COURSE DESCRIPTIONS

For the most up-to-date catalog information:
www.montana.edu/wwwcat

Course Description Information

Course offerings are subject to the availability of staff and adequate enrollment. Check the Schedule of Classes for the courses actually offered each semester.

Numbering System
- 001-099 - courses below college level. No college credit given. Credits may not be counted toward a degree.
- 100-199 - Freshman - Lower Division
- 200-299 - Sophomore - Lower Division
- 300-399 - Junior - Upper Division
- 400-499 - Senior - Upper Division
- 500-599 - Graduate Courses (except senior, 5th year courses in the School of Architecture)
- 600-699 - Graduate Courses

Core 2.0 Courses
Core 2.0 courses are designated by a letter following the course number (e.g., CLS 101US). The following letters are used to specify the core groups:
- US - University Seminar
- W - College Writing
- Q - Quantitative Reasoning
- D - Diversity
- CS - Contemporary Issues in Science
- IA - Inquiry Arts
- IH - Inquiry Humanities
- IN - Inquiry Natural Science
- IS - Inquiry Social Science
- R - Research
- RA - Research Arts
- RH - Research Humanities
- RN - Research Natural Science
- RS - Research Social Science

Classification of Courses
In the second line of each course description, following the number of credits for the course, there appears a course classification designation which indicates the mode of instruction for that course. In some cases two classifications are listed along with the number of credits in each.

Following is an explanation of course classifications.
- LEC - Lecture: Presentation of course material by the instructor, utilizing the lecture method.
- LAB - Laboratory: Instructing and supervising students in laboratory investigations.
- STU - Studio: Instructing and supervising students in studio investigations.
- SEM - Seminar: Students share, with the instructor, responsibility for preparation and presentation of course material.
- IND - Independent Study: Directed study and/or research on an individual basis, under supervision of instructor.
- RCT/DIS - Recitation-Discussion: Instructing the students in recitation and/or discussion.
- LAB - Laboratory: Instructing and supervising students in laboratory investigations.
- CLS 101US - Contemporary Issues in Science

Uniform Course Numbers
Uniform course numbers are used in all departments.
- 200, 300, 400 and 500 - Seminar
- 270, 470 and 570 - INDEPENDENT STUDY (individual projects)
- 280, 480, 580 - Special Topics (first or one-time class offering)
- 475 - Undergraduate Projects
- 576 - Internship
- 489, 490 - Undergraduate Scholars Program
- 575 - Graduate Research - Paper (professional paper or professional project)
- 588 - Professional Development
- 589 - Graduate Consultation
- 590 - Master's Thesis
- 689 - Reading and Research
- 690 - Doctoral Thesis

These courses may be repeated for credit. Specific titles of Special Topics courses are listed in the Schedule of Classes, on the Class Rolls and the student's permanent record.

Some courses such as Special Topics, INDEPENDENT STUDY and Internship are offered for varying amounts of credit, e.g., 1-5. A maximum number of credits is also imposed, e.g., Maximum 6 cr. A student may repeat such courses to earn the maximum number of credits by registering for two or more projects with the credits for each project totaling the maximum allowed. If there is no stated maximum for Internship, then all earned credits will count toward graduation, but these credits will only count toward meeting degree requirements as determined by the student's department. Credits earned beyond the stated maximum cannot be applied toward graduation.

Special Topics and INDEPENDENT STUDY Courses
The maximum number of credits allowed toward graduation in 280 plus 480 courses in each rubric is 12, and the maximum number of 470 credits in each rubric is six. Some departments have established lower limits than these, and the student is responsible for checking the specific course listings to see that he or she does not exceed the allowable number of credits. The maximum number of 570 credits applicable to a graduate degree depends upon the degree. No 470 credits are applicable to a graduate degree.

Courses Offered On Demand
A course designated as "On demand" with a specific semester (i.e., F, S, Su) preceding this phrase means that the course will be offered that semester if there is sufficient demand.

Undergraduate courses designated as given "On demand" may be offered any semester in which there is a sufficient number of students who wish to
register for the course. Usually undergraduate courses are offered at the request of 10 or more students.

Graduate courses listed "On demand" will be offered when a sufficient number of students have requested the course and faculty availability and budgets permit.

Courses Offered Alternate Years

Certain courses for which there is a small demand are offered every other year. the designation for such a course is: Semester (Alternate years, will be offered....dates...).

Undergraduate Course Prerequisites

Courses beyond the freshman year usually have "prerequisites." This means that certain lower-level courses must be taken before the student may register for the advanced course. A grade of "C-" or better must be earned in all prerequisite courses to satisfy the requirement.

The prerequisite for undergraduate courses may be "consent of instructor." The student must secure the consent of instructor of the course before registering for it. "Consent of instructor" is usually required for courses in which there is limited laboratory space and/or skills are required.

The Department of Mathematical Sciences enforces prerequisites. By University policy, in order for any course to serve as the prerequisite you must earn a "C-" or better. In addition to the specific prerequisite courses listed, students in 100 level math courses may also meet the prerequisite with the appropriate Math ACT, Math SAT, or Math Placement Exam score. Specific levels and scores for these courses can be found at: www.math.montana.edu/undergrad/prereq_flow.html

Graduate Course Prerequisites

Courses at the 500 and 600 levels may be taken only by qualified students. Unless otherwise stated the courses are open only to:

1. Students with graduate standing (poist baccalaureate students admitted to the College of Graduate Education, enrolled in non-degree status or second bachelor's degree candidates).

2. Seniors with a cumulative grade-point average of 3.25 or higher, and

3. Other seniors who have a petition approved by the head of the student's major department, and the Dean of the College of Graduate Education.

Some courses are limited to students with graduate standing or certain levels of graduate standing. These specific conditions are indicated within the course prerequisite or description statements.

Students below senior standing are not eligible to take graduate-level courses.

Course Descriptions by Subject Area

Listings in this section are grouped according to subject area and listed alphabetically. In addition to an actual description of the course, each listing includes course credit, mode of instruction and prerequisite, if any. While the semesters each course is offered are also shown (F-fall semester, S-spring semester, Su-summer session), you should consult the Schedule of Classes, published prior to pre-registration each semester for the most up-to-date information on course availability.

ACCT

Accounting
College of Business
(406) 994-4423

ACCT 220 SURVEY OF ACCOUNTING
On Demand 5 cr. LEC 3
- A survey of the basic accounting model, accounting records, recording business transactions, preparation and analysis of financial statements, and elementary income tax issues in a small business environment. This course is intended for non-business majors and may not substitute for any required business course.

ACCT 225 PRINCIPLES OF ACCOUNTING II
F, S, 3 cr. LEC 3
PREREQUISITE: BUS 221.
- A continuation of the financial accounting topics introduced in BUS 221. The course helps students learn how to prepare and analyze financial statements, and understand the role that accounting plays in business decisions. Additional topics include: stock and bond investments, cash flow reporting, financial statement analysis techniques, and manufacturing and cost accounting issues.

ACCT 270 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of Associate Dean.
- Directed research and study on an individual basis.

ACCT 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ACCT 299R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-5 cr. CRT. May be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ACCT 299R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND. May be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

ACCT 325R ACCOUNTING INFORMATION SYSTEMS
S 3 cr. LEC 3
PREREQUISITE: ACCT 223 or consent of instructor.
- A study of the structure, flow, and use of accounting data in computer-based and networked environments. Topics include systems development and documentation, internal control, business process, databases, and software applications.

ACCT 327 INTERMEDIATE ACCOUNTING I
F, S 3 cr. LEC 3
PREREQUISITE: ACCT 223 or consent of instructor.
- The theory and practice of financial accounting and reporting. A study of the conceptual framework and process by which accounting standards are established; preparation of financial statements and disclosure; applications of fair value concepts and present value measurements to accounting events; and accounting for current assets, plant assets, natural resources, intangible assets, current and long-term liabilities, and related income and expense elements.

ACCT 328 INTERMEDIATE ACCOUNTING II
F, S, 3 cr. LEC 3
PREREQUISITE: ACCT 327
- The theory and practice of financial accounting and reporting. A study of stockholders' equity, dilutive securities, earnings per share, investments, revenue recognition, deferred income taxes, pensions, leases, accounting changes, error analysis, the statement of cash flows and full disclosure in financial accounting.

ACCT 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper division level that are not covered in regular courses. Students participate in preparing and presenting discussion material.

ACCT 421 PRINCIPLES OF AUDITING
F, S 3 cr. LEC 3
PREREQUISITE: ACCT 328 or consent of instructor.
- Practice and theory of auditing financial statements. A study of most of the major activities performed during the conduct of a financial statement audit, from client acceptance to issuance of an audit report.
ACCT 425 INTRODUCTION TO TAXATION
F 3 cr. LEC 3
Prerequisite: BUS 222 or ACCT 223
- Students are introduced to a broad range of tax concepts and tax policies. Students should develop an understanding of how tax laws affect business and personal financial decisions. Tax reporting, tax planning, and basic tax research skills will be emphasized.

ACCT 432 GOVERNMENTAL ACCOUNTING
F 3 cr. LEC 3
Prerequisite: ACCT 328
- A study of the accounting principles and financial reporting unique to state and local governments.

ACCT 433 COST/MANAGEMENT ACCOUNTING I
F 3 cr. LEC 3
Prerequisite: ACCT 328
- Focus on cost accounting concepts, with emphasis on developing and evaluating information that management needs to plan, make key decisions, and monitor business performance. Key topics include cost behavior, cost-volume-profit analysis, flexible budgeting, incremental decision analysis, and performance evaluation.

ACCT 434 COST/MANAGEMENT ACCOUNTING II
S 3 cr. LEC 3
Prerequisite: ACCT 433
- A continuation of traditional topics and current readings in cost/management accounting. The course objective is to improve students' understanding of cost management by exploring the following topics in a cost management context: microeconomics, macroeconomics, working capital, capital structure, risk and other relevant topics.

ACCT 436 ADVANCED ACCOUNTING
On Demand 3 cr. LEC 3
Prerequisite: ACCT 328
- The theory and practice of financial accounting and reporting pertaining to business combinations and constant dollar statements, accounting for partnerships and related business forms, foreign currency transactions and financial statement translations, and other advanced accounting topics.

ACCT 444 ADVANCED ACCOUNTING SYSTEMS
On Demand 3 cr. LEC 3
Prerequisite: Junior standing and completion of ACCT 325 or BUS 311.
- Contemporary issues in information systems. Emphasis on the practical application of information technology to improve business efficiency and effectiveness.

ACCT 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
Prerequisite: Junior standing, consent of instructor and approval of Associate Dean.
- Directed research and study on an individual basis.

ACCT 476 INTERNSHIP
On Demand 2 - 12 cr. IND Maximum 12 cr.
Prerequisite: Formal admission to the College of Business and consent of the instructor.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

ACCT 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
Prerequisite: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ACCT 489R UNDERGRADUATE RESEARCH/CREATIVATION ACTIVITY INSTRUCTION
On Demand 1 - 2 cr. ACT May be repeated. Max 4 cr.
Corequisite: ACCT 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ACCT 490R UNDERGRADUATE RESEARCH/CREATIVATION ACTIVITY
On Demand 1-6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

ACCT 500 SEMINAR
On Demand 1 cr. SEM 1
Prerequisite: Admission to the MPAC program.
- Topics offered at the graduate level that are not covered in regular graduate courses. Students participate in preparing and presenting discussion material.

ACCT 514 FRAUD EXAMINATION
On Demand 3 cr. LEC 3
Prerequisite: ACCT 421 and admission to MPAC Program or consent of instructor.
- An overview of fraud examination, including the extent and nature of fraud, motivations of perpetrators, fraud symptoms, legal issues, as well as methods of detection, investigation, and prevention of various asset misappropriation schemes and fraudulent financial statements.

ACCT 515 PROFESSIONAL SERVICES MANAGEMENT
On Demand 3 cr. LEC 3
Prerequisite: Admission to the MPAC Program or consent of instructor.
- This course is designed to expose students to the internal operations and client management efforts of professional services organizations and providers, with a particular focus on accounting firms. Topics include managing service relationships, service firm structure and the service-profit chain.

ACCT 521 ADVANCED AUDITING
S 3 cr. LEC 3
Prerequisite: ACCT 421 and admission to MPAC Program.
- An in-depth analysis of contemporary auditing and assurance theory, statistical sampling, internal control, and audit evidence.

ACCT 524 INTERNATIONAL ACCOUNTING
S 3 cr. LEC 3
Prerequisite: ACCT 328 and admission to MPAC Program.
- This course introduces students to international accounting with special emphasis on four major topics: 1) accounting systems as expressions of cultural, political, and ideological forces, 2) comparative international accounting patterns, 3) efforts to harmonize international accounting standards worldwide, and 4) accounting issues faced by multinational corporations.

ACCT 525 ACCOUNTING THEORY AND COMPLEX ISSUES IN ACCOUNTING
F 3 cr. LEC 3
Prerequisite: ACCT 328 and Admission to MPAC Program.

ACCT 526 ADVANCED TAXATION
S 3 cr. LEC 3
Prerequisite: ACCT 425 and admission to MPAC Program or consent of instructor.
- Study of the federal tax law and incidental property and probate law as it relates to taxation of gifts and estates. Emphasis is placed upon planning techniques for minimizing estate and gift taxes and providing liquidity for their payment.

ACCT 529 LEGAL ISSUES FOR ACCOUNTANTS
S 3 cr. LEC 3
Prerequisite: BUS 561 or equivalent and admission to MPAC Program.
- Analysis of legal issues for accounting students, including debtor/creditor, bankruptcy, securities regulation, antitrust, employment regulation, uniform commercial code and real property. Course includes significant written work and oral presentations.

ACCT 530 RESEARCH IN ACCOUNTING
F 3 cr. LEC 3
Prerequisite: ACCT 528 and admission to MPAC Program.
- A project-oriented seminar that focuses on developing skills for researching accounting issues in accounting journals and other authoritative sources. Students will develop a framework to enhance their ability to analyze accounting issues throughout their careers. Students will research, analyze, develop, and present solutions to accounting and related cases found using modern information technology resources. Students will also be expected to demonstrate proficiency in writing abilities and communication skills throughout this course.

ACCT 531 TAX RESEARCH AND PLANNING
F 3 cr. LEC 3
Prerequisite: ACCT 425.
- Study and application of research methodologies related to tax compliance and tax planning work commonly performed by accountants.

ACCT 531 TAX PRACTICUM
S 3 cr. LEC 3
Prerequisite: ACCT 425 and concurrent enrollment in ACCT 531 or consent of instructor.
- This course emphasizes how the broad principles of taxation affect individuals, corporations, partnerships, S-corporations, exempt entities, estates, and trusts. Students will apply their knowledge by assisting low income individuals with their tax returns as part of the Volunteer Income Tax Assistance Program.
ACCT 532 GOVERNMENTAL AND NONPROFIT ACCOUNTING II
F 3 cr. LEC 3.
PREREQUISITE: ACCT 432 and admission to MPAC Program or consent of instructor.
- A more in-depth study of the uniquely different characteristics of accounting and financial reporting for the governmental and nonprofit sectors of the U.S. economy.

ACCT 536 ADVANCED ACCOUNTING
F 3 cr. LEC 3.
PREREQUISITE: ACCT 528 and admission to MPAC Program or consent of instructor.
- The theory and practice of financial accounting and reporting pertaining to business combinations and consolidated financial statements, accounting for partnerships and related business forms, foreign currency transactions and financial statement translations, and other advanced accounting topics.

ACCT 570 INDEPENDENT STUDY
On Demand 1-8 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of Associate Dean and Dean of Graduate Education
- Directed research and study on an individual basis.

ACCT 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
On Demand 1 - 4 cr. IND
PREREQUISITE: Graduate standing. Consent of instructor and approval of Associate Dean and Dean of Graduate Education.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

ACCT 576 INTERNSHIP
On Demand 1-3 cr. IND
PREREQUISITE: Graduate standing and consent of instructor.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

ACCT 580 SPECIAL TOPICS
On Demand 1 - 4 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ACCT 589 GRADUATE CONSULTATION
F, S, Su 1-5 cr. IND
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education
- This course may be used only by students who have completed all of their course work (and Thesis if on a Thesis Plan) but who need additional faculty or staff time or help.

AGEC
Agricultural Economics
Department of Agricultural Economics & Economics
(406) 994-3701

AGEC 21013 THE ECONOMICS OF AGRICULTURAL BUSINESS
F 3 cr. LEC 3
PREREQUISITE: ECON 101.
- This course provides an introduction to marketing, trade, risk, strategic, resource, and financial management of farms/ranches and agribusiness firms in the domestic and global economy. Basic economic principles will be applied to farm, ranch and agribusiness management, marketing, and international agricultural trade issues.

AGEC 290 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

AGEC 290R UNDERGRADUATE RESEARCH
F, S, Su 1 - 8 IND
PREREQUISITE: ECON 101 and approval of instructor.
- Intended for lower division undergraduate research/undergraduate scholar program. The student will work closely with the supervising faculty.

