Prerequisites: MAE 2300; MAE 2200 (may be taken concurrently). (F)

Course Descriptions

MAE 3420 Fluid Mechanics 3
Application of fluid dynamic theory to inviscid and viscous, incompressible and compressible, and external and internal fluid flows, with emphasis on laminar and turbulent boundary layers. Prerequisites: ENGR 2020, MAE 2200, 2300 (MAE 2200 may be taken concurrently). (F)

MAE 3440 QI Heat and Mass Transfer 3
Introduction to convection, external flow, internal flow, free convection, boiling and condensation, heat exchangers, radiation and diffusion mass transfer. Includes design project. Prerequisites: MAE 3400, 3420; MAE 2450 (may be taken concurrently). (Sp)

MAE 3800 Design I 2
First course in senior design sequence. Design process, teaming skills, engineering economics, project selection and management, proposal writing, technical writing, and technical presentations. Prerequisite: ENGR 2140. (Sp)

MAE 4300 Machine Design 3
Computer-aided design and synthesis of mechanisms, mechanical linkages, cams, fasteners, welds, gears, bearings, power transmission components, and lubrication. Component failure analysis based on metal fatigue related to dynamic loading. Prerequisite: MAE 3040. (Sp)

MAE 4400 CI Fluids/Thermal Laboratory 2
Laboratory experiences in observation and measurement of fundamental fluid and thermal phenomena. Prerequisites: MAE 3340, 3440. (F)

MAE 4800 CI Design II 3
Senior design project, including a technical presentation and a critical design review. Prerequisites: MAE 3440, 3800, 4300. (F,Sp)

MAE 5020 Finite Element Methods in Solid Mechanics I 3
Introduction to finite element methods and their application to the analysis and design of mechanical engineering systems. Prerequisite: MAE 3040. Also taught as CEE 5020. (F)

MAE 5060 Mechanics of Composite Materials I 3
Stress-strain relations for nonisotropic composites, such as fiber-reinforced plastic laminates, properties and their uses, strength and life determination, and methods for design using composite materials. Prerequisite: MAE 3040 or CEE 3010. Also taught as CEE 5060. (Sp)

MAE 5300 Vibrations 3
Vibration of single and multiple degree of freedom, and discrete mass systems. Natural frequencies and mode shapes for free, damped, and undamped sytems. Forcing functions and transient responses. Matrix methods, numerical solution, and random vibrations. Applications and design. Prerequisites: ENGR 2030, 2140. (F)

MAE 5310 Dynamic Systems and Controls 3
Study of continuous-time systems, classical and modern systems design methods, transfer function models, state space, dynamics of linear systems, and frequency domain analysis and design techniques. Introduction to controllability and observability, and full-state pole placement controller design. Laboratory work required. Prerequisite: MAE 3340. (F)

MAE 5410 Design and Optimization of Thermal Systems 3
Discussion of the basic considerations that occur in the design of thermal systems, including problem formulation, appropriate modeling and solution methodologies, optimization techniques, and economic analysis. Prerequisite: MAE 3440. (F)

MAE 5420 Compressible Fluid Flow 3
Application of conservation of mass, momentum, and energy to the design and analysis of compressible fluid systems. Prerequisites: MAE 3400, 3420. (Sp)

MAE 5440 Computational Fluid Dynamics 3
Introduction to computational fluid dynamics and heat transfer using the finite-volume method. Extensive code development. Application of a commercial CFD solver to a problem of interest. Prerequisites: MAE 3420 and 3440. (Sp)

MAE 5470 Internal Combustion Engines 3
Thermodynamics of internal combustion engines; idealized cycles, fuels, fuel metering, engine characteristics, pressure measurement, and engine testing. This course is not currently being offered. For information about when it may be offered, contact the department.

MAE 5500 Aerodynamics 3
Fundamentals of incompressible, inviscid flow; aerodynamic forces and moments; airfoil characteristics; incompressible flow around two-dimensional airfoils and finite wings; three-dimensional incompressible flow; and introduction to aircraft performance. Prerequisite: MAE 3420. (F)

MAE 5510 Dynamics of Atmospheric Flight 3
Aircraft equations of motion; aerodynamic forces and moments; aircraft stability and control in roll, pitch, and yaw; aircraft motion with six degrees of freedom; aircraft performance and design; and design project. Prerequisite: MAE 5500. (Sp)

MAE 5520 Elements of Space Flight 3
Introduction to astrodynamics and orbital design. Spacecraft systems engineering including spacecraft subsystems (e.g., attitude control, communications, power, structures). Introduction to propulsion and launch vehicles. Prerequisites: MAE 3320 or PHYS 3550; or both ECE 2270 and 2700. (F)

MAE 5530 Space System Design 3
Students in teams perform a space system design involving all aspects, including technical, cost, and schedule. Class is linked to national design competitions and/or current USU spacecraft design projects. Prerequisite: ECE 5230 or MAE 5520. Also taught as ECE 5240. (Sp)

MAE 5540 Propulsion Systems 3
Fundamentals of rocket and air breathing propulsion, including space flight dynamics, nozzle theory, combustion processes, and flight performance. Rocket propulsion systems, including solid, liquid, hybrid, and combined cycles. Air breathing propulsion systems, including ramjet, scramjet, turbojet, and turbofan engine concepts. Prerequisite: MAE 5420 or consent of instructor. (Sp)

MAE 5580 Aircraft Design 3
Design and optimization of aircraft systems. Students work in teams to design and optimize an aircraft to satisfy a specific set of mission requirements, including mission effectiveness, cost, and scheduling. Class is linked to national design competitions and/or current USU aircraft design projects. Prerequisite: Permission of instructor. (F)

MAE 5600 Manufacturing Process Planning and Statistical Quality Control 3
Explores how to produce products in today's manufacturing environment. Topics include forecasting, planning, facility layout, job design, planning, scheduling, total quality management, and statistical process control as they relate to manufacturing firms. Prerequisite: MAE 2650. (F)

MAE 5610 Hydraulics and Pneumatics 3
Hydraulic and pneumatic circuit theory, components, and systems analysis and design. Efficiency and performance evaluation, based on steady and transient flow principles and force and energy transfer concepts. Introduction to electrohydraulic control systems. Prerequisite: MAE 3420. (Sp)

MAE 5620 Manufacturing Automation 3
Principles of automation technology as applied to manufacturing systems. Topics include motion control, PLC, robotics, CNC, and system integration. Prerequisite: MAE 2650. (F)

MAE 5630 Machining Theory and Applications 3
Introduces fundamental metal cutting theory (such as chip formation, cutting forces and temperatures, and tool wear) and its applications, including high-speed machining of aerospace and other difficult-to-machine alloys. Prerequisites: MAE 2650 and 3040. (Sp)

MAE 5640 Design for Manufacturability 3
Product design for economic production. Manufacturing processes (especially primary processes), associated tooling cost and design, and resultant product design requirements. Prerequisites: MAE 2650 and 3800. (F)

MAE 5650 Nontraditional and Additive Manufacturing Processes 3
Introduction to nontraditional and additive manufacturing processes, including rapid prototyping, laser processing, and electrical discharge machining. Prerequisites: MAE 2160, 2650, and 3440. MAE 3440 may be taken concurrently. (Sp)

MAE 5660 Transport Phenomena in Manufacturing Processes 3
Analysis of manufacturing processes through the development of physically-based mathematical models. Heat and mass transfer principles used for a quantitative treatment of transport phenomena for process simulation and control. Prerequisites: MAE 2160, 3440. (Sp)

MAE 5680 Manufacturing Planning and Simulation 3
Explores planning and simulation methods for process design issues in electronics manufacturing (EM) and discrete parts manufacturing. Students learn planning, modeling, and simulation methods at the process and system level. Prerequisite: MAE 5600. (Sp)

MAE 5900 Cooperative Practice 3
Planned work experience in industry. Detailed program must have prior approval. Written report required. Student must be in professional program. (F,Sp,Su)

MAE 5930 Special Problems 1-3®
Formulation and solution of practical or theoretical problems. Prerequisite: Permission of department head. (F,Sp,Su)

MAE 6010 Finite Element Methods in Solid Mechanics II* 3**
Advanced theory and applications of finite element methods to both static and dynamic solid mechanics problems. Prerequisite: MAE 5020. (Sp)

MAE 6040 Continuum Mechanics and Elasticity 3
Mechanics of continuous media; tensors, stress, strain, deformation, rate equations, and constitutive equations. Plane stress, plane strain, torsion, and bending theories, as well as problem solutions, investigated for linear elastic materials. Prerequsite: MAE 3040 or CEE 3010. (F)

MAE 6050 Experimental Methods in Structural Engineering 3
Experimental techniques used in research and design in structural engineering and mechanics. Structural models. Theory and practical applications. Development of principles used to design research projects. Prerequisite: Instructor's consent. Also taught as CEE 6050. (Sp)

MAE 6070 Mechanics of Composite Materials II* 3**
Second course in composite materials. Stress-strain states of laminated composite structures, including interlaminar stresses, failure criteria, and hygrothermal stresses. Prerequisite: MAE 5060. Also taught as CEE 6070. (F)

MAE 6080 Boundary Element Method 3
Presents introduction to boundary element method to solve fluid and solid mechanics problems. Prerequisites: FORTRAN programming skills, MAE 3040, 5020. (Sp)

MAE 6090 Theory of Plates and Shells 3
Introduction to plate and shell theories. Development of bending and buckling of plates and shells through classical theory. Prerequisite: MAE 3040 or CEE 3010. Also taught as CEE 6090. (F)

MAE 6130 Structural Dynamics and Seismic Design 3
Development and solutions for equations of motion for single- and multi-degree of freedom systems. Dynamic analysis by Modal Superposition and Response Spectra. Design of structures for seismically active areas. Also taught as CEE 6130. (Sp)

MAE 6180 Dynamics and Vibrations* 3**
Fundamentals of two-dimensional and three-dimensional rigid body dynamics, including Newtonian, Lagrangian, and Leavit Energy Methods. Equations of motion, mode shapes, and natural frequencies for continuous media and multi degree-of-freedom systems. Prerequisite: MAE 5300 or CEE/MAE 6130. Also taught as CEE 6180. (Sp)

MAE 6320 Linear Multivariable Control 3
Modeling, analysis, and design of multi-input, multi-output control systems, including both state space and transfer matrix approaches, with an emphasis on stability. Prerequisite: ECE 4310 or MAE 5310. Also taught as ECE 6320. (F)

MAE 6340 Spacecraft Attitude Control* 3**
Spacecraft attitude dynamics and controls. Spin stabilized, three axis, and dual spin modes. Attitude determination techniques. Prerequisite: ECE 4310 or MAE 5310. Also taught as ECE 6340. (Sp)

MAE 6350 Robotics 3
Fundamentals of robotic systems, including kinetics, kinematics, sensors, actuators, control algorithms, motion planning, and computer systems. Integration of critical design components to develop complete systems. Robotic manipulator analysis and design. Applications in manufacturing. Mobile rockets, including wheeled, legged, and alternative locomotion robots. Prerequisite: ECE/MAE 6320 or instructor approval. Also taught as ECE 6350. (Sp)

MAE 6410 Fluid Dynamics 3
Basic laws of fluid motion, Navier Stokes equations, kinematics of the flow field, fundamental exact solutions of viscous flow, and elements of turbulence. Prerequisite: MAE 3420 or CEE 3500. (F)

MAE 6420 Experimental Methods in Fluid Mechanics* 3**
Explores process and techniques involved in acquisition, analysis, and presentation of experimental data, with particular emphasis on aerodynamic applications. Topics include digital signal processing, statistics, uncertainty analysis, hot wire anemometry, and wind tunnel testing. Prerequisite: MAE 3420. (Sp)

MAE 6430 Boundary Layer Theory and Convection Heat Transfer 3
Derivation of the boundary layer equations. Exact, approximate, and numerical solution techniques. Boundary layers in compressible flow. Separation. Unsteady boundary layers. Stability and transitition. Turbulent boundary layers. Integral, differential, and numerical methods for solving problems associated with transfer of heat in a viscous fluid. Prerequisites: MAE 3440, 6410. (Sp)

MAE 6440 Advanced Computational Fluid Dynamics 3
Advanced topics in computational fluid dynamics using the finite-volume method, compressible flow algorithms including body-fitted nonorthogonal grids, linear solvers, turbulence modeling, and parallel computing. Includes extensive code development. (F)

MAE 6450 Thermodynamics* 3**
Topics in classical and statistical thermodynamics, including distribution functions, free molecular flow, electron and photon gas modeling, derived properties of solids, and thermodynamic applications in areas of current research interest. Prerequisite: MAE 3400. (F)

MAE 6460 Conduction Heat Transfer* 3**
Integral, differential, and numerical methods for solving engineering problems associated with the diffusion of heat in a rigid solid. Prerequisite: MAE 3440. (Sp)

MAE 6480 Radiation Heat Transfer* 3**
Radiation theory and applications. Includes utilization of computer software. Prerequisite: MAE 3440. (F)

MAE 6490 Turbulence* 3**
Fundamentals of turbulent fluid flow, with emphasis on providing student with sufficient physical and mathematical background to critically evaluate current literature and make original research contributions. Topics include stochastic tools, the governing equations, transition to turbulence, isotropic turbulence, measurement techniques, and free and wall bounded turbulent shear flows. Prerequisite: MAE 6410 or instructor's consent. (Sp)

MAE 6500 Potential Flow* 3**
Inviscid, irrotational fluid flow with emphasis on aircraft analysis and design. Exact solutions with complex variables and conformal mapping; perturbation methods; singularity elements and influence coefficients; lifting-line method; numerical vortex lattice method; numerical panel methods; and software design and development. Prerequisite: MAE 5500. (Sp)

Course Descriptions

MAE 6510 Aircraft Dynamics and Flight Simulation 3**
Aircraft control and maneuverability, control response and transfer functions, nonlinear dynamics with gyroscopic and aerodynamic coupling, Euler angle formulations, direction cosine formulation, quaternion formulation, numerical integration methods, software design and development. Prerequisite: MAE 5510. (Sp)

MAE 6530 Propulsion Systems 3
Fundamentals of turbine and rocket propulsion, including nozzle theory and thermodynamic relations, combustion processes, and flight performance. Rocket propulsion topics, including solid, liquid, and hybrid rocket engines; and advanced engine concepts. Turbine engine propulsion systems, including turbojets, turbofans, afterburners, and advanced unducted fan concepts. Prerequisite: MAE 5420. (Sp)

MAE 6540 Astrodynamics* 3**
Advanced topics in astrodynamics to include: general and special perturbations, universal variable, methods of orbit determination, Lambert's theorem, the restricted three-body problem, and space mission planning. Prerequisite: MAE 5520. (F)

MAE 6550 Advanced Structural Analysis 3
Explores advanced structures in modern civil, mechanical, and aerospace systems. Emphasizes concepts through problem solving, and fosters an in-depth understanding of the subject. Provides understanding of the fundamental principles to analyze and design advanced structures. Prerequisite: MAE 6040. (Sp)

MAE 6560 Spacecraft Navigation 3
Fundamentals of aircraft and spacecraft navigation systems. Techniques in celestial and inertial navigation. Global Positioning System (GPS) principles. Least squares estimation and Kalman filtering for optimal estimation of stochastic systems. Prerequisite: MAE 5310 or ECE 5310 or equivalent. Also taught as ECE 6560. (Sp)

MAE 6620 Advanced Topics in Metal Cutting 3
Advanced topics in metal cutting mechanics, tool wear and tool life, chip control and breaking, high-speed and dry machining, surface roughness and integrity, and the optimization and monitoring of machining operations. Prerequisites: MAE 3800, 5630. (Sp)

MAE 6640 Life Cycle Engineering 3
Familiarizes students with re-engineering, cost/benefit analysis, value engineering, and life cycle design. Students will analyze costs and benefits of design decisions over the product life (needs, market, use, service, reliability, retirement, etc.) while improving the life cycle design of industrial products. Prerequisite: Graduate standing or permission of instructor. (F)

MAE 6800 Advanced Machine Design* 3**
Advanced topics in fluid film and boundary lubrication. Dynamics and vibration consideration in design of machine systems and fatigue failure theories. Prerequisite: MAE 4300. (Sp)

MAE 6900 Seminar 0.5®
Overview of graduate program requirements, current research, and research opportunities. Presentations from graduate students, faculty, and outside speakers. Master's degree candidates must include 1 credit and doctoral degree candidates must include 2 credits of MAE 6900 in an approved program of study. Prerequisite: Graduate standing or approval of department head. (F,Sp)

MAE 6930 Special Problems 1-3®
Independent or group study of engineering problems not covered in regular course offerings. (F,Sp,Su)

MAE 6950 Design Project 3
Individual projects involving the design, development, and/or testing of components, devices, or systems. Formal report required. (F,Sp,Su)

MAE 6970 Thesis Research 1-9®
(F,Sp,Su)

MAE 6990 Continuing Graduate Advisement 1-12®
(F,Sp,Su)

MAE 7040 Elasticity* 3**
Energy theorems, variational techniques, complex variable solutions, and three-dimensional solutions for linear elastic materials. Prerequisite: MAE 6040 or instructor's consent. (Sp)

MAE 7050 Plasticity* 3**
Analysis of stresses, deformation, and collapse in devices constructed of plastic material. Prerequisite: MAE 6040 or CEE 6080/5080 or instructor's consent. Also taught as CEE 7050. (Sp)

MAE 7080 Advanced Plate and Shell Theory 3
Analysis of plate and shell structures by classical and numerical methods. Emphasis on numerical solutions. Prerequisite: Instructor's consent. Also taught as CEE 7080. (F)

MAE 7330 Nonlinear and Adaptive Control 3
Methods of nonlinear and adaptive control system design and analysis. Includes qualitative and quantitative theories, graphical methods, frequency domain methods, sliding surface design, linear parameter estimation methods, and direct and indirect adaptive control techniques. Prerequisite: ECE/MAE 6320. Also taught as ECE 7330. (Sp)

MAE 7350 Intelligent Control Systems* 3**
Intelligent control strategies, including neural network, fuzzy logic, associated memory networks, and rule-based control systems. Prerequisite: ECE/MAE 6320 or instructor approval. Also taught as ECE 7350. (Sp)

MAE 7360 Optimal and Robust Control 3
Advanced methods of control system analysis and design. Operator approaches to optimal control, including LQR, LQG, and L1 optimization techniques. Robust control theory, including QRT, H-infinity, and interval polynomial approaches. Prerequisite: ECE/MAE 6320 or instructor approval. Also taught as ECE 7360. (F)

MAE 7380 Advanced Dynamics and Vibrations* 3**
Advanced techniques in dynamics and vibrations. Prerequisite: CEE/MAE 6180. (F)

MAE 7580 Advanced Finite Element Analysis in Fluid Mechanics 3
Application of the finite element method of analysis to problems in fluid mechanics. Use of higher order element to two- and three-dimensional flows. Prerequisites: CEE 3510, CEE/MAE 6570; or MAE 3420, CEE/MAE 5020. Also taught as CEE 7580. (Sp)

MAE 7750 Distributed Control Systems* 3
Design and implementation issues concerning distributed control systems. Real-time processing, distributed stability methods, network techniques and standards, system development and management, smart sensors, and control actuators. Survey of current literature. Prerequisite: ECE/MAE 6320. Also taught as ECE 7750. (Sp)

MAE 7930 Special Problems 1-3®
Independent or group study of engineering problems not covered in regular course offerings. (F,Sp,Su)

MAE 7970 Dissertation Research 1-12®
(F,Sp,Su)

MAE 7990 Continuing Graduate Advisement 1-12®
(F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008.
***Taught alternate years. For further information, consult department.

Mathematics (MATH)

See Department of Mathematics and Statistics, pages 388-399.

MATH 0900 Elements of Algebra 3©
Review of elementary algebra in preparation for MATH 1010. Remedial class not carrying USU or transfer credit. Remedial fee required. (F,Sp,Su)

MATH 1010 Intermediate Algebra 3©
Linear equations and inequalities, polynomials and exponents, rational expressions, roots and radicals, quadratic equations, lines and systems of linear equations. Prerequisite: *C*- or better in MATH 0900, Math ACT score of at least 18, or satisfactory score on placement exam. Required for entrance to USU. Course fee required. (F,Sp,Su)

MATH 1030 QL Quantitative Reasoning 3
Exploration of contemporary mathematical thinking, motivated by its application to problems in modern society. Emphasizes development of skill in analytical reasoning. Prerequisite: *C*- or better in MATH 1010, Math ACT score of at least 23, or satisfactory score on placement exam. (F,Sp)

MATH 1050 QL College Algebra 4©
Real and complex number systems, graphs, inverse functions, polynomial and rational functions, exponential and logarithmic functions, systems of equations, elementary matrix algebra, induction, binomial theorem, permutations and combinations. Graphing calculator required. Prerequisite: *C*- or better in MATH 1010, or Math ACT score of at least 23, or satisfactory score on placement exam. (F,Sp,Su)

MATH 1060 Trigonometry 2©
Trigonometric functions, equations, identities, and applications. Graphing calculator required. Prerequisite: *C*- or better in MATH 1010, or Math ACT score of at least 23, or satisfactory score on placement exam. May be taken concurrently with MATH 1050. (F,Sp,Su)

MATH 1100 QL Calculus Techniques 3
Techniques of elementary calculus, differentiation, integration, elementary optimization, and introduction to partial derivatives. Applications in business, social science, and natural resources. Graphing calculator required. Prerequisite: *C*- or better in MATH 1050, or a Math ACT score of at least 25. (F,Sp,Su)

MATH 1210 QL Calculus I 4
Analytic geometry, differential and integral calculus, transcendental functions, and applications. Graphing calculator required. Prerequisite: *C*- or better in MATH 1050 and 1060, or an AP Calculus score of at least 3 on the AB test, or a Math ACT score of at least 27. (F,Sp,Su)

MATH 1220 QL Calculus II 4
Integration, infinite series, introduction to vectors, and applications. Graphing calculator required. Prerequisite: *C*- or better in MATH 1210, or AP score of at least 4 on Calculus AB exam or at least 3 on Calculus BC exam. (F,Sp,Su)

MATH 2020 QI Introduction to Logic and Geometry 3
Logic; introduction to algebraic geometry and Euclidean geometry. MATH 2020 is a mathematics content course, not a methods course. Prerequisite: *C*- or better in MATH 1050 or Math ACT score of at least 25. Course fee required. (F,Sp,Su)

MATH 2210 QI Multivariable Calculus 3
Vector calculus, multiple integration, partial derivatives, line and surface integrals. The theorems of Green, Gauss, and Stokes. Prerequisite: *C*- or better in MATH 1220 or AP Calculus score of 5 on BC exam. (F,Sp,Su)

MATH 2250 QI Linear Algebra and Differential Equations 4
Linear systems, abstract vector spaces, matrices through eigenvalues and eigenvectors, solution of ode's, Laplace transforms, first order systems. Prerequisite: *C*- or better in MATH 1220 or AP Calculus score of 5 on BC exam. (F,Sp,Su)

MATH 2260 Internship and Cooperative Studies 1-6®
Lower-division internship/cooperative work experience. (F,Sp,Su)

MATH 2270 QI Linear Algebra 3
Topics from linear algebra, including matrices, abstract vector spaces, linear independence, bases, eigenvalues, eigenvectors, orthogonality, least squares approximation, and linear transformations. Recommended for Math and Math Education majors. Prerequisite: *C*- or better in MATH 1220 or AP Calculus score of 5 on BC exam. (F)

MATH 2280 QI Ordinary Differential Equations 3
First-order differential equations: solution techniques, numerical methods and applications. Higher-order scalar equations; linear systems, phase plane analysis. Additional topics selected from: series solution techniques, boundary value problems, Sturm-Liouville theory, bifurcation analysis. Prerequisites: *C*- or better in MATH 2210 and 2270. (Sp)

MATH 2910 Directed Reading and Conference 1-3®
Prerequisite: Prior arrangement with specific instructor. (F,Sp,Su)

MATH 3110 Modern Geometry 3
Euclidean and non-Euclidean geometry, with emphasis on historical significance of parallel postulate. Axiomatic development of geometry and theorems. Prerequisite: *C*- or better in MATH 1220. (Sp)

MATH 3300 School Laboratory for Mathematics Teachers Level I 1
Provides preservice mathematics teachers with supervised experiences working with teachers and students in middle and secondary schools. Activities coordinated with other Level I professional education courses. (F,Sp)

MATH 3310 Discrete Mathematics 3
Logic and axiomatics, sets, functions, counting methods, recurrence relations, graph theory, Boolean algebras, combinatorical circuits, automata, grammars, and languages. Prerequisite: *C*- or better in MATH 1220. (F,Sp,Su)

MATH 4200 CI Foundations of Analysis 3
Fundamental concepts of analysis studied from a rigorous point of view. Rigorous development of the real number system and calculus. Emphasis on learning how to construct proofs. Prerequisites: *C*- or better in MATH 2210, 2250; or *C*- or better in MATH 2210, 2270, 2280. (F,Sp)

MATH 4230 QI Applied Mathematics in Biology* 3**
Formulation, analysis, and experimental tests of mathematical models in biology. Combines mathematics, computing, experimental design, and statistical analysis while applying the scientific method to biological systems. Lectures, recitations, and a laboratory. Prerequisites: *C*- or better in BIOL 1620 and MATH 2250; or permission of instructor. Programming experience recommended. Also taught as BIOL 4230. (Sp)

MATH 4250 Advanced Internship/Co-op 1-6®
An internship/cooperative work experience which has been determined by the department to be at the 4000-level. (F,Sp,Su)

MATH 4300 School Laboratory for Mathematics Teachers Level II 1
Provides preservice mathematics teachers with supervised experiences working with teachers and students in middle and secondary schools. Activities coordinated with other Level II professional education courses. (F,Sp)

MATH 4310 CI Introduction to Algebraic Structures 3
First course in theory of algebraic structures. Topics include elementary group and ring theory. Prerequisites: *C*- or better in MATH 2210, 2270, 2280; or *C*- or better in MATH 2210, 2250. (F,Sp)

MATH 4400 History of Mathematics and Number Theory 3
Chronological parallel of math history with cilvilization, evolution of mathematical thought, historical foundations of numbers, computation, geometry, algebra, trigonometry, and calculus. Introduction to number theory. Prerequisites: At least one of MATH 4200 and 4310 with a *C*- or better, and concurrent enrollment in the other. (Sp)

MATH 4500 Methods of Secondary School Mathematics Teaching 3
A teaching methods course required of all prospective secondary school mathematics teachers. Prerequisites: *C*- or better in MATH 3110; and one of MATH 4200 or 4310 with a *C*- or better. (F,Sp)

Course Descriptions

MATH 4620 Computer Aided Math for Secondary Math Teachers 3
Problem solving using symbolic manipulation software on computers. Topics include material introduced in MATH 1210, 1220, 2210, 2250, 2270, and 2280. Includes instruction in the use of modern computerized devices in the classroom. Prerequisites: *C*- or better in MATH 2210, 2250; or *C*- or better in MATH 2210, 2270, 2280. (F)

MATH 4700 Engineering Mathematics and Statistics 3
Advanced engineering mathematics and statistics including: random variables; distributions; central limit theory; hypothesis testing; Anova; quality control; Fourier series; introductory analytic and numerical methods for elliptic, parabolic, and hyperbolic PDEs; and modern software packages. Prerequisites: *C*- or better in MATH 2210; *C*- or better in MATH 2250 or 2280. (F,Sp)

MATH 4910 Directed Reading and Conference 1-3®
Registration requires prior arrangement with specific instructor. (F,Sp,Su)

MATH 5110 Differential Geometry 3
Introduction to geometry of curves and surfaces in three dimensions, using graphic and symbolic software. Prerequisites: *C*- or better in MATH 2210, 2250; or *C*- or better in MATH 2210, 2270, 2280. (F)

MATH 5210 Introduction to Analysis I 3
One and several variable calculus from an advanced point of view. Proofs of all main theorems in calculus. Prerequisite: *C*- or better in MATH 4200 or 5510. (F)

MATH 5220 Introduction to Analysis II 3
Continuation of MATH 5210. Rigorous development of multivariable advanced calculus. Prerequisite: *C*- or better in MATH 5210. (Sp)

MATH 5270 Complex Variables 3
Basic theory and applications of complex variables for mathematics, physics, and engineering students. Topics include analytic functions, contour integration, and residue theorem conformal mappings. Prerequisites: *C*- or better in MATH 2210, 2250; or *C*- or better in MATH 2210, 2270, 2280. (Sp)

MATH 5310 Introduction to Modern Algebra* 3**
Continuation of MATH 4310. Topics include: Sylow theory for finite groups, factorization theory for commutative rings, and Galois theory. Prerequisite: *C*- or better in MATH 4310. (Sp)

MATH 5340 Theory of Linear Algebra 3**
Vector space theory, linear transformations and matrices, eigenvalues and eigenvectors, inner product spaces, orthogonality, canonical forms, and Hermitian matrices. Prerequisite: *C*- or better in MATH 2250 or 2270; or consent of instructor. (Sp)

MATH 5410 Methods of Applied Mathematics 3
Basic modeling and qualitative understanding, including dimensional analysis (Buckingham Pi theorem). Asymptotic solutions, perturbation approaches, boundary layers in differential equations, variational calculus, Hamilton's principle, and conservation of energy. Emphasizes practical approaches to science and engineering problems. Prerequisites: *C*- or better in MATH 2210, 2250; or *C*- or better in MATH 2210, 2270, 2280. (F)

MATH 5420 Partial Differential Equations 3
Modeling with partial differential equations, diffusion, and wave equations. Classical solution techniques including: maximum principles, separation of variables (eigenfunctions), method of characteristics, Fourier and Laplace transforms, and singularity methods (Green's Functions). Emphasizes understanding and solving physical equations. Prerequisite: *C*- or better in MATH 2250 or 2280. (Sp)

MATH 5460 Introduction to the Theory and Application of Nonlinear Dynamical Systems 3
Qualitative behavior of nonlinear maps and ordinary differential equations. Stability of solutions, bifurcation theory, chaos, and applications. Prerequisite: *C*- or better in MATH 2250 or 2280. (Sp)

MATH 5500 Capstone Mathematics and Statistics for Teachers 3
Builds on competencies attained in mathematics and statistics, enabling students to connect with and relate mathematics and statistics to real-world problem solving, while enhancing their capacity to explain conceptual mathematics. Prerequisites: *C*- or better in MATH 4200, 4310, and 4400. (F)

MATH 5510 Introduction to Topology 3
Elementary point-set topology, topological spaces, separation axioms, metric spaces, compactness, connectedness, order topology, countability axioms, continuity, and homeomorphisms. Prerequisite: *C*- or better in MATH 4200. (F)

MATH 5570 Actuarial Math I* 3**
Introduction to theory of risk and its application to construction and analysis of models for insurance systems. Prerequisites: *C*- or better in MATH 5710, STAT 3000, and permission of instructor. (F)

MATH 5580 CI Actuarial Math II* 3**
Continuation of MATH 5570. Prerequisite: *C*- or better in MATH 5570. (Sp)

MATH 5610 Computational Linear Algebra and Solution of Systems of Equations 3
Numerical solutions of systems of linear and nonlinear equations, methods for eigensystems, least squares problems, finding roots of functions and nonlinear systems, constrained and unconstrained optimization. Prerequisites: *C*- or better in MATH 2210, *C*- or better in MATH 2250 or 2270, and a high-level programming language. (F)

MATH 5620 Numerical Solution of Differential Equations 3**
Numerical solution of differential equations, initial and boundary value problems, finite difference, finite element, and spectral methods (FFT) applied to ODEs and PDEs. Prerequisites: *C*- or better in MATH 2210; *C*- or better in MATH 2250 or 2270; *C*- or better in MATH 2280; and a high-level programming language. (Sp)

MATH 5640 Optimization* 3**
One-semester introductory survey of optimization, including both continuous and combinatorial problems. Topics include: linear programming, constrained and unconstrained optimization, network models, dynamic programming, and integer programming. Prerequisites: *C*- or better in MATH 2210; *C*- or better in MATH 2250 or 2270; and a high-level programming language. (Sp)

MATH 5710 Introduction to Probability 3
Discrete and continuous probability, random variables, distribution and density function, joint distributions, conditional probabilities and expectations, Bayes' theorem, moments, moment generating functions, inequalities, convergence in probability and distribution, and central limit theorem. Prerequisites: *C*- or better in MATH 2210; and *C*- or better in MATH 2250 or 2270. (F,Sp)

MATH 5720 Introduction to Mathematical Statistics 3
Basic theory of point and interval estimation and hypothesis testing. Topics include: sufficiency and completeness; method-of-moments, best unbiased, maximum likelihood, Bayes', and empirical Bayes' estimators; Neyman-Pearson lemma; and likelihood ratio tests. Prerequisite: *C*- or better in MATH 5710. (Sp)

MATH 5760 Stochastic Processes* 3
Application of stochastic processes to engineering and science. Topics include Markov chains, Poisson processes, renewal theory, and Brownian motion. Prerequisite: *C*- or better in MATH 5710. (F)

MATH 5810 Topics in Mathematics 1-3®
MATH 5820 Topics in Mathematics 1-3®
Prerequisite: Permission of instructor. (F,Sp,Su) (F,Sp,Su)

MATH 5910 Directed Reading and Conference 1-3®
Prerequisite: Prior arrangement with a specific instructor. (F,Sp,Su)

MATH 5950H Honors Senior Project 1-4
A senior project required for completion of the departmental honors program. Prerequisite: Permission of instructor. (F,Sp,Su)

MATH 6110 Differential Geometry* 3
MATH 6120 Differential Geometry* 3
Topics include manifolds, calculus on manifolds, tensor calculus and differential forms, Lie groups, Riemannian geometry, deRham's Theorem, and Hodge theory. Prerequisite: *C*- or better in MATH 5110 or 5220; MATH 6110 must be completed prior to MATH 6120. (F) (Sp)

MATH 6210 Real Analysis* 3
MATH 6220 Real Analysis* 3
Measure theory, abstract integration, differentiation, introduction to functional analysis, Hilbert and Banach spaces. Prerequisite: *C*- or better in MATH 5210; MATH 6210 must be completed prior to 6220. (F) (Sp)

MATH 6250 Graduate Internship/Cooperative Studies* 1-6®
Graduate internship/cooperative work experience. (F,Sp,Su)

MATH 6270 Complex Variables* 3
Analytic functions, singular points, conformal maps, harmonic functions, analytic continuation, Residue theory. Prerequisite: *C*- or better in MATH 5210 or 5270. (Sp)

MATH 6310 Modern Algebra* 3
MATH 6320 Modern Algebra* 3
Algebraic structures, including vector spaces, groups, rings, algebras, and modules. Topics include: category theory, elementary commutative ring theory, and algebraic geometry. Prerequisite: *C*- or better in MATH 5310; MATH 6310 must be completed prior to 6320. (F) (Sp)

MATH 6340 Multilinear Algebra and Matrix Theory* 3
MATH 6350 Multilinear Algebra and Matrix Theory* 3
Permutation groups and representations, tensor spaces, symmetry classes of tensors, generalized matrix functions, matrices and graphs, and combinatorial matrix algebra. Prerequisite: *C*- or better in MATH 5340; MATH 6340 must be completed prior to 6350. (F) (Sp)

MATH 6410 Ordinary Differential Equations I* 3
Existence-uniqueness theory, linear equations and systems, nonlinear equations, and stability. Prerequisite: *C*- or better in MATH 5210. (F)

MATH 6420 Partial Differential Equations I* 3
Introduction to the theory of partial differential equations, including existence and uniqueness. Prerequisite: *C*- or better in MATH 5220 or 6410. (Sp)

MATH 6440 Ordinary Differential Equations II* 3
Asymptotic behavior, periodicity, boundary value problems, and perturbation methods. Prerequisite: *C*- or better in MATH 6410. (Sp)

MATH 6450 Partial Differential Equations II* 3
Advanced existence and uniqueness theorems, behavior of solutions, Sobolev spaces. Prerequisites: *C*- or better in MATH 6210; and *C*- or better in MATH 5420 or 6420. (Sp)

MATH 6470 Advanced Asymptotic Methods* 3
Theory of asymptotics and perturbations. Boundary layers for ordinary and partial differential equations. Free boundary problems, shocks, multiple-scale methods, and WKB methods. Prerequisite: *C*- or better in MATH 5420. (Sp)

MATH 6510 Topology* 3
MATH 6520 Topology* 3
Homotopy theory, fundamental groups, covering spaces, singular homology with applications to spheres and Euclidean spaces, CW complexes, cohomology ring, and Poincare duality. Prerequisites: *C*- or better in MATH 4310, 5510; and *C*- or better in MATH 5310 or consent of instructor. MATH 6510 must be completed prior to 6520. (F) (Sp)

MATH 6610 Numerical Analysis* 3
Linear and nonlinear equations, large scale problems, and eigenvalues. Prerequisites: *C*- or better in MATH 5210, 5610, or consent of instructor. (F)

MATH 6620 Numerical Analysis* 3
Numerical solution of ordinary and partial differential equations. Prerequisite: *C*- or better in MATH 6610 or consent of instructor. (Sp)

MATH 6640 Optimization* 3
Unconstrained problems, smooth function methods, linearly constrained problems, linear and quadratic programming, nonlinearly constrained methods, and practicalities. Prerequisite: *C*- or better in MATH 5220 or consent of instructor. (Sp)

MATH 6750 Probability Theory* 3
MATH 6760 Probability Theory* 3
Probability spaces, random variables, distribution functions, expectations, independence, modes of convergence, limit theorems, and applications. Prerequisite: *C*- or better in MATH 5210; MATH 6750 must be completed prior to 6760. (F) (Sp)

MATH 6810 Topics in Mathematics (Topic)* 3®
MATH 6820 Topics in Mathematics (Topic)* 3®
Prerequisite: Consent of instructor. (F) (Sp)

MATH 6910 Directed Reading and Conference* 1-3®
Prerequisite: Prior arrangement with specific instructor. (F,Sp,Su)

MATH 6970 Thesis 1-9®
(F,Sp,Su)

MATH 6990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

MATH 7110 Geometry (Topic)* 3®
MATH 7120 Geometry (Topic)* 3®
(F) (Sp)

MATH 7210 Analysis (Topic)* 3®
MATH 7220 Analysis (Topic)* 3®
(F) (Sp)

MATH 7310 Algebra (Topic)* 3®
MATH 7320 Algebra (Topic)* 3®
(F) (Sp)

MATH 7410 Differential Equations (Topic)* 3®
MATH 7420 Differential Equations (Topic)* 3®
(F) (Sp)

MATH 7510 Topology (Topic)* 3®
MATH 7520 Topology (Topic)* 3®
(F) (Sp)

MATH 7610 Numerical Analysis (Topic)* 3®
MATH 7620 Numerical Analysis (Topic)* 3®
(F) (Sp)

MATH 7750 Probability (Topic)* 3®
MATH 7760 Probability (Topic)* 3®
(F) (Sp)

MATH 7810 Topics in Mathematics (Topic)* 3®
MATH 7820 Topics in Mathematics (Topic)* 3®
(F) (Sp)

MATH 7910 College Teaching Internship 3®
(F,Sp,Su)

MATH 7970 Dissertation Research 1-15®
(F,Sp,Su)

MATH 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*This course will be taught as needed. For information about availability, contact the Department of Mathematics and Statistics.
**Taught 2006-2007.
***Taught 2007-2008.

Management and Human Resources (MHR)

See Department of Management and Human Resources, pages 383-387.

MHR 1160 Developing Self-Management Skills 1
A practical course designed to provide basic self-management skills contributing to personal effectiveness. For freshmen and sophomores *only*. (F,Sp,Su)

Course Descriptions

MHR 2050 Legal and Ethical Environment of Business 3
(formerly MHR 2990)
Surveys the legal and ethical environment of business. Introduction to elementary legal research and writing and critical thinking techniques. Lecture and laboratory. Prerequisites: STAT 1040 or MATH 1030 or 1050 (MATH 1050 or equivalent is required for College of Business majors); and GPA of 2.5 or higher. (F,Sp,Su)

MHR 2160 Student Applied Leadership Training 1-3®
Available to students involved in structured leadership training provided as part of their role and responsibility at the University. For details, contact the Office of University Advising and Transfer Services (SC 304). Prerequisite: Approval of course coordinator. (F,Sp,Su)

MHR 2350 Small Business Management 3©
Provides practical overview of management principles and practices as they apply to the small business enterprise. For nonbusiness majors.[1]

MHR 3110 DSS Managing Organizations and People 3©
Overview of the role of management, and an introduction to leadership theory and practice. Includes defining of mission and goals, organizing work, and managing human performance. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp,Su)

MHR 3510 Fundamentals of Entrepreneurship 3
Introduction to entrepreneurship and the processes of new ventures. The objective is to help students become familiar with entrepreneurship and ascertain the degree to which it represents a viable career path. Focuses on identifying, analyzing, and developing business opportunities. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F)

MHR 3520 Relationship and Organizational Competencies for Entrepreneurs 3
Development of the relationship and organizational competencies for entrepreneurs. Focuses on the development of persuasion, delegation, and organizational skills for individuals who launch businesses and/or play a key role in their growth. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (Sp)

MHR 3710 Developing Team and Interpersonal Skills 3
Experientially-driven course focusing on the role of teams in organizations and on developing skills which individuals and teams need to be effective. Topics include self-awareness, supportive communication, problem solving, and conflict management. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

MHR 3720 DSS Leading Organization Change 3
Explores the topic of organizational change and transformation, with special emphasis on the role of leadership, vision, and organization culture in change programs. Extensive use of case studies and experiential exercises. Also covers the history of organization development, change facilitation, and dealing with resistance to change. Prerequisites: MHR 3110; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits.[1]

MHR 3810 DSS Employment Law and Policy Development 3
Examines laws related to employment, labor relations, civil rights, compensation, safety, health, and retirement. Provides hands-on experience in drafting and reviewing human resource policies in a business setting. Addresses implementing and influencing public policy. Prerequisites: MHR 2050; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)[1]

MHR 3820 DSS International Management 3
Exploration of international culture and context of management, the impact of globalization on businesses today, and the pressures and complexities of operating in global markets, including the processes of managing multi-cultural human resources. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

MHR 4510 Senior Seminar in Entrepreneurship 3
Theoretical and practical aspects of starting or buying a business. Includes development of a business plan, as well as conducting due dilligence for buying a business or extensive consulting with a start-up or growth business. Prerequisites: MHR 3510, 3520; admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F)

MHR 4630 Human Resource Management 3
Introduces the process of managing human resources, including human resource planning, recruitment, selection, training, performance evaluation, compensation, career management, and labor relations. Also discusses diversity, human resource strategy, and related ethical issues. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F,Sp)

MHR 4710 Senior Leadership Project 3
Students plan and complete advanced leadership projects, present results, and document accomplishments. Students gain practical experience and demonstrate ability to manage complex projects, contributing to organizational goals and their own career objectives. Prerequisite: Permission of instructor.[1]

MHR 4730 Business and Society 3
Examines the relationship of business enterprises with their external environment and helps students to develop an analytical framework for addressing the business and society relationship over one's career in business or government. Helps students recognize, formulate, and analyze moral issues, as well as trace decisions forward to personal, cultural, and societal consequences. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits.[1]

MHR 4800 Independent Research and Readings 1-3®
Provides opportunity for student to pursue special interests under tutorship of faculty. Prerequisite: Approval of faculty member and department head. (F,Sp,Su)

MHR 4880 CI Business Strategy in an Entrepreneurial Context 3
Integrative capstone course dealing with processes, methods, and steps involved in starting and growing small to mid-size business ventures. Emphasizes cross-functional challenges of market entry, finance, operations, managing business growth, and entrepreneurs' responsibilities to society. Prerequisites: Senior standing; MHR 3110, BA 3400, 3500, 3700; admittance to a USU major; cumulative GPA of 2.67 or higher. (F,Sp,Su)

MHR 4890 CI Business Strategy in a Global Context 3
Integrative capstone course dealing with challenges and strategies associated with international business. Students develop global business judgment and perspective through addressing problems related to global market entry and growth, finance, operations, strategic alliances, social responsibility, and business-government relationships. Prerequisites: Senior standing; MHR 3110, BA 3400, 3500, 3700; admittance to a USU major; cumulative GPA of 2.67 or higher. (F,Sp,Su)

MHR 4950H Senior Honors Thesis/Project 3
Creative project that will then be written up, and presented, as a Senior Thesis as required for an Honors Plan. (Sp)

MHR 5350 Contemporary Manufacturing
(dual listing 6350) Management 3
Examines contemporary principles, techniques, and research findings of high-performance manufacturing. Analysis of leading models of management and continuous improvement, based upon best company practices, particularly lean, just-in-time manufacturing. Prerequisites: Admittance to a USU major; cumulative GPA of 2.67 or higher; and completion of at least 40 credits. (F)

MHR 5640 Selected Topics in Management
(dual listing 6640) and Human Resources 1-3®
Selected topics in management and/or human resources are pursued in depth. Topics and instructor may vary.[1]

MHR 6010 Advanced Business Law 3
Detailed investigation of business law, including law of contracts, torts, property, secured transactions, commercial paper, and business organizations. Prerequisite: MHR 2050.[1]

MHR 6050 Management Principles 1.5
Introduction of management principles for students entering a master's degree program in the College of Business. Prerequisite: Acceptance into a College of Business master's degree program. (Su)

MHR 6070 Fundamentals of Business Law 1.5
Introduction of business law principles for students entering a master's degree program in the College of Business. Prerequisite: Acceptance into a College of Business master's degree program. (Su)

MHR 6310 Career and Professional Development 1-3®
Explores theory and literature of careers, including orientation, as well as early-, mid-, and late-career issues. Students evaluate interests and capabilities, implement a personal development plan, get feedback on career development, and receive an objective outsider assessment of career readiness. (F,Sp,Su)

MHR 6330 Applied Human Resources Research 3
Provides applied research for selected human resource topics. (F)

MHR 6350 (dual listing 5350) Contemporary Manufacturing Management 3
Examines contemporary principles, techniques, and research findings of high-performance manufacturing. Analysis of leading models of management and continuous improvement, based upon best company practices, particularly lean, just-in-time manufacturing. (F)

MHR 6370 Project Management 3
Teaches concepts of project management, while intensively involving students in production and operations related projects. Requires integrative organizational and industry research and a professional report.[1]

MHR 6410 New Venture Creation 3
Focuses on development of new ventures, including entrepreneurial competencies, venture teams, recognizing business opportunities, gathering resources, new venture finance, entry strategies, legal structure, licensing and regulatory requirements, patents, copyrights, and product liability.[1]

MHR 6430 New Venture Growth and Expansion 3
Analyzes the growth phase of business development. Topics include organizational competencies and systems, growth strategies, growth finance and staging, cash-flow, franchising, estate and family business issues, harvest strategies including buyouts and public offerings, and employment law for small employers.[1]

MHR 6470 Entrepreneurship Project 3
Teaches concepts of project management, while intensively involving students in entrepreneurship-related projects such as initiating a start-up or consulting with management of an emerging business. Requires integrative organizational and industry research and a professional report.[1]

MHR 6500 Managing Individuals and Groups 3
Focuses on development of interpersonal and team skills. Includes development of organizational systems supporting effective use of human resources, including performance management, motivation, selection, training, rewards, and career development. (F)

MHR 6510 Performance Management 1-3
Introduces Human Resource Management, and then undertakes an in-depth analysis of performance management process, including job analysis, choice of raters, performance feedback, employee motivation and discipline, and training for improvement of individual performance. (F)[1]

MHR 6550 Human Resource Planning and Staffing 3
Focuses upon creation of competitive advantage through strategic human resources planning and staffing. Topics include job analysis, preparing candidate specifications, recruitment, assessment, and placement. Also covers pertinent laws/regulations and applicable descriptive/inferential statistics. (F)

MHR 6620 Training and Organizational Development 3
Provides advanced treatment of employee, management, and organizational development. Specific topics include: historical background, needs assessment, program design and implementation, outcomes evaluation, and how individuals and organizations change. (Sp)

MHR 6630 Compensation and Benefits 3
Strategic analysis of compensation and benefits policies and programs. Includes job evaluation systems, job pricing, wage and salary surveys, statistical methods used in compensation, group and individual pay for performance, executive compensation, and employee benefits. (Sp)

MHR 6640 (dual listing 5640) Selected Topics in Management and Human Resources 1-3®
Selected topics in management and/or human resources are pursued in depth. Topics and instructor may vary.[1]

MHR 6650 Team and Interpersonal Effectiveness 3
Experiential course designed to develop team effectiveness, and specific managerial and leadership skills contributing to interpersonal competence and effectiveness in work groups and organizations. (F)

MHR 6670 Employee Relations and the Labor Movement 3
Comprehensive survey of union-management relationships, including labor markets and the labor movement, labor history and law, union organization and government, and contract negotiation and administration. Includes exercises and cases in negotiations and grievance processes. (Sp)

MHR 6680 Human Capital Management 3
Introduction to human capital management practices. Specific objectives include developing a working understanding of the links between HRM and firm outcomes, gaining a working knowledge of HR database technologies, and achieving an ability to develop and use fundamental HR costing techniques.[1]

MHR 6690 Human Resource Strategy 3
Capstone course in Human Resource Management, designed to integrate concepts learned in specialized courses to the management of a total Human Resource function, with integration from both strategic and tactical perspectives. Covers domestic and international issues, as well as organizational change and development. (F)

MHR 6760 Employment Law 3
Examines laws related to employment, labor relations, civil rights, compensation, safety, health, and retirement. Provides experience in dispute resolution techniques in a nonunion employment setting, including negotiation, mediation, and arbitration. (F)

MHR 6770 Ethics for the Business Professional 1.5
Taking a stakeholder perspective on business, this course introduces students to several moral and ethical frameworks. Current case analyses and experiential activities allow students to confront ethical dilemmas and work through acceptable alternatives. (F)

MHR 6890 Global Business Strategy 3
Integrative capstone course, taking a CEO's perspective, addressing global competitiveness, strategic assessment, policy development, and strategy execution. Must be taken at end of advanced MBA program. (Su)

MHR 6900 Independent Research and Readings 1-3®
Provides opportunity for students to pursue special interests under tutorship of the faculty. Prerequisite: Approval of faculty member and department head. (F,Sp,Su)

MHR 6960 Professional Paper 3
Preparation of paper of professional quality, designed to demonstrate ability to complete a major project and effectively present the results.