AGEC 300 SEMINAR
F, S 1 cr. SEM 1
PREREQUISITE: Junior standing.
- Current agricultural problems and writings of people in the profession. Topics vary each semester; check with the department before registering.

AGEC 310 FOLLOW THE GRAIN
S, to be offered alternate years, 2007 3 cr. Lec 2
PREREQUISITE: ECON 201 or PSPP 102 and consent of instructor.
- The primary goal of this course is to provide students with an integrated view of the science, technology, production practices, product handling, product marketing system, and end uses for wheat and barley, the two most important crops grown in Montana.

AGEC 321 ECONOMICS OF AGRICULTURAL MARKETING
F 3 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250.
- Issues in marketing agricultural products and the economic principles that assist in analysis of these issues. Factors affecting market prices, and topics associated with methods of marketing are considered. Emphasis on Montana products.

AGEC 337 AGRICULTURAL LAW
S 3 cr. LEC 3
PREREQUISITE: Junior standing.
- Application of general principles of law to ownership and operation of farming business and its relationship with other agribusiness firms, government agencies and people.

AGEC 341 FARM & RANCH MANAGEMENT
S 8 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250 and ECON 350.
- Basic tools of economic decision making useful to farm and ranch managers are examined.

AGEC 348 AGRICULTURAL FINANCE & CREDIT ANALYSIS
F 3 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250.
- Alternatives available to farmers for acquiring and maintaining control over resources used in agriculture production. Emphasis is on the management of cash, credit, debt, taxes, and interest in relation to agricultural price levels and general economic conditions.

AGEC 421 ADVANCED AGRICULTURAL MARKETING
S 5 cr. LEC 3
PREREQUISITE: AGEC 321.
- Economic analysis of current issues in agricultural marketing including market structure, risk, and efficiency; commodity promotion; futures and options markets; price forecasting; and retained ownership options.

AGEC 445 AGRIBUSINESS MANAGEMENT
F 3 cr. LEC 3
PREREQUISITE: ECON 301, STAT 216, and either AGEC 345 or FIN 352.
- Students are expected to use tools and concepts developed in earlier course work to address typical problems faced by agribusiness and agricultural producers. Case studies modified from actual situations are used extensively.

AGEC 451RS ECONOMICS OF AGRICULTURAL POLICY
S 3 cr. LEC 3
PREREQUISITE: ECON 301.
- Senior capstone course. Consideration of the economic problems of American agriculture and of alternative solutions. Rigorous analysis of the causes and consequences of government programs (both past and present) on consumers, producers, and taxpayers.

AGEC 467 QUANTITATIVE METHODS IN ECONOMICS
F 3 cr. LEC 3
PREREQUISITE: ECON 301, MATH 221 and approval of instructor.
- Static and dynamic optimization models in economics. Nonlinear and dynamic programming models are introduced. Emphasis on formulating economic and management problems in terms of quantitative models.

AGEC 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

AGEC 480 SPECIAL TOPICS
On Demand 1 - 4 cr. LEC Maximum 12 cr.
PREREQUISITE: Course prerequisites are dependent on the offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.
AGEC 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: AGEC 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

AGEC 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 8 cr. IND
PREREQUISITE: ECON 201, junior standing, and approval of instructor.
- Intended for upper division undergraduate research/undergraduate scholars program. The student will work closely with the supervising faculty.

AGEC 514 AGRICULTURAL PRICE ANALYSIS
S 3 cr. LEC 3
PREREQUISITE: ECON 561.
- Theoretical and working knowledge of agricultural market prices, demand, and supply. Analysis of commodity models supported by statistical modeling under conventional econometrics and time series analysis, useful for market response and forecasting evaluation.

AGEC 579 INDEPENDENT STUDY
On Demand 1 - 8 cr. IND
PREREQUISITE: Graduate standing, consent of instructor; approval of department head and Dean of Graduate Education
- Directed research and study on an individual basis.

AGEC 590 SPECIAL TOPICS
On Demand 1 - 4 cr. LEC Maximum 12 cr.
PREREQUISITE: Upper division courses, and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

AGEC 589GRADUATE CONSULTATION
F, S, Su 3 cr. IND
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their coursework (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

AGEC 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND May be repeated.
PREREQUISITE: Master's standing.

AGED
Agricultural Education
Department of Entomology/Division of AGED/AOT
(406) 994-3861

AGED 105 MICROCOMPUTERS IN AGRICULTURE
S 3 cr. LEC 1 LAB 2
- Utilizing and selecting microcomputer software for the broad field of agriculture. Decision aid software, spreadsheets, database, telecommunication, financial records, and word processing are emphasized. Application of computers to control, monitor, and calibrate devices in addition to aiding management decisions. Macintosh and IBM

AGED 200 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
- Topics offered at the lower division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

AGED 255US LEADERSHIP DEVELOPMENT FOR AGRIBUSINESS & INDUSTRY EMPLOYEES
F, S 5 cr. LEC 2 LAB 1
- Process of developing and managing individuals by providing leadership and guidance at all levels of personnel development. Self concepts developed through situational leadership and management, principles of personnel management, goal setting, and belief systems. Collaborative learning and field experience utilized.

AGED 255Agricultural Education in Public Schools
S 3 cr. LEC 3
- Establish a philosophy of agricultural education at the secondary, middle school, and elementary level. Instructional content in agriculture science, mechanics, and leadership will be identified. Principles needed in developing agricultural experiences associated with agricultural education will be presented.

AGED 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

AGED 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT. May be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

AGED 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND. May be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

AGED 300 PHILOSOPHY AND PROGRAMS IN EXTENSION
S alternate years, to be offered 2007 S cr. LEC 3
PREREQUISITE: EDSD 209.
- Designed to introduce prospective county extension educators to fundamental philosophy, activities, and educational and planning methods underlying the Cooperative Extension Service. Identification of educational and program needs and providing instructional programs for rural and urban youth and adults.

AGED 312 COMMUNICATING AGRICULTURE TO THE PUBLIC
S 3 cr. LEC 2 LAB 1
PREREQUISITE: AGED 851, and ENGL 121.
- Designed to serve students in Agricultural Education, Extension Option and related fields, or any agricultural student who may have a communication component as part of their career.

AGED 314 POWER SYSTEMS OPERATION & CONTROL
F 3 cr. LEC 2 LAB 1
- A study of internal combustion engine systems and the electronic control of these systems. Emphasis on power service, fuel, electrical, ignition, and emission systems used on modern engines. Lab activities include testing, adjusting, and servicing the various systems.

AGED 316 AGRICULTURAL TRANSMISSION SYSTEMS
S 3 cr. LEC 2 LAB 1
PREREQUISITE: AGED 314.
- The application of belts, chains, gears, hydraulics and electric motors used in agriculture to transfer and control energy. Major emphasis will be on hydraulics and electric motors.

AGED 353 CONSTRUCTION TECHNOLOGY
F 3 cr. LEC 1 LAB 2
PREREQUISITE: ECON 561.
- Various construction systems that are used to construct structures on site. Includes all aspects of the construction industry including basic planning, materials, estimating, building techniques, managing, and the actual construction of buildings projects.

AGED 353 COOPERATIVE BUSINESS PRINCIPLES AND PRACTICES
F 3 cr. LEC 3
PREREQUISITE: Junior standing, consent of the Cooperative and the cooperative way of doing business. Students will learn the role of cooperatives in marketing, bargaining, purchasing, and service.

AGED 355 TEACHING PRACTICES
F 1 cr. LAB 1
PREREQUISITE: To be taken concurrently with EDSD 502.
- Provides additional experience in planning, teaching, and evaluating lessons in agricultural education.

AGED 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

AGED 417 CRITICAL THINKING FOR THE FOOD AND FIBER SYSTEM
S 3 cr. LEC 1 LAB 2
PREREQUISITE: Senior standing in AGED or AOT.
- Senior capstone course. Following an overview of current food and fiber system issues related to Montana, teams of students will select a problem to analyze, and will propose solutions to solve the problem. Application of prior knowledge, communication skills, and higher order thinking skills will be required.

AGED 470 INDEPENDENT STUDY
On Demand 1 - 8 cr. IND
PREREQUISITE: Senior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

AGED 476 INTERNSHIP
On Demand 2 - 8 cr. IND
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.
AGED 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

AGED 482 NON FORMAL TEACHING METHODS IN AGRICULTURE
F 2 cr. LEC 2
PREREQUISITE: AGED 251, ENGL 221 and Junior standing.
COREQUISITE: AGED 355.
- Non Formal Teaching Methods in Agricultural is a course designed for senior and graduate level students in Agricultural Relations and other majors who will be designing, implementing and evaluating learning through Cooperative Extension and/or other careers. Graduate teaching assistants may also take this course to aid in developing their teaching skills. The course covers theories, principles and practices associated with effective non-formal teaching and learning for adult education as well as non-adult educational settings such as 4H meetings, conferences, and conventions.

AGED 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 6 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: AGED 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

AGED 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

AGED 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and present discussion material.

AGED 506 RESEARCH METHODS
On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing, STAT 216, or concurrent enrollment in EDUC 402.
- Principles and techniques of research appropriate for planning, conducting and reporting agricultural and extension education research.

AGED 570 INDEPENDENT STUDY
S, F, Su 1-6 cr. IND 1-6
PREREQUISITE: Graduate Standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Direct research and study on an individual basis.

AGED 575 PROFESSIONAL RESEARCH PAPER
On Demand 1-4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate Standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student, the major advisor, and graduate committee.

AGED 576 INTERNSHIP
S, F, Su 2-12 cr. IND 2-12
PREREQUISITE: Graduate Standing, consent of instructor, approval of department head and Dean of Graduate Education.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

AGED 589 GRADUATE CONSULTATION
S, F, Su 5 cr. IND
PREREQUISITE: Master’s standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their coursework (and thesis, if on a thesis plan), but who need additional faculty or staff time or help.

AGED 590 MASTER’S THESIS
S, F, Su 1-10 cr.
PREREQUISITE: Master’s Standing.

ANTH Anthropology
Department of
Sociology and Anthropology
(406) 994-4201

ANTH 101D ANTHROPOLOGY AND THE HUMAN EXPERIENCE
F, S 5 cr. LEC 3
- Comparative focus on human behavior and human cultural systems from the local to global levels. The nature and sources of diversity associated with the human experience are explored and reinforced using examples from archaeology, biological anthropology, cultural anthropology, and linguistics.

ANTH 201S HUMAN PREHISTORY
F 5 cr. LEC 3
- Introduction to basic concepts and ideas about the biological and cultural evolution of human species. Topics include primate ancestors, human origins, evolutionary theory, genetics, archaeological interpretation, and cultural change from the earliest stone tools to the rise of ancient civilizations.

ANTH 290S CULTURE & SOCIETY
F 5 cr. LEC 3
- The nature of culture through selected societies: symbolism and world view as related to cultural dynamics and representational forms. A survey of social practices, linguistic and cultural representations, exchange, identity, and the dynamics of power.

ANTH 221S MYSTERIES OF THE PAST
F 5 cr. LEC 3
- Focuses on archaeological thinking and the use of the scientific method in archaeology. Examines a variety of archaeological and pseudoarchaeological claims from this perspective.

ANTH 225S BONES, APES, & ANCESTORS
F 5 cr. LEC 3
- Exploration of human biological evolution from an anthropological perspective, emphasizing scientific understanding through examination of important fossil discoveries and of the behavior and anatomy of living non-human primates, especially apes. Aimed particularly at students not majoring in anthropology.

ANTH 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ANTH 290S UNDERGRADUATE RESEARCH EXPERIENCE IN ANTHROPOLOGY
S 5 cr. SEM 5
PREREQUISITE: ANTH 101 or ANTH 204.
- Undergraduate experiences for non-majors fulfilling their core research requirement. Content course is determined by the upper level anthropology course to which this class is linked and by student's interests. Upper level majors serve as research mentors. At least fifty percent of the course grade is based on library and field or laboratory research.

ANTH 290S UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. LEC 1-3.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ANTH 290S UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND. May be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

ANTH 303 BIOLOGICAL ANTHROP OLOGY
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: Junior standing, ANTH 201
- Human evolution and biology from an anthropological perspective: the fossil record, nonhuman primates, osteology, biologically variation, and basic techniques of physical anthropology.

ANTH 310 NATIVE NORTH AMERICA
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: Junior standing, ANTH 204
- An anthropological view of native North American cultures from the perspective of the ethnographic present. Continental-wide diversity in native adaptations and lifeways are examined along lines of anthropologically-defined culture areas.

ANTH 313 DESCRIPTIVE LINGUISTICS
On Demand 3 cr. LEC 3
PREREQUISITE: ANTH 101 or ANTH 204 or permission of instructor.
- The anthropological use of linguistic materials: introduction to phonology, morphology, and syntax of human languages from a variety of languages.
ANTH 329 ARCHAEOLOGY OF NORTH AMERICA
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: Junior standing, ANTH 201.
- Prehistoric cultural adaptations and developments in North America from the earliest archaeological evidence through historic times; basic archaeological methods and theory.

ANTH 320 LANGUAGE & CULTURE
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: Junior standing, ANTH 204.
- Language as a subsystem of culture, fundamentals of linguistic analysis and the use of language in social contexts. Also explores relationships between perception and conception, thought and representation.

ANTH 336 CONTEMPORARY PACIFIC SOCIETIES
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: Junior standing, ANTH 101 and ANTH 204.
- Current ethnological and theoretical considerations of creative cultural processes in relation to classical adaptations and world views of Pacific Island peoples.

ANTH 405 MYTH, MAGIC, & RELIGION
S alternate years, to be offered 2007 3 cr. LEC 3.
PREREQUISITE: Junior standing, ANTH 204.
- Forms of religious representation and practice in cultural and historical context; from liminality and symbolic innovation to mythic charters and social transformations, cosmological scenarios and ritual forms are explored in this course.

ANTH 412 CONTEMPORARY ISSUES IN ARCHAEOLOGY
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: ANTH 101, ANTH 201.
- Examination of current methodological and theoretical issues in archaeology and how they are applied to our understanding of the past.

ANTH 422 ANTHROPOLOGICAL THEORY
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: Junior standing, ANTH 204.
- Senior capstone course. An analysis of theories of anthropological science within their social context of development; exploration and critique of representational classics.

ANTH 425R SOCIAL ORGANIZATION
S alternate years, to be offered 2008 3 cr. SEM 3
PREREQUISITE: Junior standing, ANTH 204.
- Senior capstone course. An analysis of culturally relevant components of the social order in small-scale and complex societies, and local constructs of personal and group identity. Considers classical and recent approaches to interpersonal relationships and the organization of social life.

ANTH 435 ANALYSIS OF MATERIAL CULTURE
On Demand 3 cr. LEC 1
PREREQUISITE: ANTH 101.
- A summer of archaeological field work at a location away from the University; training in excavation and laboratory methods. (Offered when funding available.)

ANTH 450 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND
PREREQUISITE: Junior standing, ANTH 201.
- Directed research and study on an individual basis.

ANTH 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed study on an individual basis.

ANTH 479R SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

AOT 201 SURVEYING APPLICATIONS
S 1 cr. LAB 1
PREREQUISITE: MATH 150.
- An introductory course in surveying, primarily for agriculture students. Course includes determining elevations and distances. Emphasis on layout for irrigation and drainage systems, construction layout, mapping, and landscape layout.

AOT 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT. May be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

AOT 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND. May be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

AOT 301 RURAL ELECTRIFICATION
S 3 cr. LEC 2 LAB 1
- This course will cover the basic wiring requirements for farm buildings and agricultural electrical motors. An emphasis is placed on application and trouble shooting. Alternative power generation methods are also discussed.

AOT 401 AGRICULTURAL STRUCTURES AND ENVIRONMENT
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: Junior standing, MATH 150.
- Design and evaluation of building structural members, heat transfer, heat and moisture management, ventilation, agricultural waste management, and alternative energy sources for agricultural buildings.

AOT 405 TECH IN PRECISION AGR
S alternate years, to be offered 2005 3 cr. LEC 3
PREREQUISITE: AGED 314 and AGED 316; or consent of instructor.
- This course will cover the basic operation and application of various electronic components to precision agriculture or site specific management. Real time global positioning, yield monitors, direct sensors, variable rate applications are the main electronic applications discussed.
AOT 417 CRITICAL THINKING FOR THE FOOD AND FIBER SYSTEM
S 3 cr. LEC 1 LAB 2
PREREQUISITE: Senior standing in AGED or AOT.
- Senior capstone course. Following an overview of current food and fiber system issues, related to Montana, teams of students will select a problem to analyze, and will propose solutions to solve problems. Application of prior knowledge, communications skills, and higher order thinking required.

AOT 419 MACHINERY MANAGEMENT
F alternate years, to be offered 2005 3 cr. LEC 2 LAB 1
PREREQUISITE: MATH 150, AGED 316.
- The selection, use, evaluation, maintenance, and management of farm, industrial, and turf equipment. Calibration, efficiency, cost considerations, and labor management are stressed.

AOT 425 WATER MANAGEMENT
S alternate years, to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: Junior standing, MATH 150.
- Assessment of water availability, water development and labor management are stressed.

AOT 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an INDEPENDENT STUDY basis.

AOT 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ARCH 151A DESIGN FUNDAMENTALS I
F, Su 4 cr. LEC 2 STU 2
PREREQUISITE: Consent of director. Restricted enrollment. Must be admitted into pre-environmental design program or be a landscape design major.
- Basic visual design principles with emphasis on two-dimensional composition, relief studies, free hand drawing, introduction to the essential tools for graphic communication, and understanding the creative process.

ARCH 152 DESIGN FUNDAMENTALS II
SSu 4 cr. RCT 2 STU 2
PREREQUISITE: ARCH 151 or advanced placement based on approved portfolio. Pre-environmental design and landscape design majors only.
- A continuation of basic visual design principles and graphic skills with emphasis on color theory, three-dimensional composition, organizational principles, and further understanding of the creative process.

ARCH 200 SEMINAR
F, S, Su 1-2 cr. SEM Maximum 4 cr.
PREREQUISITE: Determined for each offering.
- Topics offered at the lower division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ARCH 211 WORLD ARCHITECTURE MODERN: CONTEMPORARY
F 3 cr. LEC 3
- This course will examine the historical development of architecture from the 19th century to the present. Within an historical context, the course will focus on the impact of cultural and philosophic trends, technological changes and innovations and the globalization of the digital revolution on our built environment. Students will be introduced to seminal theoretical approaches professed by architects and thinkers of the 20th and early 21st centuries.

ARCH 223 INTRODUCTION TO ARCHITECTURAL THEORY
F, S 3 cr. LEC 3
- Introduction to theoretical approaches advocated by architects during the second half of the 20th century. Emphasis is placed on comparing modern and post-modern philosophies of European, Asian, and American architects and their impact on early 21st century architecture.

ARCH 241 BUILDING CONSTRUCTION
F 3 cr. LEC 3
- Introduction to the materials of construction and an overview of building construction systems. Emphasis upon an understanding of materials and systems as a means to effective and creative design utilization.

ARCH 242 ARCHITECTURAL STRUCTURES I
S 3 cr. LEC 3
PREREQUISITE: MATH 160 and PHYS 205.
- Condensed introduction to structural design/analysis as applied to architectural works; basic statics and mechanics of materials and architectural forms; strength and serviceability concepts using stress and strain assessments; application of analytical and intuitive structural concepts in a design context. Notebook computer required.

ARCH 253 ARCHITECTURAL DESIGN I
F 5 cr. LEC/RCT 2 STU 3
PREREQUISITE: ARCH 152. Admission into the environmental design program.
COREQUISITE: ARCH 201.
- Small-scale architectural design projects requiring integration of basic spatial and visual concepts into design solutions emphasizing fundamental relationships of architecture to landscape with principles of order constituents of form, openings and light, structural awareness, nature of materials, and architectural coherence. Integrated special topics include architectural graphics and design drawing conventions.

ARCH 254 ARCHITECTURAL DESIGN II
F 5 cr. LEC 1 STU 3
PREREQUISITE: ARCH 253.
COREQUISITE: ARCH 242, ARCH 262, and ARCH 265.
- Continuation of ARCH 253 using small to medium-size projects extending the development of the design process to basic site and adjacency analysis, diagramming, and integration of fundamental concepts of context. Integrated special topics are architectural graphics including the perspective and fundamental computer applications for information access, introductory 3D drawing, and 3D modeling. Notebook computer required. Field trip possible.

ARCH 261 ARCHITECTURAL GRAPHICS I
F 5 cr. LEC 1 STU 2
COREQUISITE: ARCH 253.
- Basic techniques in architectural graphic expression. Course emphasizes an observation drawing studio supplemented by design drawing lecture/demonstration sessions. Topics include freehand, multi-view, par aline, and shade and shadow drawing techniques. Integrated topics relate to the ARCH 253 studio.

ARCH 262 ARCHITECTURAL GRAPHICS II
S 3 cr. LEC 1 STU 2
PREREQUISITE: ARCH 261.
COREQUISITE: ARCH 254 and ARCH 265.
- Basic techniques in architectural graphic expression. Course emphasizes an observation drawing studio supplemented by design drawing lecture/demonstration sessions. Topics include freehand, perspective, and shade and shadow drawing techniques. Integrated topics relate to ARCH 254 studio and ARCH 263 computer applications.

ARCH 263 ARCHITECTURAL GRAPHICS III
S 3 cr. LEC 1 STU 2
PREREQUISITE: ARCH 261.
COREQUISITE: ARCH 254 and ARCH 262.
- Principles of current computer-aided design applications in architectural practice, including introductions to two-dimensional computer-aided drawing, three-dimensional computer-aided design and delineation, desktop publishing, web page development, networking, and digital presentations. Topics provide foundation for computer applications in ARCH 254 design studio and ARCH 262 graphics studio. Notebook computer required.

ARCH 270 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Directed study and research on an individual basis.
<table>
<thead>
<tr>
<th>COURSE DESCRIPTIONS: ARCH 280 - ARCH 444</th>
</tr>
</thead>
</table>

**ARCH 280 SPECIAL TOPICS**

On Demand 1 - 4 cr. Maximum 12 cr.
**PREREQUISITE:** None required but some may be determined necessary by each offering department.

Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

**ARCH 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION**

F, S 1-3 cr. RCT may be repeated

Classroom instruction associated with directed undergraduate research/creative activity projects.

**ARCH 299R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY**

F, S 1-6 cr. IND may be repeated

Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

**ARCH 322A WORLD ARCHITECTURE: ANCEINT**

F 3 cr. LEC 3
**PREREQUISITE:** Junior standing, ENGL 121W.

A survey of world architectural history from primitive developments to the Medieval Era.

**ARCH 325A WORLD ARCHITECTURE: MEDIEVAL-BAROQUE**

S 3 cr. LEC 3
**PREREQUISITE:** Junior standing, ENGL 121W.

A survey of world architectural history from the Medieval Baroque.

**ARCH 331 ENVIRONMENTAL CONTROLS I**

F 4 cr. LEC 4
**PREREQUISITE:** MATH 160.

Architectural and site responses to climate at a regional, community, and small building scale including passive solar energy and heat flow fundamentals, analysis and design of the heating, ventilating, and air-conditioning systems used in architecture. Analysis and design of water supply and sanitation systems. Notebook computer required.

**ARCH 332 ENVIRONMENTAL CONTROLS II**

S 4 cr. LEC 4
**PREREQUISITE:** MATH 160.

Analysis and design of lighting systems, electrical systems, fire safety systems, and acoustical systems. Issues of visual and perceptual comfort and daylighting are developed. Notebook computer required.

**ARCH 343 ARCHITECTURAL STRUCTURES II**

F 4 cr. LEC 4
**PREREQUISITE:** ARCH 242.

Environmental loads, case development, and load path for structures; structural design philosophies; working stress, LRFD, and limit states; analysis of structural systems and systems planning; analysis and design of wood structures; introduction to structural wood design software tools. Complete structural design/drawings for a light wood frame building as a group project. Notebook computer required.

**ARCH 344 ARCHITECTURAL STRUCTURES III**

S 4 cr. LEC 4
**PREREQUISITE:** ARCH 345.

Continuous structural systems for larger buildings. Design of structural elements in steel, reinforced concrete, masonry, and prestressed concrete; connections, foundations, and building structures; structural engineer-architect communications; introduction to structural steel/concrete/masonry design software tools. Complete structural design/drawings for a small commercial building as a group project. Notebook computer required.

**ARCH 353 ARCHITECTURAL DESIGN III**

F 5 cr. LEC/RCT 2 STU 3
**PREREQUISITE:** ARCH 254.

Architectural design including building, landscape, and urban context using projects of medium scale and complexity with particular focus on housing. Integrated topics include programming, behavioral issues, ecologically-sound design, building systems and building codes. Field trip required. Notebook computer required.

**ARCH 355 ARCHITECTURAL DESIGN IV**

S 5 cr. LEC/RCT 2 STU 3
**PREREQUISITE:** ARCH 355.

Continuation of ARCH 355. Further exploration of behavioral issues and ecologically-sound design with emphasis on the architect's responsibility to society, including design for life safety and accessibility. Building program complexity increases, utilizing long-span structural systems. Notebook computer required.

**ARCH 400 SEMINAR**

F, S, Su 4 cr. LEC 2 STU 2
**PREREQUISITE:** ARCH 341.
**COREQUISITE:** ARCH 413 and ARCH 457.

The theory and practice of drawings and specifications as contract documents for building projects using procedures similar to those found in a professional architect's office and incorporating the use of computer-aided drafting. Notebook computer required.

**ARCH 413 PROFESSIONAL PRACTICE**

F, S 3 cr. LEC 1 STU 2
**COREQUISITE:** ARCH 440 and ARCH 457.

Architecture as a social practice, emphasis includes developmental strategies: political, managerial, legal, economic, interdisciplinary relations, community relations and client relations. Topics include marketing, business planning, project management, delivery methods, technology, regulation, accessibility and trends of practice. Notebook computer required.

**ARCH 414 ARCHITECTURAL STUDY ABROAD**

F, S 9 cr. LEC 6 IND 3
**PREREQUISITE:** ARCH 356.

Structured study in foreign countries under the direction of an architecture faculty member to obtain an understanding of modern and historical architecture and the forces shaping them. Holistic study of urban environments combines design, urban design, architectural history, drawing, and pre-travel design and research. Itineraries include opportunities for additional destinations and independent travel. Notebook computer required.

**ARCH 424 CONTEMPORARY ARCHITECTURAL HISTORY AND THEORY**

F, S 3 cr. LEC 3
**PREREQUISITE:** ARCH 322 and ARCH 323.

Critique and discussion of architectural projects built and ideology proposed in writings, drawings, and models since the turn of the century, including the simultaneous social and technical context, in order to examine the architectural issues of today.

**ARCH 425 WESTERN ARCHITECTURAL HISTORY**

On Demand 3 cr. SEM 5 Maximum 6 cr.
**PREREQUISITE:** ARCH 322 and ARCH 323.

A course in applied architectural history and theory. Lectures, discussions, and student projects investigate characteristics which convey a sense of place based on historical development, architectural styles, and urban design.

**ARCH 427 NON-WESTERN ARCHITECTURAL HISTORY**

On Demand 3 cr. SEM 5 Maximum 6 cr.
**PREREQUISITE:** ARCH 322 and ARCH 323.

A course in applied architectural history and theory. Lectures, discussions, and student projects investigate characteristics which convey a sense of place based on historical development, architectural styles, and urban design.

**ARCH 428 FOREIGN STUDY HISTORY**

F, S 5 cr. LEC 2 IND 1
**PREREQUISITE:** ARCH 322 and ARCH 323.
**COREQUISITE:** ARCH 414.

An on-site study in a foreign country of the social, cultural, and historic influences on architectural design. This course is only offered in conjunction with the foreign study program within the School of Architecture. Course shall include research and on-site visits documented in a written report.

**ARCH 440 COMPREHENSIVE ARCHITECTURAL PROJECT**

F, S 4 cr. LEC 2 STU 2
**PREREQUISITE:** ARCH 241, ARCH 351, ARCH 352 and ARCH 344, or permission of instructor.
**COREQUISITE:** ARCH 413 and ARCH 457.

Development and integration of building materials and assemblies, construction costs and building systems into the construction documents, specifications, and design of a small project. Building systems to be investigated include: structural environmental and enclosure, life safety and sustainability. Notebook computer required.

**ARCH 444 COMPUTATIONAL DESIGN FOR STRUCTURES**

On Demand 3 cr. LEC 2 STU 1.
**PREREQUISITE:** ARCH 242 and ARCH 263.

Introduction to spreadsheets and blackboard computational software; spreadsheet and blackboard developments for typical structural computations used in architecture; introduction to structural design/analysis software; and development of a library of computational software tools for the application of structural architectural design. Notebook computer required.
ARCH 450 COMMUNITY DESIGN CENTER
On Demand 5 cr. LEC 1 STU 4
PREREQUISITE: ARCH 356.
- The CDC assists public and non-profit groups by providing planning, programming, and conceptual design ideas. Emphasis and scope of projects are determined by the community needs. Projects are intended to complement and promote the professional practice of architecture in the State of Montana.

ARCH 451 DESIGN FOR THE COMMUNITY
F 3 cr. IND 5 Maximum 6 cr.
PREREQUISITE: ARCH 355.
- Students will be engaged in architecturally-related activities with government and non-profit agencies. This will enable students to be involved in a service learning academic experience.

ARCH 457 ARCHITECTURAL DESIGN V
F, Su 5 cr. LEC 1 STU 4
PREREQUISITE: ARCH 356.
COREQUISITE: ARCH 413 and ARCH 440.
- Senior capstone course. Advanced architectural design projects integrating site analysis, programming, building systems, and contemporary design theory. Emphasis placed on the inclusive synthesis of conceptual processes, analysis, preliminary design investigation, and design development. Notebook computer required.

ARCH 488 ARCHITECTURAL DESIGN VI
F, S, Su 5 cr. LEC 1 STU 4
PREREQUISITE: ARCH 457.
- A continuation of the holistic design synthesis encountered in ARCH 457 with emphasis on development of student's emerging design values and theoretical perspective. Field trip possible. Notebook computer required.

ARCH 464 INTERMEDIATE COMPUTER APPLICATIONS
F 3 cr. RCT 1 STU 2
PREREQUISITE: ARCH 262 and ARCH 265.
- The investigation of two-dimensional computer-aided design and drawing as applied to architectural practice. Lectures and projects will explore the use of two-dimensional CAD programs to create design drawings and construction documents.

ARCH 465 ADVANCED COMPUTER APPLICATIONS
F 3 cr. RCT 1 LAB 2
PREREQUISITE: ARCH 263 or ARCH 464.
- The investigation and application of advanced two-dimensional and three-dimensional computer-aided design, modeling, and presentation techniques for architectural practice. Lectures and projects may include topics of three-dimensional modeling, animation, delineation, or CNC milling. Notebook computer required.

ARCH 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head. Directed research and study on an individual basis.

ARCH 471 DIRECTED RESEARCH/Creative Activity
F, S, Su 1-6 cr. IND May be repeated.
COREQUISITE: ARCH 472.
- Directed research/creative activity which may culminate in a research paper, journal article, or design project.

ARCH 472 DIRECTED RESEARCH/Creative Activity
F, S, Su 1-2 cr. RCT May be repeated. Maximum 4 cr.
COREQUISITE: ARCH 471.
- Course the instruction associated with directed research/creative activity projects.

ARCH 476 INTERNSHIP
F, S 3-12 cr. IND. Maximum 12 cr.
PREREQUISITE: ARCH 413, ARCH 440, ARCH 457, and all other architectural courses through the third year.
- Students arrange for employment in an architectural office for a continuous period of twenty-four weeks, fall or spring semester through summer session. A minimum of six credits must be taken in fall or spring semester and three credits in summer session. Students will participate in a structured work/study professional practice experience and are required to present the content of this experience upon their return to campus. Specific course requirements determined by credit loads.

ARCH 480 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ARCH 489R UNDERGRADUATE RESEARCH/Creative Activity Instruction
F, S 3 cr. RCT May be repeated. Maximum 4 cr.
COREQUISITE: ARCH 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects. Will not count toward graduate credit.

ARCH 490R UNDERGRADUATE RESEARCH/Creative Activity
F, S 1-6 cr. IND May be repeated. Maximum 12 cr.
PREREQUISITE: ARCH 489R - Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

ARCH 515 INSPECTION FIELD TRIP
F, S, Su 3 cr. IND Maximum 6 cr.
PREREQUISITE: Admittance to the graduate program or seniors by petition.
- An on-site study of social, cultural, and historical influences and their manifestation in architecture and urban design within a particular community. Research, documentation, paper and graphic presentation are required.

ARCH 521 ARCHITECTURAL THEORY
On Demand 5 cr. SEM 5 Maximum 9 cr.
PREREQUISITE: Graduate standing or seniors by petition.
- Specific architectural, urban, planning and preservation theories, their application and context within contemporary practice will be investigated through the study of essays, drawings, models and built projects.

ARCH 522 HISTORICAL ISSUES IN ARCHITECTURE AND URBAN DESIGN
On Demand 3 cr. SEM 5 Maximum 9 cr.
PREREQUISITE: ARCH 322, ARCH 523. Graduate standing or seniors by petition.
- Close examination of historic periods and individuals. Emphasis upon in-depth studies of particular personalities and the social, cultural, artistic and scientific developments that influenced the progress of architecture, urban design and city planning.

ARCH 523 ISSUES IN CITY PLANNING
On Demand 3 cr. RCT/DIS 3
PREREQUISITE: Graduate standing or seniors by petition.
- Problems and issues, processes and regulations in planning, urban design, and historic preservation. Field trip possible.

ARCH 524 DESIGN COMPETITION
On Demand 3 cr. LAB/SUU 3 Maximum 6 cr.
PREREQUISITE: ARCH 355 or consent of instructor. Admission to graduate program or seniors by petition.
- Students will work under the direction of a faculty member in the research, design, development and presentation of a project in response to a design competition.