MHR 6970 Thesis 1-4®
Designed for students preparing a master's degree thesis. (F,Sp,Su)

MHR 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

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[1] This course will be taught as needed. For information about availability, check with Management and Human Resources Department.
® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
© This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Course Descriptions

Military Science (MS)

See Department of Military Science, pages 407-408.

Basic Course

MS 1010 Introduction to Leadership 2®
Establishes a foundation for self and team development through participation in adventure training and team-building activities. Among the subjects presented are: land navigation, leader behavior and unit effectiveness, and effective time management. A two-hour weekly leadership lab is required, as well as one weekend field training exercise. (F,Sp,Su)

MS 1020 Leadership Skills 2®
Emphasizes self and team development through participation in classroom and leadership lab. Subject matter includes small unit operations, branches of the Army, troop leading procedures, communications skills, and the organization of company-sized Army units. A two-hour weekly leadership lab is required, as well as one weekend field training exercise. (F,Sp,Su)

MS 2010 Leadership Development 2®
Builds on previous leadership instruction, enhancing student skills in land navigation, small unit tactics, written and oral communication, event planning, group coordination and effectiveness, and first aid. During this course, students develop basic skills for leading others in a tactical environment. A two-hour weekly leadership lab is required, as well as one weekend field training exercise. (F,Sp,Su)

MS 2020 Small Unit Leadership 2®
Focuses on leader effectiveness. Analyzes selected historical leaders and battles, using the principles of war and other tenets. Student-led discussions highlight lessons learned relative to leadership and organizational success. Oral communication skills are central to this course. A two-hour weekly leadership lab is required, as well as one weekend field training exercise. (F,Sp,Su)

MS 2400 Physical Readiness 1®
Physical conditioning course employing U.S. Army principles of fitness. Subjects include: body composition, nutrition, cardiorespiratory fitness, muscle endurance and strength, circuit training, and drills. (F,Sp,Su)

MS 2420 Ranger Preparation 2®
Participation in Army ROTC Ranger Challenge program. Advanced military training with practical application of skills taught in MS 1010 and 4020. (F,Sp)

MS 2430 Air Assault 2
Two-week course conducted at an Army installation in the continental U.S. Provides students with training in helicopter operations, including sling loading and rappelling. Prerequisite: Instructor's approval. (F,Su)

MS 2440 Airborne Operations 2
Three-week course conducted at Fort Benning, Georgia. Provides students with training in military skydiving techniques with practical applications. Prerequisite: Instructor's approval. (F,Su)

MS 2510 ROTC Basic Camp 1-6
Five-week leadership camp conducted at Fort Knox, Kentucky. Designed to introduce students to basic military skills and leadership without incurring a military obligation. Training includes rappelling, marksmanship, small unit tactics, physical fitness, and leadership. Open only to students who have not completed MS 1010, 1020, 2010, and 2020. Graduates are qualified for Advanced Course entry into ROTC. Prerequisites: Must pass physical exam and must obtain instructor's approval. (F,Su)

Advanced Course

MS 3010 Organizational Leadership and Small Unit Tactics 3
Develops leadership skills within the framework of the U.S. Army. Focuses on theory and application of decision making, planning, organizing, management control, and communications. Also emphasizes small unit tactics and advanced land navigation skills. A two-hour weekly leadership lab is required, as well as one weekend field training exercise. (F,Sp,Su)

MS 3020 Advanced Tactics and Operations 3
Focuses on theory and application of small unit tactics, leadership, and land warfare. Subjects include preparing and issuing combat orders, organizing for combat, unit and individual movement techniques, communications, and security. A two-hour weekly leadership lab is required, as well as one weekend field training exercise. (F,Sp,Su)

MS 3110 Staff Organization and Operations 1-3®
Special project staff work for joint Army/Air Force campus ceremonies, leadership labs, field training exercises, and training camps. (F,Sp,Su)

MS 3210 Independent Study 1-3®
Students select advanced topics of interest and arrange credit under program advisor supervision in areas related to military science. (F,Sp,Su)

MS 4010 Command and Staff Functions 3
Addresses functions/roles of the commander/leader and the staff. Explores organizational planning and problem solving, written and oral communications, training management, and evaluation systems. A two-hour weekly leadership lab is required, as well as three one-hour physical fitness sessions per week and one weekend field training exercise. (F,Sp,Su)

MS 4020 Officer Perspectives 3
Conference course addressing roles and responsibilities of junior Army officers. Examines environmental stewardship, threats to U.S. security, Army modernization initiatives, the military justice system, and the law of war. A two-hour weekly leadership lab is required, as well as three one-hour physical fitness sessions per week and one weekend field training exercise. (F,Sp,Su)

MS 4110 Advanced Staff Operations 1-3®
Special project staff work for joint Army/Air Force campus ceremonies, leadership labs, field training exercises, and training camps. Students in this course provide mentoring and guidance to students in MS 3110. Prerequisite: Instructor's permission. (F,Sp,Su)

MS 4400 Advanced Physical Readiness 1®
Provides advanced instruction in physical fitness employing Army techniques and procedures. Students assist Military Science faculty in the planning/conduct of physical fitness training activities performed by lower-division students. Prerequisite: Instructor's permission. (F,Sp)

MS 4510 ROTC Advanced Camp 1-10®
Five-week leadership camp conducted at Fort Lewis, Washington. Stresses small-unit leadership under varying and challenging conditions. Prerequisites: Successful completion of basic course requirements and instructor's approval. (F,Sp,Su)

MS 4520 Cadet Troop Leadership Training 2
Two-week course conducted at an Army installation in the continental U.S. or overseas. Provides firsthand experience in an Army unit. Students learn about military life and the duties of a lieutenant. Prerequisites: MS 3010, 3020, 4510, and instructor's approval. (F,Sp,Su)

MS 4610 DHA Military History Seminar 1-3®
One-week course in which students travel to, research, and report on significant Civil War sites in the Eastern United States. Available to all students. Requires purchase of airfare and some meals. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Music Courses (MUSC)

See Department of Music, pages 409-426.

MUSC 1010 BCA Introduction to Music 3©
Nontechnical course to develop understanding and enjoyment of music. Through study of musical elements, as well as historical, cultural, and social influences, an awareness of the relationship between techniques and aesthetic values in world music can be developed. (F,Sp,Su)

MUSC 1100 BCA Fundamentals of Music 3©
(formerly MUSC 1020 BCA)
In-depth look at the basic elements of music. Notes, rhythm, scales, intervals, key signatures, chords, cadences, and chord progressions. Includes basic ear training. (F,Sp)

MUSC 1110 Music Theory I 3
Fundamentals of music. Traditional diatonic harmony in four parts, using triads in root position, first inversion, and second inversion. Prerequisite: Knowledge of music notation. (F)

MUSC 1120 Music Theory II 3
Traditional harmony in four parts, using nonchord tones, seventh chords, and secondary dominant functions. Prerequisite: MUSC 1110. (Sp)

MUSC 1130 Aural Skills I 1
First in a four-semester sequence of aural skills (ear training) courses which develop the skills of sight singing, dictation, and the composite skill of critical listening. (F)

MUSC 1140 Aural Skills II 1
Second in a four-semester sequence of aural skills (ear training) courses which develop the skills of sight singing, dictation, and the composite skill of critical listening. Prerequisite: MUSC 1130. (Sp)

MUSC 1150 Beginning Group Piano 1
(formerly MUSC 1400)
Group piano instruction for nonmusic majors. (Sp)

MUSC 1160 Intermediate Group Piano 1
(formerly MUSC 1410)
Group piano instruction for nonmusic majors. (Sp)

MUSC 1170 Keyboard Harmony I 1
(formerly MUSC 1150)
Development of keyboard skills, in conjunction with MUSC 1110, for music majors and minors. (F)

MUSC 1180 Keyboard Harmony II 1
(formerly MUSC 1160)
Development of keyboard skills, in conjunction with MUSC 1120, for music majors and minors. Prerequisite: Completion of MUSC 1170 with a *C-* or better, or faculty authorization. (Sp)

MUSC 1310 Introduction to Music Therapy 2
Introduces students to the field of music therapy through lectures, readings, and experiential work. For music therapy majors *only*. (F)

MUSC 1320 Music Therapy Ensemble 1®
Intended for music therapy majors. Designed to help students increase their performance skills in the areas of accompanying, improvisation, and popular music styles. (F,Sp)

MUSC 1420 Pedagogy Practicum 3®
Provides piano students with actual teaching situations for the practical application of principles studied in piano pedagogy. Supervised planning, presentation, and evaluation of lessons. (F,Sp)

MUSC 1430 Piano Pedagogy I 3
Designed to prepare qualified pianists to teach piano effectively and to acquaint them with new materials and techniques from the beginning to intermediate levels. (F)

MUSC 1440 Piano Pedagogy II 3
Designed to prepare qualified pianists to teach piano effectively and to acquaint them with new materials and techniques from the intermediate to early advanced levels. (Sp)

MUSC 1450 Group Organ 1®
Acquaints students with basic techniques of organ playing. Concentrates on hymn playing, and music for preludes and postludes. (F,Sp)

MUSC 1460 CI Organ Literature I 3**
Examines the history of the organ, as well as composers and literature from the Romantic Period through the end of the Twentieth Century. (F)

MUSC 1470 CI Organ Literature II 3**
Examines the history of the organ, as well as composers and literature from the Middle Ages through the Baroque Period. (Sp)

MUSC 1480 Individual Piano Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private piano instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1490 Individual Organ Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private organ instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1500 String Techniques I 1
Designed to give prospective music teachers a basic playing experience and theoretical understanding of the string instruments. (F,Sp)

MUSC 1520 Individual Viola Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private viola instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1530 Individual Violin Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private violin instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1540 Individual String Bass Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private string bass instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1550 Beginning Group Guitar 1
Fundamentals of guitar; basic chords, note reading, tablature reading, and accompaniment styles, including strumming and fingerpicking. (F,Sp)

MUSC 1560 Intermediate Group Guitar 1
Intermediate-level strumming and fingerpicking techniques, barre chords, and solos written in standard notation and tablature will be presented. (F,Sp)

MUSC 1580 Individual Guitar Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private guitar instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1600 Voice Techniques 1
Acquaints the nonvocal major with the vocal instrument; its mechanism, terminology, and techniques. (F,Sp)

MUSC 1610 Introduction to Musical Theatre 2
Survey course dealing with history, evolution, influence, practice, and production of the American Musical Theatre. (Sp)

MUSC 1620 Introduction to Opera 2
Survey course tracing history and style of opera from Peri and Caccini's "Eurdice" of 1594 to contemporary works of John Eaton and Phillip Glass. (F)

MUSC 1630 Individual Vocal Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private vocal instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1700 Individual Flute Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private flute instruction at any and all stages of advancement. (F,Sp,Su)

Course Descriptions

MUSC 1710 Individual Oboe Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private oboe instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1720 Individual Clarinet Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private clarinet instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1730 Individual Bassoon Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private bassoon instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1740 Individual Saxophone Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private saxophone instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1800 Percussion Techniques 1
Provides basic playing experience and theoretical understanding of percussion instruments. Designed for music majors. (F)

MUSC 1810 Individual Trumpet Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private trumpet instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1820 Individual Trombone Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private trombone instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1830 Individual French Horn Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private French horn instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1840 Individual Tuba/Euphonium Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private tuba/euphonium instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 1850 Individual Percussion Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private percussion instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 2110 Music Theory III 3
(formerly MUSC 2130)
Traditional chromatic harmony in four parts, using modulation, mode mixture, and neapolitan and augmented sixth chords. Prerequisites: MUSC 1110 and 1120. (F)

MUSC 2130 Aural Skills III 1
(formerly MUSC 2150)
Third in a four-semester sequence of aural skills (ear training) courses which develop the skills of sight singing, dictation, and the composite skill of critical listening. Prerequisites: MUSC 1130 and 1140. (F)

MUSC 2140 Aural Skills IV 1
(formerly MUSC 2160)
Fourth in a four-semester sequence of aural skills (ear training) courses which develop the skills of sight singing, dictation, and the composite skill of critical listening. Prerequisites: MUSC 1130, 1140, and 2130. (Sp)

MUSC 2170 Keyboard Harmony III 1
Development of keyboard skills, in conjunction with MUSC 2110, for music majors. Prerequisite: Completion of MUSC 1180 with a *C-* or better, or faculty authorization. (F)

MUSC 2180 Computer Applications in Music 2
Presents operational knowledge of computer hardware and music software. Students use M101 work station to learn music notation, sequencing, and other select applications. Enrollment limited to Music majors *only*. (F,Sp)

MUSC 2210 Instrumental Conducting Ensemble 1®
Lab group for MUSC 4240. Music and nonmusic majors play major and secondary instruments in two concerts per semester. (F)

MUSC 2310 Introduction to Observational and Behavioral Methods in Music Therapy 2
Basic behavioral terminology and methods, including systematic observations and recording methods for use in music therapy. Students conduct observations in clinical settings in the community. (F)

MUSC 2320 Music Therapy Methods and Materials 2
Music interventions and techniques appropriate for a wide range of patient populations, including hospitalized children, older adults, and individuals with orthopedic handicaps. Prerequisites: MUSC 1310 and 2310. (Sp)

MUSC 2350 Conducting 2
(formerly MUSC 3170)
Designed to provide students with basic conducting techniques. Prerequisites: MUSC 2110 and must be a premusic or music major. (F)

MUSC 2410 Individual Organ Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private organ instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2420 Piano Literature I 3**
Acquaints pianists with the standard piano composers and keyboard literature from the 14th Century to the Classical Period. (F)

MUSC 2430 Piano Literature II 3**
Acquaints pianists with the standard piano composers and keyboard literature from the Classical Period to the Romantic Period. (Sp)

MUSC 2440 Piano Literature III* 3
Acquaints pianists with the standard piano composers and keyboard literature from the Romantic Period to Impressionism. (F)

MUSC 2450 Piano Literature IV* 3
Acquaints pianists with the standard piano composers and keyboard literature from the Impressionist Period to the present day. (Sp)

MUSC 2460 Individual Jazz Piano Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private jazz piano instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 2470 Individual Jazz Piano Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private jazz piano instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2490 Individual Piano Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private piano instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2500 Individual String Bass Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private string bass instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2510 Individual Cello Instruction for Nonmusic Majors 1-2®
Variable credit offered, depending upon lesson time (1 credit equals 30 minutes). Designed to give nonmusic majors private cello instruction at any and all stages of advancement. (F,Sp,Su)

MUSC 2520 Individual Cello Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private cello instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2530 Individual Viola Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private viola instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2540 Individual Violin Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private violin instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2550 Guitar Styles (Blues/Bluegrass)* 2
Designed to teach students to play blues and bluegrass guitar styles. Presentation of musical form and repertoire. Prerequisite: Knowledge of basic chords and some standard notation and/or tablature reading. (F)

MUSC 2560 Guitar Styles (Jazz/Classical)* 2
Designed to teach students to play jazz and classical guitar styles. Presentation and analysis of pieces which have become "standard" repertoire. Prerequisite: Knowledge of basic chords and some experience reading standard notation and/or tablature. (Sp)

MUSC 2570 Fingerboard Theory I 2
Basic music theory course in which students use the guitar as a tool for learning the fundamentals of music. (F)

MUSC 2580 Fingerboard Theory II 2
Follow-up to MUSC 2570. Examination of theoretical concepts of music and how they can be visualized and played on the guitar. (Sp)

MUSC 2590 Individual Guitar Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private guitar instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2600 Women's Choir 1®
Performance of choral works in a large choral organization open to all women without auditions. (F,Sp)

MUSC 2610 Choral Society 1®
Large select mixed choir performing major works for chorus and orchestra. Admission by audition only. (F,Sp)

MUSC 2640 Individual Vocal Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private vocal instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2660 Italian Diction for Singers 2
Study of singing diction in Italian using International Phonetic Alphabet in spoken, sung, and written drills. (Sp)

MUSC 2670 German Diction for Singers 2
Study of singing diction in German using International Phonetic Alphabet in spoken, sung, and written drills. (F)

MUSC 2680 French Diction for Singers 2
Study of singing diction in French using International Phonetic Alphabet in spoken, sung, and written drills. (Sp)

MUSC 2700 Woodwind Techniques I: Flute, Clarinet 1
Provides music education major with an introduction to performance and pedagogy of the flute and clarinet. Enrollment limited to majors, or with permission of instructor. (F)

MUSC 2710 Woodwind Techniques II: Saxophone, Oboe, Bassoon 1
Provides music education major with an introduction to performance and pedagogy for the saxophone, oboe, and bassoon. Enrollment limited to majors or with permission of instructor. Prerequisite: MUSC 2700. (Sp)

MUSC 2720 Marching Band 2®
Preparation of musical entertainment and marching drills for football games. Prerequisite: Consent of director. (F)

MUSC 2730 Basketball Band 1®
Preparation of "pops" type music for basketball games. Audition necessary. Prerequisite: MUSC 2720. (Sp)

MUSC 2740 Recorder Techniques 1
Provides music majors with introduction to performance and pedagogy of the recorder, including solo repertoire and ensembles. (Sp)

MUSC 2750 Individual Flute Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private flute instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2760 Individual Oboe Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private oboe instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2770 Individual Clarinet Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private clarinet instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2780 Individual Bassoon Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private bassoon instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2790 Individual Saxophone Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private saxophone instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2800 Brass Techniques I: Trumpet, French Horn 1
Designed to give prospective music teachers a basic playing experience and theoretical understanding of the high brass instruments. (F)

MUSC 2810 Brass Techniques II: Trombone, Tuba, Euphonium 1
Designed to give prospective music teachers a basic playing experience and theoretical understanding of the low brass instruments. (Sp)

MUSC 2850 Individual Trumpet Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private trumpet instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2860 Individual Trombone Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private trombone instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

Course Descriptions

MUSC 2870 Individual French Horn Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private French horn instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2880 Individual Tuba/Euphonium Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private tuba/euphonium instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 2890 Individual Percussion Instruction (Second Instrument) for Music Majors 1®
Designed to give music majors private percussion instruction at any and all stages of advancement. One credit given for 30-minute lessons. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3010 DHA Masterpieces of Music 3
Acquaints students with great masterpieces of music representing all periods of music history. Examines lives and times of various composers. (F,Sp)

MUSC 3020 DHA History of Jazz 3
Designed to give students an understanding of the development of jazz, popular music, and contemporary idioms, and their contributions to music and culture. (Sp)

MUSC 3100 Motivation and Classroom Management Strategies in Secondary Classroom Music 3
Provides experience in current materials, methods, and management of general music education program in secondary (grades 6-12) public schools. Designed for music education majors. (Sp)

MUSC 3110 Music History I: Origins through Baroque 3
History and literature of early, Renaissance, and Baroque periods. Prerequisite: MUSC 2110. (Sp)

MUSC 3120 Music History II: Classical and Romantic Periods 3
History and literature of the music of the classical and romantic periods. Prerequisite: MUSC 3110. (F)

MUSC 3130 CI Music Theory IV 3
Study of Twentieth Century tonal, atonal, and avante guarde harmonies and compositional techniques. Prerequisites: MUSC 3110 and 3120. (Sp)

MUSC 3140 Musical Form and Analysis 3
Study of imitative, cantus firmus, ostinato, and free contrapuntal procedures of Western music. Explores techniques of Sixteenth Century counterpoint. Also includes study of phrase and period structure, small part fonts, theme and variations, rondo and sonata forms, and vocal forms. Prerequisite: MUSC 2110. (Sp)

MUSC 3160 World Music 2
Explores music traditions of non-Western cultures throughout the world. Prerequisites: MUSC 2110. (Sp)

MUSC 3180 Scoring and Arranging 2
Theoretical and practical study of scoring for orchestral instruments in various combinations, ranging from small ensembles to full orchestra. Prerequisites: MUSC 2140 and 2180; or MUSC 3900; or permission of instructor. (F,Sp)

MUSC 3190 Music History III: Music of the Twentieth Century 3
Explores historical and cultural context of important composers and works of the modern and postmodern eras, including the influence of non-Western musical traditions. (Sp)

MUSC 3220 Choral Methods and Materials 2
Investigates factors relating to administration and teaching of choral music in middle and secondary schools. (F)

MUSC 3230 Choral Literature 2
Survey of choral music from the Renaissance, Baroque, Classical, Romantic, and Twentieth Century suitable for middle and secondary school choirs. (Sp)

MUSC 3240 Instrumental Methods and Materials 2
Examination of teaching methods and materials related to wind and percussion pedagogy. Study of literature, organization and administration, and teaching techniques. (Sp)

MUSC 3260 Elementary School Music 2
Methods and materials in singing, rhythms, creating music, listening, using classroom instruments, fundamentals of music, and movement skills, with emphasis on contemporary approaches to music education. Recommended: MUSC 1010. Enrollment limited to students who have earned at least 45 credits and who have been accepted into one of the following majors: Pre-music, music education, music therapy, pre-early childhood education, pre-elementary education, early childhood education, special education, composite early childhood education/special education, composite early childhood education/ elementary education, communicative disorders and deaf education, composite early childhood education/deaf education, elementary education, composite elementary education/special education, composite elementary education/early childhood education, or composite elementary education/deaf education. (F,Sp,Su)

MUSC 3310 Music Therapy and the Exceptional Child 3
Effects of music on physical, social, cognitive, and communication skills of children with disabilities. (F)

MUSC 3320 Psychology of Music I 2**
Psychological foundations of musical behavior, including psychoacoustics, rhythmic, melodic, and harmonic foundations; affective behaviors and music; musical preferences; functional music; musical ability; and music learning. (Sp)

MUSC 3330 Music Therapy Practicum 1-3®
Supervised practicum experience in a community setting with disabled adults, children, older adults, or individuals in a medical setting. Prerequisite: MUSC 2320. (F,Sp)

MUSC 3360 MIDI Studio Techniques 2
Elements of synthesizer sound production and basic studio techniques. (Sp)

MUSC 3370 Sound Recording and Reinforcement Techniques 2®
Explores techniques of studio recording, including microphones, mixing, and signal processing. (Sp)

MUSC 3400 Individual Piano Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private piano instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3410 Ensemble and Accompanying 1-2®
Accompanying vocal and instrumental works. Ensemble music for two pianos and four hands. Sight reading and repertoire development. Admission by audition only, with 16 students per section. (F,Sp)

MUSC 3420 Keyboard Skills I 3
Study of sightreading, transposing, improvising, figured bass, scales, chords, and score rendering. (F)

MUSC 3430 Keyboard Skills II 3
Continuation of MUSC 3420, with further study of sightreading, transposing, improvising, figured bass, scales, chords, and score reading. (Sp)

MUSC 3440 Individual Jazz Piano Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private jazz piano instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3460 Church Music for Organists I* 3
Teaches students to read open scores, transpose hymns, and read scores using alto and tenor clefs. Explores history of hymnody, as well as history of church worship services. (F)

MUSC 3470 Church Music for Organists II* 3
Teaches students to read open scores, transpose hymns, and read scores using alto and tenor clefs. Explores history of hymnody, as well as history of church worship services. (Sp)

MUSC 3480 Individual Organ Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits. Number of credits granted depends upon practice time and extent of literature required. Flexible course of study leading to enhanced musical and technical skills on the instrument. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3500 DHA Symphony Orchestra 1®
Provides experience in performing standard orchestral literature. Admission by audition only. (F,Sp)

MUSC 3510 Orchestra Literature 2
Survey of materials, methods, and literature appropriate for elementary school, junior high/middle school, or high school level orchestra programs. (Sp)

MUSC 3520 String Pedagogy and Solo Literature 2®**
For qualified string players whose interest is primarily in teaching stringed instruments. Materials and teaching techniques via actual teaching experience. Prerequisite: Permission of instructor. (F,Sp)

MUSC 3550 Individual Guitar Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private guitar instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3560 Guitar History and Literature 3**
Development of guitar from its earliest ancestors to the present, including study of composers of music for guitar, guitarists, and changes to the instrument itself. (Sp)

MUSC 3570 Guitar Pedagogy I 2**
Prepares qualified guitarists to teach beginning and intermediate level students. Familiarizes participants with "business" aspects of teaching, how to set up a private studio, available materials, and teaching techniques. (F)

MUSC 3580 Guitar Pedagogy II 2**
Instruction in teaching various guitar styles. Experience in teaching class guitar and in private instruction. Review of available methods and materials. (Sp)

MUSC 3590 Electric Guitar Ensemble 1®
Offers opportunity for guitarists to rehearse and perform ensemble music written for electric guitar. Ensemble includes bass and drums. (F,Sp)

MUSC 3600 Opera Workshop 1-3®
Techniques of musical theater, including participation as cast or crew in musical or operatic stage productions or excerpts. (F,Sp)

MUSC 3610 Vocal Repertory I* 2
Survey of German Lieder and French Melodie, including styles, history, and performance practice. (F)

MUSC 3620 CI Vocal Repertory II* 2
Survey of Italian, American, and British song, including styles, history, and performance practice. (Sp)

MUSC 3630 Vocal Pedagogy I 2**
Theoretical course studying anatomy and function of the voice, methods for teaching techniques, respiration, phonation, articulation, and support and health of the voice. (F)

MUSC 3640 Vocal Pedagogy II 2**
Application of vocal theory to teaching of young, post-pubescent, and mature male and female voices, including challenges of teaching each particular type. Includes practicum in which students teach individual vocal lessons under instructor's supervision. (Sp)

MUSC 3670 Individual Vocal Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private vocal instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3700 Woodwind Ensemble 1-2®
Helps students gain knowledge and understanding of literature for woodwind ensemble, to gain knowledge of rehearsal techniques for perfecting chamber music, and to demonstrate mastery of these skills through performance. Prerequisite: Permission of instructor. (F,Sp)

MUSC 3710 Individual Flute Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private flute instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3720 Individual Oboe Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private oboe instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3730 Individual Clarinet Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private clarinet instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3740 Individual Bassoon Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private bassoon instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3750 Individual Saxophone Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private saxophone instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3760 Jazz Ensemble 1®
Select ensemble performing big band jazz music. Admission by audition only. (F,Sp)

MUSC 3770 Jazz Orchestra 1®
Preparation and performance of big band jazz music. Admission by audition only. (F,Sp)

MUSC 3780 Flute Ensemble 1®
Helps students gain knowledge and understanding of flute ensemble, to gain knowledge of rehearsal techniques for perfecting chamber music, and to demonstrate mastery of these skills through performance. Enrollment limited to music majors and music therapy majors *only*. (F)

Course Descriptions

MUSC 3790 DHA Symphonic Band 1®
Performance of significant works from symphonic band repertoire. Admission by audition or consent of instructor. (F,Sp)

MUSC 3800 Trombone Ensemble 1®
Intended for trombone majors and nonmajors interested in performing music specifically written and/or arranged for four to twelve trombones. (F,Sp)

MUSC 3810 Individual Trumpet Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private trumpet instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp)

MUSC 3820 Individual Trombone Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private trombone instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp)

MUSC 3830 Individual French Horn Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private French horn instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp)

MUSC 3840 Individual Tuba/Euphonium Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private tuba/euphonium instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp)

MUSC 3850 Brass Ensemble 1®
Helps students gain knowledge and understanding of brass ensemble, gain knowledge of rehearsal techniques for perfecting chamber music, and demonstrate mastery of these skills through performance. Prerequisite: Permission of instructor. (F,Sp)

MUSC 3860 Individual Percussion Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private percussion instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 3870 Percussion Ensemble 1®
Provides opportunity for percussionists to perform select percussion literature in a chamber music setting. (F,Sp)

MUSC 3900 Jazz Improvisation 2
Study of techniques of jazz improvisation applicable to all instruments. Prerequisites: MUSC 2110 and 2130; or permission of instructor. (F,Sp)

MUSC 3910 Individual Composition Instruction 1-12®
Individual study of techniques and procedures of music composition, emphasizing assistance in completing individual compositional projects, building composition portfolio, and preparing for composition recitals. Prerequisite: Permission of instructor. (F,Sp)

MUSC 3920 Marching Band Techniques 2
Reviews methods and materials necessary for directing high school marching bands, including administration, music selection, drill design, and computer-assisted instruction. Prerequisite: Instructor's permission. (F)

MUSC 3930 Band Literature 2
Study of literature appropriate for beginning, intermediate, and advanced level band programs. Prerequisite: Instructor's permission. (F)

MUSC 3950 Jazz Choir 1®
Emphasizes vocal ability, harmonic ear training, and rhythmic understanding. Ability to vocally improvise is helpful, though not a necessary prerequisite. Auditions held during the first week of fall semester. (F,Sp)

MUSC 4210 Advanced Music Form and Analysis 3
Expands the contents and helps further develop the skills acquired in MUSC 3140, Musical Form and Analysis. Large and small sectional forms and contrapuntal procedures are further explored in works from the Classical, Romantic, and Modern eras. (F)

MUSC 4240 Advanced Conducting 2
Covers techniques, procedures, materials, and philosophies appropriate to the motor skill of conducting and the pedagogy of rehearsal techniques with a band/choir/string ensemble. Students will be able to demonstrate techniques in music selection, score analysis, conducting gesture, and pedagogy. (F—instrumental) (Sp—Choral)

MUSC 4310 Music Therapy with Adult Populations 3
Music therapy methods for adults with major mental illness. Overview of DSM-IV criteria. Psychotherapy models, including cognitive-behavioral and person-centered approaches to treatment. (F)

MUSC 4320 CI Psychology of Music II 2
Research and laboratory course, emphasizing design, methods, and statistical procedures appropriate to research in music education and music therapy. Prerequisites: STAT 1040 and permission of instructor. (Sp)

MUSC 4330 Clinical and Professional Issues in Music Therapy 2
Ethical considerations and issues related to private practice, marketing, and reimbursement, as well as continued exploration of psychotherapeutic models and MT methods with adults, specifically anxiety disorders and personality disorders. Prerequisite: MUSC 4310 and 4320. (Sp)

MUSC 4340 Internship in Music Therapy 2
Six-month resident internship in affiliated, approved clinical setting. Prerequisite: Successful completion of senior year in music therapy. (F,Sp,Su)

MUSC 4410 Advanced Piano Pedagogy I 1-2®
Continuation of MUSC 1430 and 1440, with analysis, performance, and teaching of basic repertoire at intermediate to advanced levels. Prerequisites: MUSC 1430, 1440. (F)

MUSC 4420 Advanced Piano Pedagogy II 1-2®
Continuation of MUSC 4410, with analysis, performance, and teaching of basic repertoire at intermediate to advanced levels. Prerequisite: MUSC 4410. (Sp)

MUSC 4500 String Ensemble 1®
Offers opportunity for capable string players to study and perform music written for variety of small ensemble combinations. (F,Sp)

MUSC 4510 Individual Violin Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private violin instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 4520 Individual Viola Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private viola instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 4530 Individual Cello Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private cello instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 4540 Individual String Bass Instruction for Music Majors 1-2®
Provides 60-minute lessons, for either 1 or 2 credits, for music majors only. Number of credits granted depends upon practice time and extent of literature required. Designed to give music majors private string bass instruction at any and all stages of advancement. Must be a pre-music major, music major, music education major, or music therapy major. (F,Sp,Su)

MUSC 4550 Acoustic Guitar Ensemble 1®
Offers opportunity for guitarists to rehearse and perform intermediate and advanced music written for acoustic guitar. (F,Sp)

MUSC 4600 DHA University Chorale 1®
Select mixed choir performing a wide range of choral literature. Admission by audition only. (F,Sp)

MUSC 4610 National Standards Choir 1®
Choral ensemble focusing on music education through choral performance. Explores methods for teaching music through performance to middle and high school students. Special attention paid to National Standards in Music. This course is not currently being offered. For information about when it may be offered, contact the department.

MUSC 4620 Choral Conducting Practicum 1®
Application of principles of choral music education in public school setting. (F,Sp)

MUSC 4650 DHA Chamber Singers 1®
Select small ensemble performing a wide range of choral literature. Admission by audition only. (F,Sp)

MUSC 4700 DHA Wind Orchestra 1®
Highly-selective group, performing important traditional and contemporary works from the wind band repertoire. Entrance by audition only. (F,Sp)

MUSC 4710 Jazz Combo 1-2®
Study and performance of the finest literature for the small jazz ensemble. Prerequisites: Audition and permission of instructor. (F,Sp)

MUSC 4720 Saxophone Quartet 1-2®
Study and performance of the finest classical, jazz, and popular music for the saxophone quartet. Prerequisites: Audition and permission of instructor. (F,Sp)

MUSC 4730 CI Directed Project in Instrumental Pedagogy 2®
Acquaints students with curricular and business issues of private music teaching. Through written assignments, reviews of literature, and interviews with professionals, students develop strategies for setting up, marketing, and maintaining a private studio. (F,Sp,Su)

MUSC 4900 Baroque Counterpoint 2
Writing and analysis of tonal counterpoint in two, three, and four parts. Prerequisites: MUSC 1110, 1120, 2110, 3140. (F)

MUSC 4910 Music Composition 2®
Instruction in principles of music composition, and guidance in completing individual composition projects. Also, analysis of selected Twentieth Century masterworks. Prerequisites: MUSC 1110, 1120, 2110, 3140. (Sp)

MUSC 4920 Individual Recital 1-6®
Performance of pieces selected by the student and approved by the instructor, for performance in accordance with specific music area requirements. (F,Sp,Su)

MUSC 4930 Readings and Conference 1-6®
Undergraduate course designed to provide special interest study. (F,Sp,Su)

MUSC 4940H Senior Thesis 1-6®
As partial fulfillment of Honors Program requirements, students design and complete a major paper/project. Examples of projects include performance, composition, and musical analysis. (F,Sp,Su)

MUSC 6100 Graduate Performance Ensemble 1-2®
Designed to give students opportunity for a high-level music experience in choral and instrumental performance ensembles. (F,Sp)

MUSC 6110 Advanced Conducting 2
Students master manual technique of conducting and improve score study procedures, resulting in analysis and communication of musical ideas. (F,Su)

MUSC 6120 Advanced Rehearsal Techniques 2®
Provides students with conducting experience within their major performance areas; i.e., chorale, band, orchestra. This is accomplished through observation of rehearsal techniques and procedures, and by conducting rehearsals at the instructor's discretion. (F,Sp)

MUSC 6130 Seminar in Music: Philosophy, Aesthetics, and Trends 2
Study of philosophical bases for human responses to music and resulting musical behaviors. (F,Su)

MUSC 6610 Practicum in Choral Performance 1-4®
Provides the graduate student with insight into advanced choral techniques and methods of preparing choirs for performance by rehearsing one of the University choirs on assigned choral selections while being critiqued by the ensemble director. (F,Sp)

MUSC 6620 Seminar in Choral Literature 2
Designed to study and internalize principal forms of choral music through discussion of historical evolution and stylistic characteristics of the periods of music. Embraces significant choral functions of every style period. (Sp,Su)

MUSC 6630 Individual Instruction for Graduates 1-2®
Includes 60-minute lessons for either 1 or 2 credits. Number of credits granted depends upon practice time and extent of literature required. Designed to give graduate students private instruction at any and all stages of advancement. Prerequisite: Instructor's permission. (F,Sp)

MUSC 6900 Independent Study 1-6®
Advanced course designed to meet specific problems of the music educator and the applied music specialist. (F,Sp,Su)

MUSC 6910 Individual Recital 1-3®
Preparation and presentation of graduate recital, under supervision of major professor. (F,Sp,Su)

MUSC 6970 Research and Thesis 2-6®
Individual work in thesis writing with guidance and criticism. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.

Navajo (NAV)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

NAV 3040 Navajo Literacy and Grammar for Native Speakers 3
Designed to develop advanced skills in the grammar, comprehension, reading, and writing of Navajo. Integrates Diné holistic teaching concepts in accordance with the "Hózhóogo liná" four-direction Diné philosophy of learning paradigm. Prerequisite: Permission of instructor. (Sp)

NAV 3050 Navajo Descriptive and Narrative Writing 3
Presents reading and writing in the genres of Navajo narrration and description. Prepares students to take the Navajo Language Proficiency Exam, and integrates holistic teachings in accordance with the "Hózhóogo liná" four-direction Diné philosophy of learning paradigm. Prerequisite: Permission of instructor. (F)

NAV 4400 Teaching Navajo as a Second Language 3
Addresses major issues in the teaching/learning of second languages, with emphasis on Navajo as taught in the public schools. Integrates Diné holistic teaching concepts in accordance with the "Hózhóogo liná" four-direction Diné philosophy of learning paradigm. Prerequisite: Permission of instructor. (Sp)

NAV 4410 Teaching Navajo to Native Speakers 3
Addresses major issues and methods in teaching Navajo literacy and Navajo language arts to native speakers of Navajo. Integrates Diné holistic teaching concepts in accordance with the "Hózhóogo liná" four-direction Diné philosophy of learning paradigm. Prerequisite: Permission of instructor. (F)

National Environmental Policy Act (NEPA)

See Certificate Program in National Environmental Policy Act (NEPA), pages 427-428.

NEPA 6200 How to Manage the NEPA Process and Write Effective NEPA Documents 2
Introduction to National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations. Explores various levels of NEPA documentation and the skills necessary to identify the actions needed for a thorough environmental analysis.

NEPA 6210 Clear Writing for NEPA Specialists 2
Teaches how to identify the writing and editing requirements unique to NEPA documents, including making graphics, writing chapters, and reviewing documents for accuracy.

NEPA 6220 Reviewing NEPA Documents 2
Focuses on how to review the full range of NEPA documents, including Environmental Impact Statements (EISs), Environmental Assessments (EAs), Findings of No Significant Impacts (FONSIs), and Records of Decisions (RODs).

NEPA 6230 Risk Communication for NEPA Specialists: Strategies and Implementation 2
Explains meaning and application of risk communication. Explores full range of response communication, including development of a communication plan and strategy, standing before an audience, and responding to comments in writing.

NEPA 6260 Cultural and Natural Resource Management 2
Teaches how to manage cultural and natural resources on public lands. Addresses pertinent laws and associated executive orders and regulations pertaining to the preservations of these resources and budget issues.

NEPA 6270 Environmental Compliance Overview 1
Explores why environmental compliance is not only desirable and necessary, but is also a personal responsibility. Identifies key laws and regulations, with associated penalties affecting environmental compliance.

NEPA 6280 Interdisciplinary Team Building 1
Teaches general principles of interdisciplinary team building. Explores how information flows and how this can impact the success of a team. Students work as a team to apply the principles learned to scenarios of day-to-day actions.

NEPA 6300 Effective Environmental Contracting 1
Presents a systematic approach to the writing and reviewing of environmental Statements of Works (SOWs). Providing hands-on experience, course includes case studies and examples applying to actual environmental projects.

NEPA 6310 NEPA Writing for Technical Specialists 1
Designed to teach students how to use a "document management process" to become more efficient writers of NEPA documents.

NEPA 6320 NEPA: Cumulative Impacts 1
Explores scoping and public involvement strategies leading to sound cumulative impact analysis. Students assess various impact methodologies and learn to record cumulative impact information in ways that support clear, legally sufficient EAs/EISs.

NEPA 6330 Conflict Management in the NEPA Process 1
Trains students in NEPA conflict negotiation and management. Includes introduction to the nature of public conflict and management styles, along with environmental negotiation techniques.

NEPA 6340 Content Analysis and Public Response Management 1
NEPA regulations require public participation on environmental documents. In this course, students learn how to establish a comprehensive database of respondents and a systematic method of sending and receiving documents. They also learn how to establish a coding structure reflecting demographic catagories and subcategories. Since this course is not currently required for the Certificate Program in National Environmental Policy Act (NEPA), it may not be offered in the forseeable future. For further information, contact the director of the NEPA Certificate Program.

NEPA 6350 Socio-economic Impact Analysis for NEPA Specialists 1
Provides students with necessary tools (templates, checklists, and materials) and knowledge (including data analysis) for conducting an effective socio-economic impact analysis, as required by NEPA and CEQ regulations.

NEPA 6360 Overview of the Endangered Species Act 1
Explores history of the Endangered Species Act and various components of the Act. Examines requirements and procedures for complying with the Act.

NEPA 6370 NEPA Capstone Experience 1
Consists of a project, internship, or comprehensive examination to be negotiated by the student, based upon opportunities available at the time and preferences of the student. Helps USU to certify that students receiving the certificate have basic mastery of the material presented in the program coursework.

Nutrition and Food Sciences (NFS)

See Department of Nutrition and Food Sciences, pages 436-446.