ARCH 525 SPECIAL DESIGN TOPIC
On Demand 3 cr. LAB/SUU 3 Maximum 6 cr.
PREREQUISITE: ARCH 355 and consent of instructor. Admission to graduate program or seniors by petition.
- Students will work under the direction of a faculty member in the research, design, development and presentation of a design, research, or historic preservation project.

ARCH 533 ADVANCED ENVIRONMENTAL CONTROLS
On Demand 3 cr. IND 3.
PREREQUISITE: ARCH 331 and ARCH 332. Admission to the graduate program or seniors by petition.
- Advanced architectural lighting design explored through experimental exercises, calculations, physical modeling and computer simulations. Includes an in-depth study of new lamps, luminaries, electrical lighting design and daylighting design.

ARCH 543 ADVANCED APPLIED DESIGN AND CONSTRUCTION
On Demand 3 cr. LAB/SU 3 Maximum 6 cr.
PREREQUISITE: ARCH 241, consent of instructor, and graduate standing or seniors by petition.
- Small scale projects industrial products, furniture, buildings, etc., will be designed and built by students as an exploration of the opportunities and limitations of materials, technology, economics, and construction methods.

ARCH 545 ADVANCED STRUCTURES
On Demand 3 cr. LEC 2 STU 1
PREREQUISITE: ARCH 544 and graduate standing or seniors by petition.
- Advanced structural topics, load path, performance design, structural system planning, connection design; computer software for structural analysis/design; structural restoration; complete design/analysis/structural issues for a medium sized multi-use building (class project). Notebook computer required.
ARCH 551 ADVANCED
ARCHITECTURAL STUDIO
F, S 3 cr. STU 3.
PREREQUISITE: ARCH 457 and graduate standing.
COREQUISITE: ARCH 552.
- Building design projects which explore a specific, theoretical position with regard to contemporary architectural or historic preservation issues. Notebook computer required, field trip required.

ARCH 552
ARCHITECTURAL STUDIO RESEARCH
F, S 3 cr. LEC 1 RCT 2
PREREQUISITE: ARCH 457 and graduate standing.
COREQUISITE: ARCH 551.
- Graduate research and analysis of a major theoretical position advocated through the writings, drawings and models of architectural theorists. Notebook computer required, field trip required.

ARCH 553 ARCHITECTURAL STUDIO: THEORETICAL APPLICATION
F, S 3 cr. LEC 1 RCT 2
PREREQUISITE: ARCH 457 and graduate standing.
- Graduate research and analysis of the formal manifestations of the specific theoretical positions advocated and illustrated through the design work of significant architectural practitioners. Notebook computer required.

ARCH 554 URBAN DESIGN STUDIO
F, S, Su 3 cr. STU 3.
PREREQUISITE: ARCH 457 and graduate standing.
COREQUISITE: ARCH 555.
- Urban design projects that develop an understanding of public planning goals and constraints, urban infrastructure, formal urban fabric, historic preservation, and socio-cultural issues. Notebook computer required. Field trip required.

ARCH 555 URBAN DESIGN RESEARCH
F, Su 3 cr. LEC 1 RCT 2
PREREQUISITE: ARCH 457 and graduate standing.
COREQUISITE: ARCH 554.
- Methods, models, and techniques for analyzing the city as an artifact of social, cultural, historical, economic and physical significance. Notebook computer required. Field trip required.

ARCH 556 URBAN DESIGN THEORY
F, S 5 cr. LEC 1 RCT 2
PREREQUISITE: ARCH 457 and graduate standing.
- Graduate research and analysis of contemporary and historic design theory. Notebook computer required. Field trip required.

ARCH 564 ADVANCED
ARCHITECTURAL GRAPHICS
F 3 cr. LAB/STU 3. Maximum 6 credits.
PREREQUISITE: ARCH 262, admission to graduate program or seniors by petition.
- Advanced architectural presentation strategies for exploring visual perception and design development through graphic exploration.

ARCH 565 ADVANCED
COMPUTER APPLICATIONS II
On Demand 3 cr. RCT 1 LAB 2.
PREREQUISITE: ARCH 263 or ARCH 464.
- Computer-aided design and theory for architecture. Lectures and projects may include topics of three-dimensional modeling, animation, delineation or CNC milling. Notebook computer required.

ARCH 570 INDEPENDENT STUDY
On Demand 1-4 cr. IND Maximum 8 cr.
PREREQUISITE: Admission to graduate program.
- Directed graduate research and study of architectural, urban design or historic preservation issues on an individual basis.

ARCH 576 ARCHITECTURAL PRACTICE INTERNSHIP
S, Su 3-9 cr. IND Max. 18 cr.
PREREQUISITE: Graduate Standing.
- Students arrange for employment in an architectural office for a continuous period of twenty-four weeks, spring semester through summer session. A minimum of six credits must be taken in spring semester and three credits in summer session.
- Students will participate in a structured work-study professional practice experience and are required to present the content of their internship experience upon their return to campus. Specific course requirements determined by credit loads.

ARCH 580 SPECIAL TOPICS
On Demand 1-4 cr. Minimum 12 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Courses for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ARCH 589 GRADUATE CONSULTATION
F, S 3 cr. LEC 1 SEM 2
COREQUISITE: ARCH 551.
- Directed research and analysis of the formal and functional precedents in preparation for a project design undertaken in ARCH 592.

ARCH 591 MASTER'S STUDIO RESEARCH METHODS AND PROGRAMMING
F, S 3 cr. LEC 1 SEM 2
PREREQUISITE: Graduate standing.
- Directed research and analysis of historic, formal, and functional precedents in preparation for a project design undertaken in ARCH 592.

ARCH 592 MASTER'S STUDIO IN ARCHITECTURE
F, S, Su 6 cr. SEM 5 IND 3
PREREQUISITE: ARCH 591.
- An architectural design or historic preservation project chosen by the student and subject to approval by the student's master's studio advisor and graduate coordinator.

ARCH 598 MASTER'S STUDIO SYNTHESIS
F, S 3 cr. RCT 3
PREREQUISITE: ARCH 591.
- Advanced study and development of the graphic and three-dimensional materials required to illustrate the design process and project solution.

ARCH 599 MASTER'S STUDIO SYNTHESIS
F, S 3 cr. RCT 3
PREREQUISITE: ARCH 591.
- Advanced study and development of the graphic and three-dimensional materials required to illustrate the design process and project solution.

ARNR 100 INTRODUCTION TO ANIMAL SCIENCE
F 3 cr. LEC 3
- Introductory Animal Science includes basic principles of animal genetics, nutrition, live animal evaluation, reproduction, and their application to the production of beef and dairy cattle, sheep, swine, horses, and poultry.

ARNR 101 NATURE RESOURCE CONSERVATION
F 3 cr. LEC 3
- Description of the rangelands of the Western U.S., historical, present, and potential use. Explanation of how uses affect the biological cycles of rangelands. Concepts of ecological condition and trend are introduced.

ARNR 102 PRINCIPLES OF RANGELAND MANAGEMENT LAB
F 1 cr. LAB 1
COREQUISITE: ARNR 101.
- The laboratory exercises are designed to complement the lectures of ARNR 101. Rangeland inventory and classification methods will be reviewed. Sixty common native and introduced plants will be identified in the field and the classroom.

ARNR 103 WETLAND EQUATION
F, S 2 cr. LAB 2
- Western equitation techniques including introducory training techniques.

ARNR 114 BEGINNING ENGLISH EQUATION
F, S 2 cr. LAB 2
- Beginning English equitation technique, including horse behavior, horse handling, equipment and basic horse anatomy.

ARNR 125 NATURE OF YELLOWSTONE
F 3 cr. LEC 1 RCT 1 LAB 1
- Introduction to field ecology of the Yellowstone. Emphasis will be on plant animal relationships on the Northern Range. A three day field trip during the semester will be required.

ARNR 200 TODAY'S LIVESTOCK INDUSTRY
F 1 cr. SEM 1
PREREQUISITE: ARNR 100.
- Introduction to today's modern livestock industry and the many complex issues the livestock industry faces. This course will explore various career paths for students and how they may better prepare themselves for jobs in the livestock industry of today and tomorrow.

ARNR 202 TODAY'S EQUINE INDUSTRY
F 1 cr. SEM 1
- Introduction to today's horse industry. This course will expose students to career paths in the industry and how they may better prepare themselves for jobs in this industry.
ARNR 205 INTRODUCTION TO MEAT EVALUATION
F 2 cr. LAB 2
PREREQUISITE: ARNR 100
- Techniques for the evaluation of carcasses. Procedures include U.S. grading standards, introduction to carcass pricing and objective carcass measurements.

ARNR 207 INTERMEDIATE ENGLISH EQUITATION
F, S 2 cr. LAB 2
PREREQUISITE: ARNR 114.
- Advanced English equitation techniques including collecting, lateral movements and beginning jumping.

ARNR 208 INTERMEDIATE WESTERN EQUITATION
F, S 2 cr. LAB 2
PREREQUISITE: ARNR 110 or permission of instructor.
- Students will learn advanced movements and maneuvers such as collection, roll-backs, turn-arounds, and lead changes. Students must have secure seat and hands. Training methods for the green horse and training techniques for the older broke horse will be covered.

ARNR 211 COLT BREAKING AND TRAINING
F 2 cr. LAB 2
PREREQUISITE: ARNR 208.
- Principles and techniques of breaking and training young horses.

ARNR 212 ANIMAL PACKING, MANAGEMENT & USE IN BACK COUNTRY
Su 2 cr. LEC 1 LAB 1
- The management and use of horses in the mountains, and ecological considerations of back country use. Labs include equitation, restraint of grazing horses, and packing.

ARNR 213 SPECIALIZED HORSE TRAINING
S 2 cr. LAB 2
PREREQUISITE: ARNR 208.
- Advanced techniques and training for either reining, cutting, or working cow horses. For experienced riders.

ARNR 215 CALVING MANAGEMENT
S 2 cr. LEC 1 LAB 1
PREREQUISITE: ARNR 100 and ARNR 230 or consent of instructor.
- Procedures to correctly identify calving problems and subsequently assist the birthing process and application of techniques to maximize calf survival.

ARNR 220 RANGE LIVESTOCK PRODUCTION
S 5 cr. LEC 3
PREREQUISITE: ARNR 100, ARNR 101.
- Principles of beef and sheep production in range-land environments. Breeding, reproduction, nutrition, marketing, and distribution.

ARNR 232 APPLIED TECHNIQUES IN LIVESTOCK MANAGEMENT: SHEEP
S 1 cr. LAB 1
PREREQUISITE: ARNR 100.
- Management practices associated with farm flock and range sheep enterprises.

ARNR 233 APPLIED TECHNIQUES IN LIVESTOCK MANAGEMENT: HORSES
F 1 cr. LAB 1
PREREQUISITE: ARNR 100.
- Laboratory designed to familiarize students with approved management practices for horse enterprises.

ARNR 234 APPLIED TECHNIQUES IN LIVESTOCK MANAGEMENT: BEEF CATTLE
S 1 cr. LAB 1
PREREQUISITE: ARNR 100.
- Hands-on laboratories to familiarize students with the principles of beef cattle handling and management.

ARNR 235 RANGE AND PASTURE MONITORING
F 1 cr. LAB 1
PREREQUISITE: ARNR 100, ARNR 101, ARNR 102.
- Methods which can be used by private operators as well as state and federal land managers to identify site potential, inventory forage resources, evaluate range and pasture condition, estimate stocking rates, and measure forage utilization by wildlife and livestock.

ARNR 236 SMALL PASTURE MANAGEMENT
S 1 cr. LEC 1
PREREQUISITE: ARNR 100, ARNR 101, ARNR 102 or permission of the instructor.
- Management of small acreages (< 50 acre) to produce forage for horses and non-commercial livestock. Topics include determination of site productivity, plant and animal response to grazing, forage production, protection of water quality and controlling invasive plants. Field trips include operations with successful grazing programs and problem areas.

ARNR 240 NATURAL RESOURCE ECOLOGY
F 3 cr. LEC 2 LAB 1
PREREQUISITE: ARNR 101.
- Focus on the role of physical and biotic processes on ecosystem function, including natural and managed ecosystems. Emphasis on rangelands, wildlife habitat, watersheds, and disturbed environments.

ARNR 270 INDEPENDENT STUDY
On Demand 1-4 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Directed research and study on an individual basis.

ARNR 280 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department. Courses not required in any curriculum for which there is a particular one-time need, or given on a demand basis to determine acceptability and demand before requesting a regular course number.

ARNR 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ARNR 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

ARNR 301 LIVESTOCK INDUSTRY STUDY TRIP
On Demand 1 cr. LAB 2
PREREQUISITE: ARNR 100 and junior standing.
- Exposure of students to livestock operations and related business enterprises in different geographical locations. One three-day field trip. Graded P/F.

ARNR 305 ADVANCED MEAT EVALUATION
F 2 cr. LEC 2
PREREQUISITE: ARNR 205 or consent of instructor.
- Advanced skills in carcass evaluation, U.S. grading standards, and carcass pricing.

ARNR 309 INTRODUCTION TO LIVESTOCK EVALUATION
F 2 cr. LAB 2
PREREQUISITE: ARNR 100 and ARNR 205, or consent of instructor.
- The object of this course is to develop competent riding instructors who can communicate effectively and motivate students to higher riding skills.

ARNR 314 EQUESTRIAN INSTRUCTION
F, S 2 cr. LAB 2 Maximum 4 cr.
PREREQUISITE: ARNR 110, ARNR 208, or consent of instructor.
- Techniques and experience in live animal evaluation. Practical use of production data and other evaluation techniques.

ARNR 316 MEAT SCIENCE
S 4 cr. LEC 3 LAB 1
PREREQUISITE: ARNR 100 and BIOL 102 and CHEM 121.
- The meat industry within North America and beyond will be discussed. Live animal evaluation, pricing and carcass evaluation will be discussed. The class will include an explanation of muscle structure and function and its effect on tenderness and functionality.

ARNR 320 ANIMAL NUTRITION
F 4 cr. LEC 5 LAB 1
PREREQUISITE: ARNR 230 and BCHM 122 and VTMH 271 or consent of instructor.
- Digestion and metabolism of nutrients, nutrient requirements, feed composition, diet formulation, and practical feeding of various classes of domestic animals.

ARNR 321 PHYSIOLOGY OF REPRODUCTION
F 4 cr. LEC 3 RCT 1
PREREQUISITE: VTMH 271.
- A study of the anatomy and physiology of reproduction with major emphasis on domestic animal species. This class introduces students to emerging concepts and current technologies for improving reproductive efficiency in domestic animals.

ARNR 322 PRINCIPLES OF ANIMAL BREEDING AND GENETICS
S 3 cr. LEC 3
PREREQUISITE: ARNR 100, BIOL 102, and either STAT 216 or STAT 217 or STAT 332 or PSES 318.
- Genetic improvement of farm animals through performance testing, methods of selection, and application of mating systems such as crossbreeding.
ARNR 337 DISEASES OF DOMESTIC LIVESTOCK
S 3 cr. LEC 3 LAB 1
PREREQUISITE: VTMB 271.
- This course is structured to familiarize students with the common diseases of domestic livestock. Infectious and non-infectious diseases of horses, cattle, sheep, and swine will be covered. Particular emphasis will be placed on regional diseases.

ARNR 345 RIPARIAN ECOCY AND MANAGEMENT
S 3 cr. LEC 1 REC 2
PREREQUISITE: ARNR 240 or BIOL 305 or LRES 352 and LRES 301.
- This course will provide an overview of one of the most ecologically diverse ecosystems in western North America. Students will have the opportunity to study the physical and biological processes which shape and maintain riparian ecosystems. A field laboratory will provide experience in biological and physical monitoring methodologies that are central to land management decisions.

ARNR 347 EQUINE FORM TO FUNCTION
F 3 cr. LEC 2 LAB 1
PREREQUISITE: VTMB 271 and junior standing.
- Development of methods for analyzing a horse's conformation along with a good understanding of anatomy and its relationship to performance.

ARNR 350 VEGETATION OF WESTERN WILDLANDS
S 3 cr. LEC 2 LAB 1
PREREQUISITE: ARNR 240, BIOL 250, and either BIOL 434 or BIOL 436.
COREQUISITE: ARNR 351.
- Identification of commonly occurring plants of western North America biomes. Important ecological and management relationships of the plants will be emphasized.

ARNR 351 BIOMES OF WESTERN WILDLANDS
S 2 cr. LEC 2
PREREQUISITE: ARNR 240, BIOL 250.
COREQUISITE: ARNR 350.
- Climatic, physical, and biological interactions of natural biomes. The structure of western North America biomes will be considered in detail.

ARNR 353 GRAZING ECOLOGY AND MANAGEMENT
S 3 cr. LEC 2 LAB 1
PREREQUISITE: ARNR 101 or ARNR 102 or ARNR 240 or BIOL 303.
- Ecological perspectives of livestock grazing in the major biomes of the western United States and southern Canada. Impacts on soils, individual plants, plant communities, livestock, wildlife, and hydrology will be reviewed in the scientific literature.

ARNR 354 FIRE ECOLOGY AND MANAGEMENT
F 3 cr. LEC 2 LAB 1
PREREQUISITE: ARNR 101 or ARNR 240 or BIOL 303.
- The impact of fire on native plant communities and animals of the western United States and southern Canada. Principles of prescribed fire to achieve management objectives.

ARNR 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ARNR 403 SUSTAINABLE ANIMAL AND RESOURCE MANAGEMENT
S 3 cr. LEC 1.
PREREQUISITE: Senior standing in an agriculture or natural resources oriented curriculum.
- Senior capstone course. Seniors have the opportunity to evaluate an agricultural production system for economic and environmental sustainability. Student teams will use various data bases and market trends to evaluate a local production system and make recommendations for maintaining long term economic output and environmental quality.

ARNR 405 PESTICIDE USE IN AGRICULTURE
S alternate years, to be offered 2008 2 cr. LEC 2
PREREQUISITE: BIOL 205 or consent of instructor.
- Provides students with in-depth knowledge of chemical pesticide use and issues. Pesticide classification, modes of action, properties, chemical application technology and calibration will be covered. Modern pesticide delivery systems including genetic transformation of crops and biopesticides will be included. Examples from horticulture, field and row crops will be used.

ARNR 409 ADVANCED LIVESTOCK EVALUATION
F 3 cr. LEC 3
PREREQUISITE: ARNR 309 or equivalent.
- Advanced skills in evaluation of animals and data associated with growth and genetic improvement. Develop decision making and oral communication skills.

ARNR 410 VETERINARY ENTOMOLOGY
S 2 cr. LEC 2
PREREQUISITE: BIOL 101; BIOL 204.
- This course will provide an overview of the importance of arthropods and their effects on human and animal health. Topics covered will include classification and identification of insects, mites, and ticks, basic biology, behavior and ecology, feeding mechanisms, pathogen transmission, vector competency, production impacts, integrated management and prevention.

ARNR 415 EQUINE REPRODUCTION
F 2 cr. LEC 2
PREREQUISITE: VTMB 271, ARNR 321.
- This course is designed to familiarize students with the reproduction in horses. Students will be instructed on the appropriate methods for management of the stallion, mare and foal. The curriculum will also include equipment and facilities used, as well as management of a breeding facility.

ARNR 416R MEAT PROCESSING
F alternate years, to be offered 2007 3 cr. LEC 2 LAB 1
PREREQUISITE: ARNR 310 or instructor approval.
- Students will learn to manufacture processed meat products such as fresh sausage, ham, bacon and cooked sausage. They will also be developing new flavor profiles and new products that will be presented to a panel with proposed marketing plans.

ARNR 421 ASSISTED REPRODUCTIVE TECHNOLOGIES
F 4 cr. LEC 2 LAB 2
PREREQUISITE: ARNR 321.
- Reproductive management programs applying physiological knowledge to increase milk and meat production in cattle. Experience in the techniques of artificial insemination and pregnancy evaluation in cattle.

ARNR 422 TOPICS IN BEEF CATTLE NUTRITION
S alternate years, to be offered 2008 2 cr. LEC 2
PREREQUISITE: ARNR 320 and junior standing or consent of instructor.
- Critical evaluation of current issues and related scientific literature in beef cattle nutrition; application to decision making and problem solving.

ARNR 423 EQUINE NUTRITION
S alternate years, to be offered 2007 2 cr. LEC 2
PREREQUISITE: ARNR 320 and junior standing or consent of instructor.
- Critical evaluation of current issues and related scientific literature in equine nutrition; application to designing effective feeding programs.

ARNR 430 HORSE MANAGEMENT
S 4 cr. LEC 3 LAB 1
PREREQUISITE: ARNR 320, ARNR 321, ARNR 322, VTMB 271.
- Horse management and problems with emphasis on behavior, nutrition, reproduction, and management programs.

ARNR 432 SHEEP MANAGEMENT
S 3 cr. LEC 2 LAB 1
PREREQUISITE: ARNR 230, ARNR 232, ARNR 320, and ARNR 321 or consent of instructor.
- Management of the ewe flock, nutrition, reproduction, economics, breeding, and health related to efficient sheep production will be discussed. Production preparation and wool marketing in U.S. and world markets and economics of Montana wool production will be covered.

ARNR 454 BEEF CATTLE MANAGEMENT
F 4 cr. LEC 3 LAB 1
PREREQUISITE: ARNR 230, ARNR 240, ARNR 320, ARNR 321, ARNR 322 and AGEC 210 or AGEC 341.
- Integration of the principles of nutrition, genetics, physiology, range ecology, and economics into practical and profitable ranch management and business plans. Utilization of performance and financial records, budgeting, feed resource planning, marketing strategies, breeding plans, computer applications, and case studies.
ARNR 435 FEEDLOT MANAGEMENT
S alternate years, to be offered 2007 2 cr. LEC 2
PREREQUISITE: ARNR 230, ARNR 320.
- Application of techniques in nutrition and management dealing with feedlot cattle using live animals and computer models. Receiving ration — Application of techniques in nutrition and management dealing with feedlot cattle using live animals and computer models. Receiving ration

ARNR 438 WILDLIFE HABITAT ECOLOGY
S 3 cr. LEC 3
PREREQUISITE: FEWL 301, and either ARNR 240 or BIOL 303 and senior standing.
- Principles of habitat importance and management. Habitat requirements within wildlife population constraints will be emphasized with consideration of other natural resource demands.

ARNR 441 CLINICAL EQUINE REPRODUCTION
S 5 cr. LEC 1 LAB 2
PREREQUISITE: ARNR 415.
- This course is structured to familiarize and give students direct, hands-on training in all reproductive processes and procedures for horses. Students will learn to manage and maintain equine breeding facilities and equipment as well as learn to handle breeding stallions and mares.

ARNR 453 HABITAT INVENTORY & ANALYSIS
F 5 cr. LEC 2 LAB 1
PREREQUISITE: ARNR 240 or BIOL 303, STAT 216 or PSPP 518, and Junior standing.
- Focus on collecting, analyzing, and interpreting measures of rangeland resources including plant, animal, soil, and watershed components. Emphasis on sampling objectives, field procedures, monitoring, and evaluation.

ARNR 456 CONFLICT RESOLUTION IN NATURAL RESOURCE MANAGEMENT
F 1 cr. LEC 1
PREREQUISITE: ARNR 101 and Senior or graduate standing.
- Consensus-based, collaborative planning processes for resolving conflicts in natural resource management.

ARNR 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

ARNR 476 INTERNSHIP
On Demand 2 - 12 cr. IND
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

ARNR 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ARNR 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: ARNR 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ARNR 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

ARNR 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ARNR 507 RESEARCH METHODS
F, S 1 cr. SEM 1 Maximum 3 cr.
PREREQUISITE: Graduate standing.
- Application of scientific method and research techniques, including design of experiments and use of appropriate statistical procedures.

ARNR 520 NUTRIENT METABOLISM OF DOMESTIC ANIMALS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: ARNR 320, and either BCHM 122 or BCHM 540 or consent of instructor.
- Biochemistry of animal nutrition with emphasis on integration of biochemical principles to animal production systems. Nutrients emphasized are proteins, carbohydrates and lipids.

ARNR 521 ADVANCED RUMINANT NUTRITION
F alternate years, to be offered 2006 3 cr. LEC 2
PREREQUISITE: ARNR 320 or consent of instructor.
- Physiological and microbiology aspects of ruminant digestion and their influence on the metabolism of extraruminal tissues.

ARNR 523 ADVANCED PHYSIOLOGY OF REPRODUCTION
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: BIOL 411, BCHM 540, ARNR 321 or consent of instructor.
- Study of the basic concepts of reproductive process of mammals with special emphasis on the application of recent techniques in solving reproductive problems associated with fertility and infertility.

ARNR 524 ADVANCED ANIMAL BREEDING
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: ARNR 322.
- Quantitative genetics applied to the improvement of animals. Biometrical relationships among relatives, methods of estimating genetic parameters, application of crossbreeding systems and selection techniques.

ARNR 525 MUSCLE AND GROWTH BIOLOGY
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: BCHM 540 AND BIOL 102N.
- Growth and development of muscle, muscle structure and how growth is controlled by hormones and DNA will be studied. The impact of growth manipulation on the final product, meat, will also be evaluated.

ARNR 541 RANGE ECOPHYSIOLOGY
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: ARNR 240 or BIOL 305 or BIOL 450.
- Lectures and selected readings on the response of range plants and animals to daily and seasonal changes in their environment, including physiology, animal behavior, and plant population biology.

ARNR 545 RIPARIAN PROCESSES AND FUNCTION
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: ARNR 354, BIOL 303 and LRES 592 or ESCI 452.
- This course involves an in depth investigation of the geomorphological physical and biological parameters unique to riparian areas of the Northern Rocky Mountains and Great Plains. Emphasis will be placed on how these parameters interact to create the biotic communities associated with riparian areas.

ARNR 544 ADVANCED GRAZING MANAGEMENT AND ECOLOGY
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: ARNR 240 or ARNR 360 or ARNR 351 or BIOL 303.
- Review of management principles for livestock grazing grasslands and shrub lands and their ecological relationship to other areas. Study design and scientific results will be examined to critically review information.

ARNR 553 GRAZING BEHAVIOR OF LIVESTOCK AND WILDLIFE
F alternate years, to be offered 2006 2 cr. LEC 2
PREREQUISITE: ARNR 353 or BIOL 418.
- Behavioral processes of foraging by livestock and wild ungulates; application of theoretical concepts to range livestock production and natural resource management.

ARNR 570 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

ARNR 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

ARNR 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ARNR 589 GRADUATE CONSULTATION
F, S 3 cr. IND Maximum credits unlimited
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.
ART 206 METALSMITHING
F, S 4 cr. RCT 2 STU 2
PREREQUISITE: ART 111.
- A beginning course in basic metalsmithing techniques and three-dimensional design skills. Design concepts, small metal fabrication methods and practical demonstrations.

ART 207 SCULPTURE
F, S 4 cr. RCT 2 STU 2
PREREQUISITE: ART 111.
- Introduction to three-dimensional form through projects involving woodworking, welding, moldmaking and casting. Discussion of tools, materials, processes and safety procedures.

ART 208 RA CERAMICS
F, S 4 cr. RCT 2 STU 2
PREREQUISITE: ART 111.
- Contemporary ceramics - the history, development, and aesthetics of ceramic vessels and sculpture. The technical aspects of clay, glazes, and the firing of ceramic objects. Problem solving and the development of ideas.

ART 209 PRINTMAKING
F, S 4 cr. RCT 2 STU 2
PREREQUISITE: ART 110.
- A beginning course in which multiple original prints are made from a variety of blocks and plates. Emphasis on relief and intaglio history and processes including woodcut, lino cut, engraving, etching, and aquatint.

ART 223 GRAPHIC DESIGN I
F 4 cr. RCT 2 STU 1
PREREQUISITE: ART 110.
- Introduction to fundamental design principles, basic layout, tools and techniques, and creative thinking.

ART 224 GRAPHIC DESIGN II
S 4 cr. RCT 2 STU 2
PREREQUISITE: ART 223.
- Further exploration of design principles with increased emphasis on typographic skills and visual communications.

ART 238 RA REPRESENTATIONAL DRAWING
F, S 4 cr. LEC 2 RCT 1
PREREQUISITE: One of the following: ART 110, ART 112.
- Introduction to the basic vocabulary of drawing, observation, problem solving, and personal expression. Critiques develop student's ability to formulate and verbalize informed analysis of the completed projects.

ART 270 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of the director.
- Directed research and study on an individual basis.

ART 280 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.
ART 325 ADVANCED METALSMITHING
F, S 5 cr. RCT 2 STU 3 Maximum 15 cr.
PREREQUISITE: ART 206.
— Advanced course designed around a set of specific problems and demonstrations for advanced jewelry and metal forming concepts. Emphasis will be placed on technical development and personal imagery.

ART 327 PRINTMAKING-LITHOGRAPHY
F alternate years, to be offered 2006 5 cr. RCT 2 STU 3 Maximum 15 cr.
PREREQUISITE: ART 209 and ART 238.
— An intermediate course in which multiple original prints are made from hand-drawn images on lithographic limestone. Editioning in black and multicolor using crayon, tusche, transfer, and photo methods.

ART 333 ADVANCED SCULPTURE
F, S 5 cr. RCT 2 STU 3 Maximum 15 cr.
PREREQUISITE: ART 207.
— Advanced experiences in materials and methods of sculpture.

ART 338 ADVANCED DRAWING
F, S 5 cr. RCT 2 STU 3 Maximum 15 cr.
PREREQUISITE: ART 238.
— Advanced technical and aesthetic concepts in drawing with emphasis on the development of a personal artistic style. Use of traditional and non-traditional subject matter. Individual and group critiques.

ART 340 SURVEY OF ANCIENT ART
F alternate years, to be offered 2006 3 cr. LEC 3
— This course will examine the art and architecture of ancient civilizations surrounding the Aegean and Mediterranean seas. Beginning with the Aegean civilizations, the course will then examine the rise of the historical Greeks and will conclude with the Roman world.

ART 341 ADVANCED RELIEF PRINTMAKING
F alternate years, to be offered 2007 5 cr. RCT 2 STU 3 Maximum 15 cr.
PREREQUISITE: ART 209.
— An advanced course in which multiple original prints are made using plank and end grain wood and plastic/rubber relief plates. Methods include reductive and multi-plate color, shaped and plastic/rubber relief plates. Methods include simple hand/press inking, and various hand and press printing methods.

ART 344 PRINTMAKING-SERIGRAPHY
S alternate years, to be offered 2008 5 cr. RCT 2 STU 3 Maximum 15 cr.
PREREQUISITE: ART 209.
— An intermediate course in which multiple original prints are made using various water-based silk-screen processes. Stencil techniques include paper, screen filler, drawing fluid, and photo.

ART 348 ADVANCED INTAGLIO PRINTMAKING
S alternate years, to be offered 2007 5 cr. RCT 2 STU 3 Maximum 15 cr.
PREREQUISITE: ART 209.
— Advanced course in which multiple original prints are made using engraved and/or etched copper, zinc, and/or plastic intaglio plates. Methods include spit bite, viscosity, a la poupee, multi plate color, collagraph, and chine colle.

ART 350 ADVANCED PAINTING
F, S 5 cr. RCT 2 STU 3 Maximum 15 cr.
PREREQUISITE: ART 205.

ART 355 WATER MEDIA
S 5 cr. RCT 2 STU 3 Maximum 10 cr.
PREREQUISITE: ART 205.
— Painting with transparent watercolors.
Introduction of materials, techniques, concepts, and a brief history of the process highlighting major artists. Individual and group critiques.

ART 360 YELLOWSTONE DIGITAL
Su 3 cr. LAB 3
PREREQUISITE: ART 224 or ART 238 or MTA 265 or ARCH 261.
— A field workshop located along the Yellowstone river using either 35mm or a Digital camera to create fine art digital prints. This course is designed for individuals with a working knowledge of photographic basics and a fundamental familiarity with their own equipment that desire to explore the new media of the fine art digital print.

ART 363 ALTERNATIVE PRINT MEDIA
S alternate years, to be offered 2006 5 cr. LAB 5
PREREQUISITE: ART 209.
— An advanced course in which students are offered a wide range of printing processes. These may include monotype, photo techniques, experimental lithography, large format printing, multimedia, and digital printmaking. The structure of the course is based on technical demonstrations, studio assignments, and critiques.

ART 365 INTERMEDIATE GRAPHIC DESIGN I
F 5 cr. RCT 2 STU 3
PREREQUISITE: ART 224, Portfolio review.
— Graphic production procedures and studio tools and techniques. Projects incorporate communication problem solving with fundamentals of mechanical preparation. Development of computer skills using graphic design programs including QuarkXpress, Photoshop, and Illustrator. Laptop computers are required for all upper level graphic design courses.

ART 366 INTERMEDIATE GRAPHIC DESIGN II
S 5 cr. RCT 2 STU 3
PREREQUISITE: ART 365.
— A continuation of ART 365, with emphasis on practical application and current design trends. Laptop computers are required for all upper level graphic design courses.

ART 374 GREEK ART AND ARCHITECTURE
F alternate years, to be offered 2007 3 cr. RCT 2 STU 3
PREREQUISITE: ART 365.
— This lecture-baslic course will present a survey of the art and architecture of ancient Greece from its origins in the Dark Ages through the Hellenistic period. Study begins with the Bronze Age of antiquity and students of Hellenic art and ends with the widespread dissemination of Greek material culture after the death of Alexander the Great.

ART 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
— Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ART 405 DRAWING
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 338.
— Course in which student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of drawing. Written, signed contract required prior to registering for this course.