NFS 1000 World of Food and Nutrition 1
Weekly seminars present and discuss current issues in food, diet, and health. Presentations about topics and research in food and nutrition, with orientation to programs in the Department of Nutrition and Food Sciences. (F)

NFS 1020 BLS Science and Application of Human Nutrition 3
Role of dietary choices in providing nutrients and their relationship to the social, mental, and physical well-being of people. How to evaluate nutritional status with personal data using computer diet analysis program. (F,Sp,Su)

NFS 1050 Food Safety Manager Certification 0.5
Covers food safety information required by the Utah Food Safety Manager Certification Act. Includes role of food handlers in controlling food-borne disease, time-temperature, employee hygiene, sanitation methods, preventing contamination from time of purchase to time of serving, food service facilities/equipment, and HACCP. (F,Sp,Su)

NFS 1240 Culinary Basics 3®
Develops fundamental skills specific to culinary arts. Investigates principles of ingredients and preparation methods. Practice provided in knife skills and cooking methods. Explores the effects of cooking on food quality. Enrollment limited to Nutrition and Food Sciences majors, Family and Consumer Sciences majors, and Family and Consumer Sciences Education majors *only*. (F,Su)

NFS 1250 Sanitation and Safety 3
Principles of sanitation and safety applied to food operations. Emphasizes personal hygiene habits and food handling practices that protect the health and safety of employees and consumers. (Sp)

NFS 2020 Nutrition Throughout the Life Cycle 3
Application of nutrition principles to the human life cycle: nutrient functions, needs, sources, and alterations during pregnancy, lactation, growth, development, maturation, and aging. Prerequisite: NFS 1020. (Sp)

NFS 2030 Catering 3
Provides skills and knowledge needed for preparing food. Analysis of the preparation of food and beverages for banquet and catering functions. Prerequisites: NFS 1240 and 1250. Offered Fall 2006 *only*. Will not be offered at Logan campus after Fall 2006. (F)

NFS 2040 Introduction to Biotechnology 1
Introduces freshmen to the emerging field of biotechnology and the impact this technology has on society. Also taught as ADVS 2040, BIOL 2040, and PSB 2040. (Sp)

NFS 2050 Ala Carte 3
Provides skills and knowledge necessary to apply principles of basic food preparation and service in a restaurant setting. Prerequisites: NFS 1240, 1250, and 2030. Will not be offered after Spring 2007. (Sp)

NFS 3000 Beginning Baking 4
Introduction to theories and techniques of baking. Focuses on yeast dough production and basic desserts. Prerequisites: NFS 1240, 2030, 2050. Will not be offered after Fall 2008. (F)

NFS 3020 Nutrition and Physical Performance 2
Includes information on macro/micronutrient metabolism during exercise, specific problems experienced by athletes or highly active persons, myths, ergogenic aids, and current interests. Prerequisite: NFS 1020. (F)

NFS 3030 Advanced Baking 4
Focuses on pastry, advanced dessert preparation and presentation, and related topics. Prerequisite: NFS 3000. Will not be offered after Spring 2009. (Sp)

NFS 3060 Garde-Manger 4
Emphasizes cold food preparation, presentation techniques, food displays, and meat fabrication. Prerequisite: NFS 2050. Will not be offered after Fall 2007. (F)

NFS 3100 QI Sensory Evaluation of Food 3
Design and implementation of sensory testing of foods. Emphasizes physiology of senses, testing methods, statistical analysis, and taste panel experience. Prerequisite: STAT 3000. (Sp)

NFS 3110 DSC Food, Technology, and Health 3
Impact of food technology on food spoilage, food preservation, food quality, and foodborne diseases. Basic processing operations and regulations ensuring a safe food supply. Prerequisite: University Studies Breadth Life Sciences (BLS) course. (F)

NFS 3250 Occupational Experience in Nutrition and Food Sciences 1-3®
On-the-job training. (F,Sp,Su)

NFS 3500 Beverage Management 2
Studies in selection and service of beverages for the food service industry. Issues addressed include equipping, staffing, operating, marketing, and purchasing beverages. Addresses issues of responsible alcohol service. Will not be offered after Fall 2008. (F)

NFS 3510 The Business of Feeding 3
Covers menu design, procurement, and starting the business. Will not be offered after Spring 2006. (Sp)

NFS 3600 Medical Terminology for Health Care Professionals 1
Internet-based course teaches medical terminology by focusing on medical word-building rules, prefixes, suffixes, and whole-body terminology related to human body systems. Also includes coverage of anatomy, pathological conditions, and diagnostic treatments and procedures. (F,Sp,Su)

NFS 4020 Advanced Nutrition 3
Structures, properties, and metabolism of protein, lipids, carbohydrates, vitamins, and minerals. Includes digestion, absorption, hormonal control, cellular biochemistry, metabolic interrelationships, excretion, etc. Prerequisites: NFS 1020, CHEM 3700, BIOL 2420. (F)

NFS 4030 Advanced Nutrition Applications 1
Applications of metabolism of protein, lipids, carbohydrates, vitamins, and minerals. Must be taken concurrently with NFS 4020. (F)

NFS 4040 Dairy Foods 4
Explores manufacture of various dairy foods, including pasteurized milk, UHT milk, cream, cheddar cheese, cottage cheese, process cheese, yogurt, butter, and milk and whey powders. Three lectures and one lab. Prerequisite: Enrollment in a major within the Animal, Dairy and Veterinary Sciences Department. (F)

NFS 4050 CI Education and Counseling Methods in Dietetics I 2
Principles of education, counseling, and communication as applied to the field of nutrition education and clinical dietetics practice. Prerequisite: Junior level in Coordinated or Didactic Program in Dietetics. Corequisite: NFS 4550. (F)

NFS 4060 CI Education and Counseling Methods in Dietetics II 2
Continuation of NFS 4050. Prerequisite: NFS 4050. Corequisite: NFS 4560. (Sp)

NFS 4070 Experimental Foods 4
Science principles underlying modern food theory and practice. Relation of physical and chemical properties of food components and their systems to food preparation. Prerequisite: CHEM 1120 or 2300 or 2310. (Sp)

NFS 4250 Culinary Skills and Management Rotation 3-9®
Internship experience in various food service settings. Specific locations and durations to be arranged by instructor. Prerequisite: Junior standing. Will not be offered after Summer 2009. (F,Sp,Su)

NFS 4420 QI Nutrition Research Methodology 2
Development of experimental design, data collection, statistical analysis, interpretation, and presentation of results. Clinical, community, and management data analysis. Interpretation and presentation, including bench marking, cost/benefit analysis, and continuous quality improvement projects. Enrollment limited to seniors within the Coordinated Program in Dietetics (CPD) or Didactic Program in Dietetics (DPD). Prerequisites: STAT 1040, MATH 1050. (Sp)

NFS 4440 QI Fundamentals of Food Engineering 4
Engineering concepts taught in a fundamental sense and applied to food processing. Concepts include: general problem solving techniques, material and energy balances, fluid dynamics, heat transfer, refrigeration, and kinetics of common biological processes used in food preparation. Prerequisite: PHYS 2110. (F)

NFS 4480 Community Nutrition 3
Introduction to public health nutrition, food programs, and national nutrition monitoring. Prerequisite: NFS 1020. (F)

NFS 4550 Nutrition Assessment/Clinical Nutrition I 4
Introduction to the profession of dietetics, assessment of nutrition status, and nutrition care planning. Pathophysiology of disease states and applied medical nutrition therapy. Prerequisite: CHEM 3700. Enrollment restricted to Nutrition and Food Sciences majors *only*. (F)

NFS 4560 CI Clinical Nutrition II 4
Continuation of NFS 4550. Prerequisite: NFS 4550. (Sp)

NFS 4570 Clinical Nutrition Experience I 1
Practical experience in health care facilities. Integration and application of material learned in NFS 4550. Corequisite: NFS 4550. Prerequisite: Acceptance into Coordinated Program in Dietetics. (F)

NFS 4580 Clinical Nutrition Experience II 2
Continution of NFS 4570. Corequisite: NFS 4560. Prerequisite: NFS 4570. (Sp)

NFS 4660 CI Medical Dietetics 12
In-depth study of nutrition relationships in disease development and treatment with clinical experience in medical facilities in Salt Lake City. Prerequisites: NFS 4550, 4560, 4570, 4580. (F)

NFS 4710 Quantity Food Preparation 2
Principles of food preparation applied to large quantity production, menu planning, food selection, storage, and equipment. Prerequisite: NFS 4070 or consent of instructor. (F)

Course Descriptions

NFS 4720 QI Food Service Organization and Management 2
Principles of organization, management theory, financial controls, human and labor relations, employee training, layout, and sanitation. Prerequisite: NFS 4710. (Sp)

NFS 4730 Quantity Food Preparation Lab 2
Practical experience in quantity food preparation. Integration and application of NFS 4710. Corequisite: NFS 4710. Prerequisites: NFS 1240 and acceptance into Coordinated Program in Dietetics. (F)

NFS 4740 Food Service Organization and Management Lab 2
Practical experience in food service management. Integration and application of NFS 4720. Prerequisite: NFS 4730. Corequisite: NFS 4720. (Sp)

NFS 4750 Management of Dietetics 3
Principles of management in dietetics and current practice issues. Prerequisite: Must be enrolled in final year in Coordinated Program in Dietetics (CPD) or Didactic Program in Dietetics (DPD). (Sp)

NFS 4780 CI Maternal and Child Nutrition 3-4
Normal and clinical nutritional requirements in pregnancy, lactation, and pediatrics. To be taken in Salt Lake City in conjunction with NFS 4660 or by Didactic Program in Dietetics (DPD) students in their final year. (F)

NFS 4810 History and Practices in World Cuisines 4
Preparation of foods from around the world, incorporating historical and current food trends. Prerequisites: NFS 3030 and 3060. Will be offered Spring 2007 and Spring 2009. Will not be offered after Spring 2009. (Sp)

NFS 4900 Special Problems 1-4®
Individual problems and research problems in Nutrition and Food Sciences. (F,Sp,Su)

NFS 4990 Nutrition and Food Sciences Seminar 1
Senior student paper and presentation on current topics in nutrition and food sciences. Prerequisite: Senior in NFS. (Sp)

NFS 5020 Meat Technology and Processing 4
(dual listing 6020)
Emphasizes understanding the conversion of muscle to meat, fabrication of carcasses into primal and retail cuts, and principles underlying manufacture of processed meats. (F)

NFS 5030 Dairy Technology and Processing 4
(dual listing 6030)
Processing milk into fluid milk products, cheeses, ice cream, yogurt, concentrated milks, and powders. Identity standards of regulated dairy products. Physical, chemical, and biochemical changes that occur during manufacture and storage. Microbiological, chemical, and physical deterioration and control. (F)

NFS 5110 CI Food Microbiology 4
(dual listing 6110)
Microorganisms in food spoilage, poisoning, preservation, and sanitation. Prerequisite: BIOL 3300. (Sp)

NFS 5120 QI Biologic Markers of Diet and
(dual listing 6120) Disease Risk Lab 2
Measurement and interpretation of biologic markers of nutritional status and disease risk. Markers measured in a variety of human tissues. Prerequisites: NFS 1020, BIOL 2420, CHEM 3700, MATH 1210, and STAT 2000. (Sp)

NFS 5160 Methods in Biotechnology: Cell Culture 3
Techniques and fundamental knowledge for culturing mammalian and insect cells. Students will learn maintenance, growing, genetic engineering of cells, cytotoxicity, hybridoma creation, cloning, etc. Extensive laboratory experience is provided. Also taught as ADVS 5160, BIOL 5160, and PSB 5160. (F)

NFS 5200 Nutritional Epidemiology 2
(dual listing 6200)
Introduction to epidemiologic methods and their application to the study of nutrition, human health, and disease. Useful for students with career interests in nutrition, food sciences, dietetics, human health sciences, veterinary sciences, biology, public health, anthropology, social work, and public policy. Prerequisites: STAT 1040, NFS 1020. (F)

NFS 5210 Advanced Public Health Nutrition 2
(dual listing 6210)
Effects of diet on development and prevention of disease. Conditions of public health significance, including birth defects, coronary heart disease, hypertension, stroke, Alzheimer's disease and other causes of dementia, cancer, osteoporosis, diabetes, and international health problems. Discussion of health concerns of minority populations, cross-cultural studies, government policy, and establishment of dietary recommendations. Prerequisites: STAT 1040 or higher, CHEM 3700 or higher. (Sp)

NFS 5220 Endocrine Aspects of Nutrition 2
(dual listing 6220)
Provides physiological background into hormones involved in nutrient regulation, as well as mechanisms of hormone action at the cellular and molecular levels. Includes action of steroids in the nucleus and membrane-based signal transduction pathways. Course includes lectures and literature reviews/ presentations. Prerequisite: CHEM 3700 or permission of instructor. Also taught as ADVS 5220/6220 and BIOL 5220/6220. (Sp)

NFS 5240 Methods in Biotechnology: Protein Purification Techniques 3
Reviews basic methods of protein purification, including scaled-up use of 100L fermenter, large-scale centrifugation, diafiltration, chromotography, and use of BioCAD. Prerequisite: CHEM 3700. Also taught as ADVS 5240, BIOL 5240, and PSB 5240. (Sp)

NFS 5250 Occupational Experiences in Nutrition and Food Sciences 1-3®
On-the-job training. (F,Sp,Su)

NFS 5260 Methods in Biotechnology: Molecular Cloning 3
Laboratory-oriented course designed to teach molecular biology techniques such as DNA cloning, genetic probes, polymerase chain reaction, and DNA sequencing. Prerequisite: CHEM 3700 or 5710; or BIOL 3060; or permission of instructor. Also taught as ADVS 5260, BIOL 5260, and PSB 5260. (F)

NFS 5300 Advanced Micronutrient Nutrition 3
(dual listing 6300)
Explores the function, interaction, and practical significance of micronutrients in human metabolism and the ability of the diet to meet these needs. Relates nutrient biochemical functions to specific deficiency symptoms. Prerequisite: NFS 4020. (Sp)

NFS 5370 Molecular Methods in Nutrition Science 2
(dual listing 6370)
Theory of modern techniques used to study macromolecules and ions. Prerequisite: CHEM 3700. Also taught as ADVS/BIOL/PSB 5370/6370. (F)

NFS 5400 Nutrition Update: Present Knowledge 2©**
Enriches and updates knowledge of nutrition, as well as implications for well-being of people, through presentation of recent advances in nutrition accomplished by worldwide research efforts of scientists from academia, government, and industry. Available only through Continuing Education Independent Study Division.

NFS 5500 QI Food Analysis 4
(dual listing 6500)
Application and theory of physical, chemical, and instrumental techniques for determination of composition and quality of food. Prerequisite: NFS 5560/6560. (Sp)

NFS 5510 Food Laws and Regulations 2
(dual listing 6510)
Provides background of federal/state laws and regulations and case law history affecting food production, processing, packaging, marketing, and distribution of food products. (Sp)

NFS 5560 Food Chemistry 4
(dual listing 6560)
Chemical structure, properties, and reactions and interactions of the important chemical constituents of food. Prerequisites: CHEM 3700 and 3710. (F)

NFS 5610 Food and Bioprocess Engineering 3
(dual listing 6610)
Standardization and compounding of biomaterials and food products; preservation processing using heat, refrigeration, concentration, and dehydration. Basic unit operations in the bioprocessing industry. Prerequisite: BIE 3200. Also taught as BIE 5610/6610. (F)

NFS 5750 Advanced Dietetics Practicum 1-6
(dual listing 6750)
Advanced dietetics practicum in clinical nutrition, community nutrition, food service management, or research. Prerequisite: Must be enrolled in final year in Coordinated Program in Dietetics (CPD) or Didactic Program in Dietetics (DPD). (F,Sp,Su)

NFS 5760 Senior Practicum in Culinary Arts/Food Service Management 2®
Practical experience in food service settings, integrating and applying material learned in lectures and laboratories. (F,Sp)

NFS 5920 CI Food Product Development 3
Capstone course that incorporates and unifies the principles of food chemistry, microbiology, engineering, processing, nutrition, sensory analysis, and statistics. Prerequisite: Senior standing. (F)

NFS 6020 Meat Technology and Processing 4
(dual listing 5020)
Emphasizes understanding the conversion of muscle to meat, fabrication of carcasses into primal and retail cuts, and principles underlying manufacture of processed meats. (F)

NFS 6030 Dairy Technology and Processing 4
(dual listing 5030)
Processing milk into fluid milk products, cheeses, ice cream, yogurt, concentrated milks, and powders. Identity standards of regulated dairy products. Physical, chemical, and biochemical changes that occur during manufacture and storage. Microbiological, chemical, and physical deterioration and control. (F)

NFS 6050 Community Public Health Internship I 3
Supervised school nutrition education internship in elementary and secondary public schools developing child nutrition programs. Prerequisite: Acceptance into USU Extension Dietetic Internship Program. (F,Sp,Su)

NFS 6060 Community Public Health Internship II 3
Supervised public health nutrition internship with state and district supplemental food program for women, infants, and children. Prerequisite: Acceptance into USU Extension Dietetic Internship Program. (F,Sp,Su)

NFS 6100 Sensory Evaluation of Foods 3
Methods and practice in the sensory evaluation of foods. Testing facilities/environment, statistical design, testing method selection, and data interpretation. Prerequisite: STAT 3000 or permission of instructor. (Sp)

NFS 6110 Food Microbiology 4
(dual listing 5110)
Microorganisms in food spoilage, poisoning, preservation, and sanitation. Prerequisite: BIOL 3300. (Sp)

NFS 6120 Biologic Markers of Diet
(dual listing 5120) and Disease Risk Lab 2
Measurement and interpretation of biologic markers of nutritional status and disease risk. Markers measured in a variety of human tissues. Prerequisites: NFS 1020, BIOL 2420, CHEM 3700, MATH 1210, and STAT 2000. (Sp)

NFS 6170 Principles of Food Safety Assurance* 2
Explores prerequisite programs for HACCP, HACCP implementation, and food safety considerations in new product development. Prerequisite: BIOL 3300 or equivalent. (F)

NFS 6200 Nutritional Epidemiology 2
(dual listing 5200)
Introduction to epidemiologic methods and their application to the study of nutrition, human health, and disease. Useful for students with career interests in nutrition, food sciences, dietetics, human health sciences, veterinary sciences, biology, public health, anthropology, social work, and public policy. Prerequisites: STAT 1040, NFS 1020. (F)

NFS 6210 Advanced Public Health Nutrition 2
(dual listing 5210)
Effects of diet on development and prevention of disease. Conditions of public health significance, including birth defects, coronary heart disease, hypertension, stroke, Alzheimer's disease and other causes of dementia, cancer, osteoporosis, diabetes, and international health problems. Discussion of health concerns of minority populations, cross-cultural studies, government policy, and establishment of dietary recommendations. Prerequisites: STAT 1040 or higher, CHEM 3700 or higher. (Sp)

NFS 6220 Endocrine Aspects of Nutrition 2
(dual listing 5220)
Provides physiological background into hormones involved in nutrient regulation, as well as mechanisms of hormone action at the cellular and molecular levels. Includes action of steroids in the nucleus and membrane-based signal transduction pathways. Course includes lectures and literature reviews/presentations. Prerequisite: CHEM 3700 or permission of instructor. Also taught as ADVS 6220/5220 and BIOL 6220/5220. (Sp)

NFS 6250 Clinical Nutrition Internship I 4
Supervised clinical nutrition experience including medical, geriatric, long-term care, and oncology. Prerequisite: Acceptance into USU Extension Dietetic Internship Program. (F,Sp,Su)

NFS 6260 Clinical Nutrition Internship II 4
Supervised clinical nutrition experience including nutrition support, renal, pediatrics, intensive care units, outpatient care, and clinical staff experience. Prerequisite: Acceptance into USU Extension Dietetic Internship Program. (F,Sp,Su)

NFS 6300 Advanced Micronutrient Nutrition 3
(dual listing 5300)
Explores the function, interaction, and practical significance of micronutrients in human metabolism and the ability of the diet to meet these needs. Relates nutrient biochemical functions to specific deficiency symptoms. Prerequisite: NFS 4020. (Sp)

NFS 6350 Food Service Systems Management Internship I 6
Supervised school food service internship. Includes purchasing, inventory control, food service, and food production. Prerequisite: Acceptance into USU Extension Dietetic Internship Program. (F,Sp,Su)

NFS 6360 Food Service Systems Management Internship II 6
Supervised school food service internship. Includes administration and food service staff supervision experience. Prerequisite: Acceptance into USU Extension Dietetic Internship Program. (F,Sp,Su)

NFS 6370 Molecular Methods in Nutrition Science 2
(dual listing 5370)
Theory of modern techniques used to study macromolecules and ions. Prerequisite: CHEM 3700. Also taught as ADVS/BIOL/PSB 6370/5370. (F)

NFS 6500 Food Analysis 4
(dual listing 5500)
Application and theory of physical, chemical, and instrumental techniques for determination of composition and quality of food. Prerequisite: NFS 6560/5560. (Sp)

NFS 6510 Food Laws and Regulations 2
(dual listing 5510)
Provides background of federal/state laws and regulations and case law history affecting food production, processing, packaging, marketing, and distribution of food products. (Sp)

NFS 6560 Food Chemistry 4
(dual listing 5560)
Chemical structure, properties, and reactions and interactions of the important chemical constituents of food. Prerequisites: CHEM 3700 and 3710. (F)

NFS 6610 Food and Bioprocess Engineering 3
(dual listing 5610)
Standardization and compounding of biomaterials and food products; preservation processing using heat, refrigeration, concentration, and dehydration.

Basic unit operations in the bioprocessing industry. Prerequisite: BIE 3200. Also taught as BIE 6610/5610. (F)

NFS 6620 Microbiology of Fermented Dairy Foods 1**
Explores the microbiology and physiology of dairy starter and nonstarter bacteria. Particular emphasis placed on important metabolic functions and biochemical pathways used by these microorganisms in food fermentations and their influence on product attributes. (Sp)

NFS 6640 Food Proteins 1**
Covers topics in protein structure, folding, functional properties, allergens, and purification. (F)

NFS 6650 Meat Science* 2
Structure of muscle tissue, chemistry of contraction and relaxation, factors affecting meat tenderness, and postmortem changes and their effect on meat quality. Prerequisite: CHEM 3700. (Su)

NFS 6660 Cheese Science 2**
Studies application of chemistry and microbiology to the manufacture of cheese. (Su)

NFS 6670 Food Biosecurity and Crisis Management* 1
Food biosecurity addresses the intentional contamination of a food product. Crisis management focuses on how a food company deals with a crisis situation; including product recalls, dealing with the media, and damage control. (F)

NFS 6680 Food Enzymes 2**
Covers topics in food enzymes, including enzyme classification and nomenclature, reaction kinetics, food applications, and immobilization technology. (F)

NFS 6690 Genetics of Lactic Acid Bacteria 1**
Describes structural and functional characteristics of four major genetic elements described in lactic acid bacteria: plasmid DNA, transposable elements, bacteriophages, and the chromosome. (Sp)

NFS 6700 Dairy Chemistry* 1
Students gain an understanding of the chemical structure, properties, biosynthesis, and reactions of the main constituents in milk. Students apply this knowledge to the development and processing of dairy foods. (Sp)

NFS 6720 Metabolomics* 1
Metabolomics is the study of all metabolites within a biological sample. The "metabolome" results from genetics and environment, and is the best descriptor of phenotype. The promise of metabolomics is a molecular understanding of the effect of diet on health. (F)

NFS 6730 Understanding Crystallization in Food Systems* 1
Introduces basic concepts of crystallization mechanisms, including theories governing the crystallization process and their applications in food systems. Emphasizes the importance of controlling crystallization and its influence on final product quality and stability. (Sp)

NFS 6740 Waste and Energy Management* 1
Explores energy and waste management, including waste treatment methods and ways to reduce energy, or substitute with less-costly energy, in the food processing industry. Students learn through lectures, cooperative learning, site visits, and example problems. (F)

NFS 6750 Advanced Dietetics Practicum 1-6 (dual listing 5750)
Advanced dietetics practicum in clinical nutrition, community nutrition, food service management, or research. Prerequisite: Must be enrolled in final year in Coordinated Program in Dietetics (CPD) or Didactic Program in Dietetics (DPD). (F,Sp,Su)

NFS 6760 Special Topics in Nutrition and Food Science 1-3
Selected topics in nutrition and food science, based on individual faculty interests. (F,Sp,Su)

NFS 6780 Advanced Institutional Food Service Management 3
Principles of management applied to institutional food services and advanced professional certification curriculum. To enroll, student must be an MS candidate in dietetics or be eligible to take the national SFNS (School Food and Nutrition Service) exam. (Sp)

NFS 6800 Molecular and Cellular Nutrition 1**
Seminar course focusing on literature covering bioactive food components and nutrient action in transcriptional regulation. (F)

NFS 6810 Nutrigenomics* 1
Examination and discussion of how our unique genetic makeup affects the way we respond to our nutritional environment and how that impacts health and risk of disease. Also includes discussion of ethical and social issues related to nutritional genomics research. (Sp)

NFS 6820 Biomedical Aspects of Nutrition/ Human Diseases Interaction 1**
Study of the role nutrition plays in human disease development, prevention, and treatment. Highlights common and challenging nutrition issues in human diseases through understanding of human nutrition and pathophysiology of diseases. (Sp)

NFS 6900 Special Problems 1-4®
Individual problems and research problems for upper-division students in Nutrition and Food Sciences. (F,Sp,Su)

NFS 6910 Teaching Experiences in Nutrition and Food Sciences 1-2®
Students work with faculty in the Nutrition and Food Sciences department to gain experience in teaching. (F,Sp,Su)

NFS 6970 Thesis Research 1-12®
For students working on MS research. (F,Sp,Su)

NFS 6990 Continuing Graduate Advisement 1-12®
(F,Sp,Su)

NFS 7800 Seminar 1®
Reports and discussion on research and current literature. (F,Sp)

NFS 7970 Dissertation Research 1-12®
For students working on PhD research. (F,Sp,Su)

NFS 7990 Continuing Graduate Advisement 1-12®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.

Natural Resources (NR)

See College of Natural Resources, pages 126-128.

NR 1010 BSS Humans and the Changing Global Environment 3
Introduction to historical nature and extent of human environmental transformation at global and regional levels. Examination of how socio-economic, political, and scientific factors influence past and current perceptions, use and conservation of natural environments in Western and other cultures, and future options available. (F,Sp)

NR 2220 General Ecology 3
Study of the interrelationships among organisms, humans, and their environments, addressing where and how organisms live. Adaptation, population growth, species interactions, biodiversity, and ecosystem function are explored for a wide variety of organisms and ecosystems. Prerequisites: BIOL 1610 and 1620. Also taught as BIOL 2220. (F,Sp)

NR 4440 Natural Resource and Environmental Policy Seminar 1®
Year-long invited speaker seminar series on natural resource and environmental policy issues. Students register for only one semester, but attend the seminars until a required number has been met. Students also complete an assignment. Since this course is not required under current program requirements for the Natural Resource and Environmental Policy Certificate Program, it may not be offered in the forseeable future. For further information, contact the College of Natural Resources.

NR 6430 Natural Resource and Environmental Policy Cornerstone Seminar 3
Interdisciplinary, team-taught cornerstone course for the Natural Resource and Environmental Policy Graduate Certificate Program. Introduces different disciplinary perspectives for analyzing natural resource and environmental policies and decision-making processes. Helps students understand the role of science in policy-making and how to integrate information from contentious perspectives. (Sp)

NR 6440 Natural Resource and Environmental Policy Seminar 1®
Year-long invited speaker seminar series on natural resource and environmental policy issues. Students are required to attend a minimum number of the seminars. Students also complete an assignment. Since this course is not required under current program requirements for the Natural Resource and Environmental Policy Certificate Program, it may not be offered in the forseeable future. For further information, contact the College of Natural Resources.

NR 6450 Natural Resource and Environmental Policy Presentation 1
In their last year of graduate school, certificate candidates make a presentation on policy dimensions of thesis or dissertation, as part of this student seminar series. Students receive one semester credit for this presentation. (F,Sp)

NR 6510 Biophysical and Human Dimensions of Ecosystems 3
Intensive two-week course introducing key biophysical and socio-economic concepts through exploration of important concepts central to ecosystem management. Examines how ecosystem management differs from traditional approaches to the management of natural resources. Prerequisite: Instructor's permission. (F,Sp,Su)

NR 6520 Structure and Function of Ecological and Social Systems 3
Two-week course examining specific processes of landscape development. Establishes the relationship of landscape structure to vegetation and watersheds. Scale and pattern of ecosystems and classification studied at several scales. Prerequisite: Instructor's permission. (F,Sp,Su)

NR 6530 Integrated Inventory, Analysis, and Assessment of Ecosystems 3
Course participants develop techniques and skills for assessing the biophysical and socio-political environment. Participants gain an understanding of measurement, predicting future conditions, and decision-making techniques in ecosystem management. Prerequisite: Instructor's permission. (F,Sp,Su)

NR 6540 Ecosystem Management Implementation 3
Participants develop an integrated ecosystem assessment of a landscape unit in a capstone exercise. Assessment conducted with an interdisciplinary team during a two-week period in the field. Prerequisite: Instructor's permission. (F,Sp,Su)

NR 6550 Intensive Silviculture 3
Topics for this two-week comprehensive course in silviculture include: stand development and density management; growth and yield; silvicultural systems and reproduction methods; economic evaluation of systems; and relationships between practices and forest health, harvest systems, and forest soils. (F,Sp,Su)

NR 6560 Fire and Fuels Management 3
Two-week course evaluating fire and fuels management programs, which incorporate realistically projected changes in vegetation, fuels, and fire behavior over time. Participants inventory fuels and vegetation, predict fire behavior, and predict change in vegetation structure. (F,Sp,Su)

NR 6600 Natural Resources Integrative Experience 3
Under the direction of the student's supervisory committee, student completes an integrative capstone experience in his or her specialty. (F,Sp,Su)

Nursing (NURS)

See Weber State University/Utah State University Nursing Program, pages 434-435.

NURS 1030 Foundations of Nursing Practice 3
Nursing concepts introduced which are built upon throughout the nursing curriculum as students care for clients. (F)

NURS 1031 Foundations of Nursing Practice Clinical 3
Companion course taught in concert with NURS 1030. Clinical experience running concurrently with NURS 1030. (F)

NURS 1040 Women's Health and the Childbearing Family 2
Theory focuses on meeting basic human needs of the family and newborn throughout the childbearing cycle. (Sp)

NURS 1041 Women's Health and the Childbearing Family Clinical 1
Companion course taught in concert with NURS 1040. (Sp)

NURS 1045 Nursing Care of Adults and Children 3
Focused theory with emphasis on physiological and psychosocial needs of clients across the lifespan. (Sp)

NURS 1046 Nursing Care of Adults and Children Clinical 2
Companion course taught in concert with NURS 1045. (Sp)

NURS 1050 Treatment Modalities 3
Basic treatments and pharmacological agents used by nurses to promote health across the lifespan. (F)

NURS 1124 Transition into Associate Degree Nursing 2
Socialization from practical nursing to the associate degree, registered nurse level. (F)

NURS 2050 Treatment Modalities 2
Advanced treatments and pharmacological agents used by nurses to promote health across the lifespan. (F)

NURS 2060 Psychiatric/Mental Health Nursing 2
Students explore caring strategies for promoting mental health and preventing illness across the lifespan. (Sp)

NURS 2061 Psychiatric/Mental Health Nursing Clinical 1
Companion course taught in concert with NURS 2060. Clinical application of psychiatric/mental health nursing taught in NURS 2060. (Sp)

NURS 2070 Nursing Care of Adults and Children II 3
Theory with emphasis on more complex physiological and psychosocial needs of clients across the lifespan. (F)

NURS 2071 Nursing Care of Adults and Children II Clinical 4
Companion course taught in concert with NURS 2070. Clinical application of medical-surgical concepts learned in NURS 2070. (F)

NURS 2080 Patient Care Management 2
Theory focuses on the synthesis of nursing knowledge and skills necessary for entrance into registered nursing practice. (Sp)

NURS 2081 Patient Care Management Clinical 3
Companion course taught in concert with NURS 2080. Clinical synthesis of nursing knowledge and skills necessary for entrance into registered nursing practice. (Sp)

NURS 2283 Directed Readings and Projects 1-3
Prerequisite: Instructor's approval. (F,Sp)

NURS 2289 Cooperative Education 1-3
Open to all students who meet the minimum co-op requirements of this department. Provides academic credit for on-the-job experience. (F,Sp)

Course Descriptions

Office Systems Support (OSS)

See Office Systems Support AAS Degree, pages 447-448.

OSS 1110 Keyboarding 2
(formerly BIS 1110)
For students with no previous keyboarding experience. Designed so student can touch type and learn basic concepts related to word processing and document formatting.

OSS 1400 Microcomputer Applications 3
(formerly BIS 1400)
Introduction to operating systems, word processing, Internet, graphics, database, and spreadsheet applications. Includes preparation for University Studies Computer and Information Literacy (CIL) examination. Prerequisite: Ability to keyboard at a minimum of 25 wpm. (F,Sp,Su)

OSS 1410 Special Topics 1-3®
(formerly BIS 1410)
Selected topics related to using computers. (F,Sp,Su)

OSS 1420 Word Processing Applications 3
(formerly BIS 1420)
Word processing software instruction designed for office applications. Emphasizes creating business documents and improving keyboarding skills. Assumes ability to keyboard by touch at a minimum of 50 wpm.

OSS 1550 CI Business Correspondence 3
(formerly BIS 1550 CI)
Development and application of effective business writing skills, emphasizing business correspondence. Includes thorough review of grammar, spelling, and punctuation related to business correspondence.

OSS 2300 Data Communications
(formerly BIS 2300) and Networking 3
Emphasizes data communications in a LAN and WAN networking environment. Includes network protocols, cable technology, telecommunications standards, security issues, and general telecommunications management issues. Prerequisite: OSS 1400 or Computer and Information Literacy (CIL) Exam. (F,Sp)

OSS 2400 Web Design Applications 3
(formerly BIS 2400)
Design, development, and evaluation of documents for electronic media utilizing the wordwide web. Prerequisite: OSS 1400 or Computer and Information Literacy (CIL) Exam. (F,Sp,Su)

OSS 2450 Spreadsheets and Databases 3
(formerly BIS 2450)
Use of spreadsheets and databases to accomplish application development. Prerequisite: OSS 1400 or Computer and Information Literacy (CIL) Exam. (F,Sp,Su)

OSS 2500 Visual Basic Applications 3
(formerly BIS 3450)
Designed to teach nontechnical students to develop application solutions using Visual Basic. Features of Microsoft Access requiring knowledge of Visual Basic are introduced. Prerequisite: OSS 2450. (F,Sp)

OSS 2520 Integrating Office Technology 3
(formerly BIS 2520)
Advanced applications of office technology for production of business documents, emphasizing efficient use of word processing, graphics, and desktop publishing. Prerequisites: OSS 1420, BIS 2200.

OSS 2600 Office Procedures 3
(formerly BIS 2600)
Finishing course which integrates office knowledge and skills. Applies administrative activities which are part of the office process. Prerequisites: OSS 2520; OSS 1550 or BIS 2200.

OSS 2800 Principles of Selling 2
(formerly BIS 3550)
Focuses on the sales process, including prospecting, qualifying customers, planning and delivering the sales presentation, overcoming objections, closing the sale, and satisfying the customer's needs.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Physical Education Activity (PE)

See Department of Health, Physical Education and Recreation, pages 321-331.

PE 1010 Aerobics 1®
(formerly PE 1330)
Fitness program, primarily designed to improve cardiovascular fitness, muscular endurance, and flexibility. (F,Sp)

PE 1015 Cycling 1®
(formerly PE 1210)
Conditioning class emphasizing training. Introduction to road safety principles, various riding techniques, and cycle maintenance. Sections of road and mountain cycling offered. Beginning and intermediate classes are offered for both road and mountain cycling. (F,Sp,Su)

PE 1016 Spinning 1®
(formerly PE 1340)
Intense cardiovascular conditioning class performed on stationary bikes. (F,Sp)

PE 1046 Jog/Walk 1®
(formerly PE 1300)
Provides students with opportunity to achieve and maintain personal fitness through jogging and/or walking. (F,Sp,Su)

PE 1057 Yoga 1®
(formerly PE 1360)
Provides a simultaneous path to and discovery of ineffability, utilizing physical and mental techniques derived from and inspired by the Ati tradition of Tibet, as well as from other sources. (F,Sp,Su)

PE 1063 Conditioning 1®
(formerly PE 1310)
Designed to improve overall flexibility, strength, and endurance capacity of the body. (F,Sp)

PE 1085 Weight Training 1®
(formerly PE 1320)
Demonstration of proper weight training techniques. Helps students understand basic concepts related to weight training, in order to gain strength, improve muscle tone, and start or continue a healthy lifestyle. (F,Sp,Su)

PE 1100 Tennis 1®
(formerly PE 1250)
Designed for students desiring a basic understanding of tennis. Improvement of skills and strategies through active participation in drills and games. Beginning and intermediate level sections are offered. (F,Sp,Su)

PE 1103 Table Tennis 1®
Designed for students desiring a basic understanding of table tennis. Improvement of skills and strategies through active participation in drills and games. (F,Sp)

PE 1105 Badminton 1®
(formerly PE 1200)
Through active participation, students learn basic skills, rules, and strategies of singles and doubles badminton. (F,Sp)

PE 1110 Racquetball 1®
(formerly PE 1240)
Designed to help students understand the general rules and strategies of racquetball, improve competitive skills, and play safely and effectively. Beginning and intermediate classes are offered. (F,Sp)

PE 1120 Handball 1®
(formerly PE 1290)
Provides skills and knowledge in the fundamentals of handball. (F,Sp,Su)

PE 1130 Golf 1®
(formerly PE 1220)
Designed for the beginning and novice golfer. Basics of individual grip, set-up, posture, and swing. Includes putting, chipping, weight transfer, and balance. Beginning and intermediate classes are offered. (F,Sp,Su)

PE 1145 Bowling 1®
(formerly PE 1270)
Provides students with the knowledge, skills, and strategies for successful participation and enjoyment. (F,Sp,Su)

PE 1150 Billiards 1®
(formerly PE 1260)
Designed to develop basic knowledge and concepts for playing a variety of games. Focuses on stroke mechanics, shot selection, and strategy. Beginning and intermediate levels are offered. (F,Sp,Su)

PE 1155 Fencing 1®
(formerly PE 1510)
Introduction to basic techniques of fencing.

PE 1170 Gymnastics 1®
(formerly PE 1230)
Designed to enhance current abilities and teach skills according to the individual student's abilities. Skills taught through drill work and lecture. (F,Sp,Su)

PE 1200 Basketball 1®
(formerly PE 1100)
Designed to help the recreational player become more familiar with the basic skills involved in the game of basketball. During the course, games and/or a "mini" tournament will be played. (Sp)

PE 1210 Volleyball 1®
(formerly PE 1150)
Designed to help students enhance their basic volleyball skills and enjoyment of the game through active participation. Beginning, intermediate, and advanced levels are offered. (F,Sp)

PE 1225 Softball 1®
(formerly PE 1130)
Designed to help students develop and understand the skills and strategies of recreational softball through active participation. (Sp)

PE 1230 Soccer 1®
(formerly PE 1120)
Designed to help students develop and understand the skills and strategies of soccer through active participation in drills and games. (F,Sp)

PE 1235 Flag Football 1®
(formerly PE 1110)
Designed to help students develop and understand the skills and strategies of recreational flag football through active participation. (F)

PE 1245 Ultimate Frisbee 1®
(formerly PE 1140)
Designed to enhance each student's skills and abilities in ultimate frisbee. Emphasizes cardiovascular and muscular fitness. Course is progressive, with increase in intensity as the individual improves abilities. (F,Sp)

PE 1300 Swimming 1®
(formerly PE 1400)
Designed for swimmers and nonswimmers desiring to improve swimming skills and enhance cardiovascular and muscular fitness. Emphasizes swimming safety and enjoyment in a variety of water activities. Beginning, intermediate, and lap swim sections offered. (F,Sp,Su)

PE 1315 Water Aerobics 1®
(formerly PE 1350)
Provides students with opportunity to maintain personal fitness, with an emphasis on non-weight-bearing cardiovascular activity in water. (F,Sp)

PE 1400 Self-Defense 1®
(formerly PE 1500)
Covers skill development in terms of defensive capability, environment assessment, situation management, and the legal ramifications of the use of force. Available to the general University student body. Class offerings include Akido, Ta'i Chi, Karate, Aerobic Kickboxing, and Rape Aggression Defense. (F,Sp,Su)

PE 1505 Kayaking 1®
(formerly PE 1710)
Provides basic skills and knowledge in kayaking. (F,Sp)

PE 1510 Fly Fishing 1®
(formerly PE 1280)
Provides students with the opportunity to develop the skills, knowledge, and strategies for successful participation and enjoyment. Classes are offered in beginning and intermediate fly tying, rod building, and casting. (F,Sp,Su)

PE 1515 Sailing 1®
(formerly PE 1740)
Provides skills and knowledge in the fundamentals of sailing and water safety. (F,Sp,Su)

PE 1520 Hiking 1®
(formerly PE 1620)
Provides skills and knowledge in hiking, with an emphasis on leave no trace techniques and safe operations in an outdoor environment. (F,Sp,Su)

PE 1523 Orienteering 1®
(formerly PE 1630)
Provides skills and knowledge in the fundamentals of orienteering with an emphasis on wilderness travel techniques and safety in the outdoors. (F,Sp,Su)

PE 1527 Rock Climbing: Basic 1®
(formerly PE 1640)
Provides skills and knowledge in basic rock climbing, teaching safe judgment and proper techniques in a climbing gym. (F,Sp,Su)

PE 1532 Outdoor Survival 1®
(formerly PE 1650)
Provides skills and knowledge in the fundamentals of outdoor survival and developing a wilderness ethic to allow for safe participation in wilderness activities. (F,Sp,Su)

PE 1538 Yurt Camping 1®
(formerly PE 1830)
Provides skills and knowledge for safe winter camping using a yurt for shelter. Assists in the development of high outdoor ethics. (F,Sp)

PE 1543 Wilderness First Aid 1®
(formerly PE 1670)
Provides outdoor leaders with an introduction to wilderness first aid. Upon completion of course, students may receive a two-year wilderness first aid certification. (F,Sp,Su)

PE 1570 National Outdoor Leadership
(formerly PE 1690) School Course 3-18®
Provides students with the opportunity to earn USU credit for attending National Outdoor Leadership (NOLS) courses. (F,Sp,Su)

PE 1600 Winter Exploration 1®
(formerly PE 1810)
Provides skills and knowledge for safe winter camping using backpacking equipment. Assists in the development of high outdoor ethics. (F,Sp)

PE 1605 Skiing 1®
(formerly PE 1000)
Alpine ski instruction for all students. Offered for beginning, intermediate, and advanced levels. Focuses on knowledge, techniques, equipment, and safety necessary for participating in and enjoying alpine skiing, snowboarding, and telemark skiing. (Sp)

Course Descriptions

PE 1625 Cross Country Skiing 1®
(formerly PE 1020)
Focuses on knowledge, techniques, equipment, and safety necessary to participate in and enjoy winter recreational activities, including cross country ski touring and snowshoeing. (Sp)

PE 1655 Snowshoeing 1®
(formerly PE 1820)
Provides skills and knowledge of snowshoeing, with an emphasis on leave no trace techniques and development of safe winter activity skills. (F,Sp)

PE 1670 Ice Skating 1®
(formerly PE 1840)
Teaches basic, intermediate, conditioning, and competitive skill development. Includes sections of ice hockey and curling. (F,Sp,Su)

PE 1700 Dance 1®
(formerly PE 1900)
Designed to help students enhance their basic skills and enjoyment of dance through the following forms: jazz, modern, ballet, ballroom, social, Latin, western swing, etc. (F,Sp)

PE 1910 African Dance 1®
Introduces students to African dance using live drummers. Each class incorporates a series of warm-up exercises, followed by specific dances inspired by traditional African ceremonies and events, all accompanied by a traditional African drum ensemble. (F,Sp,Su)

PE 2000 Personal Instruction and Conditioning 1®
Designed for students and prospective members of varsity teams, as well as for the student/athlete requiring a personalized program. (F,Sp,Su)

PE 2010 Varsity Cross Country 1®
Designed to meet the needs of varsity student/athletes in cross country. (F)

PE 2020 Varsity Football 1®
Designed to meet the needs of varsity student/athletes in football. (F)

PE 2030 Varsity Soccer 1®
Designed to meet the needs of varsity student/athletes in soccer. (F)

PE 2040 Varsity Volleyball 1®
Designed to meet the needs of varsity student/athletes in volleyball. (F)

PE 2050 Varsity Indoor Track and Field 1®
Designed to meet the needs of varsity student/athletes in indoor track and field. (Sp)

PE 2060 Varsity Basketball 1®
Designed to meet the needs of varsity student/athletes in basketball. (Sp)

PE 2070 Varsity Gymnastics 1®
Designed to meet the needs of varsity student/athletes in gymnastics. (Sp)

PE 2080 Varsity Track and Field 1®
Designed to meet the needs of varsity student/athletes in track and field. (Sp)

PE 2090 Varsity Softball 1®
Designed to meet the needs of varsity student/athletes in softball. (Sp)

PE 2100 Varsity Golf 1®
Designed to meet the needs of varsity student/athletes in golf. (F,Sp)

PE 2110 Varsity Tennis 1®
Designed to meet the needs of varsity student/athletes in tennis. (F,Sp)

PE 2120 Varsity Weight Training 1®
Designed for varsity athletes. Emphasizes strength development. (F,Sp,Su)

PE 3000 Dynamic Fitness 3©
Designed to develop positive health practices in the areas of physical activity, diet, rest, and relaxation of living through classroom, laboratory, and activity experiences. (F,Sp,Su)

PE 4000 Lifeguard Training 2®
Designed to prepare students as pool or nonsurf open water lifeguards. Presents knowledge and skills necessary for lifeguard functions. American Red Cross certification available. (F,Sp)

PE 4050 Water Safety Instructor 2®
Attention given to methods of teaching swimming and lifesaving. Presents knowledge and skills necessary for lifeguard functions. American Red Cross certification available. (F,Sp)

PE 4200 Athletic Transition 2
Life skills course designed to meet the needs of fourth-year and fifth-year student athletes. Provides personal and career assistance. (F,Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Physical Education Professional (PEP)

See Department of Health, Physical Education and Recreation, pages 321-331.

PEP 2000 Introduction and History of Physical Education 2
Acquaints P.E. students with four areas of physical education, including: the department, with respect to the University and the College of Education and Human Services; the history of physical education; the effects of sociology on physical education; and future employment opportunities in the fields of physical education. (F,Sp)

PEP 2020 Introduction to Physical Therapy 2
Introduces prephysical therapy students to the discipline of physical therapy and familiarizes them with its associated spectrum of opportunities and responsibilities. (F)

PEP 2050 Sport Rules and Regulations of the Utah High School Athletic Association 1
Knowledge of the rules and mechanics of officiating all Utah high school sports. (Sp)

PEP 2100 Skills 1 (Swimming, Volleyball, Football) 1
Provides physical education majors and minors with the knowledge, skills, practice, and understanding of swimming, volleyball, and football needed for successful participation. Exposes students to a variety of teaching methods for these three sports. (F,Sp)

PEP 2200 Skills 2 (Lifetime Activities) 1
Provides physical education majors and minors with the knowledge, skills, practice, and understanding of lifetime activities needed for successful participation. Exposes students to a variety of teaching methods for these activities. (F,Sp,Su)

PEP 2300 Skills 3 (Softball, Basketball, Soccer) 1
Provides physical education majors and minors with the knowledge, skills, practice, and understanding of softball, basketball, and soccer needed for successful participation. Exposes students to a variety of teaching methods for these three sports. (F,Sp)

PEP 2400 Skills 4 (Tennis, Badminton, Track and Field) 1
Provides physical education majors and minors with the knowledge, skills, practice, and understanding of tennis, badminton, and track and field needed for successful participation. Exposes students to a variety of teaching methods for these three sports. (F,Sp)

PEP 2500 Rhythms and Movement 1
Focuses on fundamental motor skills, mixers, aerobic, line, folk, ballroom, and square dance. Provides opportunities to practice rhythms and movement, as well as opportunities to practice teaching. Designed for physical education majors and minors. (F,Sp)

PEP 3050 Physical Education in the Elementary School 3
Prepares students to teach elementary physical education. Focuses on developmentally appropriate activities, locomotor and manipulative skills, fitness, games, rhythms, motor learning, and lesson planning. Students will teach physical education lessons in the elementary school. (F,Sp,Su)

PEP 3100 Athletic Injuries 3
Care and prevention of common athletic injuries and standard taping techniques. Emphasizes recognition, first aid, and referral for these injuries. Taping techniques taught in a lab setting. (F,Sp)

PEP 3200 CI Motor Learning and Skill Analysis 3
Exploration of materials, methods, and mechanisms of learning and performing motor skills. A variety of sport skills taught in lab, using cues, demonstrations, feedback, and game-like drills. Performance of skill analysis for variety of sport skills. (F,Sp,Su)

PEP 3250 Anatomical Kinesiology 3
Study of the anatomical bases of human movement. Laboratory provides application of principles. (Sp)

PEP 3300 Clinical Experience I 1
Public school clinical experience in physical education. Prerequisite: Admission into Teacher Education program. (F,Sp)

PEP 3350 Methods of Individual and Dual Sports 1
Prepares students by providing strategies and materials for implementing a quality physical education program in individual and dual sports. Discussion of lesson and unit planning, as well as student evaluation. Prerequisites: PEP 2200, 2400. (Arr)

PEP 3400 Methods of Team Sports 1
Prepares students by providing strategies and materials for implementing quality physical education program in team sports. Discussion of lesson and unit planning, as well as student evaluation. Prerequisites: PEP 2100, 2300. (Arr)

PEP 3500 Methods of Fitness Education 1
Emphasizes classroom components for teaching lecture/activity fitness course. Students peer teach in a lecture environment. Discussion of strategies and materials for planning and implementing a quality physical education academic fitness course. Includes lecture planning, presentation, unit preparation, and evaluation. Prerequisites: PE 3000, PEP 3350, 3400. (Arr)

PEP 3550 Strategies and Methods of Teaching Team, Individual, and Dual Sports and Fitness 3
Designed to provide future physical education teachers with sound strategies and methods for teaching lifetime activities including fitness, as well as team, individual, and dual sports (F,Sp)

PEP 3600 Elementary Physical Education Practicum 3
Prepares teachers to teach elementary physical education as a support minor. Prerequisite: PEP 3050. (Arr)

PEP 3650 Movement Exploration for Elementary Teachers 2
Covers creative movement and international folk dance. Experiences range from classroom management and curriculum development to large open-space activities and performance. Includes art and sound activities. (F)

PEP 4000 Mental Aspects of Sports Performance 3
Provides current knowledge of sport psychology. Applies this knowledge to teaching sports and coaching in public schools. Also taught as PSY 4000. (F,Sp,Su)

PEP 4100 Exercise Physiology and Principles of Conditioning 4
Designed to expose students to theory and application of exercise physiology and principles of training and conditioning. Laboratory experience provides hands-on practicum for concepts taught in the classroom. Prerequisites: BIOL 2320, 2420, MATH 1050. (F,Sp)

PEP 4150 Advanced Care and Prevention of Athletic Injuries 3
Final preparation and competency demonstration of knowledge and skills prior to taking the national certification exam for the Athletic Training credential. Prerequisites: PEP 3100, instructor approval, and NATABOC certification eligibility.