ART 410 ORIGRERS IN ART
F 1 cr. LEC 1
PREREQUISITE: Junior, Senior, or Graduate standing, or consent of instructor.
— Presentations by professional artists about important career elements such as resume writing, photographing and marketing your work, making presentations to galleries and design firms, starting a business, researching graduate schools, teaching as a career, and applying for grants and fellowships.

ART 411 PAINTING
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 350.
— Course in which student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of painting. Written, signed contract required prior to registering for this course.

ART 412 SCULPTURE
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 325.
— Course in which student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of sculpture. Written, signed contract required prior to registering for this course.

ART 413 METALSMITHING
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 325.
— Course in which student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of metalworking. Written, signed contract required prior to registering for this course.

ART 414 PRINTMAKING
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 327 or ART 344, ART 341, ART 413.
— Course in which student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of printmaking. Written, signed contract required prior to registering for this course.

ART 415 CERAMICS
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 325.
— Course in which student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of ceramics. Written, signed contract required prior to registering for this course.
ART 416 GRAPHIC DESIGN
F, S, Su 1-5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 366.
- Course in which student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of graphic design. Written, signed contract required prior to registering for this class.

ART 417 INTERMEDIA
F, S, Su 1-5 cr. IND.
PREREQUISITE: ART 315 or 325 or 327 or 335 or 338 or 341 or 350 or 365.
- Course in which the student will work on an individual basis with a faculty member in developing imagery and techniques combining various media including digital technology.

ART 418 BEGINNING MODERN ART
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: ART 203.
- From Post-Impressionism to World War I. Major artists include Gauguin, Van Gogh, Cezanne, Matisse, Picasso, and the German Expressionists.

ART 419 20TH CENTURY ART
S 3 cr. LEC 3
PREREQUISITE: ART 203.
- From World War I to the present.

ART 420 WOMEN ARTISTS
Subject to instructor availability 3 cr. LEC 3
PREREQUISITE: ART 203.
- A history of women artists from the Renaissance to the present and a consideration of the image of women in art.

ART 425 FIELD STUDY
IN ART AND ART HISTORY
S 2-5 cr. LAB 2-5
PREREQUISITE: ART 110, ART 111 or ART 203, or consent of instructor.
- Course will allow students to study at an off-campus location such as a foreign country under the direction of art faculty member. Includes preparatory meetings, several hours per day of discussion on site, and writing or creative project which assimilates direct experience and research.

ART 426 ART OF EGYPT & NEAR EAST
S alternate years, to be offered 2008 3 cr. LEC 3
- This course is an exploration of the art and architecture of ancient Egypt and the Near East (Anatolia, Mesopotamia and Persia). Due to the nature of the surviving material, the emphasis will be on the ideas and attitudes of these civilizations about the relationship between humans and divinities, the cult of the ruler/king, and funerary cult and the afterlife.

ART 427 LATE GOTHIC PAINTING
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: ART 203.
- This course will deal with the development of Gothic painting in Italy and its subsequent influence on the Northern tradition of painting in the Netherlands and Germany. Major masters include Giotto, Jan van Eyck, Bosch, Bruegel, and Durer.

ART 429 TITANS OF ITALIAN RENAISSANCE
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: ART 203.
- A study of painting, sculpture and architecture in Italy in the 15th century. Major artists include Donatello, Masaccio, Piero della Francesca and Botticelli, Michelangelo, and Giorgione.

ART 430 HIGH RENAISSANCE AND MANNERISM
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: ART 203.
- This course is a study of the high renaissance in Rome, Florence and Venice, and the reactions to this in the style of mannerism. Major artists include Leonardo, Michelangelo, Raphael, Pontormo and Titan.

ART 431 CONTEMPORARY ART
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: ART 419.
- This course will focus on issues in contemporary painting, sculpture, and related radical art forms. Students are responsible for discussions of assigned readings and presentations of research projects.

ART 435 BAROQUE IN ITALY & N. EUROPE, 1600-1700
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: ART 203.
- This course is a history of painting, sculpture, and architecture produced in Italy during the 17th century. Emphasis will be placed on major artists and stylistic trends as well as the various social, political and religious contexts for viewing art.

ART 436 BAROQUE IN NORTHERN EUROPE
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: ART 203.
- The purpose of this course is to offer students a more in-depth study of art in the Baroque period in Europe (1600-1700) by focusing on cultural developments in the Republic of the Netherlands and its colonies.

ART 440 ART IN THE AGE OF REVOLUTION
S alternate years, to be offered 2008 3 cr. LEC 3
ART 203.
- This course offers students an in-depth understanding of painting and sculpture in France and Britain in the 18th century. Through focused lectures, readings and discussions and writing assignments students will learn about the 18th century cultural, philosophical and scientific developments in their original contexts as well as their bearing on the present day.

ART 442 MEDIEVAL ART
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: ART 402.
- Early Christian, Byzantine, Romanesque, and Gothic periods.

ART 445 RENAISSANCE ART
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: ART 203.
- This course is an exploration of the major artists of the 15th century in Europe and America and the developments students will learn about the 15th century cultural, philosophical and scientific developments in their original contexts as well as their bearing on the present day.

ART 446 BAROQUE ART
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: ART 203.
- This course is an exploration of the major artists of the 17th century in Europe and America and the developments students will learn about the 17th century cultural, philosophical and scientific developments in their original contexts as well as their bearing on the present day.

ART 447 COMPARATIVE ART HISTORY
F alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: ART 203.
- This course will focus on issues in comparative art historical analysis. Students will learn to compare and contrast art historical methods, sources, and approaches.

ART 448 GRAPHIC DESIGN
F alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: ART 366.
- This course offers students an in-depth understanding of graphic design. Through focused lectures, readings and discussions and writing assignments students will learn about the 20th century cultural, philosophical and scientific developments in their original contexts as well as their bearing on the present day.

ART 449 GRAPHIC ILLUSTRATION
S 5 cr. RCT 2 STU 3
PREREQUISITE: ART 365.
- The fundamentals of illustration concepts, formats, tools, media, and production processes with application to creative projects including small press publications.

ART 470 INDEPENDENT STUDY
On Demand 1-12 cr. IND
PREREQUISITE: Junior standing, consent of instructor, and approval of the director.
- Directed research and study on an individual basis.

ART 476 INTERNSHIP
On Demand 2-12 cr. IND
PREREQUISITE: Junior standing, consent of instructor, and approval of the director.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

ART 480 SPECIAL TOPICS
On Demand 1-5 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ART 489 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. Rct May be repeated. Max 4 cr.
COREQUISITE: ART 490.
- Senior capstone course. Classroom instruction associated with directed undergraduate research/creative activity projects. Graphic design students only.

ART 490 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-5 cr. IND May be repeated. Max 12 cr.
- Senior capstone course. Directed undergraduate research/creative activity which may culminate in a research paper, undergraduate thesis paper, or undergraduate thesis exhibition. Graphic design students only.

ART 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 6 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ART 505 PAINTING
F, S, Su 1-5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 411, graduate standing.
- Course in which the student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of painting.
ART 515 CERAMICS
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 415, graduate standing.
Course in which the student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of ceramics.

ART 524 METALSMITHING
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 424, graduate standing.
Course in which the student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of metalsmithing.

ART 526 DRAWING
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 403, graduate standing.
Course in which the student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of drawing.

ART 527 PRINTMAKING
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 414, graduate standing.
Course in which the student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of printmaking.

ART 529 SCULPTURE
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 412, graduate standing.
Course in which the student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of sculpture.

ART 530 INTERMEDIA
F, S, Su 1 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: ART 333, ART 339, ART 350 and graduate standing.
Course in which the student will work on an individual basis with a faculty member in developing imagery and appropriate techniques in a particular area of intermedia.

ART 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, and Dean of Graduate Education.
Directed research and study on an individual basis.

ART 575 PROFESSIONAL PAPER
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

ART 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ART 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 5 cr. May be repeated; maximum 3 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
Course offered on a one-time basis to fulfill professional development needs of in service educators. A specific focus is given to each course which is appropriately subtitled.

ART 589 GRADUATE CONSULTATION
F, S, Su 3 cr. IND
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
Course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

ART 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND Maximum 15 cr.
PREREQUISITE: Master's standing.
Directed research and study on an individual basis.

BCHM Biochemistry Department of Chemistry & Biochemistry (406) 994-4801

BCHM 100 UNDERGRADUATE SEMINAR I
F 1 cr. SEM 1
- For the new student. Integration into the department and its research and educational program.
Scientific communication and chemical literature searching skills.

BCHM 104RN THE BIOCHEMISTRY OF HEALTH FOR NON-SCIENCE MAJORS
F, S 4 cr. LEC 3 LAB 1
- Introduction for non-science majors to the biochemical basis of nutrition, health, DNA, and the human genome. The class and laboratory includes training in the use of Internet and library information resources, evaluating and presenting the information found, and an introduction to DNA fingerprinting.

BCHM 122 ORGANIC & BIOCHEMICAL PRINCIPLES
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: CHEM 121, CHEM 151, or equivalent.
An introduction into functional group organic chemistry and important biochemical structures, concepts, and processes. The laboratory is closely integrated with lecture coverage.

BCHM 201 UNDERGRADUATE SEMINAR II
PREREQUISITE: CHEM 100 or BCHM 100. S 1 cr. SEM 1
- Introduction to faculty research through faculty mini seminars. Departmental research facilities. Research groups. Research planning decisions (MSU laboratory, summer internship, student exchange, REU, USF, etc.).

BCHM 270 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
Directed research and study on an individual basis.

BCHM 280 SPECIAL TOPICS
On Demand 1 - 4 cr. LEC Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

BCHM 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

BCHM 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

BCHM 300 UNDERGRADUATE SEMINAR III
F 1 cr. SEM 1
PREREQUISITE: CHEM 201 or BCHM 201.
- Research techniques, procedures, and reports. Seminar reporting and presentation skills. Career planning and resume preparation. May be repeated once.

BCHM 340 GENERAL BIOCHEMISTRY
F, S, Su 5 cr. LEC 4 LAB 1
PREREQUISITE: BIOL 102, or BIOL 214, or BIOL 206; CHEM 312, or CHEM 315.
- Carbohydrate, lipid, protein, and nucleic acid structure and function; enzyme kinetics; energetics; major metabolic pathways for carbohydrates, lipids, and amino acids; photosynthesis; regulation of gene function.

BCHM 401 CAPSTONE SEMINAR
S 1 cr. SEM 1
PREREQUISITE: CHEM 500 or BCHM 500.
- Senior capstone course. Taught in collaboration with departmental Honors Thesis, CHEM 451. The chemistry/biochemistry research undergraduate experience constitutes a synthesis of our (bio)chemistry class room and laboratory education. The projects are orally presented in seminar format, discussed on the basis of acquired knowledge, and analyzed using stringent scientific methods and criteria. A complete personal resume is prepared. May be repeated once.

BCHM 441 BIOCHEMISTRY OF MACROMOLECULES
F 3 cr. LEC 3
PREREQUISITE: BCHM 340 (B or higher) or consent of instructor.
- Biochemical basis of modern molecular biology; structure and function of proteins, nucleic acids, and membranes; replication; transcription; translation; regulation of gene expression; and recombination.

BCHM 442 METABOLIC REGULATION
S 3 cr. LEC 3
PREREQUISITE: BCHM 340 (B or higher) or BCHM 441 (C or higher) or consent of instructor.
- In-depth biochemical treatment of metabolism and its regulation in cellular processes.
COURSE DESCRIPTIONS: BCHM 444 - BIOL 106CS

BCHM 444 BIOCHEMICAL METHODS IN MOLECULAR BIOLOGY
S 3 cr. LEC 1 LAB 2
PREREQUISITE: BCHM 441 (B or higher) or consent of instructor.
— This course focuses on molecular biology/biochemistry procedures integral to current research. Methods include PCR; gene cloning; DNA sequencing; and expression, isolation, purification, and characterization of the gene-encoded protein.

BCHM 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 5 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
— Directed research and study on an individual basis.

BCHM 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

BCHM 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: BCHM 490.
— Classroom instruction associated with directed undergraduate research/creative activity projects.

BCHM 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1 - 6 cr. IND May be repeated. Max 12 cr.
— Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

BCHM 500 SEMINAR
F, S 1 cr. SEM 1 May be repeated.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined by petition. Course prerequisites as determined for each offering.
— Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

BCHM 524 MASS SPECTROMETRY
F alternate years, to be offered 2007 3 cr LEC 3
PREREQUISITE: CHEM 325 or CHEM 301.

BCHM 526 ADVANCED PROTEIN NMR SPECTROSCOPY
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: CHEM 328.
— This lecture-based course is designed to teach the fundamental principles of nuclear magnetic resonance (NMR) spectroscopy as it applies to the structural elucidations of proteins in solution. Prerequisites include familiarity with linear algebra and basic trigonometric functions and CHEM 323. Cross referenced with CHEM 526.

BCHM 543 PROTEINS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: BCHM 441.
— Structure-function relationships of proteins and enzymes. Current literature stressed. Written student reports required.

BCHM 544 MOLECULAR BIOLOGY
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: BCHM 441. BIOL 502, MB 449 or comparable course.
— Recent advances in understanding and research methods used by eukaryotic and prokaryotic systems.

BCHM 545 ADVANCED PHYSICAL BIOCHEMISTRY
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: CHEM 324 AND BCHM 441.
— Theoretical presentation of the molecular structures and interactions occurring in proteins and nucleic acids. Discussion of spectroscopy techniques used to study bio molecular structures and function. Includes concepts in: Nuclear Magnetic Resonance, X-ray Diffraction, Ultraviolet Absorption, Fluorescence, Circular Dichroism, Vibrational Spectroscopy, molecular motion and transport properties including diffusion, sedimentation, and viscosity.

BCHM 550 PRINCIPLES OF STRUCTURE DETERMINATION BY X-RAY CRYSTALLOGRAPHY
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: BCHM 441 and BCHM 442 or the equivalent and MATH 182M.
— This course focuses on theory and practice of molecular structure determined by x-ray crystallography. Topics include crystallization of macromolecules, molecular structure determination from x-ray data, and evaluation of the quality of the resulting macromolecular models.

BCHM 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
— Directed research and study on an individual basis.

BCHM 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

BCHM 590 MASTER'S THESIS
F, S 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master's standing.

BCHM 590 R GRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1 - 5 cr. RCT
PREREQUISITE: Graduate standing. Corequisite: BCHM 590 or BCHM 690.
— Classroom instruction associated with directed graduate research/creative activity projects.

BCHM 690 DOCTORAL THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: PhD standing.

BIOL

Biology
Department of Ecology
Department of Cell Biology and Neuroscience
(406) 994-5120

BIOL 100IN ORGANISM FUNCTION
F 3 cr. LEC 3
— Comparison of plant and animal systems with respect to structure and function. The underlying chemistry, energetics, and ecological adaptations are discussed.

BIOL 101IN ORGANISMSAL BIOLOGY
F, S 4 cr. LEC 5 LAB 1
— Examination of five kingdoms of organisms (monera, protista, fungi, plants, animals), with concentrations on vascular plants and vertebrate animals. Considers survival strategies, nutrition, reproduction, and ecological and economic importance.

BIOL 102 MOLECULAR & CELLULAR BIOLOGY
F, S 4 cr. LEC 5 LAB 1
PREREQUISITE: CHEM 121 or CHEM 131.
— Introduction to cellular organization and function. Topics covered include synthesis and function of macromolecules, cell organelles and structure, energy transformations in living systems, respiration, photosynthesis, the cell cycle, classical genetics, molecular genetics, and biotechnology.

BIOL 105CS
ENVIRONMENTAL SCIENCE & SOCIETY
F, S 5 cr. LEC 3
— The relationship between people and the environment using the earth as an ecosystem to show the effects of people's activities on natural ecosystem. Environmental issues such as wilderness, wolf reintroduction, global warming, fire ecology, whirling disease, and grizzlies are covered.

BIOL 104CS LIFE AND OTHER BIG QUESTIONS
S 4 cr. LEC 2 RCT 2
— This course is for the non-science major. It is designed to foster contemplation and discussion of a few of the larger questions humans have asked, for example: Why are we here? What is the universe doing? What is our history? Where do our desires come from? An introduction to cosmology, biological evolution, evolutionary psychology, and anthropology.

BIOL 106CS INSECTS AND HUMAN SOCIETY
S 5 cr. LEC 2 RCT 1
— Ways in which research and advances in technology in the areas of insect biology and management have influenced people's lives throughout the world. Focus will be on insects as major factors affecting the areas of the world where humans live, crops and animals humans produce, and general quality of life on the planet. Interactions of insects and human cultures, technologically oriented and indigenous, non-technology based cultures, and concepts of pest management will also be explored. Students generate and test hypothesis and evaluate sources of scientific information on these topics.
BIOL 113 TWENTY FIRST CENTURY BIOLOGY
F 2 cr. LEC 1 RCT 1
- Introductory freshman seminar designed to introduce students to biology as a discipline, and establish the standards for scientific literacy. Students learn how hypotheses are formulated and tested, the nature and necessity for experimental controls, and what constitutes "burden of proof" in scientific inquiry.