PEP 4200 QI Biomechanics 4
Understanding and application of human anatomical kinesiology and biomechanical principles fundamental to efficient human movement. In required concurrent one-hour lab, students obtain hands-on application of principles of anatomical kinesiology and biomechanics. Prerequisites: BIOL 2320, 2420; MATH 1050 or equivalent. (F,Sp)

PEP 4250 Advanced Cooperative Work Experience 1-10®
Cooperative education work experience offers student opportunity to work in related field work of the major. Prerequisite: Instructor approval. (F,Sp,Su)

PEP 4300 Clinical Experience II 1
Public school clinical experience in physical education. Prerequisite: Admission into Teacher Education program. (F,Sp)

PEP 4350 Administration of Physical Education 2
Designed to help students understand objectives of physical education and sport, and incorporate them into a philosophy to assist in developing quality programs at the secondary level. Covers all aspects of physical education and sport administration including, but not limited to, budget, personnel, facilities management, programs, and activities. (F,Sp)

PEP 4400 QI Evaluation in Physical Education 3
Focuses on the nature and use of a variety of tests in physical education. Practical application, interpretation, and use of test results are stressed. (F,Sp)

PEP 4500 Methods of Coaching 3
Addresses issues associated with secondary coaching, including fund-raising, discipline, parents, booster clubs, equipment, team selection, etc. Students also get hands-on individual sports methods time with local teams. (F,Sp)

PEP 4600 Methods of Coaching Football and Soccer 1
Outlines the methods, strategies, and techniques for coaching scholastic football and soccer. Emphasizes young player skill development and high school coaches' administration of these sports. Prerequisite: PEP 4500 (may be taken concurrently). (Arr)

PEP 4700 Methods of Coaching Volleyball, Track and Field 1
Outlines the methods, strategies, and techniques for coaching scholastic volleyball, as well as track and field. Emphasizes young player skill development and high school coaches' administration of these sports. Prerequisite: PEP 4500 (may be taken concurrently). (Arr)

PEP 4800 Methods of Coaching Basketball, Baseball, and Softball 1
Outlines methods, strategies, and techniques of coaching scholastic basketball, baseball, and softball. Emphasizes young player skill development and high school coaches' administration of these sports. Prerequisite: PEP 4500 (may be taken concurrently). (Arr)

PEP 4850 Methods of Teaching and Coaching Women's Gymnastics 3
Instructs students in required coaching methods for women's gymnastics from the beginning to advanced levels. Also includes section on judging. (Arr)

PEP 4900 CI Methods of Physical Education 3
Designed to prepare physical education majors and minors to teach physical education in the schools. Emphasizes planning, teaching, strategies, and methods. Admission to the Teacher Education program is required. Must be taken concurrently with either PEP 3300 or 4300. Prerequisites: Two courses selected from PEP 3350, 3400, and 3500. (F,Sp)

PEP 4950H Honors Senior Thesis 1-6
Culminating experience within the department for honors students. Student works closely with faculty mentor in an extensive project in the student's area of interest. (F,Sp)

Course Descriptions

PEP 5050 (dual listing 6050) Psychological Aspects of Sports Performance 3
Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, and personality and sports performance. Also taught as PSY 5050/6050. (Arr)

PEP 5070 Sport Sociology 3
Develops understanding of the social significance of sport. Applies the sociological perspective to a variety of contemporary issues, enabling students to better understand how sport affects and reflects American culture. (Sp)

PEP 5100 Fitness Assessment and Exercise Programs 4
Application of physiologic principles, assessment techniques, and exercise prescription for developing quality fitness programs that impact health. Students gain experience in a personal fitness program and in the use and interpretation of fitness tests. Prerequisite: PEP 4100. (F)

PEP 5430 CI The History and Philosophy of Physical Education 3
Designed to familiarize physical education majors (or nonmajors) with history of physical education and sport, as well as philosophical influences which have contributed to development of contemporary physical education and sport. Considers historical development of yesterday's pastimes into today's complex, institutionalized forms of sport and physical education. (F)

PEP 5500 Student Teaching Seminar 2
Capstone seminar focused upon student teaching issues, professional development, and principles of effective instruction. Prerequisites: PEP 4900, completion of Level I and II field experiences. (F,Sp)

PEP 5560 Practicum in Improving School System Programs 1-4®
In-service seminar for experienced teachers, emphasizing improvement in instruction. (F,Sp,Su)

PEP 5630 Student Teaching in Secondary Schools 10
A 13-week culminating experience in which students assume full-time teaching responsibilities under the direction of cooperating teachers in physical education. Prerequisites: PEP 4900, completion of Level I and Level II field experiences. (F,Sp)

PEP 5700 (dual listing 6700) Special Topics in Physical Education 1-6®
In-depth review and discussion of special topics in physical education. (F,Sp,Su)

PEP 5900 Independent Study 1-3®
Provides opportunity for undergraduate or graduate students to participate in independent inquiry under guidance of a professor. (F,Sp,Su)

PEP 5910 Independent Research 1-3
Allows undergraduate students to pursue personal research interest by formalizing an independent project under the guidance of a professor. (F,Sp,Su)

PEP 6000 Administration of Athletics 3
Prepares students to organize and administer interscholastic and intercollegiate sports at the public school or university level. Consideration is given to both the challenges and standards associated with such programs. (Arr)

PEP 6010 Leadership in Health, Physical Education, and Recreation 3
Group approach to improvement and innovation in leadership and supervisory skills. (Sp)

PEP 6050 (dual listing 5050) Psychological Aspects of Sports Performance 3
Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, and personality and sports performance. Also taught as PSY 6050/5050. (Arr)

PEP 6070 Sport in Society 3
Introduces students to complex role and social significance of sport in contemporary society. Familiarizes students with aims, scope, and potential contributions of sport in society. (Sp)

PEP 6250 Graduate Cooperative Work Experience 1-10®
Professional level of educational work experience in a cooperative education position for graduate students. (F,Sp,Su)

PEP 6290 Corporate Wellness Marketing 3
Reviews history of corporate fitness in America, as well as common organizational and management practices. Emphasizes marketing practices promoting individual and business involvement. (Sp)

PEP 6400 Exercise in Health, Fitness, and Sport 4
Emphasizes physiological and health benefits of exercise. Discusses role of exercise in disease prevention, along with medications given to treat illness and disease. (F)

PEP 6420 Curriculum in Physical Education 3
Curriculum development studied in terms of student needs in relation to present-day society. Includes current practices and trends in the area of curriculum. (Arr)

PEP 6430 History and Philosophy of Physical Education and Sport 3
History of physical education; philosophical influences which have contributed to contemporary physical education; and methods of educational instruction using the primary philosophical positions. (F)

PEP 6450 Fitness Assessment and Exercise Testing 3
Exposure to fitness assessment in clinical cardiac settings, as well as in corporate wellness settings. Exercise testing and interpretations, using different testing protocols in emphasized variant electrocardiograms, studied as part of the disease process. Prerequisite: PEP 6400. (Sp)

PEP 6500 Practicum in Corporate Wellness 1-10®
Experiences designed for the practical implementation of coursework. Involves random populous rehabilitation, as well as executive and industry, senior citizen centers, and rest homes. (F,Sp,Su)

PEP 6540 Wellness Programming 3
Emphasizes exercise prescription writing and exercise prescription implementation. Students test prescriptions in laboratory setting. Prerequisites: PEP 6400, 6450. (Sp)

PEP 6690 Analysis of Teaching Physical Education 3
Designed to provide graduate students with practicum experiences in the analysis of physical education, via micro teaching and observation of physical education classes. (Arr)

PEP 6700 (dual listing 5700) Special Topics in Physical Education 1-6®
In-depth review and discussion of special topics in physical education. (F,Sp,Su)

PEP 6730 Worksite Guidance and Counseling 3
Provides cardiac rehabilitation/corporate wellness graduate students with basic understanding of exercise and health psychology. (Arr)

PEP 6800 Biomechanics and Ergonomics of Health, Industry, and Sport 3
Understanding and application of biomechanical and ergonomic principles fundamental to efficient human movement in health, industry, and sport. Prerequisite: PEP 4200. (Sp)

PEP 6810 Research Methods in Health Sciences 3
Explores basic to advanced concepts contained in research and statistical design, as applicable to health sciences. (F)

PEP 6820 Wellness Certification and Technology 2
Provides instruction and experience in wellness technology and wellness certification. Students learn use of current technology in the fitness industry and obtain certain wellness certifications. (Arr)

PEP 6830 Motor Learning 3
Comprehensive review and analysis of research in the area of motor skills which bears upon the teaching of physical education activities. (Arr)

PEP 6900 Independent Study 1-3®
Student conducts independent projects under direction of one or more professors. Provides student with opportunity for individualized study. (F,Sp,Su)

PEP 6910 Independent Research 1-3
Allows graduate students to pursue personal research interests by formalizing an independent project under the guidance of a graduate professor. (F,Sp,Su)

PEP 6960 Master's Project 3
Allows students opportunity to develop creative and applicable educational project. (F,Sp,Su)

PEP 6970 Thesis 1-9®
(F,Sp,Su)

PEP 6990 Continuing Graduate Advisement 1-9®
Provides graduate students with continued support and advisement. Usually taken following completion of all coursework required for the degree. (F,Sp,Su)

PEP 7550 Practicum in the Evaluation of Instruction 1-6®
Field-based experience involving supervision of student teachers in Department of Health, Physical Education and Recreation. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Personal Financial Planning (PFP)

See School of Accountancy, pages 131-135.

PFP 1050 Introduction to Personal Financial Planning 1-3
Introduction to concepts of financial planning for individuals. Taught only as a special extension course as requested.

PFP 5060 Personal Financial Planning and Advising 3
(dual listing 6060)
Fundamental concepts and principles of personal financial planning for individuals. (F)

PFP 5070 Retirement Planning 3
(dual listing 6070)
Concepts and principles of retirement planning, including retirement and benefit plans, deferred compensation, and investments. (Sp)

PFP 5080 Estate Planning 3
(dual listing 6080)
Concepts and principles of estate planning for individuals, including goal identification, data gathering, forms of property ownership, documents, probate, and transfer taxes. (Sp)

PFP 5090 Personal Financial Plans 3
(dual listing 6090)
Capstone course in personal financial planning. Knowledge from other financial planning courses used to prepare comprehensive personal financial plans. Prerequisites (may be taken concurrently): ACCT 3410; BA 3460 or 4460; PFP 5060/6060, 5070/6070, 5080/6080.

PFP 6060 Personal Financial Planning and Advising 3
(dual listing 5060)
Fundamental concepts and principles of personal financial planning for individuals. (F)

PFP 6070 Retirement Planning 3
(dual listing 5070)
Concepts and principles of retirement planning, including retirement and benefit plans, deferred compensation, and investments. (Sp)

PFP 6080 Estate Planning 3
(dual listing 5080)
Concepts and principles of estate planning for individuals, including goal identification, data gathering, forms of property ownership, documents, probate, and transfer taxes. (Sp)

PFP 6090 Personal Financial Plans 3
(dual listing 5090)
Capstone course in personal financial planning. Knowledge from other financial planning courses used to prepare comprehensive personal financial plans. Prerequisites (may be taken concurrently): ACCT 3410; BA 3460 or 4460; PFP 6060/5060, 6070/5070, 6080/5080.

PFP 6560 Business Law and Professional Responsibilities 3
Examines the ethical and legal responsibilities of business professionals. Includes the application of law to business organizations, contracts, government regulation of business, and the uniform commercial code. (F,Sp)

Philosophy (PHIL)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

PHIL 1000 BHU Introduction to Philosophy 3
(formerly PHIL 1010 BHU)
Introduction to philosophical questions regarding truth, knowledge, reality, mind, God, morality, and meaning. Examination of various philosophical responses to these questions. (F,Sp)

PHIL 1120 BHU Social Ethics 3
(formerly PHIL 2500 BHU)
Examination of principles and arguments underlying current debate in American law and politics. Topics may include abortion, euthanasia, capital punishment, discrimination and affirmative action, sexual harassment, freedom of expression, welfare, and duties to help the poor in other nations. (F)

PHIL 1200 BHU Practical Logic* 3
Recognition of arguments and their logical structure. Study of formal and informal fallacies in reasoning. Enthymemes, analogical arguments, syllogisms, and Venn diagrams. Logical analysis of writing in the arts and sciences. (Sp)

PHIL 2200 QI Deductive Logic 3
Study of deductive arguments and techniques for evaluating their validity. Recognizing formal fallacies in reasoning. Symbolizing English sentences and arguments to make their meanings precise. Study of quantifiers and relations. Prerequisite: MATH 1030 or STAT 1040. (F,Sp)

PHIL 2400 BHU Ethics 3
Study of judgments concerning what is good or bad, right or wrong. How judgments are justified and related to action. Relativism, subjectivism, absolutism, freedom, and responsibility. (Sp)

PHIL 3100 CI Ancient Philosophy 3**
Development of philosophical thought in the Ancient Greek world. Readings from the pre-Socratics, Plato, Aristotle, the Stoics, and Epicureans. (F)

PHIL 3110 Medieval Philosophy 3**
Neo-Platonism with stress on Plotinus, St. Augustine, and early Christian philosophy; early medieval thought; St. Thomas Aquinas and the rise of scholasticism; and philosophical thought in the Renaissance. (Sp)

PHIL 3120 CI Early Modern Philosophy* 3
Philosophers and philosophical disputes in Western Europe from 1400-1750. Figures and topics may include: Bacon, Hobbes, Descartes, Locke, Hume, nominalism, empiricism, rationalism, religion, politics, and morals. (F)

PHIL 3150 CI Kant and His Successors* 3
Philosophers and philosophical disputes in Western Europe from 1750-1900. Study of Kant, Hegel, Bentham, Mill, Marx, Schopenhauer, and Nietzsche. Examination of critcal idealism, philosophy of history, utilitarianism, communism, and origins of existentialism. (Sp)

Course Descriptions

PHIL 3160 CI Contemporary Philosophy 3**
Twentieth century philosophical thought, including existentialism, logical positivism, analytic philosophy, and postmodernism, as expressed in the works of Heidegger, Husserl, Wittgenstein, Carnap, Russell, Quine, Sartre, Derrida, and others. (F)

PHIL 3180 DHA/CI Contemporary European Philosophy* 3
Study of twentieth-century philosophical movements originating and developing on the European continent. Movements to be considered may include: existentialism, phenomenology, hermeneutics, and post-metaphysical philosophy. (F)

PHIL 3500 Medical Ethics 3
Key issues in medicine, including: consent, competency, confidentiality, euthanasia, abortion, and the justification of health care. (F)

PHIL 3510 DHA Environmental Ethics 3
Key issues in the treatment of nature, such as: the value of wilderness, animal rights, comparative views of nature, and moral issues in economic approaches to the wilderness. (F,Sp)

PHIL 3520 DHA Business Ethics 3
Key issues in business, including: foreign bribery, corporate responsibility, corporate culture, ethical theories, justice, and preferential treatment. (Sp)

PHIL 3700 Philosophy of Religion 3
Problems in defining "religion" and the existence of God; the problem of evil; the immortality of the soul; religious experience; faith; alternatives to theism; religious language. (F)

PHIL 3710 Philosophies of East Asia* 3
Study of three Asian philosophies: Confucianism, Taoism, and Buddhism. Focus on appreciating the merits of each system of thought. Emphasis on class discussion and participation. (F)

PHIL 3720 Philosophical Theology After Kant* 3
Explores attempts to reconstruct the reasonable basis of religion in the two centuries after the Enlightenment. (F)

PHIL 3730 CI Philosophy of the New Testament* 3
Historical and intellectual context of the development of the New Testament. Character, ideas, and historical setting of the various documents. (Sp)

PHIL 3750 Religion and Science in the Modern World* 3
Study of problems addressing the relation of religion to science in the modern world (e.g., evolution, Big Bang, origin of life). (Sp)

PHIL 3800 DHA Philosophy in Literature 3**
Study of philosophical concepts, problems, and issues as they have been presented and dramatized in works of literature and cinema. Discussion of issues concerning ethics, epistemology, ontology, and logic. Students read or view works from a variety of media, including novels, short stories, and films. (F)

PHIL 3810 DHA Aesthetics 3
Analysis of traditional theories of aesthetics and art criticism. Theories are applied to illustrative examples, including music, painting, photography, sculpture, dance, literature and cinema. (Sp)

PHIL 4300 DHA Epistemology* 3
Study of foundations of knowledge and belief systems, and related topics in epistemology, including perception, certainty, and skepticism. (F)

PHIL 4310 DHA Philosophy of Science 3
Study of different views of the nature of science: the classical traditions of Hempel and Popper, Kuhn's subjectivism, and Feyerabend's anarchism. Topics include confirmation, induction, scientific realism, reductionism, and the growth of scientific knowledge. (Sp)

PHIL 4320 DHA History of Scientific Thought 3**
Examination of key episodes in the history of science and associated ideas about the nature of scientific knowledge and how this knowledge may be acquired. Also taught as HIST 4320. (Sp)

PHIL 4400 Metaphysics 3**
Study of fundamental problems of existence. Topics include: mind and its relation to the body, determinism and human freedom, fatalism, idealism and realism, truth, and our knowledge of the world. (F)

PHIL 4410 DHA Philosophy of Mind 3
Beginning with the context of Cartesian mind/body dualism, a thorough examination of Cartesian privacy, privileged access, and the problem of other minds is conducted. Ancillary topics may include the mind/machine controversy and animal intelligence. (F)

PHIL 4420 Philosophy of Language 3**
Nature and uses of language, concepts of meaning, reference, truth, syntax, semantics, pragmatics, metaphors, ambiguity, vagueness, and definition. Application in linguistics, psychology, anthropology, and literary criticism. (Sp)

PHIL 4500 Contemporary Ethical Theory* 3
Careful examination of one or more topics playing a central role in current moral philosophy. Focus on work produced in philosophical literature within last twenty years. (Sp)

PHIL 4530 DSC Ethics and Biotechnology* 3
(dual listing 6530)
Interdisciplinary examination of key issues such as: cloning, human genetic screening and therapy, and transgenic animals and food. (Sp)

PHIL 4540 DHA Human Values and Information
(dual listing 6540) Technology* 3
Philosophical investigation of relations between technological change, human values, and the good life. Emphasis on growth of computer-mediated communication and its impact on values such as autonomy and privacy. (Sp)

PHIL 4600 Philosophy of Law* 3
Examines the nature of law, relations between law and morality, the obligation to obey law, ways to interpret law, the justification of legal punishment, and appropriate conditions for civil and criminal liability. (F)

PHIL 4610 DHA Social and Political Philosophy 3**
Explores the nature of a just society, political obligation, and justification and proper limits of political power. (Sp)

PHIL 4900 Special Topics 3®
Detailed consideration of a particular philosopher or philosophical problem. Instructor approval required. Course may be repeated when a different topic is discussed. (F,Sp)

PHIL 4910 Readings and Research 1-4®
Independent study of a particular philosopher or philosophical topic. Consent of instructor required. Course may be repeated when a different topic is discussed. (F,Sp)

PHIL 4920H Senior Honors Seminar 1
Credit for completing and presenting a senior honors thesis project. Requirement may be fulfilled by publishing the thesis in an academic journal, defending the thesis before a faculty committee, presenting the thesis at an academic conference, or presenting the thesis in the philosophy session during Scholar's Day. (Sp)

PHIL 4930H Senior Honors Thesis 1-4®
Independent study research credits for preparation of a senior honors thesis to fulfill requirements for a degree in philosophy with departmental honors. Prerequisite: Permission of instructor prior to enrollment. (F,Sp,Su)

PHIL 4990 Philosophy Seminar 3®
Advanced study of recent work in philosophy. Topic will vary by instructor. Especially appropriate for students planning to go on to graduate or professional school. (Sp)

PHIL 5200 Symbolic Logic* 3**
Study of the metatheory for truth functional and predicate logic. Examination of systems employing modal, epistemic, and deontic operators. Set theory, fuzzy logic, and Godel's undecidability theorem may also be considered. If time permits, applied logic will be considered. Prerequisite: PHIL 2200 or instructor's approval. (Sp)

PHIL 5510 Ethics and the Environment 3**
Study and analysis of both individualistic and holistic approaches to environmental ethics, with emphasis on contemporary debates within the field and their implications for the formation of public policies. Prerequisite: PHIL 3510 or graduate standing. (F)

PHIL 5600 Legal Ethics* 3**
Study and analysis of major issues arising in the practice of law within the context of the American adversarial system of justice. Prerequisite: PHIL 4600, graduate standing, or permission of instructor. (F)

PHIL 6420 Philosophy of Language 3**
(Sp)

PHIL 6530 Ethics and Biotechnology* 3
(dual listing 4530)
Interdisciplinary examination of key issues such as: cloning, human genetic screening and therapy, and transgenic animals and food. To receive graduate credit, extra readings and a 25-30 page paper will be required. (Sp)

PHIL 6540 Human Values and Information
(dual listing 4540) Technology* 3
Philosophical investigation of relations between technological change, human values, and the good life. Emphasis on growth of computer-mediated communication and its impact on values such as autonomy and privacy. To receive graduate credit, extra readings and a 25-30 page paper will be required. (Sp)

PHIL 6890 Philosophy of Science 3
(Sp)

PHIL 6900 Independent Study 1-4®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008.

Physics (PHYS)
(formerly PHYX)

See Department of Physics, pages 449-458.

PHYS 1020 BPS Energy 3
Study of energy resources, utilization, conversion, and conservation, including energy balance and flow in biological and geological systems. Social impacts of energy resource development, including public policy and planning. Prerequisites: At least one university-level mathematics or statistics course, and completion of University Studies Computer and Information Literacy (CIL) examination.

PHYS 1040 BPS Introductory Astronomy 3
(formerly PHYX 1000 BPS)
Exploration of solar system and universe. Laws of motion, fundamental interactions, structure of matter, electromagnetic radiation, and conceptual models of celestial motions. Conceptual and quantitative homework problems and exams, along with writing assignments and observation reports, are required. Facility with high school mathematics is expected.

PHYS 1080 BPS Intelligent Life in the Universe 3
(formerly PHYX 1030 BPS)
Study of the likelihood of extraterrestrial intelligence and its probable locations. Nature and evolution of life on Earth, as well as stellar evolution and planetary environments. Discussion of psychology of UFO phenomena. Prerequisites: At least one university-level mathematics or statistics course, and completion of University Studies Computer and Information Literacy (CIL) examination.

PHYS 1100 BPS Great Ideas in Physics 3
Descriptive introduction to the principles underlying contemporary physics. Great ideas will include relativity and quantum mechanics and such consequences and applications as the twin paradox, black holes, nuclear energy, magnetic imaging, lasers, superconductivity, and the paradox of Schrodinger's cat. Facility with high school algebra is expected.

PHYS 1200 BPS Introduction to Physics
by Hands-on Exploration 4
Explores structure of matter, electricity and magnetism, light, and sound through hands-on, inquiry-based activities. Facility with high school algebra is expected. Required laboratory.

PHYS 1800 BPS Physics of Technology 4
Overview of the classical physics on which industrial technology is based. Elements of kinematics, forces, energy, momentum, thermodynamics, electric and magnetic fields, waves, and optics. Required laboratory. Prerequisites: MATH 1050 and 1060.

PHYS 2110 The Physics of Living Systems I 4
Study of kinematics and dynamics of particles and systems of particles. Introduction to Newton's Laws of motion, momentum and energy conservation, rotations, and thermodynamics, with applications in biology and biotechnology. Required recitation and lab. Prerequisite: MATH 1100 or 1210.

PHYS 2120 BPS The Physics of Living Systems II 4
Introduction to electromagnetism, optics, and quantum phenomena—including the microscopic structure of matter, with applications in biology and biotechnology. Required recitation and lab. Prerequisite: MATH 1100 or 1210, PHYS 2110.

PHYS 2200 Elements of Mechanics 2
Calculus-based introduction to particle mechanics. Kinematics, Newton's laws of motion, momentum, work and energy, and angular momentum. Required recitation and lab. Prerequisite: MATH 1210.

PHYS 2210 QI General Physics—Science
and Engineering I 4
Calculus-based introduction to Newton's Laws of motion, momentum and energy conservation, rotations, oscillations, and thermodynamics, with applications in the physical sciences and technology. Required recitation and lab. Prerequisite: MATH 1210.

PHYS 2220 BPS/QI General Physics—Science
and Engineering II 4
Calculus-based introduction to electromagnetism, waves, optics, and modern physics, with applications in the physical sciences and technology. Required recitation and lab. Prerequisites: MATH 1210; PHYS 2200 *or* 2210, or a minimum score of 4 on the AP B exam, *or* a minimum score of 3 on the AP C (mechanics) exam.

PHYS 2400 Introductory Topics in Physics (Topic) 1-3®
Explores issues in contemporary physics at an introductory level. Prerequisite: Approval of instructor.

PHYS 2500 Introduction to Computer
Methods in Physics 2
Introduction to computer assistance in physics. Topics include: (1) use of numerical, graphical, and symbolic manipulation software to solve physics problems; and (2) interfacing computers to instrumentation for control and data acquisition. Prerequisite: PHYS 2110 or 2210 or 2220.

PHYS 2710 Introductory Modern Physics 3
Overview of the origins, principles, and practical applications of quantum mechanics. Atomic structure and periodic table, molecular bonding, solids, electronic properties of metals and semiconductors, and superconductivity. Prerequisites: MATH 1220, PHYS 2120 or 2220.

PHYS 3010 DSC/QI Space Exploration from
Earth to the Solar System 3
Comparative introduction to the Earth and other planets in our solar system, including geological structure and atmosphere. Emphasis on space exploration methods, including spacecraft and detection instrumentation. Examines latest results of Mars missions, Jupiter and Saturn exploration, etc. Prerequisites: Completion of University Studies Quantitative Literacy (QL) and Breadth Physical Sciences (BPS) requirements.

PHYS 3020 DSC Great Scientists 3
Lives and work of men and women responsible for scientific revolution: Maxwell (loved children), Einstein (despised authority), Curie (suffered discrimination against women), Schrodinger (fled from Hitler), Watson and Crick (the DNA story), Feynman (lock picker), Rubin (as a young girl built her own telescope),

and others. Prerequisite: Fulfillment of University Studies Breadth Physical Sciences (BPS) or Breadth Life Sciences (BLS) requirement.

PHYS 3030 DSC/QI The Universe 3
Study of properties and origin of the universe, based on Einstein's theory of gravity. Topics include curved space-time; black holes, white holes, and worm holes; the big bang; multiple universes; and the births of stars, galaxies, heavy atoms, and planets. Prerequisite: Completion of University Studies Quantitative Literacy (QL) requirement and PHYS 1040.

PHYS 3040 QI Space Weather—Dangers to the High-Tech World 3
Space weather can be as destructive to high technology as ordinary weather is to property and crops. Examines increasing vulnerability of society to events in space resulting from changes on the Sun and from human activity. Explores how we learn about space weather with satellites, radars, lidars, and numerical models. Prerequisites: Completion of University Studies Quantitative Literacy (QL) and Breadth Physical Sciences (BPS) requirements.

PHYS 3500 Topics in Physics (Topic) 1-3®
Introduces and explores issues in contemporary physics at an intermediate undergraduate level. Focuses on phenomena and experimental methods. Prerequisite: PHYS 2710 and approval of instructor.

PHYS 3550 Intermediate Classical Mechanics 3
Newton's laws of motion, work and energy, systems of particles, Lagrange's and Hamilton's equations, accelerated reference frames, central force problem, harmonic oscillations, and rigid body rotations. Prerequisites: PHYS 2710, MATH 2210; MATH 2250 (may be taken concurrently).

PHYS 3600 Intermediate Electromagnetism 3
Electrostatics, electric potential, current, magnetostatics, induction, AC curcuits, Maxwell's equations, and electromagnetic waves. Prerequisites: PHYS 2710, MATH 2210; MATH 2250 (may be taken concurrently).

PHYS 3700 Thermal Physics 3
Rigorous treatment of laws of thermodynamics and statistical mechanics. Concepts of work, temperature, heat, energy, and entropy; and their application to reversible and irreversible processes. Criteria for equilibrium. Prerequisite: PHYS 2710.

PHYS 3710 Intermediate Modern Physics 3
Introduction to the principles and applications of special and general relativity. Space-time, relativistic kinematics and dynamics, gravity and geometry, black holes, Big Bang, nuclei, radioactivity, and nuclear reactions. Interconnections between modern cosmology and elementary particle physics. Prerequisites: MATH 1220, PHYS 2120 or 2220.

PHYS 3750 Foundations of Wave Phenomena 3
Survey of wave phenomena in physics, with emphasis on application of mathematical techniques to the wave equation, Schrodinger equation, and Maxwell equations. Prerequisites: PHYS 2710, MATH 2210; MATH 2250 (may be taken concurrently).

PHYS 3870 CI Intermediate Laboratory I 2
Modern experimental techniques, data and error analysis, experimental design, and communication skills. Exercises complement upper-level theory courses, and include some experiments of historical importance. Prerequisite: PHYS 2500.

PHYS 3880 CI Intermediate Laboratory II 2
Continuation of PHYS 3870. Prerequisite: PHYS 3870.

PHYS 3900 Projects in Physics 1-3®
Individual study pursued under direction of staff member. Prerequisite: Approval of instructor.

PHYS 4010 DSC/QI Chaos Under Control 3
Introduction to principles and applications of new sciences of fractals, chaos, and complexity. Importance of describing physical, geological, biological, and natural resource structures with fractals. Practical benefits of understanding and controlling erratic behavior in physical and living systems. Technological consequences of self-organized, adaptive behavior. Prerequisites: Completion of University Studies Quantitative Literacy (QL) and Breadth Physical Sciences (BPS) requirements.

PHYS 4020 DSC/QI Science, Art, and Music 3
Explores how science constrains production and appreciation of visual and auditory art. Relevance to art of: physics of sound and light, perspective and observer in relativity and quantum mechanics, symmetry, fractals, chaos, complex adaptive behavior, and self-organization. Prerequisites: Completion of University Studies Computer and Information Literacy (CIL) examination, Quantitative Literacy (QL), and Physical or Life Sciences breadth (BPS or BLS) requirements.

PHYS 4250 CI Cooperative Work Experience 1-6®
Planned work experience in industry or national laboratories. A detailed plan and the purpose of the experience must have prior approval. A written report is required. Prerequisite: PHYS 2710.

PHYS 4550 Advanced Classical Mechanics 3
Lagrange's equations, Liouville's theorem, continua, Euler's equations, small vibrations, and special relativity. Prerequisites: PHYS 3550, 3750.

PHYS 4600 Advanced Electromagnetism 3
Potential formulations of electrodynamics, energy and momentum, waves and boundary conditions, waves in dielectrics and conductors, guided waves, dipole radiation, and relativistic electrodynamics. Prerequisites: PHYS 3600 or ECE 3870; PHYS 3550, 3750.

PHYS 4650 Optics I 3
(dual listing 6650)
Topics include mathematics of wave motion, electromagnetic theory of light, light propagation, geometrical optics, and superposition of waves. For graduate (6000-level) credit, additional reading, recitation, use of optical-design software, and/or writing will be required. Also taught as ECE 4650/6650. Prerequisite: ECE 3870.

PHYS 4680 Optics II 3
(dual listing 6680)
Topics include polarization, interference, diffraction, Fourier optics, coherence theory, and the quantum nature of light. For graduate (6000-level) credit, additional reading, recitation, use of optical-design software, and/or writing will be required. Prerequisite: PHYS/ECE 4650 or PHYS/ECE 6650. Also taught as ECE 4680/6680.

PHYS 4700 Quantum Mechanics I 3
Principles of quantum mechanics, operators in Hilbert space, matrix mechanics, angular momentum, spin, perturbation theory, and applications. Prerequisites: PHYS 3550, 3600, 3750.

PHYS 4710 Quantum Mechanics II 3
Continuation of PHYS 4700. Prerequisite: PHYS 4700.

PHYS 4900 CI Research in Physics 1-3®
Research experience pursued with faculty mentor. Prior to registration, student must make arrangements with the Physics Department's undergraduate research advisor. Prerequisite: PHYS 2710.

PHYS 5340 Methods of Theoretical Physics I 3
Physics applications of vector calculus and differential geometry, group theory, infinite series, complex analysis, differential equations, Sturm-Liouville theory, orthogonal functions, integral equations, and the calculus of variations.

PHYS 5350 Methods of Theoretical Physics II 3
Continuation of PHYS 5340. Prerequisite: PHYS 5340.

PHYS 5500 Intermediate Topics in Physics (Topic) 1-3®
Explores issues in contemporary physics at the advanced undergraduate and beginning graduate level.

PHYS 5800 Physics Colloquium 1®
A series of invited lectures on specialized topics in physics and related subjects.

PHYS 5870 CI Advanced Laboratory 3
Experimental experience with such modern techniques as scanning tunneling microscopy, LEED, Auger spectroscopy, and Fourier transform infrared spectroscopy. Prerequisite: PHYS 2710.

PHYS 6010 Classical Mechanics I 3
Lagrange's equations, Hamilton's principle, Hamilton's equations, canonical transformations, Hamilton-Jacobi theory, central forces, noninertial reference

frames, rigid body motion, small oscillations, relativistic mechanics, canonical perturbation theory, continuum mechanics. Prerequisite: PHYS 4550 or equivalent.

PHYS 6020 Classical Mechanics II 3
Continuation of PHYS 6010. Prerequisite: PHYS 6010.

PHYS 6110 Electrodynamics I 3
Fundamental laws of electrostatics and magnetostatics; dielectric media, Maxwell's equations, time varying fields, and electromagnetic waves. Waveguides and radiation by moving charges. Prerequisite: PHYS 4600 or equivalent.

PHYS 6120 Electrodynamics II 3
Continuation of PHYS 6110. Prerequisite: PHYS 6110.

PHYS 6210 Quantum Mechanics I 3
Advanced quantum mechanics stressing the formalism of states and operators in the study of quantum dynamics, angular momentum, symmetry and group theory, perturbation theory and scattering. Prerequisite: PHYS 4710 or equivalent.

PHYS 6220 Quantum Mechanics II 3
Continuation of PHYS 6210. Prerequisite: PHYS 6210.

PHYS 6240 Space Environment and Engineering 3
Study of space environment and models used for engineering analysis. Topics include considerations for engineering in the space environment such as plasma interactions, debris, chemical reactions, radiation effects, and thermal issues. Prerequisite: MATH 2250. Corequisite: ECE 5230. Also taught as ECE 6240.

PHYS 6250 Cooperative Work Experience 1-6®
Allows students to register for credit when working in a physics-related position. Prerequisite: Permission of department head prior to enrollment.

PHYS 6310 Solar-terrestrial Physics I 3
Study of solar-terrestrial physics, including planetary magnetic fields, the interaction of the sun with planetary properties (magnetic fields and atmospheres), and an overview of ionospheric measurement techniques. Study of the upper atmosphere and the physics occurring in each of the layers and zones, including the equatorial and polar ionosphere. Prerequisite: PHYS 4600 or equivalent.

PHYS 6320 Solar-terrestrial Physics II 3
Continuation of PHYS 6310. Prerequisite: PHYS 6310.

PHYS 6330 Plasma Physics I 3
Characteristics of the plasma state and plasma generation; velocity distribution functions, collisions and Boltzmann's equation; wave modes in a plasma; transport theory; plasma devices. Prerequisite: PHYS 4600 or equivalent.

PHYS 6340 Plasma Physics II 3
Continuation of PHYS 6330. Prerequisite: PHYS 6330.

PHYS 6410 Statistical Mechanics I 3
Review of thermodynamics. Discussion of foundation of statistical mechanics and applications to ideal classical and quantum gases, blackbody radiation, ideal crystals, interacting classical gases and liquids, phase transitions, and critical phenomena.

PHYS 6420 Statistical Mechanics II 3
Continuation of PHYS 6410. Prerequisite: PHYS 6410.

PHYS 6530 Solid State Physics I 3
Development of the modern theory of the solid state. Emphasis placed on understanding the bulk properties of the solids, including crystal structure, cohesive properties, electronic structure, and lattice dynamics. Explores response to added stimuli, such as electric, magnetic, and optical fields. Prerequisites: PHYS 4600 and 4710; PHYS 6410 (can be taken concurrently).

PHYS 6540 Solid State Physics II 3
Continuation of PHYS 6530. Prerequisite: PHYS 6530.

PHYS 6550 Physics of Materials I 3
Application of microscopic (quantum) and macroscopic (classical) physics to study materials properties (e.g., bonding, structure, atomic dynamics, electrical, magnetic, thermal, optical), characterization methods, and a survey of materials. Prerequisites: PHYS 3700, 4710.

PHYS 6560 Physics of Materials II 3
Continuation of PHYS 6550. Prerequisite: PHYS 6550.

PHYS 6650 Optics I 3
(dual listing 4650)
Topics include mathematics of wave motion, electromagnetic theory of light, light propagation, geometrical optics, and superposition of waves. For graduate (6000-level) credit, additional reading, recitation, use of optical-design software, and/or writing will be required. Also taught as ECE 6650/4650. Prerequisite: ECE 3870.

PHYS 6680 Optics II 3
(dual listing 4680)
Topics include polarization, interference, diffraction, Fourier optics, coherence theory, and the quantum nature of light. For graduate (6000-level) credit, additional reading, recitation, use of optical-design software, and/or writing will be required. Prerequisite: PHYS/ECE 4650 or PHYS/ECE 6650. Also taught as ECE 6680/4680.

PHYS 6910 Relativity I 3
Foundations of spacetime physics. Survey of the basics of special and general relativity, including kinematics, mechanics, and electrodynamics in flat spacetime, the description of curved spacetime, and the Einstein equations. Exact solutions, applications, tests, and the mathematical techniques of general relativity. Prerequisites: PHYS 6020, 6120.

PHYS 6920 Relativity II 3
Continuation of PHYS 6910. Prerequisite: PHYS 6910.

PHYS 6930 Quantum Field Theory I 3
Detailed study of the relativistic quantum description of scalar, spinor, and vector fields in spacetime. Topics include gauge theories, canonical and path integral quantization, and interactions.

PHYS 6940 Quantum Field Theory II 3
Continuation of PHYS 6930. Prerequisite: PHYS 6930.

PHYS 6970 Thesis Research 1-10®
Advanced research under guidance of one or more faculty members.

PHYS 6990 Continuing Graduate Advisement 1-9®

PHYS 7210 Spacecraft Instrumentation 3
Theory, engineering, and data reduction techniques of spacecraft instrumentation for space science and spacecraft systems. Prerequisite: ECE 6240. Also taught as ECE 7210.

PHYS 7500 Advanced Topics in Physics (Topic) 3®
Explores issues in contemporary physics at the advanced graduate level.

PHYS 7510 Seminar 1-3®

PHYS 7970 Dissertation Research 1-15®

PHYS 7990 Continuing Graduate Advisement 1-9®

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Plant Science (PLSC)

See Department of Plants, Soils, and Biometeorology, pages 459-472.

PLSC 2100 BLS Introduction to Horticulture 3
Introduction to production of nursery, greenhouse, fruit, and vegetable crops. Explores residential and commercial landscape construction and management. Students also learn about interior plants, arboriculture, turf science, landscape plant materials, and home gardening. (F)

Course Descriptions

PLSC 2200 Pest Management Principles and Practices 3
Overview of pest control considerations, procedures, and principles. Topics include integrated pest management, organic and chemical pest control, environmental considerations, safety, life cycles of pests, and commercial pesticide licensing. (Sp)

PLSC 2250 Occupational Experience in Agronomy and Horticulture 1-4®
Provides credit for on-the-job training in jobs related to plants or soils. (F,Sp,Su)

PLSC 2600 Annual and Perennial Plant Materials 1.5
Identification, culture, and utilization of herbaceous ornamental plants in the landscape, including annual and perennial flowering plants, herbaceous ground covers, ornamental grasses, and herbs. (F)

PLSC 2610 Indoor Plants and Interiorscaping 1.5
Identification, culture, use, and maintenance of indoor foliage and flowering plants used in the interior plantscaping industry. (F)

PLSC 2620 Woody Plant Materials: Trees and Shrubs for the Landscape 3
Identification, culture, and utilization of woody ornamental plants in the landscape, including shade trees, flowering trees and shrubs, hedge plants, and vines. Review of native plants commonly used in the landscape. (F)

PLSC 2650 Identification and Selection of Plants in Production Agriculture 1
Identification of plants important in horticulture/agronomy and the morphological features making them useful for various agricultural purposes. (F)

PLSC 2900 Special Problems in Plant Science 1-4®
Student-selected practical problems in horticulture and/or agronomy. (F,Sp,Su)

PLSC 3010 Basic Flower Arranging 2
Principles of basic flower design using fresh, dried, and artificial flowers. Proper care of cut flowers and foliages. Basic plant physiology behind such principles. Lab fee required. (F)

PLSC 3020 Floral Crops Judging and Contemporary Design 2
Judging of potted ornamental plants and cut flowers for quality. Contemporary floral design and floral art. Prerequisite: PLSC 3010 or professional design experience. Lab fee required. (Sp)

PLSC 3050 Greenhouse Management and Crop Production 4
Design and management of commercial greenhouse facilities. Production requirements of primary greenhouse crops. (Sp)

PLSC 3200 DSC Horticultural Science 3
Methods, technology, and scientific basis of landscape, fruit, and vegetable gardening in the arid west. Interaction of gardening with the urban environment. This course is not currently being offered. For information about when it may be offered, contact the department.

PLSC 3300 Residential Landscapes 3
Functional and aesthetic relationships of plants and structures in the landscape in connection with installation considerations. Use of imaging and CAD software in initial computer design layout. Prerequisite: PLSC 2620. Recommended: PLSC 2600. (Sp)

PLSC 3400 Landscape Management Principles and Practices 3
Principles and practices of landscape management, including plant site analysis, pruning, soil and irrigation management, pest management, equipment considerations, cost estimating, and sustainability. Prerequisites: PLSC 2600, 2620. (F)

PLSC 3500 The Structure and Function of Economic Crop Plants 3
Environmental effects on plant structure and function. Control of plant development for enhanced production of marketable goods. Introduction to principles using examples from horticulture and agronomy. Applications in these fields emphasized. Prerequisites: Integrated Science or comparable breadth course, BIOL 1010 or 1610. (Sp)

PLSC 3700 Plant Propagation 4
Propagation of plants by sexual and asexual means. Covers fundamental physiology of propagation, as well as cultural practices and techniques used in crop production. Recommended: BIOL 1610. (F)

PLSC 3800 Turfgrass Management 3
Fundamentals of turfgrass science: species adaptation, identification, and cultural requirements; turfgrass growth and development; establishment; primary cultural practices (fertilization, irrigation, mowing); secondary cultural practices; pest management; integrated management planning for turfgrass systems. Prerequisite: BIOL 1010 or 1610. (F)

PLSC 4100 Landscape Water Conservation 2
Explains why water conservation is important, and how water can be conserved through precision irrigation and conversion to low-water-use landscapes. This course is not currently being offered. For information about when it may be offered, contact the department.

PLSC 4280 Field Crops 3
Economic importance, use, distribution, origin, history, classification, identification, botanical nature, marketing, processing, storage, certification, grading, diseases, insects, commercial production, and improvement of cereal, root, and oilseed crops. Two lectures, one lab per week. (F odd)

PLSC 4300 World Food Crops and Cropping Systems: The Plants That Feed Us 3
Climatic, geographic, and management requirements of the world's plants that provide food for humans, including botanical relationships. Systems used to produce these crops and processes for turning them into food. Prerequisite: Integrated Science or comparable breadth course. (F even)

PLSC 4320 Forage Production and Pasture Ecology 3
Cultivation and management of legumes and grasses used throughout the world for grazing, stored feed, soil improvement, and conservation. Forage plant growth and development, nutrient and water utilization, and responses to environmental stress. Prerequisite: Integrated Science or comparable breadth course. (F)

PLSC 4400 Modern Vegetable Production 3
Principles and practices underlying scientific vegetable culture. Discussion of production of important vegetables, focusing on the physiological processes influencing their culture. Explores crop performance in research and commercial applications. Prerequisite: BIOL 1010 or 1610. (F)

PLSC 4500 Fruit Production 4
Cultivars, physiology, anatomy, propagation, sites, soils, climate, culture, irrigation, fertilizers, insects, diseases, integrated management, plant and fruit growth and development, harvesting, storage, pruning, orchard architecture, environmental protection, and economics for both tree and small fruits. Prerequisite: BIOL 1010 or 1610. (Sp)

PLSC 4600 DSC/QI Cereal Science* 3**
Introduction to principles involved in cereal chemistry and processing. Covers starch chemistry, dry milling, wet milling, decortication, malting, and extrusion. Processing of all major cereals also covered. Prerequisite: MATH 1030 or STAT 1040 or completion of University Studies Quantitative Literacy (QL) requirement. (Sp Even)

PLSC 4800 Professional Turfgrass Management 2
Fertilization, irrigation, and cultivation practices for managed landscapes. Construction issues, including compaction, soil modification, and specialized construction practices for golf courses and sports turf. Prerequisites: SOIL 3000, PLSC 3800. (Sp)

PLSC 5100 Landscape Irrigation Management 3
(dual listing 6100)
Explores how principles of evapotranspiration, soil and plant properties, and urban landscape sprinkler irrigation systems can be combined for proper irrigation scheduling. Evaluating and analyzing landscape water demand. (Sp)

PLSC 5200 Crop Physiology 2
(dual listing 6200)
Quantitatively analyzes the relationship between physiological processes and growth of whole plants. Energy balance and water use efficiency. Light interception and canopy geometry. Canopy photosynthesis and respiration. Carbon partitioning and source/sink relationships. Prerequisites: BIOL 4400, MATH 1050, or consent of instructor. (Sp)

PLSC 5210 Crop Physiology Laboratory 1
(dual listing 6210)
Measurement and analysis of physiological processes that result in whole plant growth. Includes an individual lab project. Take concurrently with PLSC 5200 or 6200. (Sp)

PLSC 5300 Principles of Cytogenetics* 3
Examination and analysis of variation in chromosome structure, behavior, and number. Includes discussions of developmental and evolutionary effects of this variation, and practical applications in plant and animal genetics. Prerequisite: BIOL 3060. (Sp)

PLSC 5400 Low Water Landscaping 3
(dual listing 6400)
Examines arid ecosystems, emphasizing the Intermountain West, and recreating such ecosystems in a range of amenity landscapes. Also covers procurement, propagation, establishment, and maintenance of plants appropriate for low water landscapes. Also taught as LAEP 5400/6400. (F)

PLSC 5420 CI Forest and Shade Tree Pathology 3
Nature, cause, and management of forest diseases. Also taught as BIOL 5420 and FRWS 5420. (Sp)

PLSC 5430 Plant Nutrition* 2**
(dual listing 6430)
Mechanisms of nutrient acquisition, rhizosphere interactions, root morphology and distribution, short- and long-distance transport, nitrogen fixation, and biochemical function of essential and beneficial elements. (F odd)

PLSC 5440 Plant Molecular, Cellular, and
(dual listing 6440) Developmental Biology I 3**
Examines background and recent advances. Students analyze and discuss structure, genome, molecular development, and photosynthesis topics from a research perspective. Prerequisites: BIOL 3060, 5210; CHEM 3700 or 5710. Also taught as BIOL 5440/6440. (Sp)

PLSC 5450 Plant Molecular, Cellular, and
(dual listing 6450) Developmental Biology II* 3
Examines background and recent advances. Students analyze and discuss cell wall, growth regulator, and environmental response topics from a research perspective. Prerequisites: BIOL 3060, 5210, CHEM 3700 or 5710. Also taught as BIOL 5450/6450. (Sp)

PLSC 5550 Weed Biology and Control 4
(dual listing 6550)
Management strategies for undesirable plant species in native and agroecosystems. Interference and allelopathy, undesirable plant invasion and spread, noxious weed eradication principles and practices, integrated plant management strategies, herbicide interactions with weeds and crops, and economics of management emphases. (F)

PLSC 5600 Plant Water Relations 2
(dual listing 6600)
Explores basic concepts such as the soil-plant-atmosphere continuum. Explains how water affects the physiological processes that control the quantity and quality of growth. Includes discussion of crop physiology and plant physiology. (F)

PLSC 5650 Urban/Community Forestry 3
Social, biological, and administrative aspects of managing urban/community forests, including field and classroom exercises and a management planning project. Also taught as FRWS 5650. (Sp)

PLSC 5700 Principles of Plant Breeding* 3**
Principles of plant breeding. Breeding techniques for self-pollinated, cross-pollinated, and asexually reproducing crops. Real-life breeding problems solved, showing that resource identification and allocation are the critical points in developing a successful program. Prerequisite: BIOL 3060. (Sp)

PLSC 5750 Crop Biotechnology* 2
Genetic and cellular approaches to crop improvement. Emphasizes cell culture, transformation, markers, marker-assisted selection, mapping simple and quantitatively inherited traits, fine mapping, gene cloning, mutagenesis, and microassays bioinformatics. Prerequisite: BIOL 3060. (Sp)

PLSC 5760 Crop Ecology 2
Features of agroecosystems compared with natural ecosystems; input of energy and materials to manipulate agroecosystems and produce maximum, sustained quality and yield of agricultural products. Prerequisites: BIOL 4400, PLSC 5200/6200, or instructor's consent. Will not be taught Spring 2006. Contact department for furhter information. (Sp)

PLSC 6100 Landscape Irrigation Management 3
(dual listing 5100)
Explores how principles of evapotranspiration, soil and plant properties, and urban landscape sprinkler irrigation systems can be combined for proper irrigation scheduling. Evaluating and analyzing landscape water demand. (Sp)

PLSC 6200 Crop Physiology 2
(dual listing 5200)
The relationship between physiological processes and growth of whole plants. Energy balance and water use efficiency. Light interception and canopy geometry. Canopy photosynthesis and respiration. Carbon partitioning and source/sink relationships. Prerequisites: BIOL 4400, MATH 1050, or consent of instructor. (Sp)

PLSC 6210 Crop Physiology Laboratory 1
(dual listing 5210)
Measurement and analysis of physiological processes that result in whole plant growth. Includes an individual lab project. Take concurrently with PLSC 6200 or 5200. (Sp)

PLSC 6220 Professional Experience in
Water Efficient Landscaping 6
Internship component of water efficient landscaping master's program. Summer employment with water purveyors, consulting firms, and businesses involved in landscape irrigation. (Su)

PLSC 6230 Readings in Landscape Water Conservtion 1
Background topics in water development and policy in the West. Current topics on various aspects of water conservation in urban landscapes. (Sp)

PLSC 6240 Water Efficient Landscaping Seminar 2
Students develop skills in public speaking by presenting their summer internship experience to the Plants, Soils, and Biometeorology faculty. Students also work on a culminating academic endeavor for the program. (F)

PLSC 6400 Low Water Landscaping 3
(dual listing 5400)
Examines arid ecosystems, emphasizing the Intermountain West, and recreating such ecosystems in a range of amenity landscapes. Also covers procurement, propagation, establishment, and maintenance of plants appropriate for low water landscapes. Also taught as LAEP 6400/5400. (F)

PLSC 6430 Plant Nutrition* 2**
(dual listing 5430)
Mechanisms of nutrient acquisition, rhizosphere interactions, root morphology and distribution, short- and long-distance transport, nitrogen fixation, and biochemical function of essential and beneficial elements. (F odd)

PLSC 6440 Plant Molecular, Cellular, and
(dual listing 5440) Developmental Biology I 3**
Examines background and recent advances. Students analyze and discuss structure, genome, molecular development, and photosynthesis topics from a research perspective. Prerequisites: BIOL 3060, 5210; CHEM 3700 or 5710. Also taught as BIOL 6440/5440. (Sp)

PLSC 6450 Plant Molecular, Cellular, and
(dual listing 5450) Developmental Biology II* 3
Examines background and recent advances. Students analyze and discuss cell wall, growth regulator, and environmental response topics from research perspective. Prerequisites: BIOL 3060, 5210, CHEM 3700 or 5710. Also taught as BIOL 6450/5450. (Sp)

PLSC 6550 Weed Biology and Control 4
(dual listing 5550)
Management strategies for undesirable plant species in native and agroecosystems. Interference and allelopathy, undesirable plant invasion and spread, noxious weed eradication principles and practices, integrated plant management strategies, herbicide interactions with weeds and crops, and economics of management emphases. (F)

PLSC 6570 Herbicide Physiology and Mode of Action* 3
Entrance, movement, and metabolism of major herbicides; and a critical study of the physiological processes affected by them. Prerequisites: BIOL 4400, PLSC 6550/5550 or instructor's consent. (Sp)

PLSC 6600 Plant Water Relations 2
(dual listing 5600)
Explores basic concepts such as the soil-plant-atmosphere continuum. Explains how water affects the physiological processes that control the quantity and quality of growth. Includes discussion of crop physiology and plant physiology. (F)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008.
***This course is taught alternating years. Check with department for information about when course will be taught.

Political Science (POLS)

See Department of Political Science, pages 473-478.

POLS 1100 BAI United States Government and Politics 3©
U.S. Constitution, political parties and elections, interest groups, Congress, president, bureaucracy, courts, and civil rights and liberties. This course meets the Americanization requirement. (F,Sp)

POLS 2100 Introduction to International Politics 3
Analysis of the nation-state system as well as interdependence of the global community. (F,Sp)[1]

POLS 2200 BSS Comparative Politics 3
Comparisons of differences in political culture, institutions, and processes, including authoritarian and democratic systems, violence and corruption, political development, and public policy. (F,Sp)[1]

POLS 2300 Introduction to Political Theory 3
(formerly POLS 2350)
A survey course covering ancient and modern political theory. (F,Sp)

POLS 3000 QI Introduction to Political Research 3
Methodology, methods, and approaches used to study and analyze political events and relationships, including the use of library resources. Prerequisite: STAT 1040 or MATH 1030. (F,Sp)[2]

POLS 3100 Global Issues* 3
The origins and consequences of conflict and cooperation in an interdependent global community are examined in order to analyze how transnational, as well as competing national, interests and institutions affect economic, political, and environmental choices and outcomes. (F)

POLS 3110 DSS Parties and Elections 3**
Political parties, campaigns, and elections. (Sp)

POLS 3120 DSS Law and Politics 3
Examines history, processes, and theories underlying American law and politics. Makes selective comparison of the American legal system with other legal systems. (F)

POLS 3130 DSS United States Legislative Politics 3
Legislative process. (Sp)

POLS 3140 DSS The Presidency* 3
Examines the origins, purposes, and scope of the executive power in the American constitutional system. (F)

POLS 3150 State and Local Government 3
Includes state and local politics, in addition to metro-urban politics. (Sp)

POLS 3160 Practicing American National Government 3
Includes survey of legislative, executive, and judicial governing. Offers academic basis for Washington, DC experience. (F,Sp,Su)

POLS 3170 Law and Economics 3
Explains legal and political rules, the organization of government, and other institutional processes. Uses standard microeconomic tools and concepts, such as scarcity, choice, preferences, incentives, and supply and demand. Prerequisite: POLS 1100. Also taught as ECON 3170. (F)

POLS 3180 Introduction to Public Administration 3
Overviews management of United States governmental affairs. Helps students understand how the government is structured to accomplish the execution and implementation of public policy. Prerequisite: POLS 1100. (F)

POLS 3190 DSS Gender, Power, and Politics* 3
Examines the question of gender inequality in politics, focusing on contemporary political issues cross-culturally and in different political systems. (F)

POLS 3210 DSS Western European Government and Politics 3**
Britain, France, Germany, Scandinavia, and the European Union. (F)

POLS 3220 DSS Russian and East European Government and Politics* 3
(F)

POLS 3230 Middle Eastern Government and Politics 3**
General overview of political cultures and political developments in the Middle East. (F)

POLS 3250 DSS Chinese Government and Politics 3
(F)

POLS 3270 DSS Latin American Government and Politics 3
Survey of most of the governments and politics of Latin America, emphasizing events, policies, and governmental actions of the past decade. (F)

POLS 3310 DSS American Political Thought 3
Survey of American political thought from colonial times to the present. (F)

POLS 3320 The Foundations of American Constitutionalism 3
Introduces students to debate over constitutions, constitutionalism, and constitution-making which occurred during the period (roughly) from the Revolution to the election of 1800.

POLS 3400 DSS United States Foreign Policy 3
Formulation, execution, and impact of United States foreign policy. (F,Sp)[3]

POLS 3430 Political Geography 3
The relationship between earth and state. World political phenomena studied from a geographic point of view, including international boundaries, territorial seas, and landlocked states. Also taught as GEOG 3430. (Sp)

POLS 3810 DSS Introduction to Public Policy 3
Examines different approaches to the study of public policy and different value dimensions in the design of policies. (F)

POLS 4000 Political Analysis 3
Political data, quantitative and analytical techniques. Prerequisite for majors: POLS 3000. (F)[4]

POLS 4120 American Constitutional Law 3
Analyzes the separation of powers, checks and balances, federalism, the Bill of Rights, and other constitutional amendments. (F)

POLS 4130 Constitutional Theory 3
Introduces students to modern constitutional theory, with particular emphasis on American constitutional theory. Prerequisite: POLS 1100. (Sp)

POLS 4140 Political Organizations 3
Focuses on formal and informal constitutional rules, examining how different sets of rule structures impact the collective decisions of individuals in society and how individuals can influence or shape the rules structuring their lives. Prerequisite: POLS 1100.

POLS 4210 European Union Politics 3**
Explores creation and ongoing development of the European Union. Examines governing institutions, and internal and external politics of the European Union across a number of issues areas. (Sp)

POLS 4220 CI Ethnic Conflict and Cooperation 3
Examines origins of ethnic groups and the causes of ethnic conflicts, as well as different strategies for preventing or resolving such conflict. Explores conditions facilitating interethnic cooperation, the more common form of ethnic group interaction. (Sp)[4]

POLS 4230 Issues in Middle East Politics 3**
Contemporary Middle Eastern political movements, regional conflicts, and state-level political change. (Sp)

POLS 4260 Southeast Asian Government and Politics* 3
(Sp)

POLS 4280 Politics and War* 3
Examines causes and implications of war. Study of wars from general to limited, including case studies such as the Vietnam War. (Sp)

POLS 4310 CI History of Political Thought I 3
Issues and thinkers in ancient and medieval political thought. (Sp)

POLS 4320 DSS History of Political Thought II* 3
Issues and thinkers in modern and contemporary political thought. (Sp)

POLS 4330 Political Theory and Literature 3
Utilizes works from the field of literature, partly in order to discuss issues in politics and political philosophy, and partly as examples of political thought at its best. (F,Sp)

POLS 4410 Global Negotiations* 3
Creates an awareness of international issues and other cultures. Utilizes a computer simulation program in which negotiating teams of students from around the world are linked in a negotiation simulation. (Sp)

POLS 4450 CI United States and Latin America 3
Study and analysis of foreign relations of Latin American nations among themselves and with the rest of the world. (Sp)

POLS 4460 National Security Policy* 3
How intelligence systems function, fit within the policymaking systems of free societies, and are managed and controlled. (Sp)

POLS 4470 Foreign Policy in the Pacific* 3
Analysis of contemporary foreign policies of major countries surrounding the North Pacific. (Sp)

POLS 4480 International Trade Policy 3**
Examines governance and politics of international trade relations, focusing in particular on cooperation, conflict, and dispute resolution in the GATT/WTO, European community, NAFTA, and Asian cooperative regimes. (Sp)

POLS 4800 The Supreme Court and American Constitutional History 3
Examines many of the major arguments made about the Constitution, which were presented before the Supreme Court of the United States. Also taught as HIST 4800.

POLS 4810 Politics and Public Policy 3
Explains public policies as rational expressions of political self-interest and explores the relationship between self-interest and values such as “equity” and “efficiency” in policy. (F)

POLS 4820 DSS Natural Resources and Environmental Policy: Political Economy of Environmental Quality 3**
Causes of environmental and natural resources problems and evaluation of political and private responses to them. Study of economics and politics applied to the environment. Production, protection, and allocation of scarce resources by markets and political systems. (Sp)

POLS 4890 Special Topics 1-5®
Credit arranged. Instructor’s permission required. (F,Sp)

POLS 4910 Readings and Conference 1-5®
Individually directed study in subjects of special interest to students. Credit arranged. Instructor permission required. (F,Sp,Su)

POLS 4990 CI Senior Research Seminar 3®
Introduces students to the research process by having them complete a major research project in the topic area of the particular professor. (F,Sp)

POLS 5110 Social Policy 3**
Examines health, education, and welfare policies in U.S. contexts and in comparative context. (F)

POLS 5120 Economics of Russia and Eastern Europe, 9th Century to 21st Century 3
Development of the economics of Russia and Eastern Europe from earliest times to the present, emphasizing the interaction between economic forces and policies of the state. Prerequisite: ECON 2010. Also taught as ECON 5120. (F)

POLS 5130 Law and Policy 3
Analyzes the relationship between law and the formation and implementation of policy. (Sp)

POLS 5140 Law, Politics, and War 3
Examines relationship between law, policy, and war, with particular emphasis on the American experience since 1787. (F)

POLS 5180 Natural Resource Policy 3**
Political and economic theory applied to the analysis of natural resource allocation conflicts and U.S. policies enacted to resolve such conflicts. (Sp)

POLS 5200 Global Environment 3
Examines different strategies for resolving global resource and environmental problems. This course is not currently being offered. For information about when it may be offered, contact the department.

POLS 5210 Comparative Political Change/Development* 3
Emphasis on approaches and theories in the field of comparative politics, with a focus on political change/development. (F)

POLS 5230 Development in the Middle East* 3
Study of Middle Eastern regimes, political cultures, and political developments. (Sp)

POLS 5270 Latin American Politics and Development 3
Focuses on special contemporary issues of selected Latin American nations, such as democratization, the role of the military, and elections. (Sp)[4]

POLS 5290 Development in Europe 3
Emphasizes political and economic development in Europe. (Sp)[4]

POLS 5350 DSS Evolution, Conflict, and Cooperation* 3
Intensively examines human cooperation as a fundamental problem of development and human conflict as the major obstacle to development. (Sp)

POLS 5440 DSS Gender and World Politics 3**
Examines the role gender inequality plays in the construction of international relations, using a variety of feminist approaches. Central theme of gendered critique is global security, defined in terms of economic, ecological, political, and military dimensions. (Sp)

POLS 5910 Campaign Internship 1-12®
A semester campaign internship. Instructor approval required. (F,Sp,Su)

POLS 5920 Washington Internship 1-12®
A semester congressional, administrative, or legal internship in Washington, D.C. Instructor approval required. (F,Sp,Su)

POLS 5930 State Government Internship 1-12®
A semester legislative, lobbying, or administrative internship in the state government of Utah or those of any other state government. Instructor approval required. (F,Sp,Su)

POLS 5940 Administrative Internship 1-12®
A semester administrative internship at the local or state level. Instructor approval required. (F,Sp,Su)

POLS 6010 Research Design 3
A graduate survey of the philosophy and methods of political analysis. Topics ranging from the methodology of inquiry to elementary statistical methods will be covered. (F)

POLS 6020 Public Policy Analysis 3
Examines and reviews leading theories of policy analysis and the policy-making process at an advanced level. (Sp)

POLS 6030 Political Theory, Political Economy, and Capitalism 3
Provides an introduction to the study of political economy by considering the connections among political theory, political economy, and capitalism. This course is not currently being offered. For information about when it may be offered, contact the department.

POLS 6040 Public Choice 3
Introduction to applying the microeconomic theory of markets to political processes. This course is not currently being offered. For information about when it may be offered, contact the department.

POLS 6100 Introduction to Public Administration 3
Introduction to issues of public and nonprofit management. Provides overview of macro and micro forces influencing public and nonprofit management.

POLS 6110 Budgeting and Finance 3
Surveys all major activities concerning allocation, investment, and control of public funds, as well as budgeting and revenues in context of fiscal policy making (Alt Sp)

POLS 6120 Program Assessment and Evaluation 3
Practical guidelines for conducting evaluation studies. Dissussion of performance measurement, social indicators, quantitative and qualitative methods, and experimental and quasi-experimental designs as used in applied policy and program research. (Alt F)

POLS 6130 Law and Administration 3
Exploration and analysis of constitutional and legal basis in which American Public Administration is set, including separation of powers, checks and balances, delegation of discretionary authority, and common law and equity. (Alt Su)

POLS 6140 Leadership in Public Organizations 3
Analysis of leadership behavior and managerial activities. Examination of major theories of leadership and motivation, including leadership vs. management, leadership qualities and characteristics, and leadership skills. (Alt Su)

POLS 6210 Conflict and Security 3
Explores the many causes of conflict at different levels. Identifies the means by which resolution can be achieved, as well as the challenges and barriers associated with such efforts. (Sp)

POLS 6220 International Relations Theory 3
Reading seminar on theory and method in the interplay of politics and economics in international relations. This course is not currently being offered. For information about when it may be offered, contact the department.

POLS 6230 Terrorism and Counter-Terrorism 3**
Explores the history, causes, and consequences of terrorism, as well as its impact on the global arena. Teaches students why understanding of terrorism is crucial, in order to allow effective, intelligent responses. (Sp)

POLS 6240 Democratic Theories and Practice 3
Explores the many different perspectives and theories on the concept of democracy, ranging from the 18th Century to writings of the 21st Century. (F)

POLS 6250 Theories of War and Peace 3
Examines the "classic" alternative understanding, in the history of political thought, regarding the reasons people go to war. Explores consequent proposals to erase the sources or alleviate the results of armed conflicts. (F,Sp)

POLS 6400 United States Foreign Policy 3
Explores contemporary U.S. foreign policy in the context of international relations theory and global realities. Utilizing theoretical perspectives as analytical models, course examines how policy makers formulate and attempt to achieve U.S. foreign policy goals in the global arena. Taught during alternate years.

POLS 6810 Graduate Seminar 1-4®
American politics; comparative politics; political theory; international politics; public law; public administration. (F,Sp,Su)

POLS 6910 Graduate Tutorial 1-3®
Prerequisite: instructor's consent. (F,Sp,Su)

POLS 6920 Internship 1-15®
Internship in a public administration agency. Instructor approval required. (F,Sp,Su)

POLS 6970 Thesis Research 1-9®
Prerequisite: admission to candidacy. (F,Sp,Su)

POLS 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.
[1]Taught Fall 2006, and Spring 2007 and 2008.
[2]Taught Fall 2007 and Spring 2009.
[3]Taught Fall 2006 and 2007, and Spring 2008 and 2010.
[4]Not taught 2007-2008 or 2008-2009.

Portuguese (PORT)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

PORT 1010 Portuguese First Year I 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. (F)

PORT 1020 Portuguese First Year II 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: PORT 1010 or equivalent. (F,Sp)

PORT 1050 Intensive Portuguese for Spanish Speakers 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Intensive course for Spanish speakers. (Sp)

PORT 2010 Portuguese Second Year I 4
Continued development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: PORT 1020 or equivalent. (F)

PORT 2020 Portuguese Second Year II 4
Continued development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: PORT 2010 or equivalent. (Sp)

PORT 2880 Individual Readings 1-4®
Individual study of selected readings in Portuguese. Instructor's permission required. (F,Sp)

PORT 3040 CI Advanced Portuguese Grammar and Composition 3
Review of the more complex Portuguese grammatical points and development of writing skills through composition. Prerequisite: PORT 2020 or equivalent. (F,Sp)

PORT 3570 Brazilian Culture and Civilization 3
Historical, social, political, economic, and cultural conditions and institutions of Brazil. (F)

PORT 3630 Survey of Brazilian Literature 3
Selected readings and discussions of major works and authors in Brazilian literature. Prerequisites: PORT 3040 and 3570. (Sp)

PORT 3800 Portuguese III Study Abroad 1-4
Intense review of selected problematic areas of Portuguese grammar for students with advanced language skills. Prerequisite: PORT 2020 or equivalent. Taught *only* in USU's overseas Portuguese program. (Su)

PORT 4880 Individual Readings 1-4®
Readings in Brazilian and/or Portuguese literature. Prerequisite: Instructor's permission. (F,Sp)

PORT 4920 Portuguese Language Tutoring 1®
Allows students to develop tutoring skills by assisting professors in lower-division courses or fulfilling instructional duties for a comparable amount of time in the language laboratory, public schools, or similar activities with departmental approval. May be repeated to a maximum of 3 credits. Prerequisite: Permission of instructor. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Parks and Recreation Professional (PRP)

See Department of Health, Physical Education and Recreation, pages 321-331.

PRP 1000 Introduction to Parks and Recreation 3
Introductory course examining the conceptual foundations of play, recreation, and leisure. Examines the history and development of the profession, as well as current trends. Provides insight into the careers in the leisure service industry. (F,Sp)

PRP 1500 Social Recreation Leadership 3
Information and practical experience in the organization and management of social recreation activities. Planning, programming, and evaluation techniques given for a variety of age groups. (Sp)

PRP 2100 Leisure and Aging 2
Examines relevance of leisure as a means of enhancing the quality of life throughout the lifespan. Addresses the quality of life throughout the lifespan, as well as the physical, psychological, social, and developmental aspects of aging relating to leisure and recreational programming. (Sp)

PRP 2250 Introductory Cooperative Work Experience 1-6®
An introductory-level educational work experience in a cooperative education or business position as approved by the department. Repeatable for up to 6 credits. (F,Sp,Su)

PRP 2500 Outdoor Recreation Management 3
Explores philosophy, meaning, and value of outdoor recreation in society. Gives management agency overview. Emphasizes organizing and leading outdoor recreation pursuits. (F)

PRP 3000 Recreation Progamming 3
Studies recreation programming, including methods, models, and classification. Also includes analysis of activities, organizational structures, and evaluation techniques. (Sp)

PRP 3200 Recreation Event Planning and Management 3
Explores principles of special event and festival planning, emphasizing development and integration of operational strategies. Concentrates on conceptualization, analysis, economic impacts, marketing, and evaluation of small-scale to large-scale community events. Prerequisite: PRP 3000. (F,Sp)

PRP 3500 CI Community Recreation Administration 3
Examines community recreation organization with emphasis on administrative skills and functions, including budgeting, personnel management, and grantsmanship. Prerequisites: PRP 1000 and 3000. (F)

PRP 3750 Commercial Recreation and Tourism 3
Examines history, organization, and management of commercial recreation and tourism enterprises. Studies entrepreneurship, feasibility, marketing, and management of projects. (Sp)

PRP 3900 Introduction of Therapeutic Recreation for Diverse Populations 3
Explores characteristics, behaviors, and programming techniques used to meet recreational needs of varied population groups and all degrees of disabilities. (F)

PRP 4000 Therapeutic Recreation 3
Examines special population groups served by recreation, including institutional procedures, clinical application, and activity programming. Prerequisite: PRP 3900.

PRP 4200 Advanced Therapeutic Recreation* 3
Examines current trends and issues in therapeutic recreation and how they affect the therapeutic recreation profession. Instruction in licensing requirements for eligibility for TRT and TRS licensure and certification. Prerequisite: PRP 4000.

PRP 4250 Advanced Cooperative Work Experience 1-12®
Cooperative education work experience with increased levels of complexity, wherein students gain a more professional level of experience as they advance toward completion of the program. (F,Sp,Su)

PRP 4300 Legal Aspects of Recreation and Leisure 3
Focuses on legal aspects of recreation and park programs, management, and administration. Provides basic knowledge and understanding of risk management process, legal terms, and their application. Prerequisites: PRP 1000 and 3000. (Sp)

PRP 4400 Recreation Facility Design and Management 3
Studies recreation park facility design and management issues including: feasibility studies, master plans, features, trends and issues in equipment design, maintenance, accessibility, and safety. Prerequisite: PRP 3000. (F)

PRP 4700 Internship Seminar 1
In preparation for PRP 4750, students identify interships and prepare written materials and objectives for internship assignment. (Sp)

PRP 4750 Recreation Internship 6
Practical, off-campus management experience with cooperating parks and recreation agency. Prerequisites: PRP 1000, 3000, 4300, 4700; and 200 hours of documented work experience. (F,Sp,Su)

PRP 4970H Honors Senior Thesis 1-6
Culminating experience within the department for honors students. Student works closely with faculty mentor in an extensive project in the student's area of interest. (F,Sp,Su)

PRP 5000 CI Seminar in Recreation 3
Student analysis, papers, and presentations of current issues and problems in recreation. Includes discussions with professionals and development of resume. Prerequisites: PRP 1000, 2500, 3500, 3750, 3900, 4000, 4400. (F,Sp)

PRP 5900 Independent Study 1-3®
Students work on special projects and research out of the classroom, with approval and guidance of instructor. (F,Sp,Su)

PRP 5910 Independent Research 1-3®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*This course is taught alternating years. Check with department for information about when course will be taught.

Course Descriptions

Plants, Soils, and Biometeorology (PSB)

See Department of Plants, Soils, and Biometeorology, pages 459-472.

PSB 1050 Plants, Soils, and Biometeorology Orientation 1-2
Orientation to the teaching, research, and extension programs of the department, and to career opportunities. Optional orientation to a specific major: Horticulture, Crop Science, or Environmental Soil/Water Science. (F)

PSB 2040 Introduction to Biotechnology 1
Introduces freshmen to the emerging field of biotechnology and the impact this technology has on society. Also taught as ADVS 2040, BIOL 2040, and NFS 2040. (Sp)

PSB 2800 Fundamentals of Organic Agriculture 3
Organic agriculture uses a holistic systems approach for maintaining plant, animal, and soil health. In this course, animal and crop production approaches and disease, as well as insect and weed management strategies, are scientifically assessed, critically compared, and used in decision making and problem solving exercises. (Sp)

PSB 4250 Internship in Plants, Soils, and/or Biometeorology 1-4®
Professional internship in crop science, horticulture, environmental soil/water science, and/or biometeorology. (F,Sp)

PSB 4800 Teaching Practicum for Undergraduate Students 1-3
Offers undergraduate students an opportunity for guided teaching and methods for student evaluation in a variety of Plants, Soils, and Biometeorology courses. Taught infrequently. Contact department for further information. (F,Sp)

PSB 4890 CI Senior Seminar 1®
Student preparation for careers. Familiarization with placement processes. Discussion of role in society and career opportunities for graduates. Experiences in team building. Opportunities for oral presentations of solutions to current issues and scientific information. Must take during both fall and spring semesters. (F,Sp)

PSB 4900 Special Problems 1-4®
Special topics and problems in crop science, horticulture, environmental soil/water science, and/or biometeorology. Subject, time, and credit arranged individually as needed. Department approval required. (F,Sp,Su)

PSB 5160 Methods in Biotechnology: Cell Culture 3
Techniques and fundamental knowledge for culturing mammalian and insect cells. Students will learn maintenance, growing, genetic engineering of cells, cytotoxicity, hybridoma creation, cloning, etc. Extensive laboratory experience is provided. Also taught as ADVS 5160, BIOL 5160, and NFS 5160. (F)

PSB 5200 Site-Specific Agriculture and Landscape/Horticultural Management 3
Integration of site-specific management technology, such as computers, GPS, yield monitors, variable rate controllers, mechanized samplers, and postharvest processing controllers with planning, tillage, planting, chemical applications, and harvesting to optimize off-site inputs and environmental/economical sustainability in crop or landscape management. (Sp)

PSB 5240 Methods in Biotechnology: Protein Purification Techniques 3
Reviews basic methods of protein purification, including scaled-up use of 100L fermenter, large-scale centrifugation, diafiltration, chromotography, and use of BioCAD. Prerequisite: CHEM 3700. Also taught as ADVS 5240, BIOL 5240, and NFS 5240. (Sp)

PSB 5260 Methods in Biotechnology: Molecular Cloning 3
Laboratory-oriented course designed to teach molecular biology techniques such as DNA cloning, genetic probes, polymerase chain reaction, and DNA sequencing. Prerequisite: CHEM 3700 or 5710; or BIOL 3060; or permission of instructor. Also taught as ADVS 5260, BIOL 5260, and NFS 5260. (F)

PSB 5370 Molecular Methods in Nutrition Science 2 (dual listing 6370)
Theory of modern techniques used to study macromolecules and ions. Prerequisite: CHEM 3700. Also taught as ADVS/BIOL/NFS 5370/6370. (F)

PSB 6370 Molecular Methods in Nutrition Science 2 (dual listing 5370)
Theory of modern techniques used to study macromolecules and ions. Prerequisite: CHEM 3700. Also taught as ADVS/BIOL/NFS 6370/5370. (F)

PSB 6700 Integrative Topics in Plants, Soils, and Biometeorology 1-3®
Team-taught special topics course encouraging interdisciplinary analysis of a research or policy area from the current literature, encompassing the three departmental subdisciplines. Emphasis on written and oral student presentations. This course is not currently being offered. For information about when it may be offered, contact the department.

PSB 6800 Graduate Student Teaching Practicum 1-3
Offers graduate students an opportunity for guided teaching and methods for student evaluation in a variety of Plants, Soils, and Biometeorology courses. (F,Sp)

PSB 6890 Plants, Soils, and Biometeorology Graduate Seminar 1®
Review and critique of presentations. Communication practice in extemporaneous, extension, research, poster, and lecture presentations. PSB graduate students must enroll during both fall and spring semesters. (F,Sp)

PSB 6900 Special Problems in Plants, Soils, and/or Biometeorology 1-8®
(F,Sp,Su)

PSB 6970 Research and Thesis 1-18®
(F,Sp,Su)

PSB 6990 Continuing Graduate Advisement 1-12®
(F,Sp,Su)

PSB 7800 Graduate Student Teaching Practicum 1-3
Offers graduate students an opportunity for guided teaching and methods for student evaluation in a variety of Plants, Soils, and Biometeorology courses. (F,Sp)

PSB 7890 Plants, Soils, and Biometeorology Graduate Seminar 1®
Review and critique of presentations. Communication practice in extemporaneous, extension, research, poster, and lecture presentations. PSB graduate students must enroll during both fall and spring semesters. (F,Sp)

PSB 7900 Special Problems in Plants, Soils, and/or Biometeorology 1-8®
(F,Sp,Su)

PSB 7970 Research and Thesis 1-18®
(F,Sp,Su)

PSB 7990 Continuing Graduate Advisement 1-12®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Psychology (PSY)

See Department of Psychology, pages 479-488.

Note: Prerequisites for Psychology courses are *strictly enforced*. In the course listings below, prerequisites are indicated at the end of course descriptions. A student must be admitted as a psychology major or must complete *at least* 45 semester credits with a GPA of 3.0 or higher prior to taking psychology courses numbered 3000 or above. However, students who have been admitted to the Teacher Education program may take PSY 3660, provided they have met the prerequisites. A student must be admitted as a psychology major or must

complete *at least* 60 semester credits with a GPA of 3.0 or higher prior to taking psychology courses numbered 4000 or above.

PSY 1010 BSS General Psychology 3©
Explores basic areas of psychology, and how each explains human thought and behavior at the individual, familial, and cultural levels. (F,Sp,Su)

PSY 1100 Developmental Psychology: Infancy and Childhood 3
Introduction to psychological development with emphasis on perceptual, language, cognitive, and social development in children. Prerequisite: PSY 1010. (F,Sp)

PSY 1210 Psychology of Human Adjustment 3©
Examination of life situations affecting human adjustment to everyday living, with emphasis on practical applications. Prerequisite: PSY 1010. (F,Sp)

PSY 1220 Career and Life Planning 3
Students assess and clarify their interests, values, skills, and temperaments. Emphasizes discovering relationships between these personal characteristics and the realities of educational and employment opportunities. Explores setting goals, creating action plans, and coping with change. (F,Sp)

PSY 1400 Analysis of Behavior: Basic Principles 3
A laboratory course about the scientific methods used in the study of animal and human behavior. Prerequisite: PSY 1010. (F,Sp,Su)

PSY 1410 Analysis of Behavior: Basic Principles Lab 1
Laboratory experience accompanying PSY 1400. Prerequisite: PSY 1010. (F,Sp,Su)

PSY 1730 Strategies for Academic Success 1-3
Orients students to the systems, tools, and resources unique to higher education that are needed to maximize academic success (e.g., library, computer lab use, etc.). Also helps students develop critical thinking, study, and learning strategies necessary for college success. (F,Sp)

PSY 1750 Comprehension Strategies for College Reading 1
Practical course emphasizing application of strategies and development of critical thinking skills needed to comprehend and distill meaning from college-level texts. (F,Sp)

PSY 2100 Developmental Psychology: Adolescence 3**
Characteristics of adolescents and their psychological, educational, and adjustment problems are discussed in detail. Prerequisite: PSY 1010. (Sp)

PSY 2250 Introductory Cooperative Work Experience 1-6®
Educators and employers cooperate to provide opportunities for students to apply classroom theory and principles in job environments, thereby gaining practical experience in their field. Prerequisite: Approval of Psychology Department coop education counselor. (F,Sp,Su)

PSY 2800 QI Psychological Statistics 3
Elementary study of statistical procedures in handling test scores and other data, and of the concepts needed for each current type of educational and psychological literature. Prerequisite: STAT 1040. (F,Sp)

PSY 2950 Orientation to Psychology as a Career and Profession 3
As an orientation to psychology, students clarify goals, identify steps necessary to achieve goals, prepare a vita, and gain skills in a variety of important tools for the major (including APA writing, ethics, and library usage). Prerequisites: PSY 1010 and consent of Psychology Advising Office. (F,Sp,Su)

PSY 3110 Health Psychology* 3**
Introduction to "biopsychosocial model" of health and well-being. Focuses on reciprocal interactions among biological, psychological, and social factors in human functioning and disease. Explores cultural approaches to health, illness, and treatment. Prerequisite: PSY 1010. (Sp)

PSY 3120 DSS Abuse, Neglect, and the Psychological Dimensions of Intimate Violence 3©
Overview of child maltreatment, animal abuse, dating, courtship, domestic violence, and abuse of the elderly. Stresses the psychological factors related to the causes, consequences, and treatment of abuse and neglect. Presents multidisciplinary perspectives, including historical, legal, medical, psychiatric, and psychological approaches. Prerequisite: PSY 1010. (F,Su)

PSY 3210 DSS Abnormal Psychology 3©
Introduction to "abnormal" human behavior. Covers characteristics, etiology, and treatment of a variety of psychological disorders. Prerequisite: PSY 1010. (F,Sp)

PSY 3400 DSS Analysis of Behavior: Advanced 4
In-depth examination of principles introduced in PSY 1400. Considers principles governing more complex human and animal behavior, as well as emotional and motivational factors in behavior. Lab included as part of credit. Prerequisites: PSY 1400 and 1410. (F,Sp)

PSY 3450 Perception and Psychophysics 3
Analysis of how sensory processes and principles help determine behavior. Introduction to methods used to measure sensory-determined behavior. Methods, results, and principles of sensory communication. Lab required as part of 3 credits. Prerequisite: PSY 1010. (F)

PSY 3460 Physiological Psychology 3
Introductory course examining relationship between central system anatomy and physiology, and behavior and emotional functioning. Also considers neural and biochemical substrates of behavior. Lab required as part of 3 credits. Prerequisite: PSY 1010. (Sp)

PSY 3500 DSS Scientific Thinking and Methods in Psychology 3
Social science research is commonly reported by the media, and by political and governmental interests. Students learn how to legitimately interpret such research through a study of accepted research methods and analysis procedures, and through critical study of the common interpretive mistakes made by media writers. Prerequisite: PSY 1010. (F,Sp)

PSY 3510 DSS Social Psychology 3
Study of the individual in society; problems, theories, and methods of social psychology; will relate reading assignments to current social issues. Prerequisite: PSY 1010. (F,Su)

PSY 3660 Educational Psychology for Teachers 2
Principles and practices for development of conditions for effective learning. Lab required. Prerequisite: PSY 1100 or 2100. (F,Sp)

PSY 3720 Behavior Modification 3
Approaches to behavior modification in a variety of settings. Students required to complete an individual project. Prerequisites: PSY 1010, 1400, 1410, 3400. (Sp)

PSY 4000 Mental Aspects of Sports Performance* 3**
Provides an understanding of theory and applications in the specialty area of sports psychology, including enhancement of motivation and performance, stress, anxiety, aggression and time management, and the relation of these issues to physical development and coaching styles. Also taught as PEP 4000. (F,Sp,Su)

PSY 4210 DSS Personality Theory 3©
Explanatory study of various personality theories, their origin, and approaches to the understanding of human behavior. Prerequisites: PSY 1010 and 2800. (Sp)

PSY 4230 DSS Psychology of Gender* 3**
Critical analysis of evidence for sex differences, gender roles, the effect of gender on traditional psychology, and other topics, including parenthood, cultural influence, and sexual orientation. (Sp)

PSY 4240 DSS Multicultural Psychology 3
Explores cultural influences on basic psychological processes, including perception, cognition, language, emotion, intelligence, attitudes, values, and intergroup relations. Prerequisite: PSY 1010. (F)

PSY 4250 Advanced Cooperative Work Experience 1-12®
Cooperative education work experience position; increased level of complexity and a more professional level of experience as student advances toward completion of the program. Prerequisite: Approval of Psychology Department cooperative education coordinator. (F,Sp,Su)

PSY 4420 DSS Cognitive Psychology 3
In-depth study of basic concepts, methods, and theories involved in perception, memory, and thinking. Lab required. Prerequisite: PSY 1010. (Sp)

PSY 4430 Cognitive Psychology Laboratory 1
Required laboratory, designed to accompany PSY 4420. Focuses on conducting cognitive experiments via computer simulations and sampling data collection. Designed to increase skills in designing data collection and interpreting experimental data. (Sp)

PSY 4510 CI Effective Social Skills Interventions 3
Examination of theory and practice of social skills training with children, adolescents, and adults. Prerequisites: PSY 1010, 1100, and either PSY 3210 or 3510. (Sp)

PSY 4790 (dual listing 6790) Psychological Principles and Individuals who are Deaf and Hard of Hearing 3
Psychological theories and research used to describe the deaf and hard of hearing. Exploration of principles that can be used in helping these individuals achieve emotional well-being. Also taught as COMD 4790/6790. (Sp)

PSY 4910 Undergraduate Research Creative Opportunity 1-3®
A cooperative process of discovery, investigation, research, or creativity between faculty and one or more students. Prerequisite: Approval of Psychology Department URCO coordinator. (F,Sp,Su)

PSY 4920 Practicum 1-3®
Field work in applied psychological setting at BS level. (F,Sp,Su)

PSY 5020 (dual listing 6020) Multicultural Issues in Psychology 3
Examines role of culture in human development, with emphasis on understanding relations between culture, ethnicity, and identity and how images of "cultural selves" and "cultural others" are produced and "naturalized." (F)

PSY 5050 (dual listing 6050) Psychological Aspects of Sports Performance 3
Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, personality and sports performance. Also taught as PEP 5050/6050. (Sp)

PSY 5100 (dual listing 6100) History and Systems of Psychology 3
Theoretical and historical developments in psychology with primary emphasis on nineteenth and twentieth century developments, although earlier precursors are also considered. Prerequisite: PSY 1010. (Sp)

PSY 5200 CI Introduction to Interviewing and Counseling 3
Theory, models, and practice in basic principles of interviewing and counseling, including listening skills, facilitation of verbal interaction, gathering information, attending to nonverbal behavior, interpersonal dynamics, and promoting helping relationships. Prerequisites: Psychology major or minor, matriculation in master's program requiring PSY 5200, or consent of instructor. (F)

PSY 5330 (dual listing 6330) Psychometrics 3
Overview of measurement development principles and statistics. Evaluation, interpretation, and uses of standardized tests of aptitude, intelligence, achievement, personality, and adjustment. Prerequisites: PSY 1010, 2800. (F)

PSY 5500 Interdisciplinary Workshop 1-3®
(F,Sp,Su)

PSY 5720 Behavior Analysis Practicum 3
Students receive supervised training in applying behavior analysis principles in community, school, and institutional settings. Either SPED 5050 or PSY/SPED 5720 fulfill part of practicum requirement for Behavior Analysis track. Prerequisite: Permission of instructor. Also taught as SPED 5720. (F)

PSY 5900 Independent Study 1-3®
Individual discussion and intensive study of a particular problem or area. Prerequisite: Instructor's consent. (F,Sp,Su)

PSY 5910 Independent Research 1-3®
Experiments and demonstration projects are conducted and reported. Prerequisite: Instructor's consent. (F,Sp,Su)

PSY 5930 Instructional Apprenticeship in Psychology 1-3®
Didactic and applied experience in course preparation and instructional techniques applicable to the teaching of psychology. Intended for students planning careers as instructors at the secondary and postsecondary levels. Prerequisite: Instructor's consent. (F,Sp,Su)

PSY 5950 CI Undergraduate Apprenticeship I 3
Orientation to profession of psychology. Students clarify career goals, identify steps necessary to achieve goals, prepare a vita, plan and begin executing their apprenticeship experience with faculty member(s) or approved agency, and present progress reports to diverse audiences. Prerequisites: Psychology major, junior standing, and consent of on-campus USU Psychology Advising Office. (F,Sp)

PSY 5960 CI Undergraduate Apprenticeship II 3
Under supervision of departmentally approved agency and/or faculty member(s), students complete their pre-approved apprenticeship, which involves conducting research and/or providing community service. Students prepare a report of this experience and present it to diverse audiences. Prerequisites: PSY 5950, Psychology major, senior standing, and consent of on-campus USU Psychology Advising Office. (F,Sp)

PSY 6010 Introduction to Program Evaluation: Evaluation Models and Practical Guidelines 3
Alternative approaches and practical guidelines for conducting evaluation studies. Through case studies and simulations, addresses impact of social, political, and ethical issues on evaluation. Also taught as EDUC 6010.

PSY 6020 (dual listing 5020) Multicultural Issues in Psychology 3
Examines role of culture in human development, with emphasis on understanding relations between culture, ethnicity, and identity and how images of "cultural selves" and "cultural others" are produced and "naturalized." (F)

PSY 6050 (dual listing 5050) Psychological Aspects of Sports Performance 3
Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, personality and sports performance. Also taught as PEP 6050/5050. (Sp)

PSY 6100 (dual listing 5100) History and Systems of Psychology 3
Theoretical and historical developments in psychology with primary emphasis on nineteenth and twentieth century developments, although earlier precursors are also considered. Prerequisite: PSY 1010. (Sp)

PSY 6150 Empirically Supported Treatments for Psychological Disorders of Children and Adolescents 3
Introduction to single-subject treatment designs and basic principles of applied behavior analysis. Behaviorally-oriented treatment approaches for psychological disorders of childhood. Should be taken concurrently with a clinical practicum or assistantship. (Sp)

PSY 6220 Group Counseling 3
Introduction to theory of group counseling with illustrative experiences to show how theory may be applied. Prerequisite: PSY 6350. (F)

PSY 6240 Introduction to School Counseling and Guidance 3
Introduction to role and function of school counselors. Overview of history of school guidance and counseling, and role of counselors in comprehensive guidance program. (F)

PSY 6250 Internship in School Counseling and Guidance 1-10®
Internship in approved school system involving comprehensive guidance activities, under supervision of certified school counselor. (F,Sp,Su)

PSY 6260 Career Development: Theory and Practice 3
Consideration of career patterns and factors influencing career development and career effectiveness. (Sp)

PSY 6270 Child Psychopathology 3
Focuses on issues relevant to the understanding of child emotional and behavioral disorders. Discussion of symptom characteristics, assessment, and treatment protocols, as well as research pertaining to the major mental health problems found in children and adolescents. Prerequisite: Admission to graduate program in psychology or permission of instructor. (F)

PSY 6290 Diversity Issues in Treatment and Assessment 3
Introduction to diversity issues in counseling and psychological/educational assessment, including culture, gender, language, and related issues. Training in models for providing effective psychological services to clients, taking into account their unique background. Prerequisite: PSY 6350 or instructor's consent. (Sp)

PSY 6310 Intellectual Assessment 3
Training and supervised experience in administering and interpreting individual intellectual ability tests, such as the Wechsler and Stanford-Binet scales. Prerequisite: Matriculation into School Psychology program or Combined Psychology program. (F)

PSY 6320 Objective Assessment of Personality and Affect 3
Research bases and clinical applications of objective psychological assessment instruments and techniques, designed to measure adolescent and adult personality, affect, and psychotherapy. Prerequisite: PSY 6310. (Sp)

PSY 6330 Psychometrics 3
(dual listing 5330)
Overview of measurement development principles and statistics. Evaluation, interpretation, and uses of standardized tests of aptitude, intelligence, achievement, personality, and adjustment. Prerequisites: PSY 1010, 2800. (F)

PSY 6340 Psychological and Educational Consultation 3
Overview of theory and practice of consultation as provided by counselors, psychologists, and other mental health education professionals. Consultation with teachers, parents, medical professionals, and organizations, emphasizing applications in educational settings. (F)

PSY 6350 Introduction to Theory and Practicum in Counseling 3
Introduction to basic theories and techniques of counseling, with applied practice in role-playing, interviewing, and actual counseling sessions with practice subjects. Prerequisite: Matriculation in School Counseling, School Psychology, or Combined Psychology program. (F)

PSY 6360 Practicum in Counseling and Psychotherapy 3®
Supervised practicum in counseling and psychotherapy conducted within Psychology Community Clinic. Closely supervised practice in assessment, counseling, psychotherapy, and consultation with individuals, couples, and families. Prerequisite: PSY 6350. (Sp,Su)

PSY 6370 Practicum in School Counseling 3®
Supervised practicum in public school setting, under direction of certified school counselor. Taken by students in School Counseling master's program. (F,Sp,Su)

PSY 6380 Practicum in School Psychology 3®
Supervised practicum in school psychology in public school or closely related setting. Taken by second-year students in School Psychology master's program. (F,Sp,Su)

PSY 6410 Psychoeducational Assessment 3
Training and supervised experience in assessment of school-age and preschool-age children. Administration and interpretation of cognitive, developmental, and academic achievement measures, along with other psychoeducational assessment instruments and methods. (Sp)

PSY 6450 Introduction to School Psychology 1
Introductory overview of field of school psychology. Role and function of school psychologist, historical context of school psychology, and trends and new developments in service provision. Prerequisite: Matriculation into School Psychology master's program or Combined Psychology doctoral program. (F)

PSY 6460 Professional Issues in School Counseling and School Psychology 3
Legal, ethical, and professional issues relevant to school counselors and school psychologists. Issues and practices in providing counseling and psychological services to "at-risk" students. Prerequisite: Graduate standing in psychology or instructor's consent. (Sp)

PSY 6470 Health Psychology 3
Explores psychological and behavioral principles relating to health and illness. Focuses on development and maintenance of health behaviors. Emphasizes integration of research findings with clinical intervention. Prerequisite: Graduate standing in Psychology; or graduate standing in Health, Physical Education and Recreation. (F)

PSY 6500 Interdisciplinary Workshop 1-2®
Series of self-instructional modules and videos and a variety of elective training. Module topics include developmental disabilities, legal aspects and issues, assessment, intervention, assistive technology, transition, and prevention/intervention for aggression and violence. (F,Sp,Su)

PSY 6510 Social Psychology* 3**
Provides all graduate students with common knowledge base in social psychology. Emphasizes overview of recent developments, while also discussing social psychology principles as a guide in executing evaluation research and helping clients. Understanding of both emphases ensures breadth as psychologists. Prerequisite: PSY 3510. (Sp)

PSY 6530 Developmental Psychology 3
Advanced survey course in general developmental psychology. Theory and research in human development across the lifespan, with particular emphasis on child and adolescent development. (F)

PSY 6570 Introduction to Educational and Psychological Research 3
Provides introduction to research methods, including identification of research problem, review and evaluation of research literature, and design and implementation of research project. Prerequisite: PSY 2800. Also taught as EDUC 6570. (F,Sp,Su)

PSY 6600 Research Design and Analysis I 3
Research design and statistical concepts for research in education, human services, and psychology, with emphasis on the selection and interpretation of statistical analyses. Prerequisites: EDUC/PSY 6570, passing score on 6600 Pretest via WebCT, and permission of instructor. Also taught as EDUC 6600. (F,Sp,Su)

PSY 6650 Theories of Learning: The Behavioral Perspective* 3**
In-depth examination of the major behavioral theories of learning, including classical and operant conditioning. (F)

PSY 6660 Cognition and Instruction* 3**
Survey of theory and principles in cognitive psychology, with special emphasis on applying these principles in instructional settings. (Sp)

PSY 6750 Empirically Supported Treatments for Adult Psychological Disorders 3
Emphasizes development of knowledge regarding criteria for determining if a treatment is empirically supported. Explains methods for indentifying specific empirically supported treatments. Develops skills for applying these treatments to psychological disorders and for understanding how to evaluate the efficacy of treatments. (Sp)

Course Descriptions

PSY 6790 (dual listing 4790) Psychological Principles and Individuals who are Deaf and Hard of Hearing 3
Psychological theories and research used to describe the deaf and hard of hearing. Exploration of principles that can be used in helping these individuals achieve emotional well-being. Also taught as COMD 6790/4790. (Sp)

PSY 6800 Addictive Behaviors* 3
Provides students with an overview of the theoretical issues, research, and models that underlie our understanding of behavioral syndromes commonly referred to as "addictive behaviors." Emphasizes chemical dependency problems, as well as the well-studied pattern of "addiction." (F)

PSY 6810 Seminar 1-3®
Special topics designed to help students develop in-depth knowledge of emerging research, theory, and practice in psychology. Taught in seminar format by USU faculty or visiting scholars. (F,Sp,Su)

PSY 6820 Clinical Applications of Biofeedback* 3**
Training in clinical applications of biofeedback for treating common health, psychological, and stress-related problems. Practical experience provided in use of different modalities of biofeedback (e.g., neurofeedback, skin temperature training, and electrodermal training). Stresses importance of integrating biofeedback into other appropriate treatments. Prerequisite: Graduate standing in psychology or instructor's consent. (F)[1]

PSY 6850 Introduction to the Combined Doctoral Program 1
This seminar is designed to orient beginning PhD students to the combined program and to the School of Graduate Studies. Opportunity provided for students to meet and talk with all faculty members concerning their research. Students also begin their own research and become acquainted with required paperwork for their program. (F)