BIOL 204 IN ANTHROPOLOGICAL ECOLOGY
F 3 cr. LEC 2 LAB 1
PREREQUISITE: One of the following: BIOL 100, BIOL 101 or BIOL 102.
- General biology of insects including principles of morphology, physiology, behavior, ecology, and control. Includes identification of major orders and common families.

BIOL 207 ANATOMY & PHYSIOLOGY I
S,Su 5 cr. LEC 3 LAB 2
PREREQUISITE: CHEM 121, CHEM 131 or CHEM 141 with a grade of "C" or better. Priority given to majors requiring this course.
- General principles of cell and tissue biology that apply to all living systems. Structure and function of skeletal, muscular, nervous, and endocrine systems. Homeostasis, control, and integration of the human body will be emphasized. Laboratory will cover related systems. This course is not repeatable without prior consent of instructor.

BIOL 208 ANATOMY & PHYSIOLOGY II
F 4 cr. LEC 3 LAB 1
PREREQUISITE: BIOL 102, BIOL 207, BIOL 214 or MB 301 with grades of "C" or better in each course. Priority given to majors requiring this course.
- Structure and function of digestive, cardiovascular, respiratory, reproductive, and urinary systems of humans. Principles of integration, metabolism, energy flow, and homeostasis will be emphasized. This course is not repeatable without prior consent of instructor.

BIOL 213 INTRODUCTORY BIOLOGY: CELLS TO ORGANISMS
S 4 cr. LEC 3 LAB 1
PREREQUISITE: STAT 216 and CHEM 131.
- Introduction to and function in the animal and plant kingdoms. Topics will include circulation and gas exchange, chemical signals, reproduction, nutrition, and the animal nervous system. Laboratories will be inquiry based with mathematical and computational applications to biological problems.

BIOL 214 INTRODUCTORY BIOLOGY: MOLECULES TO CELLS
F 4 cr. LEC 3 LAB 1
PREREQUISITE: STAT 216 and CHEM 131.
- Introduction to biological macromolecules, cell structures and function, and gene structure and expression. The laboratory portion will include both wet labs and computer-based modules.

BIOL 215 INTRODUCTORY BIOLOGY: ORGANISMS TO POPULATIONS
S 4 cr. LEC 3 LAB 1
PREREQUISITE: BIOL 102 or BIOL 214, STAT 216 and MATH 170 or MATH 181.
- An introductory course in ecology and evolution with in-depth coverage of topics in micro- and macroevolution, behavioral ecology, population ecology, community ecology, and biodiversity. The laboratory portion of the course will include material on biological diversity, evolutionary processes, and ecological processes.

BIOL 250 IDENTIFICATION OF SEED PLANTS
S 4 cr. LEC 2 LAB 2
PREREQUISITE: BIOL 101.
- Identification of conifers, trees and shrubs, and herbaceous seed plants; determination by use of manuals; vocabulary, classification and nomenclature; and preparation and collection of seed plant specimens. Cross-listed with PS 250.

BIOL 251 BOTANY: AN INTRODUCTION TO PLANT BIOLOGY
F 3 cr. LEC 3
PREREQUISITE: BIOL 101N.
- This course will provide a thorough overview of the fundamentals of plant and fungal biology from evolutionary, ecological, and physiological perspectives. Cross-listed with PS 251.

BIOL 252 BOTANY LAB
F 1 cr. LEC 1
COREQUISITE: BIOL 251.
- This lab will feature plant ecology and also plants that have been used as model organisms in studies of basic biological processes. Cross-listed with PS 252.

BIOL 290 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

BIOL 295 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

BIOL 296 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

BIOL 297 HUMAN PHYSIOLOGY I
S 3 cr. LEC 3
PREREQUISITE: CHEM 121 or CHEM 131 or CHEM 141 with grades of "C" or better in each course.
- General principles of cell and tissue biology; function of skeletal, muscular, nervous, and endocrine systems. Homeostasis, control, and integration of the human body will be emphasized.

BIOL 298 HUMAN PHYSIOLOGY II
F 3 cr. LEC 3
PREREQUISITE: BIOL 102 or BIOL 207 or BIOL 214 or BIOL 297 or MB 301 with grades of "C" or better in each course.
- Function of the human digestive, cardiovascular, respiratory, reproductive, and urinary systems. Principles of integration, metabolism, energy flow and homeostasis will be emphasized.

BIOL 301 PRINCIPLES OF GENETICS
F, S 3 cr. LEC 3
PREREQUISITE: BIOL 102 or BIOL 214 or MB 301.
- Introduction to classical and molecular genetics of eukaryotes, with emphasis on transmission genetics, the structure and regulation of genes, and mechanisms of genetic change.

BIOL 302 ADVANCED CELL & MOLECULAR BIOLOGY
S 3 cr. LEC 3
PREREQUISITE: BIOL 501, BCHM 540 or consent of instructor.
- In-depth study of cell structure and function.

BIOL 303 PRINCIPLES OF ECOLOGY
S 3 cr. LEC 3
PREREQUISITE: BIOL 101 or BIOL 215; MATH 105 or MATH 170; STAT 216 or PSPP 518; or equivalents; junior standing.
- Relation of organisms to their environment. The competition, structure, function and distribution of populations, communities, and ecosystems.

BIOL 310 COMPARATIVE VERTEBRATE ANATOMY
F 3 cr. LEC 2 LAB 2
PREREQUISITE: BIOL 101 or BIOL 215.
- A comparative study of organ systems of vertebrates. Laboratory utilizes representative vertebrate types. Cross-listed with GEOL 516.

BIOL 311 DEVELOPMENTAL BIOLOGY
S 4 cr. LEC 3 LAB 1
PREREQUISITE: BIOL 101 or BIOL 215, and BIOL 102 or BIOL 214, and BIOL 301.
- Developmental Biology: Introduction to the cell signaling pathways and morphogenic processes that establish the basic vertebrate body plan and organs. Laboratory utilizes microscopic and experimental study of chicken and frog embryos.

BIOL 312 HISTOLOGY
On Demand 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 102 or BIOL 214, senior standing and consent of instructor.
- Microscopic study of cells, tissues, and selected mammalian organs.

BIOL 400 SEMINAR
F, S 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper division level which are not covered in regular courses. Students attend and discuss seminar presentations by professional biologists.

BIOL 401 BIOLOGY INSTRUCTING
F, S, Su 2 cr. LAB 2 Maximum 4 cr.
PREREQUISITE: Junior or senior standing, consent of instructor and department head.
- Provides deeper contact with a subject for those considering an academic profession. This provides experience in a teaching laboratory under detailed academic supervision in recognition that teaching enhances learning. Includes the preparation, organization, presentation of materials, and student evaluation.

BIOL 403 EVOLUTION
S 5 cr. LEC 3
PREREQUISITE: BIOL 301.
- For seniors in biology. Evolutionary theory is presented and takes two principle directions, the study of evolutionary history, and the study of natural selection.

BIOL 404 Limnology
F 3 cr. LEC 3
PREREQUISITE: BIOL 101, CHEM 121 or CHEM 131, and PHYS 205.
- Principles of aquatic ecology, physical, chemical, and biological characteristics of interactions within freshwater lakes and streams.
BIOL 405 BEHAVIORAL & EVOLUTIONARY ECOLOGY
S 3 cr. LEC 3
PREREQUISITE: BIOL 308.
- Abundance and distribution of organisms in relation
to their evolution, behavior, population biology
and interactions with other organisms.

BIOL 406 ROCKY MOUNTAIN ECOSYSTEMS
F 2 cr. LEC 1 LAB 1
PREREQUISITE: Junior or senior status in biological
sciences and consent of instructor.
- Field identification of major Rocky Mountain habi-
tat types; their environmental conditions; structure
and function of climax and alternate communities;
and discussion of management alternatives. Includes
introduction to field methods, statistical evaluations,
and library use.

BIOL 407 ALPINE ECOLOGY
Su 3 cr. LEC 1 LAB 2
PREREQUISITE: Junior standing, BIOL 101.
- The ecological characteristics of alpine areas. A
three-day field trip will confirm and reinforce mate-
rial presented in class and is a course requirement.

BIOL 410 ADVANCED HUMAN ANATOMY
S 4 cr. LEC 2 LAB 2
PREREQUISITE: Junior or Senior standing, comple-
tion of at least two upper division courses in the
biological sciences and consent of instructor.
- Dissection and prosection of the detailed anatomy
of the human thorax, abdomen and pelvis with
special dissection emphasis on the extremities.
Topographic, three-dimensional and detailed rela-
tionships of organs, nerves and vessels are empha-
sized. Can fulfill upper division honor credits.

BIOL 411 ANIMAL PHYSIOLOGY
F 3 cr. LEC 3
PREREQUISITE: Junior standing, BIOL 102 or
BIOL 214, and one of the following: CHEM 215,
CHEM 311, or BCHM 122.
- General homeostatic physiology of animals with
emphasis on mammals. Selected body systems are
covered with major emphasis on the integration of
body processes.

BIOL 413 NEUROPHYSIOLOGY
F 3 cr. LEC 3
PREREQUISITE: Junior standing, and BIOL 411 or
BIOL 207 or BIOL 214.
- Physiology of integrative mechanisms in nervous
systems. Topics range from the mechanisms of syn-
aptic transmission and action potential generation
to the neural basis of learning and memory.

BIOL 415 ICYTHOLOGY
S 5 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 310.
- Characteristics, classification, evolution, and life
histories of major groups of marine and freshwater
fishes, with an emphasis on North American fresh-
water fauna. Laboratory emphasizes identification,
nomenclature, morphology, and distribution of
Montana species.

BIOL 418 MAMMALOGY
F 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 310.
- Evolution, functional biology, distribution, and
classification of mammals. Labs cover taxonomy and
identification of representative forms.

BIOL 419 ORNITHOLOGY
S 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 310.
- Evolution, functional biology, distribution, and
classification of major Montana species recognition
is developed through laboratory use of a representa-
tive skin collection.

BIOL 420 FIELD ORNITHOLOGY
Su 3 cr. LAB 3
PREREQUISITE: Junior standing, and either BIOL
100 or BIOL 101.
- Field identification, habitat affinities and life histo-
ries of birds of the northern Rockies. Includes early
morning field trips.

BIOL 421 YELLOWSTONE WILDLIFE
ECOLOGY
Su 3 cr. LEC 2 LAB 1
PREREQUISITE: Junior standing, and either BIOL
100 or BIOL 101.
- Basic ecology of the major animal species of the
Yellowstone area and the ecological controversies
surrounding their management.

BIOL 422 GENES AND CANCER
F alternate years 2006 3 cr. LEC 3
PREREQUISITE: BIOL 301 and BIOL 302.
- This course will focus on the molecular and cellu-
lar mechanisms of human cancer. The role of oncog-
enes and tumor suppressor genes in normal and
cancerous cells will be examined, with an emphasis
on how mutations in certain genes results in altered
cell-cell signaling and cell proliferation. The role of
genetic mutation in breast, colorectal and lymph-
oma cancers will be discussed, along with new
technologies to detect and treat these cancers.

BIOL 426 NEUROETHOLOGY
On Demand 3 cr. LEC 3
PREREQUISITE: BIOL 413, or consent of
instructor.
- Neural and hormonal bases of animal behavior,
including mechanisms underlying sensory percep-
tion and motor responses, learning and memory,
spatial navigation, language, dominance hierarchies
and aggression, mating systems, and parental behav-
or. Model systems from a variety of different animal
species will be studied including humans.

BIOL 427 AQUATIC FIELD ECOLOGY
F 2 cr. LEC 1 LAB 1
PREREQUISITE: Prior or concurrent registration
in BIOL 404.
- Optional laboratory for BIOL 404. Introduction to
representative freshwater habitats, communities,
animals, and sampling methods through labora-
tory and field exercises and classroom discussions.
Formal written reports are required after completed
exercises.

BIOL 430 PLANT PHYSIOLOGY
S 3 cr. LEC 3
PREREQUISITE: Junior standing, BIOL 101 and
one of the following: CHEM 215, CHEM 311, or
BCHM 122.
- Physiological processes of higher plants, including
photosynthesis, water relations, mineral nutrition,
and development. Cross-listed with PS 450.

BIOL 432 PLANT ANATOMY
F alternate years, to be offered 2007 3 cr. LEC 1
LAB 2
PREREQUISITE: Junior standing, BIOL 101.
- Advanced plant biology examining structure and
functions of plant cells and tissues. Includes experi-
ence with plant growth in greenhouse, light micros-
copy, and an individual project with slide prepara-
tion. Cross-listed with PS 452.

BIOL 433 PHYCOLOGY
F alternate years, to be offered 2007 3 cr. LEC 2
LAB 1
PREREQUISITE: BIOL 102 and BIOL 303.
- Identification, physiology, ecology, and evolution
of marine and freshwater algae. Cross-listed with
PS 453.

BIOL 434 AGROECOLOGY
F alternate years, to be offered 2007 3 cr. LEC 1
LAB 2
PREREQUISITE: BIOL 250.
- Examination of the structure, classification, evolution,
and ecology of grasses and grasslike plants occurring
in Montana; morphological and ecological features;
preparation of about 120 reference specimens taken
from the state flora. Cross-listed with PS 454.

BIOL 435 INSECT IDENTIFICATION
S alternate years, to be offered 2004 4 cr. LEC 2
LAB 2
PREREQUISITE: ENTO 204N and one of the fol-
lowing: BIOL 100, BIOL 101, or BIOL 102.
- The identification of insects and related terrestrial
arthropods. Evolutionary patterns reflected in mod-
ern insect diversity will be used to illustrate classifica-
tion methods. Taxonomic methods will be used as
an access to information retrieval.

BIOL 436 PLANT SYSTEMATICS
F alternate years, to be offered 2006 3 cr. LEC 1
LAB 2
PREREQUISITE: BIOL 101 and BIOL 250.
- Introduction to the local vascular plant flora
emphasizing characteristics of the common families
genera. Lab concentrates on plant identification
of common angiosperm plant families in
Montana; preparation of about 120 reference
specimens taken from the local flora. Cross-listed
with PS 456.

BIOL 437 PLANT DEVELOPMENT
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: BIOL 301.
- Cellular and molecular mechanisms of the develop-
ment of multi cellular life forms that consist
of walled cells, and primarily plants. Some topics
include developmental differences between plants
and animals, regulation of gene expression, environ-
mental effects on plant development, and computer
modeling of development. Cross-listed with PS 457.

BIOL 438 DEVELOPMENTAL MECHANISMS
F alternate years, to be offered 2007 3 cr. LEC 2
LAB 1
PREREQUISITE: BIOL 302.
- This course will focus on the molecular and
acellular mechanisms which drive developmental
processes.

BIOL 439 STREAM ECOLOGY
F 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 101, CHEM 121 or CHEM
151, and PHY 205.
- Examination of the structure and function of
stream ecosystems emphasizing connections among
stream organisms, the aquatic chemical and physi-
cal environment, and the surrounding terrestrial
landscape.

BIOL 445 CURRENT TOPICS IN BIOLOGY
S 2 cr. SEM 2
PREREQUISITE: Senior standing in Biology
Option, and prior or concurrent registration in
BIOL 403.
- Senior capstone course. Discussion of topics that
integrate evolutionary theory with ecology, genetics,
medicine, behavior, or other subjects that are part of
the biology curriculum.
BIOL 445 COGNITIVE NEUROSCIENCE
F S cr. LEC 3
PREREQUISITE: BIOL 303.
Topics will range from perception and action to attention, consciousness and mental illness.

BIOL 447 MOLECULAR MEDICINE
S 3 cr. LEC 1 SEM 2
PREREQUISITE: BIOL 301 and BCHM 340.
- Lecture and seminar courses based on recent, original papers. Moves from human disease to molecular explanations. Intended for upper level students with a strong background in biology.

BIOL 450 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

BIOL 451 CELL BIOLOGY & NEUROSCIENCE DEPARTMENT CAPSTONE SEMINAR
F S 2 cr. SEM 2
PREREQUISITE: Senior standing in the Cell Biology & Neuroscience Department, BIOL 301, and one or more of the following courses: BIOL 302, BIOL 310, BIOL 312, or BIOL 411.
- Senior capstone course. Students are expected both to present and to discuss advanced topics from the current biomedical literature. These topics will expand upon material presented in regular courses in the biomedical science curriculum. Students will write at least one major paper.

BIOL 452 TOPICS IN FISH ECOLOGY
S alternate years, to be offered 2008 2 cr. LEC 2
PREREQUISITE: Prior completion or concurrent registration in: BIOL 305, 403, and BIOL 415.
- Discussion of ecological adaptations and interactions among fishes, with emphasis on applications to management of fish populations and habitats.

BIOL 466R GENE CONSTRUCTION
F 3 cr. LAB 3
PREREQUISITE: BIOL 302 or BCHM 340.
- The goals are to provide upper level students with the opportunity of designing and building their own genes. The goal of the course is to use this design experience to learn basic techniques in cell and molecular biology.