PSY 6880 Transcultural Assessment Lab 1
Psychoeducational assessment laboratory experience to be taken by students in the School Psychology and Combined Psychology programs in conjunction with PSY 6290. (Sp)

PSY 6890 Assessment of Child and Adolescent Psychopathology and Personality 3
Theoretical foundations and applied training in methods of assessing and classifying behavioral, social, and emotional problems of children and adolescents. Prerequisite: Matriculation into Combined Psychology doctoral program or School Psychology master's program. (Su)

PSY 6900 Independent Study 1-3®
Individual discussion and intensive study of a particular problem or area. Prerequisite: Instructor's consent. (F,Sp,Su)

PSY 6910 Independent Research 1-3®
Experiments and demonstration projects are conducted and reported. Prerequisite: Instructor's consent. (F,Sp,Su)

PSY 6930 University Teaching Apprenticeship 1-3®
Prepares graduate students for college teaching. Students learn to prepare study guides, examinations, and lectures, and learn to use audio-visual aids. Students also examine various current methods of instruction and course evaluation schemes. (F,Sp,Su)

PSY 6950 Internship in School Psychology 3®
Internship in approved school system involving assessment, counseling, consultation, and program development, under the supervision of a certified school psychologist. Prerequisite: Permission of instructor. (F,Sp,Su)

PSY 6970 Thesis 1-6®
(F,Sp,Su)

PSY 6990 Continuing Graduate Advisement 1-12®
(F,Sp,Su)

PSY 7020 Advanced Evaluation Methodology and Techniques* 3
Provides advanced theory and practice in focus group interviews, on-site visit techniques, observation and anchor scales, multiple-site evaluation standards, and advanced reporting techniques. Prerequisite: PSY 6010. (Sp)

PSY 7030 Instrument Development* 3**
In-depth study of factors and techniques critical for designing and developing evaluation and research instruments. (F)

PSY 7040 Practicum in Evaluation Planning and Contracting 3
Provides detailed information on methods for planning program evaluations, negotiating agreements with client/sponsor, and finalizing evaluation contract. Taught every third year. Prerequisite: EDUC/PSY 6010. (Sp)

PSY 7050 Internship in Program Evaluation 1-9®
Experience in practical aspects of program evaluation through planned, supervised evaluation project participation approved by student's supervisory committee. Prerequisite: EDUC/PSY 6010. (F,Sp,Su)

PSY 7060 Internship in Research 1-9®
Research experience gained through conducting planned, supervised research project. Prerequisites: Approval by supervisory committee and EDUC/PSY 6570. (F,Sp,Su)

PSY 7070 Advanced Measurement Theories and Practice 3
Covers psychometric topics, including classical test theory, generalizability theory, item response theory, and issues concering bias in psychological testing. Prerequisites: PSY 5330/6330, EDUC/PSY 6600. (Sp)

PSY 7090 Research and Evaluation Methodology Program Seminar 1®
Provides opportunity for all doctoral students in the Research and Evaluation Methodology Program to meet on a regular basis to read journal articles, explore student and faculty research projects, and discuss current issues in the field. (F,Sp)

PSY 7100 Biological Basis of Behavior* 3**
Explores normal and abnormal behavior from a basic neuroanatomical/ neurophysiological perspective. Discusses pharmacological/nonpharmacological applications. (Sp)

PSY 7110 Advanced Theories in Cognitive Psychology 3
In-depth study of theories, models, and current research in the field of cognitive psychology, including memory, perception, problem-solving, and decision making. Prerequisite: PSY 4420 or 6660. (F)

PSY 7230 Theory and Research in Personality* 3**
Overview of theoretical approaches, research, and clinical applications regarding personality differences. (F)

PSY 7250 Professional Ethics and Standards* 1-3**
Designed to train clinicians and researchers in the field of psychology to operate within the professional ethics and standards of the field. (F)

PSY 7270 Psychopathology* 3**
Summarizes research on risk, epidemiologic factors, and etiological perspectives regarding emotional and behavioral disorders of adolescents and adults. Models of classification of disorders are outlined, emphasizing the DSM system. Focuses on anxiety, mood, somatoform, dissociative, personality, and psychosexual disorders, as well as schizophrenia, drug/alcohol dependence, violence, and psychological factors affecting physical illness. (F)

PSY 7320 Advanced Personality Assessment 2
Theory and clinical training in personality assessment, with additional techniques than those covered in PSY 6320. Focuses on the comprehensive scoring system of Rorschach. Prerequisite: PSY 6320 or instructor's consent. (Su)

PSY 7350 Practicum in School Psychology 3®
Doctoral-level practicum in a school or closely related setting. Supervised experience in developmental, learning, and school-related problems. Appropriate assessment and consultation with teachers, administrators, parents, and other related individuals. Prerequisite: Permission of program chair. (F,Sp,Su)

PSY 7360 Practicum in Counseling Psychology 3®
Doctoral-level practicum in a counseling setting. Supervised experience in individual, group, and family counseling. Appropriate assessment and consultation. Prerequisite: Permission of program chair. (F,Sp,Su)

PSY 7370 Practicum in Clinical Psychology 3®
Doctoral-level practicum in a clinical setting. Supervised experience in individual, group, and family psychotherapy. Includes psychological assessment and consultation. Prerequisite: Permission of program chair. (F,Sp,Su)

PSY 7380 Practicum in Psychology 1-6®
Doctoral-level practicum in a variety of health service settings. Supervised experience in individual, group, and family psychotherapy assessment and consultation as needed. Prerequisite: Permission of program chair. (F,Sp,Su)

PSY 7610 Research Design and Analysis II 3
Advanced treatment of research design and statistical concepts and issues in educational, human services, and psychological research. Prerequisite: EDUC/PSY 6600. Also taught as EDUC 7610. (F,Sp,Su)

PSY 7670 Literature Reviews in Education and Psychology 2
Advanced concepts in designing, writing, and critiquing literature reviews. Prerequisites: PSY/EDUC 6600 and consent of instructor. Also taught as EDUC 7670. (Sp,Su)

PSY 7700 Grant Writing 3**
Students learn to identify funding sources, select strategies for seeking resources, and write proposals for research, development, training, and service activities in education, psychology, and related fields. Prerequisite: PSY/EDUC 6570. (Sp)

PSY 7780 Multivariate Methods in Psychology and Education 3
Focuses on application of multivariate methods (factor analytic techniques, structural equation modeling, canonical correlation, multivariate analysis of variance, etc.) in research and measurement in psychology, education, and other social and behavioral sciences. Prerequisites: EDUC/PSY 6600, 7610. (F)

PSY 7810 Seminar 1-3®
Special topics designed to help students develop in-depth knowledge of emerging research, theory, and practice in psychology. Taught in seminar format by USU faculty or visiting scholars. (F,Sp,Su)

PSY 7820 Neuropsychology: Principles and Assessment* 2 or 4**
Overview of neuropsychological symptoms, common syndromes, and underlying neural structures. Coverage of neuropsychological assessment approaches, diagnostic issues, and supervised experience with selected neuropsychological tests. Includes some discussion of rehabilitation, but primarily emphasizes assessment. (Sp)

PSY 7840 Psychophamacology* 1**
Provides psychology graduate students with basic working knowledge of the field of psychopharmacology and the medical use of psychotropic drugs. Prerequisite: PSY 6320.[1]

PSY 7900 Independent Study 1-3®
Individual discussion and intensive study of a particular problem or area. Prerequisite: Instructor's consent. (F,Sp,Su)

PSY 7910 Independent Research 1-3®
Experiments and demonstration projects are conducted and reported. Prerequisite: Instructor's consent. (F,Sp,Su)

PSY 7950 Internship in Professional Psychology 1®
One-year, supervised, full-time internship required of doctoral candidates in professional psychology (clinical, counseling, and/or school psychology). Prerequisite: All doctoral coursework completed, with the possible exception of the dissertation if approved by the student's committee, prior to initiating the internship. (F,Sp,Su)

PSY 7970 Dissertation 1-18®
(F,Sp,Su)

PSY 7990 Continuing Graduate Advisement 1-12®
(F,Sp,Su)

[1]This course is offered infrequently. For more information, contact Psychology Department.
®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.
***This course is taught alternating years. Check with department for information about when course will be taught.

Public Health (PUBH)

See Department of Biology, pages 177-190.

PUBH 3120 Family and Community Health 3
Focuses on health aspects of various population groups within the community. Particular emphasis placed on guidelines for optimal family health. (Sp)

PUBH 3310 Occupational Health and Safety 3
Covers the principles of occupational health and safety, including regulatory standards. Emphasizes on-the-job health and safety problems from the occupational health and safety professional and management view. Prerequisite: CHEM 1220. (F)

PUBH 3610 Environmental Management 3
Introduction to environmental health, emphasizing relationships among environmental quality, public health, environmental and occupational health regulations, human health risk assessment, institutions, and engineered systems in environmental health management. Prerequisites: CHEM 1210; BIOL 1610 or University Studies Breadth Life Sciences (BLS) course; MATH 1210. Also taught as CEE 3610. (F)

PUBH 4000 Public Health Field Experience 3-6®
Field experience in the practice of public health, as appropriate to each student's area of public health emphasis: public health education, environmental health, or industrial hygiene. Prerequisite: Junior standing in public health. (F,Sp,Su)

PUBH 4030 Communicable Disease Control 3©
Comprehensive study of communicable diseases, including etiological agents, reservoirs of infection, and mechanisms of transmission, control, and prevention. Recommended prerequisite: A course in microbiology. (F)

PUBH 4040 Fundamentals of Epidemiology 3©
Introduction to the study of the distribution and causes of communicable and noncommunicable diseases of humans and other animals. Recommended prerequisite: A course in statistics. (Sp)

PUBH 4300 Industrial Hygiene Seminar 1®
Participant seminar on current developments in industrial hygiene. (F)

PUBH 4310 Industrial Hygiene Recognition of Hazards 4
Through classroom and field experiences, provides an introduction to industrial hazards and familiarizes students with manufacturing and industrial processes in which industrial hygienists commonly work. Prerequisite: PUBH 3310 (may be taken concurrently). (F)

PUBH 4320 Industrial Hygiene Chemical Hazard Evaluation 3
Survey of principles and methods used to evaluate industrial chemical health hazards. Practical application in a field sampling project. Prerequisite: PUBH 3310. (Sp)

PUBH 4330 Industrial Hygiene Physical Hazards 3
Through lectures and labs, covers the potential health effects, methods of exposure evaluation, and principles of control of noise, vibration, heat and cold, and nonionizing and ionizing radiation hazards that can occur in the workplace. Prerequisite: PUBH 3310 or 4310. (Sp)

PUBH 4380 Industrial Hygiene Internship 3-6®
Field experience in the practice of industrial hygiene. Participation in an active program serving employees in either the private or public sector. Prerequisites: PUBH 4300, 4320, and 4330. (F,Sp,Su)

PUBH 4410 Industrial Safety 3
Through lectures, demonstrations, and hands-on activities, covers recognition and control of industrial safety hazards (including power tools, fire, electricity, excavations, confined spaces, and falls), material handling, process safety,

protective equipment, safety promotion and training, and standards and programs. (Sp)

PUBH 4850 Special Topics in Public Health 1-3®
Prerequisite: Junior standing in public health. (F,Sp,Su)

PUBH 5000 Public Health Seminar 1®
Participant seminar on current problems in public health. (Sp)

PUBH 5330 QI Industrial Hygiene Chemical Hazard Control 3
Covers methods to control chemical occupational health hazards, with an emphasis on the function, design, and management of local exhaust ventilation. Prerequisites: PUBH 4310, MATH 1210. (F)

PUBH 5340 Industrial Hygiene and Safety Programs 2
Provides students with the foundation to administer and manage occupational health and safety programs commonly encountered in the workplace. Prerequisites: PUBH 4320 and 4330. (Sp)

PUBH 5500 CI Public Health Management 2
Presentation of basic organizational and financial management tools, which students will utilize in written and oral reports on an educational, environmental, or occupational health problem of their choice. Prerequisite: PUBH 4000 or 4380 or permission of instructor. (F,Sp)

PUBH 5670 Hazardous Chemicals Handling and Safety 2
Provides students with necessary skills and knowledge for working safely in areas associated with hazardous chemicals. Topics covered include: regulations, exposure routes, toxicology, chemical and physical hazards, personal protective equipment, sampling, monitoring, decontamination, and emergency response procedures. Prerequisite: CHEM 1210. Also taught as CEE 5670. (Sp)

PUBH 5730 (dual listing 6730) Analysis and Fate of Environmental Contaminants 3
Provides students with understanding of methods used in analysis of environmental samples for organic contaminants. Examines various properties and processes determining the fate of organic contaminants in the environment. Taught first half of spring semester. Prerequisites: CHEM 1210, 2300. Also taught as CEE 5730/6730. (Sp)

PUBH 5790 Accident and Emergency Management 3
Introduction to fundamentals of accident, hazard, and emergency management. Topics include legislation; chemical safety fundamentals; fire, explosion, and spill fundamentals; contaminant air transport fundamentals; hazard and risk assessment; dispersion applications; and hazard and risk management applications. Prerequisite: CHEM 1220. Also taught as CEE 5790. (Sp)

PUBH 6730 (dual listing 5730) Analysis and Fate of Environmental Contaminants 3
Provides students with understanding of methods used in analysis of environmental samples for organic contaminants. Examines various properties and processes determining the fate of organic contaminants in the environment. Taught first half of spring semester. Prerequisites: CHEM 1210, 2300. Also taught as CEE 6730/5730. (Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Rehabilitation Counseling (REH)

See Department of Special Education and Rehabilitation, pages 512-522.

REH 1010 BSS Disability in the American Experience 3
Discussion of definitions and types of disabilities, ethical issues, society's prejudice and discrimination against people with disabilities, and the individual's adjustment to the disability experience. Disability as a natural part of life. Also taught as SPED 1010.

REH 6100 Introduction to Rehabilitation Counseling 3
Overview of history, philosophy, and legal basis of rehabilitation programs, both public and private. Independent living programs. Roles of the rehabilitation counselor and the processs of rehabilitation. Skill development including literature use, writing, and professional organizations. (F)

REH 6110 Medical Aspects of Disability 3
Overview of basic medical issues affecting employment and independent living for persons with disabilities. Explores basic anatomy and systems, as well as disorders and diseases of these systems. Covers medical terminology applicable to rehabilitation counseling. (F)

REH 6120 Psychosocial Aspects of Disability 3
Explores psychological and sociological aspects of disabilities, including adjustment factors in living with disabilities (i.e., individual, family, sexuality, other service providers, etc.). Examines societal attitudes, women's issues, and deaf culture issues. Includes group counseling applications for persons with disabilities. (Su)

REH 6130 Rehabilitation Counseling Skill Development 2
Utilizes role playing of simulated interviews and rehabilitation counseling sessions to develop the basic skills necessary to function as a human service helper. Must be taken concurrently with REH 6140. Prerequisite: Permission of instructor. (Su)

REH 6140 Practicum in Rehabilitation 2®
Under faculty supervision, students receive minimum of 100 hours of firsthand experience working with persons with disabilities in rehabilitation agency or facility. Must be taken the first time concurrently with REH 6130. With faculty approval, may be repeated for credit. Prerequisite: Permission of instructor. (F,Sp,Su)

REH 6150 Case Studies in Rehabilitation 3
Coordination of community resources, individual assessment information, ethical issues, eligibility determination, and development of individualized rehabilitation programs and independent living plans. Time, fiscal, and caseload management skills for rehabilitation professionals. Emphasizes client choice in rehabilitation planning. (Sp)

REH 6160 Job Analysis, Development, and Placement for Persons with Disabilities 3
Applies career development theories to job placement. Presents job placement factors resulting in employment for persons with disabilities, including job analysis, job development and retention, advocacy, assistive technology, ADA, occupational information systems, and labor market analysis. (Sp)

REH 6170 Internship in Rehabilitation 4-12®
Direct supervised provision of rehabilitation services to persons with disabilities in a community facility or agency. Total of 300 hours of direct service required for each 6 semester credits. Repeatable for up to 12 credits. Prerequisite: Permission of instructor. (F,Sp,Su)

REH 6180 Rehabilitation of Persons with Severe Mental Illness, Substance Abuse, and Severe Learning Disabilities 3
Overview of rehabilitation of persons with severe mental illness, including psychopharmacology, housing, case management, job placement, diagnosis (DSM IV), and social learning programs. Includes information on rehabilitation of persons experiencing substance abuse, dual diagnoses, and learning disorders. (Sp)

REH 6190 Vocational Assessment for Persons with Disabilities 3
Addresses vocational assessment for persons with disabilities. Includes overview of traditional vocational assessment, but focuses on contemporary methodology developed for individuals with severe disabilities. Discussion of functional assessment, including client choice and ecological assessment issues. (F)

REH 6200 Theories of Counseling Applied to Persons with Disabilities 3
Introduction to established counseling theories and their implications for providing services to persons with disabilities. Discussion of individual and group counseling paradigms. Emphasizes development of students' individual counseling philosophies. (F)

REH 6210 Vocational Evaluation Principles and Systems 2
Introduction to vocational evaluation principles and their application in using commercially available vocational evaluation systems. Actual practice with the systems (including integrated report writing) in the rehabilitation services clinic. (Su)

REH 6220 Culturally Valid Rehabilitation Practices 2
Analysis of the effect of cultural/ethnic/racial/linguistic background in the rehabilitation counseling setting, including acceptance/perception of disability, and successful application, process, and rehabilitation outcome. Practice applications include provision of culturally sensitive counseling, vocational evaluation, and job placement. (Su)

REH 6230 Introduction to Rehabilitation Research 3
Provides introduction to research methods in rehabilitation and disability studies, including the various types of research designs and the use of statistical methods. Introduces students to empirical research journals in rehabilitation. (Sp)

REH 6560 Special Topics in Rehabilitation 1-4®
Opportunity to provide specialized training in topics unique to rehabilitation. Topics cover many disability, employment, and independent-living issues. (F,Sp,Su)

REH 6900 Independent Study 1-3®
Prerequisite: Permission of instructor. (F,Sp,Su)

REH 6910 Independent Research 1-3®
Prerequisite: Permission of instructor. (F,Sp,Su)

REH 6970 Thesis 1-6®
This course is not currently being offered. For information about when it may be offered, contact the department.

REH 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Russian (RUSS)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

RUSS 1010 Russian First Year I 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Not open to those with more than one year high school Russian or equivalent. (F)

RUSS 1020 Russian First Year II 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: RUSS 1010, or not more than three years of high school Russian. (Sp)

RUSS 2010 Russian Second Year I 4
Further development of first-year competencies with emphasis on language structure, vocabulary expansion, reading, writing, and conversation in the context of culture. Prerequisite: RUSS 1020 or two or more years of high school Russian. (F)

RUSS 2020 Russian Second Year II 4
Further development of first-year competencies with emphasis on language structure, vocabulary expansion, reading, writing, and conversation in the context of culture. Prerequisite: RUSS 2010 or three or more years of high school Russian. (Sp)

RUSS 2880 Individual Readings 1-4®
Individual study of selected readings in Russian. Prerequisite: Instructor's permission. (F,Sp)

RUSS 3040 Advanced Russian Grammar and Composition 3

RUSS 3050 Advanced Russian Grammar and Composition 3
Detailed presentation of Russian grammar. Class discussions and work on oral and written assignments. Prerequisite: RUSS 2020 or equivalent. (F) (Sp)

RUSS 3300 DHA Contemporary Russian Language and Culture 3
Discussion of contemporary Russia, including its geography, business, government, literature, art, etc. Prerequisite: RUSS 2020 or equivalent. (F,Sp)[1]

RUSS 3510 CI Business Russian* 3
Study of current Russian business and commercial terminology and practices. Development of communication skills for international Russian business purposes. Prerequisite: RUSS 2020 or equivalent. (F)[2]

RUSS 3540 Russian Translation for Science, Business, and Culture 3
Familiarization with approaches to translation, special grammatical structures, specialized vocabulary, and reference materials and aids. Practical exercises. Prerequisite: RUSS 2020 or equivalent. (Sp)[3]

RUSS 4880 Individual Readings 1-4®
Readings in technical, scientific, or literary Russian. Prerequisite: Instructor's permission. (F,Sp)

RUSS 4920 Russian Language Tutoring 1®
Allows students to develop tutoring skills by assisting professors in lower-division courses or fulfilling instructional duties for a comparable amount of time in the language laboratory, public schools, or similar activities with departmental approval. May be repeated to a maximum of 3 credits. Prerequisite: Permission of instructor. (F,Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
[1]Taught Spring 2007 and Fall 2008.
[2]Taught Fall 2007.
[3]Taught Spring 2008.

Secondary Education (SCED)

See Department of Secondary Education, pages 493-497.

SCED 1000 Volunteer Experience 1
Optional course providing orientation to agencies coordinating volunteer experiences in the community; such experiences are part of standards for admission to secondary teacher education. (F,Sp,Su)

SCED 3100 Motivation and Classroom Management 3
Designed to lead pre-service secondary school teachers to address two questions: (1) What diverse traits, talents, attitudes, and experiences do pre-adolescent and adolescent students bring to the middle school, junior high school, and high school environment? and (2) In light of these diverse traits, talents, attitudes, and experiences, how should teachers work with students to build cooperative classroom communities where students are motivated to engage in productive learning activities? (F,Sp)

SCED 3210 DSS/CI Educational and Multicultural Foundations 3
Provides preservice teachers with the opportunity to critically examine the political, economic, and educational policies influencing students' access to equitable educational experiences. Examines historical and philosophical foundations influencing the nature of multicultural education in our democratic society, how personal biases can influence instructional practices, and development of multicultural curriculum relevant to specific content areas. (F,Sp)

SCED 3300 Clinical Experience I 1
First clinical practicum (40 hours minimum) in middle and secondary schools, arranged by special methods instructors in department. Required at level 1. Prerequisite: Program admission. (F,Sp)

Course Descriptions

SCED 3400 Teaching Science I 3
Laboratory practicum focused on design, practice, and performance of secondary science demonstrations and investigative lab activities. Must be taken at Level 1. Prerequisite: Program admission. (F,Sp)

SCED 3500 Teaching Social Studies 3
Methods course focused on social studies curriculum and instruction for preservice secondary teachers with teaching majors or minors in history or any of the social sciences. Should be taken at Level 1. Prerequisite: Program admission. (F,Sp)

SCED 3600 Teaching English 3
Methods course focused on English curriculum and instruction for preservice secondary teachers with teaching majors or minors in English. May be taken at either Level 1 or Level 2. Prerequisite: Program admission. (F,Sp)

SCED 4200 CI Reading, Writing, and Technology 3
Performance-based class focused on a wide range of academic skills related to reading, writing, and advanced technology access. Prerequisite: Program admission and completion of Level 1. (F,Sp)

SCED 4210 Cognition and Evaluation of Student Learning 3
Designed to lead the preservice secondary school teacher to address two questions: (1) How do students construct concepts; discover relationships; and develop knowledge-level skills, comprehension and communication skills, and problem-solving abilities? (2) How do teachers monitor students' progress, evaluate and communicate their achievement, and interpret the results of system-wide and standardized test results to students and their parents? (F,Sp)

SCED 4300 Clinical Experience II 1
Second clinical practicum (40 hours minimum) in middle and secondary schools, arranged by special methods instructors in department. Required at level 2. Prerequisite: Program admission and completion of Level 1. (F,Sp)

SCED 4400 Teaching Science II 3
Methods course focused on science curriculum and instruction for preservice secondary teachers with teaching majors in any of the science areas. Must be taken at Level 2. Prerequisite: Program admission, completion of Level 1, and SCED 3400. (F,Sp)

SCED 4600 Philosophy and Organization
(dual listing 6600) of the Middle Level School 3
Focuses on characteristics of young adolescents and how middle level schools can be organized to meet those characteristics through interdisciplinary teaming, advisory programs, and exploratory mini-courses. Also taught as ELED 4600/6600. (F,Su)

SCED 4610 Curriculum, Methods, and
(dual listing 6610) Assessment for the Middle Grades 3
Integrates current approaches to curriculum design with instructional models and assessment of learning appropriate for grades 5-9. Also taught as ELED 4610/6610. (Sp,Su)

SCED 4620 Service Learning Applications
(dual listing 6620) for the Middle Grades 3
Examines literature related to service learning for the middle grades. Application of service learning in curriculum. Also taught as ELED 4620/6620. (Su)

SCED 4710 Diversity in Education 3
Provides educators with background and techniques for more effectively addressing the needs of students in a culturally and linguistically diverse society. Diversity topics also include religion, socioeconomic class, ability differences, race, gender, and sexual orientation. Prerequisite: Admission into a teacher educ ation program. Also taught as ELED 4710. (Sp,Su)

SCED 4730 Educational Linguistics 3
(dual listing 6730)
Examines theoretical foundations, functions, and characteristics of first language acquisition and language variation in the Pre-K-12 classroom context. Also emphasizes social context of language in K-12 classroom interaction, instruction, and curriculum. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 4730/6730. (F,Su)

SCED 4740 Second Language Acquisition
(dual listing 6740) in the Classroom 3
Explores the processes of second language acquisition, including the influences of linguistic, cognitive, and sociocultural factors, as well as the relationship to first language acquisition. Emphasizes implications for teaching in the K-12 classroom environment. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 4740/6740. (Sp,Su)

SCED 4760 ESOL Instructional Strategies 3
(dual listing 6760)
Includes strategies for promoting oral language, reading, and writing for K-12 English language learners. Methods for integration for second language learners into the larger school community. Discussion of parental involvement. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 4760/6760. (F,Sp)

SCED 4770 ESOL Instructional Strategies
(dual listing 6770) in the Content Areas 3
Focuses on methods which help English language learners in content-area classrooms to increase academic learning and integration into the larger school community. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 4770/6770. (F,Sp)

SCED 4780 Assessment for Language Learners 3
(dual listing 6780)
Explores principles and techniques for developing, analyzing, and interpreting assessment measures for English language learners, including oral, writing, reading, and content-area assessment, as well as assessments used in public schools. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 4780/6780. (F,Sp)

SCED 4900H Senior Thesis 1-6
Student-initiated research project under faculty supervision. Requires prior approval of department head, honors committee, and instructor. Prerequisite: Approval of department head. (F,Sp)

SCED 5000 Practicum in Improvement
(dual listing 6000) of Instruction 1-6®
Open topics course focusing upon effective teaching methods, teaching performance, curriculum decision-making, and characteristics of learners. Also taught as ELED 5000/6000. (F,Sp,Su)

SCED 5400 Laboratory Practicum 3
Laboratory practicum for inservice teachers, focused on design, practice, and performance of secondary science demonstrations and investigative lab activities. (F,Sp)

SCED 5500 Student Teaching Seminar 2
Ten-week capstone seminar focused upon student teaching issues, professional development, and principles of effective instruction, emphasizing reflective teaching. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. (F,Sp)

SCED 5630 Student Teaching in Secondary Schools 10
Thirteen-week culminating practicum in which students assume full-time teaching responsibilities under direction of cooperating teachers in major and minor fields. Prerequisites: Level 1 and Level 2 completion, and student teaching placement. (F,Sp)

SCED 5700 Modified Student Teaching 2-4
Culminating practicum experience for students seeking dual licensure, earning half of their student teaching credit in a secondary school setting. Prerequisite: Program admission and completion of Level 1 and Level 2. (F,Sp)

SCED 5800 Secondary School Internship 2-6
Advanced practical teaching experience under combined public school and University supervision. Offered only by arrangement with Director of Field Experiences. Prerequisites: Level 1 and Level 2 completion, and special recommendation. (F,Sp)

SCED 5900 Independent Study 1-3®
Prerequisite: Instructor approval. (F,Sp)

SCED 6000 (dual listing 5000) Practicum in Improvement of Instruction 1-6®
Open topics course focusing upon effective teaching methods, teaching performance, curriculum decision-making, and characteristics of learners. Also taught as ELED 6000/5000. (F,Sp,Su)

SCED 6040 Designing and Interpreting Measurements for Assessing Student Learning 3
Teachers and instructional supervisors develop their talents for (a) designing and interpreting measurements for monitoring students' learning and (b) interpreting scores from standardized and government-mandated tests. Also taught as ELED 6040. (F,Su)

SCED 6100 Motivation and Management in Inclusive Settings 3
Leads in-service teachers to develop classroom management strategies for gaining and maintaining students'cooperation. Also taught as ELED 6100. (Sp,Su)

SCED 6150 Foundations of Curriculum 3
Examination of theories, principles, and foundations of curriculum, emphasizing program planning and current curriculum trends. Also taught as ELED 6150. (F,Su)

SCED 6190 Theories of Teaching and Learning 3
Demonstration, analysis, and evaluation of various models of teaching, emphasizing research-based principles of learning. Also taught as ELED 6190. (Sp,Su)

SCED 6250 Mathematics Curriculum and Instruction 2
Examination of current curriculum standards, trends, and effective methods of instruction for mathematics in middle and secondary schools. (Su)

SCED 6300 English Curriculum and Instruction 2
Examination of current curriculum standards, trends, and effective methods of instruction for English/language arts in middle and secondary schools. (Su)

SCED 6310 Content Area Reading and Writing 3
Practical approaches for teaching reading/writing and learning skills to elementary, middle, and high school students, in all content areas. Also taught as ELED 6310. (Su)

SCED 6320 (dual listing 7320) Literacy and Cognition 3
Examination of cognitive and sociocultural research related to K-12 students' acquisition and use of reading, writing, and learning strategies. Explores implications for school policies and classroom instruction. Also taught as ELED 6320/7320. (Sp)

SCED 6330 Utah Writing Project 1-6
Workshop, seminar, and institute experiences in the Utah Writing Project, focusing on writing process, principles, and research-based strategies for improving writing instruction in grades K-12. Also taught as ELED 6330. (Su)

SCED 6340 Issues and Trends in Literacy 2®
Exploration of current issues and instructional trends in the teaching of reading and writing. Emphasis on reading widely and critically in the professional literature. Prerequisites: ELED 3100, 4040; or teaching experience in elementary or middle school. Also taught as ELED 6340.

SCED 6350 Reading Assessment and Intervention 3
Covers the correlates and diagnosis of reading problems, as well as methods and materials for remedial reading instruction. Prerequisites: ELED 3100, 4040; or teaching experience in elementary, middle, or secondary school. Also taught as ELED 6350. (Sp)

SCED 6360 Research in Reading 3
Covers classical, historical, and contemporary research studies in reading, with an emphasis upon understanding and translating findings into classroom practices. Prerequisites: ELED 3100, 4040; or teaching experience in elementary or middle school. Also taught as ELED 6360. (Su)

SCED 6370 Supervised Internship in Reading and Writing 1-3
Individual practicum experience designed to allow graduate students to implement and focus on one or more aspects of reading and writing instruction in a classroom or clinical setting. Prerequisite: Consent of instructor. Also taught as ELED 6370. (F,Sp,Su)

SCED 6380 Understanding and Supporting Adolescent Literacy Development 3
Focuses on instructional practices, as well as research and theory related to fostering the literacy development of middle school and high school students (Sp,Su)

SCED 6390 Teaching with Tradebooks in the Elementary and Middle Level Classroom 3
Explores the use of trade books in the elementary and middle level classroom. Focuses on how teachers can use various genres to invite children to read and write. Prerequisites: SCED/ELED 6310 or 6360. Also taught as ELED 6390. (Su)

SCED 6400 Multiple Talent Approach to Teaching 2
Explores one model for embedding the teaching of creative and critical thinking in regular curricula. Includes practical application requirements. Also taught as ELED 6400. (Su)

SCED 6420 Education of Gifted and Talented Learners 2
Provides multiple cultural and historical perspectives on giftedness and talent. Explores characteristics of gifted individuals, with emphasis on identifying needs. Provides general overview of possible services for gifted learners. Must be taken concurrently with ELED/SCED 6430. Also taught as ELED 6420. (F)

SCED 6430 Practicum: Individual Case Study 1
Practicum experience in association with ELED/SCED 6420. Requires intensive supervised study of gifts and talents of individual child of student's choice. Must be taken concurrently with ELED/SCED 6420. Also taught as ELED 6430. (F)

SCED 6440 Creativity in Education 2
Exploration of theories, research, and strategies concerning creativity, and their application to personal creativity and to improvement of classroom practice. Also taught as ELED 6440. (Su)

SCED 6460 Identification and Evaluation in Gifted Education 2
Provides educators with theory and models for identifying students as gifted, creative, and talented. Presents models for evaluation of programs for gifted learners. Explores instruments for use in identification and evaluation. Must be taken concurrently with ELED/SCED 6470. Also taught as ELED 6460. (Sp)

SCED 6470 Practicum: Team Consultation 1
Practicum experience in association with ELED/SCED 6460. Requires participation, as part of a consultative team, to improve practice in an approved setting for a specific child, classroom, school, school district, or other educational entity. Must be taken concurrently with ELED/SCED 6460. Also taught as ELED 6470. (Sp)

SCED 6480 Methods and Materials in Gifted Education 2
Explores programming and curriculum models in gifted education, with special attention to the development of instructional materials for use with students. Must be taken concurrently with ELED/SCED 6490. Also taught as ELED 6480. (F)

SCED 6490 Practicum: Classroom Applications 1
Practicum experience in association with ELED/SCED 6480. Requires application of at least three curriculum, cognitive, or affective models in the student's current teaching assignment. Must be taken concurrently with ELED/SCED 6480. Also taught as ELED 6490. (F)

SCED 6500 Science Curriculum and Instruction 2
Examination of current curriculum standards, trends, and effective methods of instruction for science in middle and secondary schools. Emphasizes science program improvement through investigative lab activities. (Su)

SCED 6550 Social Studies Curriculum and Instruction 3
Examination of current curriculum standards, trends, and effective methods of instruction for social studies in middle and secondary schools. (Su)

Course Descriptions

SCED 6570 Advanced Comprehension 3
Designed to enhance teachers' understanding of research and practice related to teaching vocabulary and reading comprehension and fostering motivation for reading. Prerequisite: ELED/SCED 6310 or 6360. Also taught as ELED 6570. (Alt years)

SCED 6580 Character and Values Education 2
Overview of research, theory, and practical approaches to values education, emphasizing processes of moral development and socialization. Also taught as ELED 6580. (Su)

SCED 6590 Supervising School Reading Program 2
Examines strategies for improving school reading programs. Emphasizes simulations, guided practice, and small group discussions. Prerequisites: ELED/SCED 6350 and 6360. Also taught as ELED 6590. (Sp)

SCED 6600 Philosophy and Organization
(dual listing 4600) of the Middle Level School 3
Focuses on characteristics of young adolescents and how middle level schools can be organized to meet those characteristics through interdisciplinary teaming, advisory programs, and exploratory mini-courses. Also taught as ELED 6600/4600. (F,Su)

SCED 6610 Curriculum, Methods, and
(dual listing 4610) Assessment for the Middle Grades 3
Integrates current approaches to curriculum design with instructional models and assessment of learning appropriate for grades 5-9. To receive credit for 6610, graduate students design and implement an action research project related to curricular or pedagogical interests, then share their findings in class. Project will include review of literature related to student's interest. Prerequisite: ELED/SCED 6600. Also taught as ELED 6610/4610. (Sp,Su)

SCED 6620 Service Learning Applications
(dual listing 4620) for the Middle Grades 3
Examines literature related to service learning for the middle grades. Application of service learning in curriculum. Also taught as ELED 6620/4620. (Su)

SCED 6730 Educational Linguistics 3
(dual listing 4730)
Examines theoretical foundations, functions, and characteristics of first language acquisition and language variation in the Pre-K-12 classroom context. Also emphasizes social context of language in K-12 classroom interaction, instruction, and curriculum. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 6730/4730. (F,Su)

SCED 6740 Second Language Acquisition
(dual listing 4740) in the Classroom 3
Explores the processes of second language acquisition, including the influences of linguistic, cognitive, and sociocultural factors, as well as the relationship to first language acquisition. Emphasizes implications for teaching in the K-12 classroom environment. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 6740/4740. (Sp,Su)

SCED 6760 ESOL Instructional Strategies 3
(dual listing 4760)
Includes strategies for promoting oral language, reading, and writing for K-12 English language learners. Methods for integration for second language learners into the larger school community. Discussion of parental involvement. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 6760/4760. (F,Sp)

SCED 6770 ESOL Instructional Strategies
(dual listing 4770) in the Content Areas 3
Focuses on methods which help English language learners in content-area classrooms to increase academic learning and integration into the larger school community. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 6770/4770. (F,Sp)

SCED 6780 Assessment for Language Learners 3
(dual listing 4780)
Explores principles and techniques for developing, analyzing, and interpreting assessment measures for English language learners, including oral, writing, reading, and content-area assessment, as well as assessments used in public schools. Additional requirements for graduate students. Prerequisite: Admission into a teacher education program. Also taught as ELED 6780/4780. (F,Sp)

SCED 6840 Workshop: Intermountain Conference on
Education of the Gifted and Talented 1-2®
Provides instruction by leading national authorities in gifted and talented education, as well as networking with educators of the gifted from throughout the Intermountain West. Also taught as ELED 6840. (Su)

SCED 6900 Independent Study 1-3®
Individually directed readings and conference. Departmental permission required before registration. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 6910 Independent Research 1-3®
Individually directed research projects. Departmental permission required before registration. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 6940 Supervision and Administration Internship 3
Individually directed internship experiences in secondary school settings for development of supervisory and administrative skills. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 6960 Creative Project 3
Individually directed creative project, with a focus closely related to coursework or to area of teaching specialization. Only students pursuing the Plan B MEd option should enroll in this course. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 6970 Master's Thesis 3-6
Individually directed work in thesis writing, with guidance from committee chair. Designed for use on MA and MS degrees only. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 6980 Portfolio Project 3
Individually directed portfolio for students in the MEd Plan B degree, only to be taken at the end of student's program of study. Designed for students to integrate and apply concepts learned in the master's program. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 6990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

SCED 7000 Student Teacher Supervision 1-3
Experiences in providing guidance for secondary student teachers in public schools. Analysis of roles and responsibilities of cooperating teachers and university supervisors. Prerequisite: Instructor's approval. (F,Sp)

SCED 7050 Internship in Program Evaluation 1-6
Experiences in practical aspects of program evaluation through planned and supervised evaluation project participation. Must be approved by student's graduate committee. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 7060 Internship in Research 1-6
Experiences in conducting research through planned and supervised research project participation. Must be approved by student's graduate committee. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 7320 Literacy and Cognition 3
(dual listing 6320)
Examination of cognitive and sociocultural research related to K-12 students' acquisition and use of reading, writing, and learning strategies. Explores implications for school policies and classroom instruction. Also taught as ELED 7320/6320. (Sp)

SCED 7330 Internship in Supervision 1-3
Directed experiences in supervision with selected public school personnel in approved settings. Experiences arranged by student's graduate committee. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 7350 Internship in Curriculum Development 1-3
Directed experiences in curriculum development with selected public school personnel in approved settings. Experiences arranged by student's graduate committee. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 7500 Interdisciplinary Workshop 1-3®
Prerequisite: Instructor's approval. (Su)

SCED 7810 Research Seminar 1-3®
Identification of research problems and critical issues, consideration of critical issues and research methods, and application of data analysis procedures under faculty direction. (F,Sp,Su)

SCED 7900 Independent Study 1-3®
Individually directed reading and conference. Departmental permission required before registration. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 7910 Independent Research 1-3®
Individually directed research projects. Departmental permission required before registration. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 7970 Dissertation 1-12®
Individual work on research problems in the PhD or EdD program. Prerequisite: Instructor's approval. (F,Sp,Su)

SCED 7990 Continuing Graduate Advisement 1-12®
Prerequisite: Approval of instructor. (F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.\

Science (SCI)

See College of Science, pages 129-130.

SCI 4300 Science in Society 2
Investigation of interactions between current scientific topics and societal goals and concerns. Intended as a capstone course for science teaching majors. Prerequisite: Senior standing and consent of instructor. (F,Sp)\

Sociology (SOC)

See Department of Sociology, Social Work and Anthropology, pages 500-511.

SOC 1010 BSS Introductory Sociology 3©
Examination of social behavior of humans and social institutions. Theories and methods for studying society and social issues, along with insights from related disciplines. (F,Sp)

SOC 1020 Social Problems 3
Study of major U.S. and international social problems. Examination of how issues are defined as social problems and ways groups attempt to solve the problems. (F,Sp)

SOC 2370 Sociology of Gender 3
(formerly SOC 2500)
Examines impacts of social constructions of gender on individual and collective experience. Investigates how gender is shaped through social processes and through the effects of social institutions. Particular attention given to relation of gender to social stratification. (F)

SOC 3010 Race, Class, and Gender 3
Examines theories and research concerning how race, class, and gender intersect in the lives of societal members. (F,Sp)

SOC 3110 CI Methods of Social Research 3
Methods and techniques of analyzing social data. Examines surveys, field research, observational studies, and other social science techniques. Emphasizes analysis of data and published research. Prerequisite: Completion of 6 credits in departmental courses. (F,Sp)

SOC 3120 QI Social Statistics I 3
Examines use of statistics in social sciences. Particular focus on use of statistical analysis with surveys and census-type data. Includes parametric and nonparametric statistics utilized most in social analysis. Prerequisite: Completion of 6 credits in departmental courses and STAT 1040 or equivalent. (F,Sp)

SOC 3200 DSS Population and Society 3
Examination of interrelationships between population change and social structure in national and international context. Examines contributions of fertility, mortality, and migration to population characteristics, particularly sex, age, and ethnic composition. Stresses demographic data and analysis. (F,Sp)

SOC 3320 Sociology of Work and Organization 3
Stresses contribution of sociology to the understanding of industry as a social system. (Sp)

SOC 3330 Medical Sociology 3
In-depth analysis of major contributions of sociology to field of medicine. (F)

SOC 3410 Juvenile Delinquency 3©
Focuses on nature, extent, and causes of delinquent behavior. Examines workings of juvenile justice system and programs for delinquency prevention. (F,Sp)

SOC 3420 Criminology 3
Examines theoretical explanations for crime in the U.S. Describes characteristics of major forms of criminal behavior. (F,Sp)

SOC 3430 Social Deviance 3
Examination of sociological perspectives on deviance as they apply to lifestyles, commitment, and social control in American society. (F)

SOC 3500 Social Psychology 3
Explores interaction between the social system and the individual. Examines human behavior in terms of positions people occupy in the social structure. (F,Sp)

SOC 3600 Sociology of Urban Places 3
Provides historical and international perspective on social, cultural, and spatial characteristics of urban places. Examines changes associated with urbanization processes and the effect of urbanization on community, crime, neighborhoods, and urban space. (F)

SOC 3610 DSS Rural Sociology 3
Examines patterns and processes of social change in rural and nonmetropolitan sectors of the U.S. and other advanced industrial societies. Considers how rural social change is influenced by demographic, economic, political, and natural resource conditions at regional, national, and global scales. (F)

SOC 3750 Sociology of Aging 3
Examination of social context in which aging occurs, the social implications of aging, and attendant social policy issues. Considers both individual and societal aging, using an historical and global approach. (F)

SOC 4010 Contemporary Sociological Theory 3
Critical analysis of major theorists and schools of theory in sociology from the late nineteenth century through recent and current works. Emphasizes contemporary issues, insights, and uses of sociological theory. (F,Sp)

SOC 4330 Sociology of Religion 3
Discussion of theories and research used by sociologists to understand social dimensions of religion. Includes ways in which religion influences and is influenced by other societal institutions, such as politics, the economy, and the class system. (F)

SOC 4350 Political Sociology* 3
Examines prevalent theories and concepts related to global development, underdevelopment, and social change, while building an understanding of contemporary global social issues accompanying these processes. Particular emphasis placed on understanding global inequality and regional differences. (Sp)

SOC 4420 CI Criminal Law and Justice 3
Sociological analysis of relationship between law and social control and social change, especially regarding law enforcement, courts, and corrections. (Sp)

SOC 4620 DSS Sociology of the Environment and Natural Resources 3
Social aspects associated with the environment and natural resources. Topics include: environmental attitudes and perceptions, environmentalism as a social movement, resource scarcity and land use, and social change in resource-based communities. (Sp)

Course Descriptions

SOC 4710 Asian Societies 3
Explores history; social, economic, and political institutions; and peoples and cultures of Asian Societies. (Sp)

SOC 4720 Applied Community Development 3
Involves a service-learning placement with an organization engaging in community development. Overview of community development models and theories, as well as the service-learning activity. Includes reflective evaluation of theories based upon the service-learning experience. (Sp)

SOC 4730 Women in International Development 3
Examines status of women in developing countries, and the role they play in the development process. (Sp)

SOC 4800 Seminar in Sociology 1-3®
Seminars in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) social organization, (e) social deviance, (f) social psychology, (g) human ecology, (h) gerontology. (F,Sp)

SOC 4900 Independent Readings in Sociology 1-5®
Independent readings in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) social organization, (e) social deviance, (f) social psychology, (g) human ecology. Prerequisite: Permission of instructor. (F,Sp,Su)

SOC 5100 Interpreting Social Research 3
Examines research design issues (conceptualization and measurement, sampling), modes of observation (experiments, surveys, field research, evaluation research), and interpreting social research findings (basic understanding of statistical analysis), as well as focusing on the ethics and politics of social research. (F,Su)

SOC 5130 Ethnographic Field School 3-6
(dual listing 6130)
Provides practical training in use of ethnographic field methods, qualitative data analysis, and ethnographic report-writing. Combines classroom instruction with supervised off-campus field research, while living in a cross-cultural setting. Fulfills program methods requirement. Application and additional fee required. Also taught as ANTH 5130/6130. (Su)

SOC 5640 Conflict Management in
(dual listing 6640) Natural Resources 3
Introduction to conflict management techniques for those involved in natural resource management. Also taught as ENVS 5640/6640. (Sp)

SOC 5650 DSS Developing Societies 3
(dual listing 6650)
Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. Also taught as ANTH 5650/6650 and GEOG 5650/6650. (F)

SOC 6010 Development of Sociological Theory 3
Examines development of social theory from early to premodern times. Special attention given to nineteenth century European influences on development of American sociological theory. (F)

SOC 6020 Modern Social Theory 3
Examines current analytical and empirical theories from sociology as science perspective. Also explores network, exchange, conflict, functional, and interactionist approaches to, and difficulties with, scientific theorizing. (F)

SOC 6100 Advanced Methods of Social Research 3
Examines philosophical bases, techniques, and political and ethical aspects of social research. (F)

SOC 6130 Ethnographic Field School 3-6
(dual listing 5130)
Provides practical training in use of ethnographic field methods, qualitative data analysis, and ethnographic report-writing. Combines classroom instruction with supervised off-campus field research, while living in a cross-cultural setting. Fulfills program methods requirement. Application and additional fee required. Also taught as ANTH 6130/5130. (Su)

SOC 6150 Social Statistics II 3
Statistical procedures for sociological analysis; nonparametric statistics; inferential statistics, cross-tabulation, and log-linear analysis; correlation; regression; ANOVA; and other multivariable social science statistical treatments. (Sp)

SOC 6200 Social Demography* 3
Focuses on relationships between demographic and sociological processes. Study of theoretical perspectives and empirical analyses of the determinants. Consequences of change in population size, composition, and distribution, as well as changes in demographic processes. (F)

SOC 6230 Techniques of Demographic Analysis* 3
Provides instruction in use of rates, ratios, life tables, and related measures to describe, analyze, and estimate population. Review of measures designed to examine the three demographic processes: fertility, mortality, and migration. Utilization of analytical tools to explore population composition. Special emphasis placed on use of U.S. Census data to create population profiles. (Sp)

SOC 6250 Sociology Internship/Co-op 1-6
Professional level of educational work experience in an internship/cooperative education position for graduate students. (F,Sp,Su)

SOC 6310 Sociology of Work and Occupations* 3
Uses an applied and comparative cross-cultural perspective to examine work in pre-industrial (agricultural/pastoral), industrializing, industrialized, and post-industrial societies. (Sp)

SOC 6420 Gender and Social Inequality* 3
Contemporary American gender stratification, including (1) What is the problem? (2) Why is it a problem? (3) How does it interact with other stratifiers? (4) What caused or is causing it? (5) How and why is it maintained? and (6) When does it vary and why? Comparison of different views on these issues. (Sp)

SOC 6450 Special Topics in Social Problems 3®
Seminars on various topics appropriate to sociological analysis of contemporary social problems. Subject matter will reflect current faculty research and interests. (F,Sp)

SOC 6460 Sociology of Health* 3
Examination of social and cultural factors influencing health. Analysis of health behaviors as consequences of variety of diverse personal and social processes. (F)

SOC 6620 Environment, Technology,
and Social Change* 3
Focuses on human interactions with the physical environment and changes brought about by this interaction. Topics of major emphasis include: approaches to environmental sociology; environmental values and attitudes; social movements pertaining to environmental concern; and social change responses to technology and resource scarcity. (Sp)

SOC 6630 Natural Resources and
Social Development* 3
Focuses on social dimensions of natural resources use, development, scarcity, and allocations. Examines ways in which changing resource conditions impact human social organization. Emphasis on topics including: social characteristics of resource-dependent communities and areas; social organizational responses to changes in availability of, or access to, natural resources; and social impacts of natural resource development activities. (Sp)

SOC 6640 Conflict Management
(dual listing 5640) in Natural Resources 3
Introduction to conflict management techniques for those involved in natural resource management. Also taught as ENVS 6640/5640. (Sp)

SOC 6650 Developing Societies 3
(dual listing 5650)
Reviews how sociology, cultural geography, and economic anthropology analyze processes of globalization in postcolonial societies. Examines changing livelihoods, patterns of spatial incorporation and societal evolution, and emergent policy problems associated with rapid socioeconomic change. Also taught as ANTH 6650/5650 and GEOG 6650/5650. (F)

SOC 6700 Advanced Rural Sociology* 3
Analysis of major developments in the study of rural society and rural communities. Emphasis on rural social changes related to economic, demographic, organizational, and technological trends at societal and global levels. (Sp)

SOC 6730 Gender and International Development* 3
Examines gender issues in economic and social development. Focuses on theory and methodologies for gender analysis. (Sp)

SOC 6750 Social Change and Development* 3
Readings from both domestic and international scholarship are used to examine the important social, economic, and political forces that shape patterns of social change and development. (Sp)

SOC 6800 Seminar in Sociology 1-3®
Seminars in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) social organization, (e) social deviance, (f) social psychology, (g) social problems, (h) international development, (i) domestic development, (j) rural sociology, (k) environmental sociology, (l) other. (F,Sp,Su)

SOC 6900 Independent Readings in Sociology 1-3®
Independent readings in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) environmental/natural resource sociology, (e) sociology of development, (f) social problems. (F,Sp,Su)

SOC 6970 Thesis Research 1-12®
(F,Sp,Su)

SOC 6990 Continuing Graduate Advisement 1-3®
(F,Sp,Su)

SOC 7010 Issues in Sociological Theory* 3
Explores current philosophical discussions on theoretical approaches to understanding society. Examines feminist, post-structuralist, and post-modernist conceptualizations of power, knowledge, and identity. (Sp)

SOC 7100 Advanced Survey Techiques* 3
Examines the empirical and methodological literature regarding techniques for designing and implementing mail, telephone, and internet surveys for sociological research. Focuses on practical lessons for sampling, data collection, and survey data organization. (Sp)

SOC 7110 Advanced Sociological Analysis* 3
Provides review of several quantitative approaches utilized in contemporary social research. Students undertake small-scale analytical exercises in topics including, but not limited to, log-linear and structural equation modeling, logistic regression, and event history analysis. (F)

SOC 7150 Advanced Qualitative Methods in Sociology* 3
Examines the empirical and methodological literature regarding techniques for designing and implementing qualitative data collection and analysis for sociological research. Emphasizes practical tools for graduate students seeking to use qualitative methods for their thesis or dissertation research. (Sp)

SOC 7210 Teaching Sociology 3
Provides a learning opportunity for graduate students who will be graduate instructors or teaching assistants. Reviews teaching strategies (meeting a class for the first time, teaching a large lecture class) and course development (constructing a syllabus, developing tests and writing assignments). (F)

SOC 7250 Advanced Seminar in Social Demography* 3
Detailed comparative and multilevel examination of substantive and methodological issues in the study of nuptiality, fertility, morbidity and mortality, migration, and social mobility. Covers theories, data collection strategies, measurement issues, and analytical techniques. (Sp)

SOC 7400 Perspectives on Inequality and Social Problems* 3
Examines major theoretical and empirical approaches to the sociological analysis of inequality and social problems. (F)

SOC 7440 Crime and Society* 3
Explores the field of criminology, which is primarily concerned with describing and explaining patterns of deviance violating criminal laws. Reviews the epistemological foundations of criminology, and then addresses specific topics surrounding various legal definintions of criminal behavior. (Sp)

SOC 7620 Sociology of Environmental Hazards and Risks* 3
Focuses on how individuals and organizations respond to environmental hazards and risks resulting from either natural events or human technological and industrial processes. (F)

SOC 7640 Population and Environment* 3
In-depth exploration of relationship between human populations and their environment. Heavy emphasis placed on developing an understanding of contemporary research in this area, especially with regard to the association between environmental factors and population organization, change, and growth. (Sp)

SOC 7660 The Environment and Social Inequality* 3
Explores the intersection of social inequality and the physical enviroment. Examines how social structures and individual actions both perpetuate and combat various forms of inequality, including class, race, ethnicity, gender, and "expert knowledge." (F)

SOC 7720 Community Theory and Research* 3
Explores theoretical and empirical sociological literature on the human community. Topics include: conceptualization and measurement of community well-being, dynamics and impacts of social and economic change on community life, and comparison of community research conducted in different settings. (Sp)

SOC 7800 Topical Seminar in Sociology 3®
Seminars in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) environmental/natural resource sociology, (e) sociology of development, (f) social problems. (F,Sp)

SOC 7900 Independent Study 1-3®
Independent study in sociological areas emphasizing (a) theory, (b) methodology, (c) demography, (d) environmental/natural resource sociology, (e) sociology of development, (f) social problems. (F,Sp,Su)

SOC 7970 Dissertation Research 1-12®
(F,Sp,Su)

SOC 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

*This course is taught alternating years. Check with department for information about when course will be taught.
®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Soil Science (SOIL)

See Department of Plants, Soils, and Biometeorology, pages 439-472.

SOIL 2000 BPS Soils, Waters, and the Environment 3
Introduction to principles of physical and biological science. Discussion of current environmental topics, focusing on soil and the waters that contact the soil. Topics include water quality, global climate change, deforestation, soil conservation, and agricultural sustainability. (Sp)

SOIL 3000 Fundamentals of Soil Science 4
Fundamentals of soil science, emphasizing physical, chemical, mineralogical, and biological properties of soils, and how these properties relate to plant growth and environmental quality. Prerequisites: CHEM 1110, MATH 1050, or equivalents. (F,Sp)

SOIL 3100 DSC Soils and Civilization 3
Lectures, readings, and discussions to explore effects of soil physical, chemical, and biological properties on civilization throughout history. Influence of soils on settlement patterns, land use/management, and civilization decline. Case studies focus on current soil and land use issues in western North America. (Sp)

Course Descriptions

SOIL 3200 DSC Microbes in Environmental Action 3
Microorganisms play a central role in maintaining the biosphere. In this course, the diversity of microbial lifestyles is introduced. Current examples and case studies used to demonstrate microbial actions in composting, waste water treatment, and bioremediation of pollutants in the environment. Prerequisite: Completion of Breadth Life Sciences (BLS) University Studies requirement. (Sp)

SOIL 3600 Water Properties and Humankind 3
Examines properties, distribution, movement, uses, treatment, and care of our planet's most vital resource. Through examples from everyday life and case studies, explores the many implications of the physical properties of water on the natural and constructed world. (Sp)

SOIL 4000 Soil and Water Conservation 4
Applied soil and water conservation in an agronomic setting. Management of soil-water-plant-atmosphere continuum. Soil conservation techniques as they apply to actual situations. (F)

SOIL 4700 Irrigated Soils 3
Soil salinity, soil-moisture-plant relationships, water supply and quality, irrigation water measurements, soil moisture movement, and irrigation methods. Prerequisite: SOIL 3000 or equivalent, or instructor's consent. (Sp)

SOIL 5050 Principles of Environmental
(dual listing 6050) Soil Chemistry 3**
Introduction to common chemical processes occurring among solid, liquid, and gas phases in soil systems. Emphasis placed on chemistry of arid land soils. Prerequisites: CHEM 1110 or higher, MATH 1050 or higher. (Sp odd)

SOIL 5130 Soil Genesis, Morphology,
(dual listing 6130) and Classification 4
Morphology, development, and classification of soils. Lectures and weekly field exercises emphasize soil as a natural body of the landscape: its properties, distribution, behavior, and interpretations for diverse land uses. Prerequisite: Understanding of fundamental soil science; SOIL 3000 recommended. (F even)

SOIL 5310 Soil Microbiology* 3
Ecology and diversity of microorganisms in soils. Emphasis on factors controlling microbial activity and the role of microorganisms in organic matter decomposition and nutrient cycling. Prerequisites: BIOL 1610, 1620; CHEM 2300 or 2310; SOIL 3000. Also taught as BIOL 5310. (F)

SOIL 5320 Soil Microbiology Laboratory* 2
Techniques for measuring microbial activity and diversity in soils. Includes use of molecular and isotope methods. Prerequisite: Concurrent or prior enrollment in BIOL/SOIL 5310. Also taught as BIOL 5320. (F)

SOIL 5350 Wildland Soils 3
(dual listing 6350)
Application of basic principles of soil science to wildland ecosystems. Effects of disturbance and land use on wildland soil properties. Role of soils in natural resource management. Prerequisites: CHEM 1110, SOIL 3000, and one additional upper-division Soils course, or permission of instructor. Also taught as FRWS 5350/6350. (Sp)

SOIL 5550 QI Soils and Plant Nutrient Bioavailability 3
(dual listing 6550)
Description of forms, transformations, and movement of plant nutrients in soils. Discussion of factors affecting nutrient supply, both qualitatively and quantitatively, for nutrient elements essential for plant growth. Prerequisites: SOIL 3000; CHEM 1110 or 1210. (Sp)

SOIL 5560 Analytical Techniques for the
(dual listing 6560) Soil Environment 2
Analysis of chemical and biological soil characteristics. Results interpreted for soil fertility, land use, and environmental remediation. Graduate credit requires a paper reviewing analysis of element or compound class. Prerequisite: SOIL 5050/6050 or 5550/6550 (may be taken concurrently), or instructor's permission. (Sp)

SOIL 5600 Surface Hydrologic Field Methods 3**
(dual listing 6600)
Hydrologic concepts and terminology taught through collection, analysis, and interpretation of hydrologic data. Emphasizes principles and practice of several hydrologic measurements and water sampling in natural and manmade environments. Prerequisite: SOIL 3000 or instructor's permission. Also taught as AWER 5600/6600. (Sp)

SOIL 5620 Aquatic Chemistry 3
Provides students with understanding of principles of aquatic chemistry, emphasizing chemical equilibria, acid-base reactions, complex formation, oxidation-reduction reactions, complex formation, and dissolution chemistry. Prerequisite: CHEM 1210 or equivalent. Also taught as CEE 5620. (F)

SOIL 5650 Environmental Soil Physics 3
(dual listing 6650)
Characterization of the physical properties of soils and other porous media. Measurement, prediction, and control of processes taking place in and through soils (e.g., water flow and solute transport), including atmospheric and groundwater interactions. (F)

SOIL 5750 Environmental Quality: Soil and Water 2
Senior capstone course for Environmental Soil/Water Science (ESWS) major. Students analyze current soil and water environmental quality problem(s), formulate remediation or mitigation plans, and present findings in oral and written reports. Prerequisites: SOIL 5130 and two 5000-level Soil courses. (Sp)

SOIL 6050 Principles of Environmental
(dual listing 5050) Soil Chemistry 3**
Introduction to common chemical processes occurring among solid, liquid, and gas phases in soil systems. Emphasis placed on chemistry of arid land soils. Prerequisites: CHEM 1110 or higher, MATH 1050 or higher. (Sp odd)

SOIL 6130 Soil Genesis, Morphology,
(dual listing 5130) and Classification 4
Morphology, development, and classification of soils. Lectures and weekly field exercises emphasize soil as a natural body of the landscape: its properties, distribution, behavior, and interpretations for diverse land uses. Prerequisite: Understanding of fundamental soil science; SOIL 3000 recommended. (F even)

SOIL 6140 Unsaturated Flow and Transport 3**
Measurement, prediction, and control of transport processes taking place in and through partially saturated porous formations (e.g., water flow and solute transport), emphasizing parameter estimation and multi-dimensional flow. (F)

SOIL 6190 Salt-affected Soils 2**
Emphasis on chemistry of salt-affected soils. Topics include carbonate chemistry, cation exchange, and reclamation of sodium and salt-affected soils. Exploration of effects of sodium accumulation on soil hydraulic conductivity and the biochemistry of salt and potentially toxic elements. (Sp)

SOIL 6200 Biogeochemistry of
Terrestrial Ecosystems 3**
Inputs, outputs, and cycling patterns of major nutrients. Emphasis on mechanisms for transformations, factors influencing process rates, and the impacts of management and global change on nutrient cycles and air and water quality. Prerequisites: BIOL 1620, SOIL 3000, CHEM 2300 or 2310, or permission of instructor. Also taught as BIOL 6200 and FRWS 6200. (F)

SOIL 6350 Wildland Soils 3
(dual listing 5350)
Application of basic principles of soil science to wildland ecosystems. Effects of disturbance and land use on wildland soil properties. Role of soils in natural resource management. Prerequisites: CHEM 1110, SOIL 3000, and one additional upper-division Soils course, or permission of instructor. Also taught as FRWS 6350/5350. (Sp)

SOIL 6400 Spatial and Temporal Estimation
Methods for Environmental Sciences 2**
Introduction to methods for obtaining spatial information and interpolation schemes. Incorporation of uncertainty into dynamic models (temporal predictions). Methods and models for combining spatial and temporal information, with applications to monitoring and forecasting natural processes. (Sp)

SOIL 6550 Soils and Plant Nutrient Bioavailability 3
(dual listing 5550)
Description of forms, transformations, and movement of plant nutrients in soils. Discussion of factors affecting nutrient supply, both qualitatively and quantitatively, for nutrient elements essential for plant growth. Prerequisites: SOIL 3000; CHEM 1110 or 1210. (Sp)

SOIL 6560 (dual listing 5560) Analytical Techniques for the Soil Environment 2
Analysis of chemical and biological soil characteristics. Results interpreted for soil fertility, land use, and environmental remediation. Graduate credit requires a paper reviewing analysis of element or compound class. Prerequisite: SOIL 6050/5050 or 6550/5550 (may be taken concurrently), or instructor's permission. (Sp)

SOIL 6600 (dual listing 5600) Surface Hydrologic Field Methods 3**
Hydrologic concepts and terminology taught through collection, analysis, and interpretation of hydrologic data. Emphasizes principles and practice of several hydrologic measurements and water sampling in natural and manmade environments. Prerequisite: SOIL 3000 or instructor's permission. Also taught as AWER 6600/5600. (Sp)

SOIL 6650 (dual listing 5650) Environmental Soil Physics 3
Characterization of the physical properties of soils and other porous media. Measurement, prediction, and control of processes taking place in and through soils (e.g., water flow and solute transport), including atmospheric and groundwater interactions. (F)

SOIL 6720 Chemistry of Arid Land Soils 3**
Chemical equilibria and kinetics of arid land soils. Special emphasis on solubility relationships of soil minerals and on carbonate chemistry. (Sp)

SOIL 7200 Soil Interfacial Processes and Reactive Transport* 3
Course divided into two blocks. Subject matter for first block is soil electrochemistry and surface chemistry. Second block applies material from first block to system in which transport limits reaction time. (Sp)

SOIL 7210 Advanced Topics in Pedology 2®
Strategies for designing and critiquing pedological research through literature, discussions, and field trips. Topics will change, depending upon student interest, and can include factors and processes involved in pedogenesis, soil mineralogy, soil-biota relationships, and landscape evolution. Prerequisite: SOIL 6130/5130. (Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
*Taught 2006-2007.
**Taught 2007-2008.

Spanish (SPAN)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

Lower Division

SPAN 1010 Spanish First Year I 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: No more than one year of Spanish in high school or placement in this specific class by examination. (F,Sp)

SPAN 1020 Spanish First Year II 4
Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: SPAN 1010 (or equivalent coursework) or placement in this specific class by examination. (F,Sp)

SPAN 1050 Intensive First Year Spanish 8
Intensive one-semester alternative course to SPAN 1010 and 1020, emphasizing active usage. (Su)

SPAN 1800 Spanish I Study Abroad 1-4®
Taught overseas only. Communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. (Su)

SPAN 2010 Spanish Second Year I 4
Continued development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: SPAN 1020 (or equivalent coursework) or placement in this specific class by examination. (F,Sp)

SPAN 2020 Spanish Second Year II 4
Continued development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: SPAN 2010 (or equivalent coursework) or placement in this specific class by examination. (F,Sp)

SPAN 2800 Spanish II Study Abroad 1-4®
Taught overseas only. Continued development of communicative competencies in the four language skills: speaking, listening, reading, and writing, with exposure to cultures and customs. Prerequisite: SPAN 1020 or equivalent. (Su)

Upper Division

Upper-division Spanish courses (3000 level and above) are available *only* to students who have completed SPAN 2020 or who can demonstrate equivalent proficiency through testing.

SPAN 3010 Hispanic Outreach Practicum 1-4®
Allows students of Spanish to improve their language skills and cultural awareness within a Hispanic community setting. Prerequisite: Permission of instructor. May be repeated to a maximum of 4 credits, only 3 of which can be applied toward the Spanish major or minor. (F,Sp,Su)

SPAN 3040 Advanced Spanish Grammar 3
Intense review of selected problematic areas of Spanish grammar for students with advanced language skills. Prerequisite: SPAN 2020 (or equivalent coursework) or placement in this specific class by examination. (F,Sp)

SPAN 3060 CI Advanced Spanish Conversation and Composition 3
Development of advanced conversation and writing skills through debate and composition on contemporary controversial topics. (F)

SPAN 3510 Business Spanish 3
Development of communication skills in Spanish for international Hispanic business purposes. (F)

SPAN 3520 Business Spanish Practicum 1-4®
Allows students of Spanish to gain practical work experience in a Hispanic Business context. Prerequisite: Permission of instructor. May be repeated to a maximum of 4 credits, only 3 of which can be applied toward the Spanish major or minor. (F,Sp,Su)

SPAN 3550 DHA Spanish Culture and Civilization 3
Historical, social, political, economic, and cultural conditions and institutions of Spain. (F)

SPAN 3570 DHA Latin American Culture and Civilization 3
Historical, social, political, economic, and cultural conditions and institutions of Latin American countries. (Sp)

SPAN 3600 DHA Survey of Spanish Literature I 3
Selective readings and discussions of major works and authors in Spanish literature from El Cid through Calderon. Prerequisites: ENGL 1010 and 2010; SPAN 3040; and either SPAN 3550 or 3570. (F,Sp)

SPAN 3610 DHA Survey of Spanish Literature II 3
Selective readings and discussions of major works and authors in Spanish literature from the eighteenth to twentieth centuries. Prerequisites: ENGL 1010 and 2010; SPAN 3040; and either SPAN 3550 or 3570. (F,Sp)

SPAN 3620 DHA Survey of Latin American Literature I 3
Selective readings and discussions of major works and authors in Latin American literature from Pre-Columbian works through the beginnings of Modernism. Prerequisites: ENGL 1010 and 2010; SPAN 3040; and either SPAN 3550 or 3570. (F,Sp)

SPAN 3630 DHA Survey of Latin American Literature II 3
Selective readings and discussions of major works and authors in Latin American literature from Modernism to the present. Prerequisites: ENGL 1010 and 2010; SPAN 3040; and either SPAN 3550 or 3570. (F,Sp)

SPAN 3650 Spanish Literature—Study Abroad 1-4®
Selective readings and discussions of major works and authors in Spanish literature. Taught only in Studies Overseas in Spanish program. Prerequisites: ENGL 1010 and 2010; SPAN 3040; and either SPAN 3550 or 3570 (or equivalents). (Su)

SPAN 3660 Latin American Literature—Study Abroad 1-4®
Selective readings and discussions of major works and authors in Latin American literature. Taught only in Studies Overseas in Spanish program. Prerequisites: ENGL 1010 and 2010; SPAN 3040; and either SPAN 3550 or 3570 (or equivalents). (Su)

SPAN 3800 Spanish III Study Abroad 1-4®
Intense review of selected problematic areas of Spanish grammar for students with advanced language skills. Taught only in studies overseas in Spanish program. (Su)

SPAN 4200 Applied Spanish Linguistics and Phonetics 3
Analysis of selected phonological, morphological, syntactic, and semantic features of the Spanish language, including Spanish-English contrastive analysis. Prerequisite: SPAN 3040. (Sp)

SPAN 4800 Hispanic Culture and Civilization—Study Abroad 1-4®
Historical, social, political, economic, and cultural conditions and institutions of Hispanic countries. Taught only in studies overseas in Spanish program. (Su)

SPAN 4880 Individual Readings 1-4®
Individual readings or projects in Spanish. Prerequisite: Instructor's permission. (F,Sp)

SPAN 4900 Topics of Spanish Literature 3®
Repeatable for additional credit when topics vary. Prerequisites: At least two of the following: SPAN 3600, 3610, 3620, and 3630. (F,Sp)

SPAN 4910 Topics of Latin American Literature 3®
Repeatable for additional credit when topics vary. Prerequisites: At least two of the following: SPAN 3600, 3610, 3620, and 3630. (F,Sp)

SPAN 4920 Spanish Language Tutoring 1®
Allows students to develop tutoring skills by assisting professors in lower-division courses or fulfilling instructional duties for a comparable amount of time in the language laboratory, public schools, or similar activities with departmental approval. May be repeated to a maximum of 3 credits. Prerequisite: Permission of instructor. (F,Sp,Su)

SPAN 4990 Spanish Degree Assessment 1
Final requirement for all Spanish majors and minors, to be completed their last semester before graduation. Includes review of coursework and comprehensive exit examination, individualized according to the courses taken for the degree. Prerequisite: Permission of instructor. (F,Sp,Su)

SPAN 6200 Spanish Linguistics and Phonetics 3
Analysis of phonology, morphology, and syntax of the Spanish language. Prerequisite: SPAN 2020, another 3000-level or higher SPAN course, or demonstrated proficiency through testing. (Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Speech Communication (SPCH)

See Department of Languages, Philosophy, and Speech Communication, pages 364-379.

SPCH 1020 CI Public Speaking 3
(formerly SPCH 1050 CI)
Speaking in formal public communication situations. Development of skills in speech preparation, audience adaptation, and delivery. (F,Sp)

SPCH 2110 CI Interpersonal Communication 3
(formerly SPCH 2600 CI)
Examination of theories, methods, and competencies relevant to studying, establishing, and maintaining interpersonal relationships in family, intercultural, professional, and other contexts. Classroom experiences with topics such as perception, language, nonverbal behavior, conflict resolution, and listening. (F,Sp)

SPCH 2270 Argumentation and Debate 3
(formerly SPCH 4280)
Techniques of analysis, investigation, evidence, reasoning, brief making, refutation, and construction and delivery of the argumentative speech and academic debate. (F)

SPCH 2280 Listening 2
Development of comprehension, critical, and relationship listening skills. Experience in developing listening training for kindergarten to adult education. (Sp)

SPCH 3000 Speech Communication Teaching Practicum 1®
Intensive speech teaching workshop. Supervised on-campus teaching experience. Must be completed prior to student teaching experience. Repeatable to a maximum of 2 credits. (Sp)

SPCH 3050 DSS Technical and Professional Communication 3**
Skill development in oral technical reporting, interviewing, and interpersonal communication to meet the unique communication requirements of business, industry, and the professions. (Su)

SPCH 3250 CI Organizational Communication 3
Study of internal communication requirements of organizations. Analysis of communication problems associated with conflict, diversity, interpersonal influence, communication technology, and information flow. Development of effective communication practices. (F)

SPCH 3300 Clinical Experience I 1
First clinical practicum in middle and secondary schools. Arranged by special methods instructor. Required at Level I. Must be taken concurrently with SPCH 5370. Prerequisites are set by the Secondary Education Department. (F)

SPCH 3330 DSS Intercultural Communication 3
Study of how communication shapes culture and how culture, in turn, affects communication. Development of active intercultural communication in professional and personal contexts. (F)

SPCH 3400 CI Persuasion 3
Survey of theory and research investigating the process of social influence. Topics include: compliance-gaining strategies, enactment and detection of deception, verbal and nonverbal influence, attitude change, conformity, communicator characteristics, credibility, emotional appeals, and ethics. (F)

SPCH 3600 Communication and Conflict 3
Study of contemporary theories on conflict and communication. Analyses of the roles of culture, gender, and personal and/or organizational ethics in conflict and disputes. Discussion and application of negotiation, mediation, and facilitation skills. (F)

SPCH 4300 Clinical Experience II 1
Second clinical practicum in middle and secondary schools. Arranged by special methods instructor. Required at Level II. Must be taken concurrently with SPCH 5370. Prerequisites are set by the Secondary Education Department. (F)

SPCH 4800 CI Nonverbal Communication 3**
Examination of theories, methods, and competencies relevant to studying, enacting, and perceiving gestures, facial expressions, body movements, touches, and other nonverbal cues. Investigation of environmental, cultural, and social influences on nonverbal communication in a variety of contexts.

SPCH 5000 Studies in Speech Communication 1-5®
Study of special topics in interpersonal, small group, organizational, or intercultural communication theory and research. Prerequisite: Permission of instructor. (F,Sp)

SPCH 5090 Small Group Theory 3**
Study of theories of group processes such as decision-making, leadership, power, conflict, deviance, and the development of group structures, functions, norms, and roles.

SPCH 5100 CI Theories of Speech Communication 3
Social, scientific, and humanistic inquiry into the process of human communication. Multi-theoretical approach, including perspectives and research on interpersonal, persuasive, organizational, intrapersonal, group, and intercultural communication. (Sp)

SPCH 5250 Environmental Rhetoric 3
Study of persuasive tactics and strategies as used by social advocates. Focuses on environmental issues and organizations. Analysis of environmental messages with an emphasis on the development of writing and critical thinking skills. (Sp)

SPCH 5280 Communication Education Theory 3**
Study of contemporary theories and research in communication education. Emphasis on communication competency development, communication apprehension, critical thinking, communication assessment, development of communication ethics, freedom of speech, instructional communication, and history of communication education. (Sp)

SPCH 5370 Methods in Teaching Speech Communication 3
Development of materials and strategies for teaching secondary school speech communication. Prerequisite: Admission to teacher education. (F)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
**Taught 2007-2008.

Special Education (SPED)

See Department of Special Education and Rehabilitation, pages 512-522.

SPED 0100 Strategies for Reading 1-3®
Practical course with major emphasis on improvement of reading, writing, and comprehension skills that are essential for academic success. Remedial class not carrying USU or transfer credit. Remedial fee required. (F,Sp)

SPED 1000 Principles of Effective Peer Teaching 2®
High school peer tutors are given university credit for tutoring low readers for one hour each day. Tutors are taught a systematic tutoring and mentoring process. In addition, specific criteria are included to evaluate tutors' instructional performance. (F,Sp)

SPED 1010 BSS Disability in the American Experience 3
Discussion of definitions and types of disabilities, ethical issues, society's prejudice and discrimination against people with disabilities, and the individual's adjustment to the disability experience. Disability as a natural part of life. Also taught as REH 1010. (3 cr)

SPED 2010 Effective Behavior Management Practices for Paraeducators 1-3®
Teaches paraeducators to apply effective behavior management practices to individuals with disabilities in a variety of settings. Introduction to proactive behavior management strategies, basic concepts of behavior management, and the application of intervention plans.

SPED 2150 Introductory Experience with Students with Disabilities 1-4®
Introductory seminar and practicum from which students learn basic instructional techniques from videodisc simulations, then apply them in public schools. (F,Sp,Su)

SPED 2790 Special Topics 1-4®

SPED 3030 Educational and Multicultural Foundations 3
Explores historical and cultural aspects of schooling and the inclusion of students with disabilities and bilingual students in general education classrooms. Examines how schooling practices change from elementary to high school and commonalities that bind the teaching profession. (Sp)

SPED 4000 Education of Exceptional Individuals 2
Characteristics of all types of exceptional children with emphasis on the educational and psychological implications of these conditions to the development of the child. (F,Sp,Su)

SPED 4790 Special Topics 1-4®

SPED 4910 Undergraduate Research and Creative Opportunities 1-4®
Individually directed study at the undergraduate level. Permission of instructor required. (F,Sp,Su)

SPED 4970H Honors Thesis 1-6®
Provides an opportunity for honors students in the Department of Special Education and Rehabilitation to interact with other honors students in the College of Education and Human Services and explore an interdisciplinary area of interest. A written paper will be required. (F,Sp,Su)

SPED 5010 QI Applied Behavioral Analysis 1: Principles, Assessment, and Analysis 3
Covers topics related to collecting data, using data to make decisions, analyzing data, graphing data, and applying principles of behavior management and instruction to children and youth. Prerequisite: Admission to special education major or permission of instructor. (F)

SPED 5040 Foundations of Effective Assessment and Instructional Practices 3
Principles of standardized and curriculum-based assessment. Foundations for designing effective instructional programs to help students achieve mastery and proficiency. Prerequisite: Admission to special education major and SPED 5010 or permission of instructor. (F)

SPED 5050 Applied Behavioral Analysis 2: Applications 3
Expands knowledge of basic applied behavior analysis principles. Develops skills for remediating behavior problems using functional behavioral assessment. Prerequisite: Admission to special education major or permission of instructor. (Sp)

SPED 5060 Consulting with Parents and Teachers 3
Provides strategies for communicating with parents and teachers, as members of a multidisciplinary team, to assist parents and other teachers in collaborative problem solving. Prerequisite: Admission to special education major or permission of instructor. (Sp)

SPED 5070 Policies and Procedures in Special Education 1-3®
Provides an understanding of federal and state laws for persons with disabilities and procedures for organizing a special education classroom and auxiliary staff. Prerequisite: Admission to special education major or permission of instructor. (F)

SPED 5200 CI Student Teaching in Special Education 3-15
Prerequisite: Admission to special education major or permission of instructor. (F,Sp,Su)

SPED 5210 CI Student Teaching in Special Education: Dual Majors 3-15
Undergraduate student teaching for dual majors. (F,Sp,Su)

SPED 5220 Special Education Student Teaching Seminar 3
Weekly seminar taken concurrently with student teaching (SPED 5200 or 5210). Focuses on problems arising during student teaching and the development of a teaching portfolio. Prerequisites: Admission to teacher education and completion of the SPED sequence. (F,Sp,Su)

SPED 5230 Student Teaching in Special Education: Alternative Preparation 3-15
Student teaching for students in alternative teacher preparation programs. (F,Sp,Su)

SPED 5300 Orientation to Teaching Students with Mild/Moderate Disabilities 2
Provides preservice teachers with overview of information and resources, examples, and practice in applying effective instructional and behavior

management strategies in their classrooms. Emphasizes things to know and do on their first day(s) and first week of school. (Su)

SPED 5310 Teaching Reading and Language Arts to Students with Mild/Moderate Disabilities 2-4
Curriculum, instructional methods, assessment, and data-based decision making related to teaching reading and language arts to students with mild/moderate disabilities. (F)

SPED 5320 Teaching Content Areas and Transition to Students with Mild/Moderate Disabilities 3
Students learn to teach content area material, learning strategies, and transition-related skills to students with mild/moderate disabilities. Also includes assessment and decision making strategies related to these curricular areas. (Sp)

SPED 5330 Eligibility Assessment for Students with Mild/Moderate Disabilities 1
Choosing and administering eligibility assessment tests for students who may have mild/moderate disabilities. Interpretation of test results and applying results to decisions regarding students' eligibility for special education services. (F)

SPED 5340 Teaching Math to Students with Mild/Moderate Disabilities 3
Explains procedures for teaching mathematics to students with mild/moderate disabilities, so that each progresses as fast as his or her capabilities will allow. Prerequisite: Admission to special education major or permission of instructor. (Sp)

SPED 5350 Teaching Students with Mild/Moderate Disabilities I 3
Provides students with information and skills in the area of classroom and individual behavior management procedures. Emphasizes research-validated strategies that students will apply to everyday instructional situations. Prerequisite: Admission to the Alternative Teacher Preparation Licensure Program. (F)

SPED 5360 Teaching Students with Mild/Moderate Disabilities II 3
Provides students with instructional and management skills. Through case studies and classroom simulations, students learn research-validated instructional and management skills. Prerequisite: Admission to the Alternative Preparation Licensure Program. (Sp)

SPED 5400 Orientation to Teaching Students with Severe Disabilities 2
Provides preservice teachers with overview of information, resources, examples, and practices in applying effective instructional and behavior management strategies to students with severe disabilities. (F)

SPED 5410 Practicum: Direct Instruction Reading and Language Arts for Students with Mild/Moderate Disabilities 1-3
Students learn to use Direct Instruction techniques, positive management, curriculum-based assessment, and data-based decision-making to teach reading and language arts to children with mild/moderate disabilities. Students are placed in a classroom, where they teach a group of children daily. (F)

SPED 5420 Practicum: Teaching Mathematics to Students with Mild/Moderate Disabilities 4
Use of effective instructional techniques, positive management, curriculum-based assessment, and data-based decision making to teach mathematics content to children with mild/moderate disabilities. Students placed in a classroom, where they teach one or more group(s) of children daily. (Sp)

SPED 5430 Field-Based Applications for Students with Mild/Moderate Disabilities 3
Designed to help students acquire and consistently demonstrate effective teaching practices to aid students with mild/moderate disabilities. Teaches students to analyze and solve instructional and management problems. Prerequisite: Admission to the Alternative Teacher Preparation Licensure Program. (F)

SPED 5510 Curriculum for Students with Severe Disabilities 3-4
Provides information about commercially available curricular materials, as well as how to plan for and design functional academic curricula, for persons with severe disabilities. Prerequisite: Admission to Special Education major or permission of instructor. (F)

SPED 5520 Curriculum for Secondary-Level Students with Severe Disabilities 3
Provides information on developing and implementing secondary-level classroom, community, domestic, leisure, and transition instructional programs. Prerequisite: Admission to Special Education major or permission of instructor. (Sp)

SPED 5530 Technology for Teaching Exceptional Learners 3
Familiarizes students with existing technology (IT and AT), federal and state technology legislation, and resources to fund technology in the classroom. Teaches methods for evaluating technology needs of individuals with disabilities. Prerequisite: Admission to Special Education major or permission of instructor. Taught on campus during spring semester *only.* Occasionally offered off campus during fall semester. (F,Sp)

SPED 5540 Assessment of Persons with Severe Disabilities 1
Seminar providing students with knowledge and skills necessary for conducting assessment activities with pupils having severe disabilities. Covers norm-referenced/standardized, criterion-referenced, and alternative assessment instruments. Students complete assignments in administering, interpreting, and communicating results of each type of assessment. As a result of this training and these assignments, students should develop increased skills in administration, interpretation, and communication of assessment activities typical of students having severe disabilities. (Sp)

SPED 5550 Field-Based Applications for Students with Severe Disabilities 3
Designed to help students acquire and consistently demonstrate effective teaching practices to aid students with severe disabilities. Teaches students to analyze and solve instructional and management problems. Prerequisite: Admission to Severe Alternative Teacher Preparation Program. (Sp)

SPED 5560 Practicum in Improving School System Programs 1-4®
Practicum or seminar providing information/experience in public school instruction. Permission of instructor required.

SPED 5570 Advanced Field-Based Applications for Students with Severe Disabilities 3
Designed to help students become competent in various effective teaching practices with students who have severe disabilities. Prerequisites: Admission to Severe Alternative Teacher Preparation Program and completion of SPED 5550. (F)

SPED 5600 Practicum: Introduction to Instruction of Students with Severe Disabilities 3
A field-based class providing experience in observing and teaching functional academic curricula to students with severe disabilities. Prerequisite: Permission of instructor. (F)

SPED 5610 Practicum: Advanced Systematic Instruction of Students with Severe Disabilities 4
Provides opportunity to assess students' needs and to design programs for community, domestic, leisure, and transitional skills. Prerequisite: Permission of instructor. (Sp)

SPED 5710 Young Children with Disabilities: Characteristics and Services 3
Provides information about young children with disabilities, including historical development of services, skill areas, family involvement, teaming, and the array of service environments. Prerequisite: Admission to Special Education major or permission of instructor. (Sp)

SPED 5720 Behavior Analysis Practicum 3
Students receive supervised training in applying behavior analysis principles in community, school, and institutional settings. Either SPED 5050 or PSY/SPED 5720 fulfill part of practicum requirement for Behavior Analysis track. Prerequisite: Permission of instructor. Also taught as PSY 5720.

SPED 5730 (dual listing 6260) Intervention Strategies for Young Children with Disabilities 3
Provides information on curricula, instructional strategies, service environments, and staffing roles for teachers of young children (0-5) with disabilities. (F)

SPED 5790 Special Topics 1-4®
(F,Sp,Su)

SPED 5810 Seminar and Field Experiences with Infants and Families 4
Participation with an infant and family in both the home and early intervention setting. Seminar topics include infant medical issues, health, safety, syndromes, and low incidence characteristics. (Sp)

SPED 5820 Preschool Practicum with Young Children with Disabilities in Community Environments 1-4®
Students participate in variety of environments serving preschoolers with disabilities, assist in developing a family service plan, and teach other staff to implement techniques. (F)

SPED 5830 Seminar Working with Peers on Multidisciplinary Teams 1
Seminar for discussion of topics pertaining to how teams work with children, with and without disabilities, in a practicum. Students are assigned to a team for planning and problem solving throughout the semester. (F,Sp)

SPED 5840 Seminar: Preschool Practicum with Young Children with Disabilities 2
Students participate in variety of environments, problem solving and teaming about their experiences. Must be taken concurrently with SPED 5820. (F)

SPED 5900 Independent Study 1-3®
Permission of instructor required. (F,Sp,Su)

SPED 5910 Independent Research 1-3®
Permission of instructor required. (F,Sp,Su)

SPED 6010 Interventions for Parents and Families 2
Explores special challenges faced by parents and families of at-risk students and students with disabilities. Emphasizes intervention strategies, supportive resources, and parent programs.

SPED 6020 Design and Evaluation of Instruction 3
Presents curriculum in which diagnosis and instruction are welded as a unit into the regular teaching procedures. (Sp)

SPED 6030 Clinical Practicum: Student Teaching 2-12
Supervised practicum in a clinical teaching setting. Prerequisite: Permission of instructor.

SPED 6040 Functional and Augmentative Communication Approaches and Technology 3
Theory and methods of symbolic and nonsymbolic communication acquisition, especially for students with dual sensory impairments. Application of instruction and systems within natural routines. (F)

SPED 6050 Issues with the Delivery of Services for Students with Dual Sensory Impairments 2
In-depth presentation of best practices for educational services for students with dual sensory impairments. (F)

SPED 6060 Legal Issues in Special Education 3
Provides knowledge of a wide range of legal issues concerning the provision of special education services to students with disabilities. (Sp)

SPED 6070 Infusing Mobility and Communication for Students with Dual Sensory Impairments 2
Reviews methods for providing orientation and mobility training to students with dual sensory impairments. Provides methods for infusing these and communication objectives into normal age-based routine activities. (Sp)

SPED 6080 Collaboration and Management of Services for Students with Dual Sensory Impairments 2
Reviews methods of planning and coordination of services for students with dual sensory impairments (e.g., transition, lifestyle planning, transition team coordination). Service management addressing issues of scheduling, monitoring, and training of staff and peers. (Sp)

SPED 6090 Curriculum and Environmental Variations and Management 2
Presents instructional and curricular strategies to promote utilization of residual vision or hearing skills. Overviews tactile cuing and movement-based approaches, with emphasis on integration within natural context and functional activities. Review of model delivery methods. (Sp)

SPED 6110 Social and Psychological Implications of Visual Impairments 2
Explores attitudes and beliefs related to visual impairment and blindness. Emphasizes impact of vision loss on the psychosocial functioning of individuals and their families. Studies self-concept, self-esteem, and strategies to enhance these areas in visually impaired children. (Su)

SPED 6120 Ocular Disorders and Examination Techniques of Low Vision 4
Students demonstrate the ability to identify the important parts of the visual system, to understand and interpret eye reports, and to translate the information into an educational plan. Participants also conduct and supervise vision screening clinics. In addition, participants demonstrate a basic understanding of approaches and practices of low-vision services. Includes low-vision aids, optics, and environmental modifications. (F)

SPED 6130 Literary Braille Codes and Technologies 4
Focuses on reading and writing literary braille. Includes literary braille contractions, short-form words, punctuation, and rules of usage for basic Grade 2 braille, using the Perkins Braille Writer. Emphasizes accuracy, beginning formatting, and ability to apply the rules. Using a slate and stylus, as well as computerized braille writers, students learn to write literary braille. (F)

SPED 6140 Nemeth Braille Codes and Braille Technologies 3
Transcription of print mathematical symbols into appropriate formats, using Nemeth Braille Code of Mathematics. Computation skills using adapted abacus for basic mathematical operation. Explores braille music, foreign language braille, computer braille, and Grade 3 braille. Emphasizes literary braille in more extended writing projects. (Sp)

SPED 6150 Teaching Children with Dual Sensory Impairments (Deaf/Blind) 3
Provides basic understanding of the needs of learners (ages 0-22) having sensory impairments with multiple disabilities. Includes role and characteristics of the transdisciplinary team, learning environments, resources, assessment procedures, and instructional strategies. Identifies inclusion procedures, transitional issues, and methods of encouraging parental involvement. (Su)

SPED 6160 Introduction to Orientation and Mobility 2
Introduces students to orientation and mobility, as well as basic assessment techniques. Students learn to use the results of these assessments, along with specific teaching techniques in pre-cane orientation and mobility skills, in teaching children with visual impairments. Students also become familiar with basic indoor (non-cane) mobility techniques, learn to identify and teach orientation cues in the environments, and develop lesson plans to teach concepts necessary for future cane travel. (Su)

SPED 6170 Instructional Management for Students with Visual Impairments (0-21) 4
Emphasizes best practices for instructional management of children with visual impairments in early intervention settings, preschool programs, and early elementary grades. Also addresses practices for older students in upper elementary through high school grades. Explores strategies for development of

basic concepts, socialization skills, emergent literacy, effective braille reading and writing, daily living skills, career understanding, and recreational and leisure skills. Focuses on understanding agency and community resources, family collaboration, modification and adaptation of materials and environments, and adapted technology. (Sp)

SPED 6180 Field Studies in Visual Impairments 1
Participants work with visually impaired students in a variety of educational sites. Emphasizes use of adapted technology, implementation of teaching activities, student assessment, and modification of educational materials. Corequisite: SPED 6130 or 6170. (F,Sp)

SPED 6220 Characteristics of Children with Emotional and Behavioral Disorders 3
Explores characteristics of children and youth with emotional and behavioral disorders. Covers definitions, prevalence and incidence, classification, causal factors, and facets of disordered behavior. (3 cr)

SPED 6230 Education of Students with Emotional and Behavioral Disorders 2
Methods of teaching students with emotional and behavioral disorders, including educational strategies and behavioral treatments.

SPED 6260 (dual listing 5730) Intervention Strategies for Young Children with Disabilities 3
Provides information on curricula, instructional strategies, service environments, and staffing roles for teachers of young children (0-5) with disabilities. (F)

SPED 6280 Instructional Leadership for At-Risk Students 3
Examines theories and practices of instructional leadership for at-risk students. Instructs students in services and programs available for at-risk students. (Sp)

SPED 6290 Teaching Social Skills, Self-Management, and Values 3
Discussion of current research and practices related to teaching social skills, self-management, and values. Explores teaching procedures and curriculum programs. (Sp)

SPED 6300 Collaboration Skills for Classroom Teachers 3
Emphasizes knowledge, attitudes, and skills which special educators must possess to effectively collaborate with parents and professionals. (F)

SPED 6320 Seminars in Learning Characteristics of Students with Dual Sensory Impairments 2
Investigates characteristics of dual sensory impairment, learning styles, and environmental demands. Awareness of eye and ear anatomy. Interpretation of formal assessments. Development of instructional strategies. (Su)

SPED 6410 Field Studies I: Analysis of Service for Students with Dual Sensory Impairments 2
First of three field experiences for students in the DSI program. Emphasizes team-based review and analysis of services. (F)

SPED 6420 Field Studies II: Analysis of Service for Students with Dual Sensory Impairments 2
Practicum in integrated programs for students with dual sensory impairments within the context of the model classroom. Emphasizes transdisciplinary methods for assessment, instructional design, and planning skills.

SPED 6430 Field Studies III: Analysis of Service for Students with Dual Sensory Impairments 2
Advanced practicum in integrated programs for students with dual sensory impairments. Emphasizes an overall management of instructional environment and services.

SPED 6500 Interdisciplinary Workshop 1-3®
Series of self-instructional modules and videos and a variety of elective training. Module topics include developmental disabilities, legal aspects and issues, assessment, intervention, assistive technology, transition, and prevention/ intervention for aggression and violence. (F,Sp,Su)

SPED 6550 Practicum in the Evaluation of Instruction 1-4®
Field-based research course contributing toward graduate degrees and supervisory licensure related to the assessment of an ongoing or newly proposed program of instruction. (F,Sp,Su)

SPED 6560 Improvement of Instruction 1-4®
Focuses on effective teaching methodologies, teaching performance, and curriculum decision making. (F,Sp,Su)

SPED 6700 (dual listing 7700) Single-Subject Research Methods and Designs 3
Examines single-subject research methods for applied research, including measurement, design, and analysis issues. Also taught as EDUC 6700/7700. (F,Su)

SPED 6720 (dual listing 7720) Advanced Behavior Analysis in Education 3
Discussion of advanced topics and issues in behavior analysis, including rule-governed behavior, stimulus control, setting events, functional analysis, and verbal behavior. Topics integrated into educational practice. Prerequisite: SPED 5050 or equivalent. (F)

SPED 6790 Special Topics 1-4®

SPED 6810 Seminar in Special Education 1-3®
(F,Sp,Su)

SPED 6900 Independent Study 1-2®
Prerequisite: Permission of instructor. (F,Sp,Su)

SPED 6910 Independent Research 1-2®
Prerequisite: Permission of instructor. (F,Sp,Su)

SPED 6930 Internship in Special Education 2-10
Professional and supervised intern experience for master's program. Prerequisite: Permission of instructor. (F,Sp,Su)

SPED 6960 Creative Project 1-6®
Culminating experience of MEd program. Prerequisite: Proposal approval by supervisory committee. (F,Sp,Su)

SPED 6970 Thesis 1-9®
Culminating experience of MS program. Prerequisite: Proposal approval by supervisory committee. (F,Sp,Su)

SPED 6990 Continuing Graduate Advisement 1-8®
(F,Sp,Su)

SPED 7050 Internship in Program Evaluation 1-5®
Guided experience in evaluation of educational programs in schools, treatment centers, homes, and communities. Prerequisite: Permission of instructor. (F,Sp,Su)

SPED 7060 Research Internship 1-5®
Guided experience in conducting educational research. Prerequisite: Permission of instructor. (F,Sp,Su)

SPED 7070 Grant Writing 1-3®
Guided experience in preparation of grant proposals. Permission of instructor required. (F,Sp,Su)

SPED 7330 Supervision Internship 1-5®
Guided experience in supervising undergraduate and master's students during practica, student teaching, and other field experiences. (F,Sp,Su)

SPED 7340 College Teaching Internship 1-3®
Guided experience in teaching university courses. (F,Sp,Su)

SPED 7500 Interdisciplinary Workshop 1-3®
Workshop on current interdisciplinary issues and topics in special education and related fields. (F,Sp,Su)

SPED 7700 (dual listing 6700) Single-Subject Research Methods and Designs 3
Examines single-subject research methods for applied research, including measurement, design, and analysis issues. Also taught as EDUC 7700/6700. (F,Su)

SPED 7710 Advanced Single-Subject Research Methods and Design 3
Explores advanced concepts and procedures in within-subject research methods. Builds on knowledge and skills acquired in SPED 7700 regarding scientific questions, measures, research designs, data analysis, and inference. Students analyze research and design, conduct, and report a scientific study. Prerequisite: SPED 7700. (Sp)

SPED 7720 (dual listing 6720) Advanced Behavior Analysis in Education 3
Discussion of advanced topics and issues in behavior analysis, including rule-governed behavior, stimulus control, setting events, functional analysis, and verbal behavior. Topics integrated into educational practice. Prerequisite: SPED 5050 or equivalent. (F)

SPED 7800 Seminar: Issues in Special Education and Rehabilitation 1-3®
Critical analysis of variety of special education and rehabilitation issues and trends. Empirical and theoretical information presented in a seminar format. (F,Sp,Su)

SPED 7810 Research Seminar in Special Education and Rehabilitation 1-3®
Identification of research problems and discussion of research strategies and methods. Applications of research, data analysis, and statistical concepts. (F,Sp,Su)

SPED 7820 Seminar: Special Topics 1-3®
In-depth study of special topics in special education and rehabilitation. Seminars examine historical aspects, relevant research, and theoretical positions on selected topics. (F,Sp,Su)

SPED 7830 Special Education Personnel Preparation Methods 2
Focuses on critical issues in preparing special education teachers. Includes teaching, supervision, and overall program development. Students demonstrate supervision and teaching competencies. (Sp)

SPED 7900 Independent Study 1-3®
Prerequisite: Permission of instructor. (F,Sp,Su)

SPED 7910 Independent Research 1-3®
Prerequisite: Permission of instructor. (F,Sp,Su)

SPED 7920 Doctoral Program Professional Seminar 3
Orients new students to doctoral program, utilizing five goals: (1) familiarize students with requirements of the program and of the Graduate School, (2) acquaint students with the faculty and the resources available, (3) initiate a career planning process, (4) teach students some fundamental concepts underlying scientific research, and (5) teach students to conduct literature reviews. (F)

SPED 7930 Internship in Special Education 1-12®
Professional, supervised internship experience for doctoral students. Prerequisite: Permission of instructor. (F,Sp,Su)

SPED 7940 Journal Reading Group 1-2®
Seminar discussion of recent empirical and theoretical journal articles in special education and related fields. (F,Sp,Su)

SPED 7970 Dissertation 1-15®
Variable credit for dissertation project in connection with doctoral program in special education. (F,Sp,Su)

SPED 7990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Statistics (STAT)

See Department of Mathematics and Statistics, pages 388-399.

STAT 1040 QL Introduction to Statistics 3©
Descriptive and inferential statistical methods. Emphasis on conceptual understanding and statistical thinking. Examples presented from many different areas. Prerequisite: Math ACT score of 19 or greater, *C-* or better in MATH 1010, or 70 percent or greater on MATH 1050 placement test. (F,Sp,Su)

STAT 2000 QI Statistical Methods 3©
Introduction to statistical concepts, graphical techniques, probability, distributions, estimation, one and two sample testing, chi-square tests, and simple linear regression. Prerequisite: *C-* or better in MATH 1050. (F,Sp)

STAT 2250 Internship and Cooperative Studies 1-6
Lower-division internship/cooperative work experience in statistics. (F,Sp,Su)

STAT 2300 QL Business Statistics 4©
Descriptive and inferential statistics, probability, sampling, estimation, tests of hypotheses, linear regression and correlation, chi-square tests, analysis of variance, and multiple regression. Prerequisite: *C-* or better in MATH 1050. (F,Sp,Su)

STAT 2950 Directed Reading and Conference 1-3®
Prerequisite: Prior arrangement with specific instructor. (F,Sp,Su)

STAT 3000 QI Statistics for Scientists 3
Introduction to statistical concepts, graphical techniques, discrete and continuous distributions, parameter estimation, hypothesis testing, and chi-square tests. Prerequisite: *C-* or better in MATH 1100 or 1210. (F,Sp,Su)

STAT 4250 Advanced Internship/Co-op 1-6®
Advanced educational work experience in statistics. Prerequisite: Approval of instructor. (F,Sp,Su)

STAT 4500 Methods of Teaching Statistics in Secondary and Middle School 3
Teaching methods course required for all prospective mathematics and statistics composite teaching majors. (F,Sp)

STAT 4950 Directed Reading and Conference 1-3®
Prerequisite: Prior arrangement with specific instructor. (F,Sp,Su)

STAT 5100 CI/QI Linear Regression and Time Series 3
Methods for prediction and hypothesis testing in multiple linear regression models, including analysis of variance and covariance, logistic regression, introduction to time series, and signal processing. Prerequisite: *C-* or better in STAT 2000 or 3000. (F)

STAT 5120 Categorical Data Analysis 3
Analysis of categorical data, contingency tables, goodness of fit, random sampling, log-linear and logistic regression models, and sampling for proportions, as well as stratified and cluster sampling. Prerequisite: *C-* or better in STAT 5100. (F)

STAT 5200 Design of Experiments 3
Design, analysis, and interpretation of experiments, split plots, incomplete blocks, confounding, fractional factorials, nested designs, two- and three-way analysis of variance, covariance, and multiple regression. Prerequisite: *C-* or better in STAT 2000 or 3000. (Sp)

STAT 5300 QI Statistical Process Control 3
Techniques and applications of statistics in modern management of industrial processes. Control charts, acceptance sampling, design of industrial experiments, and analysis of process failures. Prerequisite: *C-* or better in STAT 2000 or 3000. This course is not currently being offered. For information about when it may be offered, contact the department.

STAT 5410 (dual listing 6410) Applied Spatial Statistics 3
Explores spatial point patterns, spatially continuous data, area (grid) data, nearest neighbor distances, K function, complete spatial randomness, variogram, kriging, correlogram, and Moran's I. For graduate (6000-level credit), a major

project is required. Prerequisite: *C*- or better in STAT 3000. Knowledge of a statistical package (e.g., S-Plus, R, SAS, etc.) or any programming language (e.g., C/C++, FORTRAN, etc.) is *strongly recommended*. (F)

STAT 5570 Statistical Bioinformatics 3
Explores the bioconductor project. Discusses the following topics in gene expression analysis: microarray experiments, data normalization, sources of variability, testing for differential expression, multiple testing issues, and cluster analysis. Also explores the following sequence analysis topics: scoring alignments, hidden Markov models, and phylogenetic trees. Considers databases and ontologies. Prerequisite: *C*- or better in STAT 5100 or 5200. (Sp)

STAT 5600 CI Applied Multivariate Statistics 3
Introduction to multivariate statistical procedures for data analysis. Topics include MANOVA, principal component analysis, factor analysis, clustering, and classification. Prerequisite: *C*- or better in STAT 5100. (Sp)

STAT 5810 Topics in Statistics 1-3®
STAT 5820 Topics in Statistics 1-3®
Prerequisite: Consent of instructor. (F) (Sp)

STAT 5890 CI Problem Solving in Statistics 3
Capstone course for Statistics majors, applying course material covered in the undergraduate major. Prerequisite: Permission of instructor. (Sp)

STAT 5940 Directed Reading and Conference 1-3®
Prerequisite: Prior arrangement with specific instructor. (F,Sp,Su)

STAT 5950H Senior Honors Project 1-4
A senior project, required for completion of the departmental honors program and developed under the direction of a departmental faculty member. Prerequisite: Permission of instructor. (F,Sp,Su)

STAT 5970 Seminar 1-3®
Review of current literature and developments in the field of statistics. (F,Sp)

STAT 6100 Advanced Regression Analysis* 3
Explores the following topics in the theory of linear models: least squares estimation, the general linear hypothesis, regression diagnostics for multicollinearity, outliers, and influential points. Also includes discussion of robust regression, nonlinear regression, generalized linear models, ACE, generalized additive models, and regression models for survival data. Prerequisites: *C*- or better in MATH 5720 and STAT 5100. (F)

STAT 6180 Time Series 3
The domain and frequency domain time series analysis, including Box-Jenkins methods, spectral analysis and filtering, introduction to state space methodology. Prerequisites: *C*- or better in STAT 5100, MATH 5720. This course is not currently being offered. For information about when it may be offered, contact the department.

STAT 6190 Wavelet Methods for Time Series 3**
Explores time series models, time and frequency domain analysis, discrete wavelet transform, and wavelet ANOVA, as well as applications in physics and finance. Prerequisites: *C*- or better in MATH 5720 and STAT 5100. (Sp)

STAT 6200 Analysis of Unbalanced Data and Complex Experimental Designs* 3
Examines means and effects models, estimability, and type I-IV hypotheses. Contrasts and sums of squares. Generalized linear models for experimental data. Linear mixed models. Generalized linear mixed models. Analysis of complex experimental designs. Nonreplicated experiments. Tests for additivity. Half-normal plots. Prerequisite: *C*- or better in STAT 5200. (Sp)

STAT 6250 Graduate Internship/Co-op* 1-8®**
Educational work experience at the graduate level. Prerequisite: Permission of instructor.

STAT 6410 Applied Spatial Statistics 3
(dual listing 5410)
Explores spatial point patterns, spatially continuous data, area (grid) data, nearest neighbor distances, K function, complete spatial randomness, variogram, kriging, correlogram, and Moran's I. For graduate (6000-level credit), a major project is required. Prerequisite: *C*- or better in STAT 3000. Knowledge of a statistical package (e.g., S-Plus, R, SAS, etc.) or any programming language (e.g., C/C++, FORTRAN, etc.) is *strongly recommended*. (F)

STAT 6530 Modern Nonparametric Statistics 3**
Examines topics in resampling methods including: the jackknife and the bootstrap, bias, variance, and confidence intervals. Also explores the following topics in smoothing methods: histograms, kernel density estimates, and local polynomial regression. Includes testing procedures using ranks and empirical cumulative distribution functions. Prerequisites: *C*- or better in MATH 5710 and STAT 3000. (Sp)

STAT 6550 Statistical Computing* 3**
Survey of algorithms and tools for modern statistical computing. Topics include simulation design and implementation, algorithms for linear regression and subset selection, smoothing algorithms, fast fourier transform, EM algorithm, numerical methods for maximum likelihood estimation, and neural networks. Prerequisites: *C*- or better in STAT 5110, MATH 5720, and knowledge of a programming language. (Sp)

STAT 6560 Graphical Methods* 3**
Statistical graphics and scientific visualization of one, two, and higher dimensional data. Well-chosen and designed graphics are vital in exploratory data analysis, model diagnostics, and data presentation. Includes specific methods and general principles, such as effective use of color and motion. Prerequisites: *C*- or better in STAT 3000 and programming experience. (F)

STAT 6600 Multivariate Analysis 3
Statistical methods for analyzing multivariate data and the theory behind them. Topics include multivariate normal distribution and multivariate distributions derived from it, multivariate t-tests, regression, MANOVA, principal components and factor analysis, multidimensional scaling, classification, and cluster analysis. Prerequisites: *C*- or better in MATH 5720 and concurrent enrollment in STAT 5110. This course is not currently being offered. For information about when it may be offered, contact the department.

STAT 6650 Statistical Learning: Multivariate Statistical Analysis for Bioinformatics, Data Mining, and Machine Learning 3**
Explores supervised learning, linear methods for regression and classification, model assessment and selection, model inference and averaging, additive models, boosting, neural networks, support vector machines, and unsupervised learning. Prerequisites: *C*- or better in MATH 5720 and STAT 5100. Programming experience in R or a related language is *strongly recommended*. (F)

STAT 6710 Mathematical Statistics I 3
Modes of convergence of random variables, laws of large numbers, characteristic functions, and the central limit theorem. Prerequisite: *C*- or better in MATH 5720. (F)

STAT 6720 Mathematical Statistics II 3
Consistency, loss functions, risk, and notions of optimality of estimations. Hypothesis testing and confidence regions. Large sample theory, notions of robustness. Prerequisite: *C*- or better in STAT 6710. (Sp)

STAT 6810 Topics in Statistics (Topic)* 3®**
STAT 6820 Topics in Statistics (Topic)* 3®**
Prerequisite: Permission of instructor. (F) (Sp)

STAT 6890 Practical Statistical Consulting* 1-3®**
Introduction to statistical consulting for graduate students, for faculty in other research departments, and for business, industry, and government. Prerequisite: Permission of instructor. (F,Sp,Su)

STAT 6910 Seminar in Statistics* 1-3®**
Review of current literature and developments in statistics. Prerequisite: Permission of instructor. (F,Sp)

STAT 6950 Directed Reading and Conference* 1-4®**
Prerequisite: Prior arrangement with specific instructor. (F,Sp,Su)

STAT 6970 Thesis and Research 1-6®
Outlining and conducting research in statistics. Thesis preparation. (F,Sp,Su)

STAT 6990 Continuing Graduate Advisement 1-9®
(F,Sp,Su)

STAT 7110 **Linear Models (Topic)*** ** **3®**
STAT 7120 **Linear Models (Topic)*** ** **3®**
(F) (Sp)

STAT 7180 **Time Series Analysis (Topic)*** ** **3®**
STAT 7190 **Time Series Analysis (Topic)*** ** **3®**
(F) (Sp)

STAT 7210 **Experimental Design (Topic)*** ** **3®**
STAT 7220 **Experimental Design (Topic)*** ** **3®**
(F) (Sp)

STAT 7310 **Business and Industrial Statistics (Topic)*** ** **3®**
STAT 7320 **Business and Industrial Statistics (Topic)*** ** **3®**
(F) (Sp)

STAT 7510 **Nonparametric Statistics (Topic)*** ** **3®**
STAT 7520 **Nonparametric Statistics (Topic)*** ** **3®**
(F) (Sp)

STAT 7550 **Computational and Graphical Statistics (Topic)*** ** **3®**
STAT 7560 **Computational and Graphical Statistics (Topic)*** ** **3®**
(F) (Sp)

STAT 7610 **Multivariate Statistics (Topic)*** ** **3®**
STAT 7620 **Multivariate Statistics (Topic)*** ** **3®**
(F) (Sp)

STAT 7710 **Mathematical Statistics (Topic)*** ** **3®**
STAT 7720 **Mathematical Statistics (Topic)*** ** **3®**
(F) (Sp)

STAT 7730 **Bayesian Statistics and Decision Theory (Topic)*** ** **3®**
STAT 7740 **Bayesian Statistics and Decision Theory (Topic)*** ** **3®**
(F) (Sp)

STAT 7810 **Topics in Statistics (Topic)** **1-3®**
STAT 7820 **Topics in Statistics (Topic)** **1-3®**
(F) (Sp)

STAT 7970 **Dissertation Research** **1-15®**
(F,Sp,Su)

STAT 7990 **Continuing Graduate Advisement** **1-9®**
(F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
© This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.
*Taught 2006-2007.
**Taught 2007-2008.
***This course will be taught as needed. For information about availability, contact the Department of Mathematics and Statistics.

Social Work (SW)

See Department of Sociology, Social Work and Anthropology, pages 500-511.

SW 1010 **Introduction to Social Welfare** **3**
(formerly SW 1050)
Foundation course to facilitate development of an approach to thinking about social welfare. Explores broad common base of social work professional values, knowledge, skills, social policies, and programs. (F,Sp)

SW 2100 **Human Behavior in the Social Environment** **3**
(formerly SW 2500)
Interrelatedness of social, cultural, and environmental factors that combine with biological and psychological compenents to mold human behavior. Relevance of these factors to generalistic social work practice. Prerequisite: SW 1010. (Sp)

SW 2400 **Social Work with Diverse Populations** **3**
Examines characteristics of various populations, including patterns, dynamics, and consequences of discrimination, economic deprivation, and oppression. Emphasis placed on empowerment of groups and individuals, as well as the accumulation of multicultural competence. Prerequisite: SW 1010. (Sp)

SW 3050 **Practice I** **3**
Introduction of generalist social work framework as integrative tool, with special attention shown to strengths and empowerment perspective. Individuals as targets for change. Prerequisite: Admission to social work bachelor's program, SW 1010, 2100, 2400. (F)

SW 3350 **Child Welfare** **3**
Developments in programs for meeting such needs of children as substitute parental care, adoptions, delinquency problems, mental retardation, and unmarried motherhood. Prerequisites: SW 1010, 2100, 2400.

SW 3360 **Adolescents: Theories, Problems, and Issues** **3**
Focuses on major social problems confronting youth today: teenage pregnancy, substance abuse, unemployment, education, and mental health. Investigation of theories explaining these problems and society's efforts to resolve these problems. Prerequisites: SW 1010, 2100, 2400.

SW 3450 **School Social Work*** **3**
Overview of social work practice in an educational setting.

SW 3550 **Social Gerontology*** **3**
Overview of field of aging and its connection to the practice of social work.

SW 3650 **Mental Health** **3**
Services offered for the prevention and treatment of mental illness and the feasibility of social action programs on a community level. Prerequisites: SW 1010, 2100, 2400.

SW 3750 **Medical Social Services** **3**
Introduction to role of social worker in health settings. Emphasizes definition of health and disease, patient rights, and consumer participation. Examination of basic health programs, major trends in health planning, and alternate models of health delivery. Prerequisites: SW 1010, 2100, 2400.

SW 3850 **Spirituality and Social Work*** **3**
Provides a framework of knowledge, values, skills, and experiences for spiritually sensitive social work practice.

SW 3950 **Occupational and Environmental Health*** **3**
Overview of the issues of occupational and environmental health from a public policy and psycho social perspective. Presents issues concerning industrial and environmental hazards relating to occupational injury and illness. Explores policies addressing these issues, as well as legislation and social problems.

SW 4100 **Social Work Research** **3**
Survey of qualitative and quantitative scientific methods of research in social work. Articulation of research with practice and policy. Prerequisites: SW 1010, 2100, 2400. (F)

SW 4150 **Practice II** **3**
Introduction to generalist social work practice at the micro level. Emphasizes study of skills from a strengths and empowerment perspective with individuals, families, and small groups. Special attention paid to ethical issues and working with diverse population. Prerequisite: SW 3050. (Sp)

SW 4160 **Practice III** **3**
Introduction to generalist social work practice at the macro level. Emphasizes study of skills from a strengths and empowerment perspective with groups, organizations, and community systems. Special attention paid to ethical issues and working with diverse populations. Prerequisite: SW 4150. (Sp)

SW 4870 Beginning Field Practicum 6®
Practical experience in a social service agency. Seminar integrates field work experiences and academic knowledge. Emphasizes use of self and integration of knowledge, values, skills, and methods of practice, with special emphasis given to the code of ethics. Prerequisite: Instructor's permission and by application. (F)

SW 4900 Topical Issue Seminar 3-6®
Advanced seminar, designed as a forum for students from varied social science disciplines. Seminars may include issues involved in social work values and ethics, diversity, promotion of social and economic justice, and/or populations-at-risk. The following topics are offered: school social work, crisis intervention strategies, special topics in aging, and occupational and environmental health. Prerequisites: SW 1010, 2100, 2400, and permission of instructor.

SW 4950 Directed Readings 1-5®
Independent readings in various areas of social work: practice, policy, HBSE, research, populations-at-risk, values and ethics, social and economic justice, and diversity. Prerequisite: Instructor's permission and a plan for study. (F,Sp)

SW 5350 CI Social Welfare Policy 3
Introduction to policy making in social welfare. Principles of social and economic justice used to analyze selected social policies and programs within a historical and contemporary context. Attention given to differential impact on at-risk populations. Prerequisites: SW 1010, 2100, 2400. (F)

SW 5870 Advanced Field Practicum 6®
Supervised social work practice and projects. Provides opportunities for advanced social work students to apply classroom learning in a field setting. Minimum of 240 hours in a social service agency required. Prerequisite: Instructor's permission and SW 4870. (Sp)

*This course is taught alternating years. Check with department for information about when course will be taught.
®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Theatre Arts (THEA)

See Department of Theatre Arts, pages 523-533.

THEA 1000 Theatre Orientation for Majors 1
Departmental policies, procedures, requirements, and philosophy. Introduction to fundamental audition and portfolio presentation techniques. (F)

THEA 1013 BCA Understanding Theatre 3
(formerly THEA 1010 BCA)
Survey of dramatic principles and structure, genre, and conventions for nonmajors. Functions and contributions of theatre artists and practices of the contemporary stage. (F,Sp,Su)

THEA 1023 BCA Introduction to Film 3
(formerly THEA 1020 BCA)
Study of elements of film narrative in fictional and nonfictional movies to provide a deeper understanding of content and film form. (F)

THEA 1030 BHU Exploring Performance Through Aesthetic Texts 3
Introduces concepts and practices of performance studies and oral language arts. Integrates interpretation, analysis, and performance of major literary genres and oral forms of communication that contain aesthetic qualities. Students learn theatre techniques to create orginal performance pieces. (F,Sp,Su)

THEA 1033 Beginning Acting 3
(formerly THEA 1400)
Demonstration of skills in actor awareness (personal and group), organic acting techniques, scene study with partners, and monologue preparation. Provides understanding of theories and methodologies. Skills demonstrated in areas of body movement, diction, observation, concentration, imagination, and "action." (F,Sp)

THEA 1113 Beginning Voice 3
(formerly THEA 1450)
Training in basic vocal principles (Rodenburg, Linklater). Covers proper breath placement and support, physical alignment, projection, and resonance. Students learn basic warm-up to prepare the voice for performance. (F)

THEA 1223 Stage Makeup 2
(formerly THEA 1530)
Emphasizes one-dimensional and three-dimensional illusional work, focusing on knowledge and skills in "corrective" aging and period makeup, with introductions to related areas, such as hair, hands, and prosthetics. Enrollment restricted to students who are theatre arts majors or who have received departmental authorization. (F,Sp)

THEA 1430 Movement for Actors I 3
Introductory, experiential course in movement styles, including Laban Movement Analysis, Alexander Technique, Feldenkrais, Grotowski, and others. Improvisation will be emphasized to develop a creative approach to character, emotion, and action through movement. (F,Sp)

THEA 1513 Stage and Costume Crafts 3
(formerly THEA 1500)
Introduction to different physical theatre forms, standard stage equipment, and methods of staging plays. Basic practices in set construction, stage lighting, sound, and costume construction. Enrollment limited to Theatre Arts majors and to students receiving departmental permission. (F,Sp)

THEA 1713 Introduction to Playscript Analysis 3
(formerly THEA 1210)
Introductory course focusing on plot, character, language, and thematic analysis of varied historical and modern performance texts in the context of contemporary staging practice. Enrollment limited to theatre majors and minors *only*. (F,Sp)

THEA 2410 Directing 3
Provides instruction and practice in play selection, script analysis, research, blocking, leadership, communication skills, conduct of rehearsals, self-awareness, production organization and operation, and personal organization for stage direction. Principles apply in professional, civic, and educational settings. Prerequisite: THEA 1033 (F,Sp)

THEA 2420 Intermediate Acting: Scene Study 3
Scene study from the modern and contemporary theatre using the principles studied in THEA 1033. Prerequisite: THEA 1033. (F,Sp)

THEA 2430 Movement for Actors II 3
Theory and practice in physical theatre movement styles, including Grotowski, Mime, Commedia dell'Arte, and others. Emphasis on creative approach for projecting character, emotion, and action through use of the body. History and practical experience in advanced movement styles. Prerequisite: THEA 1430. (F,Sp)

THEA 2440 Introduction to Dance for Theatre: Jazz, Ballet, and Tap 3
Offers an introduction to the three most influential styles of dance in musical theatre: jazz, ballet, and tap. Enables dancers to learn new steps quickly by utilizing the appropriate techniques. Time steps and turns are mastered. (F)

THEA 2470 Movement: Stage Combat 3
Techniques in stage combat. Prerequisite: THEA 1430. (F,Sp)

THEA 2480 Intermediate Voice for Theatre 3
Training in vocal technique, incorporating breath support, vocal range, power, and projection. Training in speech and articulation. Work in various vocal theories (Berry, Linklater, Hart). Instruction in the International Phonetic Alphabet. Prerequisite: THEA 1113. (Sp)

THEA 2490 Intermediate Acting: Shakespeare 3
Exploring language and techniques of playing Shakespeare through scene study and monologues. Prerequisite: THEA 1033. (F,Sp)

THEA 2510 Scene Painting/Properties 3
Instruction in scene painting techniques. Construction and alteration of stage properties. For theatrical technicians and designers. Demonstration and lab work included. Prerequisite: THEA 1513. (F,Sp)

THEA 2540 Lighting Design 3
Introduction to basic elements of lighting design. Demonstration of techniques used to create and execute a lighting design. Provides basic understanding of light energy, angle, color, and technology available for designing with this medium. (F,Sp)

THEA 2550 Stage Management 3
Provides problem-solving environment for students to acquire knowledge and skills necessary for becoming a competent stage manager. Discussion of organization, delegation, scheduling, and personnel management. Prerequisite: Permission of instructor. (F,Sp)

THEA 2555 Production Practicum 1®
(formerly THEA 2750)
Specialized crew work in ongoing Theatre Arts Department productions. Assignments made upon meeting with technical director. (F,Sp,Su)

THEA 2556 Production Run Crew 1
(formerly THEA 2750)
Specialized crew work for Theatre Arts Department productions. Assignments made upon meeting with technical director. (F,Sp,Su)

THEA 2560 Theatre and Studio Sound 3
Sound recording, reinforcement, and control operation skills for theatrical production. (F,Sp)

THEA 2666 Performance Practicum I 1®
(formerly THEA 2740)
Performance work in ongoing Theatre Arts Department productions, upon casting by the director. (F,Sp)

THEA 2667 Performance Practicum II 1®
(formerly THEA 2740)
Performance work in ongoing Theatre Arts Department productions, upon casting by the director. (F,Sp)

THEA 3050 DHA Period Styles/Historic Interiors 3
Intensive instruction in architecture, furniture, and interior design of major Western European periods from Egyptian to the present. Taught through lectures, slide presentations, and student-compiled source book with examples of major styles. (Sp,Su)

THEA 3230 DHA Survey of Western Theatre 3
History of performance traditions, theatre architecture, management systems, personnel, and written drama in the West from ancient Egypt to mid-20th Century. (F)

THEA 3300 Clinical Exerience in Teaching I 1
Clinical apprenticeship consisting of teaching theatre in local schools. Includes observation, tutorial work, small group discussions, whole class instruction, and lesson/unit planning. (F,Sp)

THEA 3400 Mask Building and Performance 3
History and practical experience in mask building and performance, including neutral mask, commedia, alternative identities, human, animal, phantasmagoric, and other mask techniques. Emphasizes expressing emotion and developing character through gesture and posture. Prerequisite: THEA 1430. (F,Sp)

THEA 3410 Dance for Theatre: Tap 3
Builds on tap skills learned in the introductory course, emphasizing mastery of single and double tap sounds and ensuring a solid foundation for elementary and intermediate tap steps commonly used in theatre productions. Prerequisite: THEA 2440. (F,Sp)

THEA 3420 Dance for Theatre: Jazz 3
Builds on jazz skills learned in the introductory course, incorporating contemporary jazz styles, jazz techniques, and routines used in musical theatre repertory. Prerequisite: THEA 2440. (F,Sp)

THEA 3430 Period Dance Styles 3
Dances learned from different periods then "rechoreographed" for stage practice. Prerequisite: THEA 1430. (F,Sp)

THEA 3440 Dance for Theatre: Ballet 3
Designed for an in-depth experience in ballet, focusing on technique and learning ballet choreography. Builds on ballet skills learned in the introductory course. Prerequisite: THEA 2440. (F,Sp)

THEA 3450 Dialects 3
Review of International Phonetic Alphabet. Explores range of regional American and British dialects, as well as specific foreign language dialects. Prerequisites: THEA 1113 and 2480. (F,Sp)

THEA 3510 Scene Design 3
Preparation for designing sets used in theatre. Development of skills in drafting, rendering, model-making, research, and portfolio development. Prerequisite: THEA 1513. (F,Sp)

THEA 3520 Stage Costume Design 3
Theory and practice in design and selection of costumes for nonrealistic, historical, and modern plays. Study of relationship of costume to character and production. Prerequisites: THEA 1513 and 3570; or permission of instructor. (F,Sp)

THEA 3570 DHA Historic Clothing 3
Historic survey of development of clothing from ancient Egyptians to the present day. (F,Su)

THEA 4030 DHA Storytelling 3
(dual listing 6030)
Reviews background and techniques of traditional telling. Explores psychological, educational, therapeutic, historical, and folkloric aspects of storytelling. For 6030 credit, graduate students must participate in microteaching sessions in areas of expertise, with additional storytelling research or service. (F,Sp,Su)

THEA 4250 Playwriting 3
Study of dramatic theory and sample plays, combined with practice in writing short plays. Minimum of three plays required. Prerequisite: THEA 1713. Also taught as ENGL 4250. (F)

THEA 4300 Clinical Experience in Teaching II 1
Clinical apprenticeship of teaching theatre in local schools, including observation, tutorial work, small group discussions, whole class instruction, and lesson/unit planning. Prerequisite: THEA 3300. (F)

THEA 4330 Drama and Theatre for Youth: Grades K-6 3
(dual listing 6330)
Practical teaching strategies, tools, and performance techniques for integrating drama and theatre in the classroom and beyond, with special emphasis on language arts curriculum. For graduate credit, students must participate in microteaching sessions with additional research, writing, and/or service assignments. (F,Sp,Su)

THEA 4400 Company Workshop 3®
Company workshop of theatrical productions emphasizing process and instruction. Supervised rehearsals, technical preparation, and public performances. Prerequisite: Permission of instructor. (F,Sp)

THEA 4450 Advanced Voice for Theatre 3
Advanced vocal training includes units in microphone technique, radio drama, classical Greek theatre, and vocal improvisation. Prerequisites: THEA 1113 and 2480. (Sp)

THEA 4480 Theatre Leadership and Management 3
(dual listing 6480)
Explores legal and financial choices, market research and marketing plans, physical plant and season operations, consideration of union and management relationships, and various planning and budget control procedures. For 6480 credit, graduate students must participate in microteaching sessions with additional practicum, writing, or problem solving assignments. (Sp)

THEA 4510 Advanced Scene Design 3
(dual listing 6510)
Preparation for graduate school or a career in design. Advanced instruction in drafting, rendering, model-making, technical skills, research, design principles, and portfolio development. For 6510 credit, graduate students must participate in microteaching sessions with additional rendering assignments. Prerequisites: THEA 1513 and 3510. (F,Sp)

THEA 4520 Advanced Costume Design 3
(dual listing 6520)
Advanced theory and practice in the design and selection of costumes for nonrealistic, historical, and modern plays. For 6520 credit, graduate students must participate in microteaching sessions with additional research or practicum assignments. Prerequisite: THEA 3520. (F,Sp)

Course Descriptions

THEA 4540 Advanced Lighting Design 3
(dual listing 6540)
Advanced training in elements of lighting design. Exploration of advanced techniques used to create and execute a lighting design. For 6540 credit, graduate students must participate in microteaching sessions with additional research or practicum assignments. Prerequisite: THEA 2540. (Sp)

THEA 4740 Advanced Performance Practicum I 1-2®
Advanced performance work in ongoing Theatre Arts Department productions, upon casting by the director. Director will assign credits. (F,Sp)

THEA 4750 Advanced Production Practicum 1-3®
Specialized practical experience in theatre production, including opportunities for advanced work in directing, design, scene and costume construction, stage management, props, sound, and lighting, under the supervision of Theatre Arts Department faculty members. (F,Sp,Su)

THEA 4840 Advanced Performance Practicum II 1-2®
Advanced performance work in ongoing Theatre Arts Department productions, upon casting by the director. Director will assign credits. (F,Sp)

THEA 4850 Advanced Production Projects 1-3®
Specialized practical experience for Theatre Arts Department productions. Assignments made in conjunction with the technical director. (F,Sp,Su)

THEA 5240 DHA/CI Contemporary Theatre 3®
(dual listing 6240)
History and theory of a theatre movement since the 1980s, primarily in the English-speaking world, leading to a study of the theatrical world and its practices today. For 6240 credit, graduate students must participate in microteaching sessions with additional reading or writing assignments. Prerequisite: THEA 3230. (F,Sp)

THEA 5250 Playwriting Company Workshop 3®
Advanced study in playwriting. Course culminates in the performance of original works. Enrollment is contingent on permission of instructor. Theatre Arts majors and students who have completed THEA/ENGL 4250 will have priority. (Sp)

THEA 5270 DHA Performance Theory and Criticism 3®
(dual listing 6270)
Topics in dramatic theory, including traditional Aristotelian analysis, comedy, tragedy, and modern and postmodern performance theories. For 6270 credit, graduate students must participate in microteaching sessions with additional research or writing assignments. (Sp)

THEA 5290 Special Topics in Theatre
(dual listing 6290) History and Literature 3®
Specialized topics in theatre history, performance, and dramatic literature. Sample topics include Classical Theatre of Greece and Rome, Golden Age Spanish Theatre, Elizabethan Theatre, Musical Theatre, Asian Theatre, and others. For 6290 credit, graduate students must participate in microteaching sessions with additional research or writing assignments. Prerequisite: THEA 3230. (F,Sp)

THEA 5310 Theatre Mentorship and Service 1-3®
Clinical mentorship of teaching skills, including observation, instruction, and evaluation in specific areas of expertise. Projects may include developing and using drama and theatre practices for service in classroom or community settings. Prerequisite: Permission of instructor. (F,Sp,Su)

THEA 5340 Theatre Production Methods for Educators 3
Specialized practical instruction in technical methods and theatre production for education majors. Required for students in the Theatre Education Emphasis. (Sp)

THEA 5360 Drama in the Secondary Education
(dual listing 6360) Classroom: Grades 7-12 3
Practical teaching strategies, tools, and performance and production techniques for meeting core curriculum requirements in the secondary education classroom. Prerequisite: Sophomore-level or higher. (Sp)

THEA 5370 Methods in Teaching Theatre and Speech 3
Development of materials and strategies for teaching secondary school speech and theatre, and managing secondary theatre drama programs. Prerequisite: Admission to Secondary Teacher Education Program (STEP). (F)

THEA 5390 Student Teaching Seminar 2
Focuses on problems arising during student teaching. Includes plans, procedures, adaptive classroom strategies, and evaluation. (F,Sp)

THEA 5400 Advanced Acting: Turn of the Twentieth Century 3®
Scene study from turn of the century playwrights, including Ibsen, Chekhov, Shaw, and Wilde. Prerequisites: THEA 1033; and THEA 2420 or 2490. (F,Sp)

THEA 5410 Advanced Directing 3
(dual listing 6410)
Provides instruction and practice in advanced techniques of script analysis, research outside the discipline, review of literature, awareness of thinking styles and values, and preparation for studio directing assignments. Prerequisites: THEA 2410 and permission of instructor. (F,Sp)

THEA 5420 Advanced Acting: Absurdists 3
Theatre absurdists: nontraditional acting approaches to nontraditional texts. Includes scene study from the plays of Pinter, Mamet, Brecht, and Ionesco. Prerequisites: THEA 1033; and THEA 2420 and 2490. (F,Sp)

THEA 5430 Advanced Acting: Acting for the Camera 3
Acting for the camera. Prerequisite: THEA 1033. (F,Sp)

THEA 5440 Advanced Acting: Musical Theatre Auditions 3
Introduction to techniques of musical theatre auditions. Prerequisites: THEA 1033; and THEA 2420 or 2490. (F,Sp)

THEA 5450 Advanced Acting: Restoration and Greek 3
Scene study from the Restoration and Greek playwrights, including Congreve, Euripides, Sophocles, and Vanbrugh. Prerequisites: THEA 1033; and THEA 2420 or 2490. (F,Sp)

THEA 5470 Advanced Acting: Modern Methods 3
Twentieth Century acting techniques, methodologies, and theories. Prerequisites: THEA 1033; and THEA 2420 or 2490. (F,Sp)

THEA 5510 Computer-Aided Design for Theatre 3
Computer-aided design applications for theatre. Drafting and rendering on computer for set, light, and costume design. Prerequisites: THEA 2540, 3510, 3520. (F)

THEA 5590 Design Studies for Theatre 2
Actualization of a design from conception through completion with faculty supervision. Creation of all drafting, renderings, and/or models for portfolio development. (F,Sp)

THEA 5740 Repertory Theatre Performance 2-8®
(dual listing 6740)
Rehearsal, crew, and staff assignments. Performance of four plays in repertory. Company members selected through audition, based on ability and commitment to theatre. For 6740 credit, graduate students fulfill mentoring assignments and/or additional assignments in community service. Enrollment limited and by permission of Theatre Arts Department staff. (Su)

THEA 5750 Repertory Theatre Production 2-8®
(dual listing 6750)
Rehearsal, crew, and staff assignments. Performance of four plays in repertory. For 6750 credit, graduate students work with undergraduate students in mentoring situations. (Su)

THEA 5900 Special Projects I 1-4®
Directed individual research studies or creative projects in theatre. (F,Sp,Su)

THEA 5910 Senior Project 2
Culminating project and/or recital in student's specified program. (F,Sp)

THEA 5920 Special Projects II 1-4®
Directed individual research, advanced design, or creative projects in theatre. (F,Sp,Su)

THEA 5930 Special Projects III 1-4®
Directed individual advanced design or creative projects in theatre. (F,Sp)

THEA 5950 Rendering and Painting for the Theatre 3
Hands-on experience for theatrical technicians and designers using a variety of drawing techniques commonly used in theatrical design. Primary method of instruction is demonstration and experience through lab work. (F,Sp)

THEA 6010 Introduction to Graduate Study in Theatre 3
Bibliography, research methods, and writing. (F)

THEA 6030 Storytelling 3
(dual listing 4030)
Reviews background and techniques of traditional telling. Explores psychological, educational, therapeutic, historical, and folkloric aspects of storytelling. For 6030 credit, graduate students must participate in microteaching sessions in areas of expertise, with additional storytelling research or service. (F,Sp,Su)

THEA 6180 Theatre Production Portfolio 3
Prepares graduate students for the workplace using portfolio presentation techniques, job applications, resumes, interview techniques, and the creation of a design portfolio. (Sp)

THEA 6240 Contemporary Theatre 3®
(dual listing 5240)
History and theory of a theatre movement since the 1980s, primarily in the English-speaking world, leading to a study of the theatrical world and its practices today. For 6240 credit, graduate students must participate in microteaching sessions with additional reading or writing assignments. Prerequisite: THEA 3230. (F,Sp)

THEA 6250 Playwriting 3
Advanced study in playwriting. Course culminates in the performance of original works. Enrollment is contingent on permission of instructor. Theatre Arts majors and students who have completed THEA/ENGL 4250 will have priority. (Sp)

THEA 6270 Performance Theory and Criticism 3®
(dual listing 5270)
Topics in dramatic theory, including traditional Aristotelian analysis, comedy, tragedy, and modern performance theory. Includes preparation for review and adjudication of performance. For 6270 credit, graduate students must participate in microteaching sessions with additional research or writing assignments. (Sp)

THEA 6290 Special Topics in Theatre
(dual listing 5290) History and Literature 3®
Specialized topics in theatre history, performance, and dramatic literature. Sample topics include Classical Theatre of Greece and Rome, Golden Age Spanish Theatre, Elizabethan Theatre, Musical Theatre, Asian Theatre, and others. For 6290 credit, graduate students must participate in microteaching sessions with additional research or writing assignments. Prerequisite: THEA 3230. (F,Sp)

THEA 6330 Drama and Theatre for Youth: Grades K-6 3
(dual listing 4330)
Practical teaching strategies, tools, and performance techniques for integrating drama and theatre in the classroom and beyond, with special emphasis on language arts curriculum. For graduate credit, students must participate in microteaching sessions with additional research, writing, and/or service assignments. (F,Sp,Su)

THEA 6360 Drama in the Secondary Education
(dual listing 5360) Classroom: Grades 7-12 3
Practical teaching strategies, tools, and performance and production techniques for meeting core curriculum requirements in the secondary education classroom. Prerequisite: Sophomore-level or higher. (Sp)

THEA 6410 Advanced Directing 3
(dual listing 5410)
Provides instruction and practice in advanced techniques of script analysis, research outside the discipline, review of literature, awareness of thinking styles and values, and preparation for studio directing assignments. Prerequisites: THEA 2410 and +permission of instructor. (F,Sp)

THEA 6480 Theatre Leadership and Management 3
(dual listing 4480)
Explores legal and financial choices, market research and marketing plans, physical plant and season operations, consideration of union and management relationships, and various planning and budget control procedures. For 6480 credit, graduate students must participate in microteaching sessions with additional practicum, writing, or problem solving assignments. (Sp)

THEA 6510 Advanced Scene Design 3
(dual listing 4510)
Preparation for graduate school or a career in design. Advanced instruction in drafting, rendering, model-making, technical skills, research, design principles, and portfolio development. For 6510 credit, graduate students must participate in microteaching sessions with additional rendering assignments. Prerequisites: THEA 1513 and 3510. (F,Sp)

THEA 6520 Advanced Costume Design 3
(dual listing 4520)
Advanced theory and practice in the design and selection of costumes for nonrealistic, historical, and modern plays. For 6520 credit, graduate students must participate in microteaching sessions with additional research or practicum assignments. Prerequisite: THEA 3520. (F,Sp)

THEA 6540 Advanced Lighting Design 3
(dual listing 4540)
Advanced training in elements of lighting design. Exploration of advanced techniques used to create and execute a lighting design. For 6540 credit, graduate students must participate in microteaching sessions with additional research or practicum assignments. Prerequisite: THEA 2540. (Sp)

THEA 6740 Repertory Theatre Performance 2-8®
(dual listing 5740)
Rehearsal, crew, and staff assignments. Performance of four plays in repertory. Company members selected through audition, based on ability and commitment to theatre. For 6740 credit, graduate students fulfill mentoring assignments and/or additional assignments in community service. Enrollment limited and by permission of Theatre Arts Department staff. (Su)

THEA 6750 Repertory Theatre Production 2-8®
(dual listing 5750)
Rehearsal, crew, and staff assignments. Performance of four plays in repertory. For 6750 credit, graduate students work with undergraduate students in mentoring situations. (Su)

THEA 6790 Seminar in Drama 1-4®
Flexible service topics course covering a range of topics according to individual student need and/or visiting instructors, independent study, etc. (F,Sp)

THEA 6800 Graduate Studies in Theatre 1-6®
Research and preparation for graduate practicum projects in theatre. (F,Sp)

THEA 6900 Research Studies 1-4®
Directed individual research studies or creative projects in theatre. (F,Sp,Su)

THEA 6920 Graduate Projects in Theatre 2-3®
Studio practicum in support of projects in stage directing, design, and technical practice. (F,Sp)

THEA 6970 Thesis 1-4®
(F,Sp)

THEA 6990 Continuing Graduate Advisement 1-2®
(F,Sp)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Course Descriptions

University Studies (USU)

See General Education Requirements, pages 49-51.
Also see University Studies Depth Education Requirements, pages 52-57.

USU 1000 Introduction to Computers and Information Literacy 1
Introduction to basic concepts of computers and information literacy. Preparation for USU Computer and Information Literacy (CIL) test. For students having some familiarity with computers, but needing additional instruction. Taught during the first seven weeks of fall or spring semester. **Note:** USU 1000 *cannot* be counted toward the breadth requirements. (F,Sp)

USU 1010 University Connections 1-3
Provides an environment of challenge and support to help new students make a successful transition to USU. Class curriculum and activities provide an environment wherein students become familiar with the broad academic, social, and cultural opportunities offered by USU and the surrounding community. (F,Sp)

USU 1100 First-Year Seminar 3
Characterized by investigation of a topic that is most likely a research, scholarly, or artistic specialty of the faculty member. Topic presented in pedagogically interesting ways. May include fieldwork or trips to enhance study of the topic. **Note:** USU 1100 *cannot* be counted toward the breadth requirements.

USU 1300 BAI U.S. Institutions 3©
Provides basic understanding of the history, principles, form of government, and economic system of the United States. Emphasis on ideas and critical thinking, rather than dates, names, and places. (F,Sp,Su)

USU 1320 BHU Civilization: Humanities 3
Provides basic understanding of a broad range of themes, which cut across human history and continue to be important in contemporary society. (F,Sp,Su)

USU 1330 BCA Civilization: Creative Arts 3
Students will explore questions such as: What is Art? How is it judged? How does artistic expression vary across cultures? Course will cover several forms of art, and students will attend concerts, visit galleries, and attend theatrical performances. (F,Sp,Su)

USU 1340 BSS Social Systems and Issues 3
Examines debates in the social sciences about contexts which shape human experience. Compares experiences between life stages, individuals, groups, societies, and/or historical periods. Contrasts different social science disciplines. (F,Sp,Su)

USU 1350 BLS Integrated Life Science 3
Interdisciplinary course focusing on basic concepts of life science. Demonstrates role of modeling, prediction, and observation in the process of scientific discovery, which occurs within an historical and social context. (F,Sp,Su)

USU 1360 BPS Integrated Physical Science 3
Interdisciplinary course focusing on basic concepts of physical science, including structure of matter and magnitude and character of the forces of nature. Demonstrates role of modeling, prediction, and observation in the process of scientific discovery, which occurs within an historical and social context.

USU 3330 DHA Arts Symposium 1-2®
Students attend a number of cultural events offered at USU and in the community, as well as write critiques of the events. Prerequisite: Completion of at least 30 credits. **Note:** USU 3330 may be applied to the depth requirements, but *not* to the breadth requirements. Two credits of USU 3330 are needed to fulfill the DHA requirement.

USU 4900 Undergraduate Research 1-3
Research experience pursued with a faculty mentor. Prior to registration, student must make arrangements with a faculty mentor within his or her department. **Note:** USU 4900 *cannot* be counted toward fulfillment of University Studies requirements.

USU 6900 Responsible Conduct of Research 1
Provides an underpinning of ethical conduct for students entering into the research enterprise while at USU. Designed for upper-level undergraduates and graduate students, with each weekly session being split between lecture and discussion activities. Subjects covered include those required of all trainees being supported on Public Health Service grants. **Note:** USU 6900 *cannot* be counted toward fulfillment of University Studies requirements.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.
©This course is also offered by online correspondence and/or CD through Continuing Education Time Enhanced Learning.

Watershed Sciences (WATS)

See Department of Watershed Sciences, pages 535-540.

The WATS course prefix will not be used until Spring Semester 2007. For Fall Semester 2006, these courses will continue to use the Aquatic, Watershed, and Earth Resources (AWER) prefix. For AWER course descriptions, see pages 566-568.

Women and Gender Studies (WGS)

See Women and Gender Studies, page 548.

WGS 1010 Introduction to Women and Gender Studies 3
Survey course covering fundamentals of women and gender studies. Explores women's and men's diverse experiences, perspectives, and contributions to society and its institutions. Examines cultural beliefs and stereotypes concerning women's and men's roles in society. Reviews feminist theory, socialization, ideology, and history of women's movement. (Sp)

WGS 2010 Women and Leadership 3
Engages students in academic and practical experiences that strengthen their sense of self and prepare them to pursue leadership roles. Discussion of research and readings pertinent to the study of women's leadership and activism. Development of and participation in a personal leadership project providing a substantive opportunity to apply information and skills learned through the class. (Sp)

WGS 4550 DHA/CI Women and Gender in America 3
Writing intensive course drawing on film, primary documents, and readings to trace the history of women, emphasizing race, class, and gender influences of each era. Also taught as HIST 4550. (F)

WGS 4900 Directed Study: Women and Gender Studies 1-3®
Directed research, writing, and reading in relation to gender studies. Provides students with an in-depth opportunity to work individually with a faculty member. Contract for work to be completed must be signed by the Women and Gender Studies director, the faculty member, and the student, then filed with the Women and Gender Studies Program. Prerequisite: Permission of program chair. (F,Sp,Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

Wildland Resources (WILD)

See Department of Wildland Resources, pages 541-547.

The WILD course prefix will not be used until Spring Semester 2007. For Fall Semester 2006, these courses will continue to use the Forest, Range, and Wildlife Sciences (FRWS) prefix. For FRWS course descriptions, see pages 630-632.