BIOL 467 MOLECULAR MEDICINE
S 3 cr. LEC 1 SEM 2
PREREQUISITE: BIOL 301 and BCHM 340.
- Lecture and seminar courses based on recent, original papers. Moves from human disease to molecular explanations. Intended for upper level students with a strong background in biology.

BIOL 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

BIOL 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: BIOL 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

BIOL 500 SEMINAR
On Demand 1 cr. SEM Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition and course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

BIOL 501 EVOLUTIONARY GENETICS
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: BIOL 101, BIOL 310, or BIOL 411.
- The operations of fundamental genetic principles in populations of living things. Emphasis on natural populations with a thorough consideration of factors of evolution, particularly at the species level and below.

BIOL 502 ADVANCED LIMNOLOGY
S alternate years, to be offered 2008 4 cr. LEC 2
LAB 2
PREREQUISITE: MATH 170, BIOL 404, BIOL 427, BCHM 122 or BCHM 340.
- Advanced quantitative study of the physical, chemical and biological dynamics of lakes and reservoirs.

BIOL 503 PALEOBIOLOGY
S alternate years, to be offered 2007 3 cr. LEC 2
LAB 1
PREREQUISITE: BIOL 310, BIOL 403.
- A study of the fossil record as a means of inferring biological characteristics of extinct species. Current topics in paleontology, phylogenetic systematics, patterns of evolution, speciation and extinction and osteohistology will be examined.

BIOL 504 QUANTITATIVE BIOLOGY
F alternate years, to be offered 2006 3 cr. LEC 2
LAB 1
PREREQUISITE: BIOL 303, either STAT 216 or STAT 302, and one of the following: MATH 170, MATH 181, MATH 182.
- Applications of mathematical models to biological phenomena with examples drawn from physiology, ecology and bioengineering. The course is intended to develop facility with optimization techniques, numerical methods, matrix operations, complex variables and simple statistical ideas. Computer lab.

BIOL 505 ENVIRONMENTAL ANALYSIS
S alternate years, to be offered 2008 3 cr. LEC 2
LAB 1
PREREQUISITE: BIOL 303, either STAT 216 or STAT 302, and one of the following: MATH 170, MATH 181, MATH 182.

BIOL 506 POPULATION DYNAMICS
S alternate years, to be offered 2007 3 cr. LEC 2
LAB 1
PREREQUISITE: BIOL 303, either STAT 216 or STAT 302, and one of the following: MATH 170, MATH 181, MATH 182.
- Techniques for modeling the growth, regulation, harvesting and persistence of populations. Computer lab.

BIOL 507 COEVOLUTION
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: BIOL 501, BIOL 503, or BIOL 403.
- Exploration of nature and dynamics of symbiotic relationships between and among plants, animals, fungi and bacteria.

BIOL 508 SCIENTIFIC WRITING
S 3 cr. LEC 2 LAB 1
PREREQUISITE: Graduate standing and permission of instructor.
- The course is designed to provide an intensive scientific writing experience for graduate students in the process of writing the first draft of their thesis or dissertation, including editing and critique sessions by both peers and the instructor.

BIOL 509 INTRODUCTION TO PRACTICAL MODELING
F 3 cr. LEC 2 LAB 2
PREREQUISITE: First courses in calculus and statistics or consent of instructor.
- With computers, the power of mathematical modeling is accessible to every biologist. We will discuss philosophies, strategies, techniques and pitfalls of modeling. After this course, students should be able to answer complex biological questions by formulating and analyzing mathematical/computational models.

BIOL 510 TOPICS IN NEUROBIOLOGY
S 3 cr. LEC 2 RCT 1 Maximum of 9 credits.
PREREQUISITE: Graduate standing and at least one upper division or graduate course in neurobiology.
- Recent advances in topics in neurobiology with emphasis in different years on either neurocytology, neuroendocrinology/neuroimmunology, or developmental neurobiology.
BIOL 513 TERRESTRIAL ECOLOGY OF PLAINS AND PRAIRIES
Su 1 cr. RCT 1
PREREQUISITE: Either BIOL 406 or BIOL 516, graduate standing, secondary teacher certification, two years teaching experience, and computer access.
COREQUISITE: Suggested: ESCI 515.
- Students will develop plant keys for classroom use, quantitatively analyze two grassland communities, and develop classroom activities on ecology of grasslands. Distance learning, class offered by internet connection. This course is designed for secondary school teachers enrolled in MSSE program and cannot be used in graduate programs in Biological Sciences.

BIOL 515 LANDSCAPE ECOLOGY AND MANAGEMENT
F alternate years, to be offered 2007 4 cr. LEC 2 LAB 2
PREREQUISITE: Graduate standing or consent of instructor.
- Principles on landscape pattern, change, and function. Application of theory to conservation including population viability, reserve design, multiple-use landscapes. Lab introduces GIS, GPS, and simulation models. For graduate students and motivated undergraduates.

BIOL 516 TERRESTRIAL ECOLOGY OF THE NORTHERN ROCKY MOUNTAINS
Su 2 cr. RCT 1 LAB 1
PREREQUISITE: Graduate standing, two years of classroom teaching, undergraduate science degree, and one year of biology.
- Description and comparison of grassland, forest, and alpine ecosystems of the NRML with respect to composition, structure, and process such as production, decomposition and mineral cycling. We will use tools including keys to species and environmental types, dimension analysis, remote sensing, and statistics. This course is designed for secondary school teachers enrolled in MSSE Program and cannot be used in graduate programs in biological sciences.

BIOL 518 PARAMETER ESTIMATION FOR ECOLOGICAL MODELS
F alternate years, to be offered 2007 5 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 504 or equivalent.
- Statistical methods to quantify uncertainty, and to plan data collection for cost-efficient reduction in uncertainty, in application to ecological models where data are often sparse and processes are often noisy, and management decision must take account of uncertainty.

BIOL 519 BIOLOGY OF RIPARIAN ZONES AND WETLANDS
Su 2 cr. RCT 2
PREREQUISITE: Either BIOL 516 or BIOL 406, secondary teacher certification, two years teaching experience, and computer access.
COREQUISITE: Suggested: ESCI 515, ESCI 515.
- Students will develop plant keys for classroom use, quantitatively analyze two riparian and two wetland areas, and develop classroom activities about ecology of those areas. Distance learning class offered by internet connection. This course is designed for secondary school teachers enrolled in the MSSE program and cannot be used in graduate programs in Biological Sciences.

BIOL 520 ANIMAL BIODIVERSITY IN GYE
Su 2 cr. LEC 1 LAB 1
PREREQUISITE: BIOL 303, F&LF 301, BIOL 405, or equivalent and (a) 2 years science technology experience or (b) enrolled in MSSE.
- Exploration of biodiversity's meaning, importance & determinants; key ecological features of the Greater Yellowstone Ecosystem and patterns of change in those features & possible strategies for maintaining biodiversity in the Greater Yellowstone Ecosystem.

BIOL 522 BIRDS OF PREY IN THE GREATER YELLOWSTONE ECOSYSTEM
Su 2 cr. LEC 1 LAB 1
PREREQUISITE: BIOL 503, F&LF 301, BIOL 405, or equivalent and 2 years science technology experience or enrolled in MSSE.
- Exploration of the ecology and habitat of avian raptors in the Greater Yellowstone Ecosystem (GYE). Application of the scientific method to the study of raptors. Field identification of raptors, investigation of species life histories, and inquiry methods of species-specific habitat needs. Student will develop methods and skills for classroom-based research on wildlife. This course is designed for secondary school teachers enrolled in the MSSE program.

BIOL 523 WILDLIFE ECOLOGY OF THE NORTHERN ROCKY PLAINS
Su 2 cr. LEC 2
PREREQUISITE: BIOL 503, F&LF 301, BIOL 405, or equivalent and 2 years science technology experience or enrolled in MSSE.
- Introduction to wildlife species and the range of habitats present in the Northern Rocky Mountain ecosystems. Emphasis on large carnivores and ungulates within montane terrestrial systems.
Application of the scientific method to study interactions between predators, prey, and human impacts. This course is designed for middle and high school teachers.

BIOL 524 FRONTIERS IN LANDSCAPE ECOLOGY
F alternate years to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 503 or the equivalent.
- Students and instructor will write a scientific paper for publication that synthesizes an important question in landscape ecology. Students will select the topic, review and synthesize current knowledge on the topic, and write a scientific manuscript.

BIOL 525 RESEARCH METHODS AND THE SCIENTIFIC PROCESS
F 3 cr. LEC 2 RCT 1
PREREQUISITE: Graduate standing or consent of instructor.
- Application of the scientific method to answer biological questions and the development of skills needed to prepare research proposals, critique research studies and communicate research findings. For first-year graduate students.

BIOL 526 PHYSIOLOGICAL PLANT ECOLOGY
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: BIOL 503.
- Outlines the plant's Hutchinsonian niche through review of energy, material (water, nutrients and toxins) and functional (including animal) factors. Computer modeling of plant function in the environment is discussed.

BIOL 533 PHYSIOLOGICAL PLANT ECOLOGY LAB
S alternate years, to be offered 2007 1 cr. LAB 1
COREQUISITE: BIOL 532.
- A research project in physiological plant ecology will be chosen, carried out and reported in scientific journal format.

BIOL 534 VEGETATION ECOLOGY
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: BIOL 533.
- Considers the composition, structure, function, distribution in time and space, ecology and classification of communities. Emphasizes universal methods, current studies and Rocky Mountain systems. Complementary field experience is available in BIOL 406.

BIOL 540 ANALYSIS OF ECOLOGICAL COMMUNITIES
S alternate years, to be offered 2008 3 cr. LEC 2 LAB 1
- Multivariate statistical analysis of data from terrestrial or aquatic, plant or animal communities. Classification, ordination, and predictive modeling of species and communities, emphasizing a hands-on approach and practical problem solving in community ecology.

BIOL 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

BIOL 573 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1 - 4 cr. IND
Graduate standing and committee approval.
- A research or professional paper or project dealing with a topic in the field. The topic must be mutually agreed upon by the student and his or her major advisor and graduate committee.

BIOL 576 INTERNSHIP
On Demand 2 - 12 cr. IND
PREREQUISITE: Graduate standing, consent of instructor and approval of department head.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

BIOL 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Max 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

BIOL 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 5 cr. May be repeated; maximum 5 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
- Courses offered on a one time basis to fulfill professional development needs of in-service educators. A specific focus is given to each course which is appropriately subtitled.
BIOL 589 GRADUATE CONSULTATION
F, S, Su 5 cr. IND
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

BIOL 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master's standing.

BIOL 690 DOCTORAL THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing.

BREN
Bio-Resources Engineering
Department of Civil Engineering
(406) 994-2111

BREN 432 ADVANCED ENGINEERING HYDROLOGY
S 3 cr. LEC 3
PREREQUISITE: CE 331.
COREQUISITE: CE 332.
- Hydrology emphasizing engineering design. Topics include modern techniques for flow estimation, flood routing and sediment yields, design of conveyance structures, and water project development.

BREN 434 GROUND WATER SUPPLY AND REMEDIATION
S 3 cr. LEC 3
PREREQUISITE: EM 335.
- Contemporary groundwater topics including water supply, contaminant transport, and remediation technologies.

BREN 441 NATURAL TREATMENT SYSTEMS
S 3 cr. LEC 3
PREREQUISITE: CE 340.
- Planning, design, and operation of remediation facilities emphasizing natural versus mechanical elements. Specific topics include stabilization ponds, constructed wetlands, land treatment, and on-site domestic systems.

BREN 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 4 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of Department Head.
- Directed research and study on an individual basis.

BREN 490 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: BREN 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

BREN 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

BREN 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

BRE Bus 500 SEMINAR
F, S 1 cr. SEM 1
PREREQUISITE: Graduate status or seniors by petition.
- Presentations and discussion of current research by faculty, students, and guest lecturers on the biological, physical, cultural, economic, and social components of Montana ecosystems. Participation required of all graduate students enrolling for multidisciplinary study in the Big Sky Institute.

BSI
Big Sky Institute
(406) 994-2374

BSI 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

BSI 500 SEMINAR
F, S 1 cr. SEM 1
PREREQUISITE: Graduate status or seniors by petition.
- Presentations and discussion of current research by faculty, students, and guest lecturers on the biological, physical, cultural, economic, and social components of Montana ecosystems. Weekly lectures present current research on relevant topics. Required of all graduate students enrolling for multidisciplinary study in the Big Sky Institute.

BUS
Business
College of Business
(406) 994-4423

BUS 101 US FIRST YEAR SEMINAR
F 3 cr. SEM 3 (mode of instruction change effective Fall 2007)
- Introduction to the language of business and integration into the culture and expectations of higher education. Through a variety of assignments, readings, and activities in a seminar setting, the course focuses on written and oral communication, teamwork, critical thinking, and issues facing prospective business professionals.

BUS 201 MANAGERIAL COMMUNICATION
F, S, Su 3 cr. LEC 3
PREREQUISITE: Completion of University Seminar and Writing University Core Requirement and one of the following: ENGR 100, CS 150, ME 101, MET 101.
- Strategies for written, oral, graphical, and nonverbal communications in business organizations.

BUS 222 MANAGERIAL ACCOUNTING
F, S, Su 3 cr. LEC 3
PREREQUISITE: BUS 221, CS 150.
- An introduction to the principles of financial accounting for students of all business curricula. Specific topics include key accounting concepts, accounting transaction recording, financial statement preparation, accounting systems overview, business entity structures and financial statement analysis.

BUS 230 MANAGERIAL ACCOUNTING
F, S, Su 3 cr. LEC 3
PREREQUISITE: BUS 221, CS 150.
- An introduction to the principles of financial accounting for students of all business curricula. Specific topics include key accounting concepts, accounting transaction recording, financial statement preparation, accounting systems overview, business entity structures and financial statement analysis.

BUS 301 MANAGEMENT & ORGANIZATION
F, S, Su 3 cr. LEC 3
PREREQUISITE: Junior standing, ECON 102, CS 150, and for business majors, Formal Admission to the College.
- Design and control of organizations: work groups, individual behavior, interpersonal relations, communication, leadership, organizational structure, decision making, planning, control, staffing, motivation, and international issues.

BUS 302 CAREER PERSPECTIVES
F, S, Su 1 cr. LEC 1
PREREQUISITE: Junior standing, completion of the Business Pre-Core. For Business Majors, Formal Admission to the College.
- Reinforced are the process of career planning and development through self-assessment, exploration of career options, early planning, and goal setting. Individualized feedback is provided on career-related issues such as internships, interviewing, and self-presentation.

BUS 311 INFORMATION SYSTEMS
F, S, Su 3 cr. LEC 3
PREREQUISITE: Junior standing, CS 150, BUS 221, and for business majors, Formal Admission to the College.
- A survey of the uses of information in organizational management, with emphasis on systems to support managerial decision making. Students apply concepts in practical application projects using currently available software.

BUS 331 OPERATIONS MANAGEMENT
F, S, Su 3 cr. LEC 3
PREREQUISITE: Junior standing, BUS 311, and for business majors, Formal Admission to the College.
- Introduction to the topics and methods of production and operations management. Emphasis is given to critical thinking, business analysis and computer modeling. Application areas include accounting, finance, marketing, and management.
COURSE DESCRIPTIONS: BUS 341 - CE 413

BUS 341 MARKETING
F, S, Su 3 cr. LEC 3
PREREQUISITE: Junior standing, ECON 102, CS 150, and for business majors, Formal Admission to the College.
- Marketing management decision-making in the product, price, promotion, and distribution areas. The behavioral, legal, ethical, competitive, technological, and economic environments as they affect decisions in the domestic and international organization.

BUS 351 FINANCE
F, S, Su 3 cr. LEC 3
PREREQUISITE: Junior standing, completion of Business Pre-Core, and for business majors, Formal Admission to the College.
- Study of the principles of finance with emphasis on the application and integration of financial concepts in decision making.

BUS 361 INTRODUCTION TO LAW
F, S, Su 3 cr. LEC 3
PREREQUISITE: Junior standing, completion of Social Science Core, and for business majors, Formal Admission to the College.

BUS 474 BUSINESS SENIOR SEMINAR
F, S, Su 4 cr. LEC 1 SEM 5
PREREQUISITE: Senior standing, Formal Admission to the College of Business, and completion of Business Core. Take last or next to last semester prior to graduation.
- Senior capstone course. Policy, strategy, and ethics will be addressed in this integrative senior capstone courses.

CE Civil Engineering
Department of Civil Engineering
(406) 994-2111

CE 101 INTRODUCTION TO CIVIL ENGINEERING
F, S 1 cr. LEC 1
PREREQUISITE: Must be taken within your freshman year.
- This course is optional for students entering civil engineering but is encouraged for freshmen wanting to learn about the breadth of the discipline. Students choosing to take the course will be introduced to civil engineering, including department programs and areas of specialty, civil engineering career options, professionalism, history, and ethics.

CE 201 SURVEYING
F, S; Su On Demand, 3 cr. LEC 2 LAB 1
PREREQUISITE: MATH 175 or MATH 181.
- Surveying field practice, error propagation analysis, survey for project design.

CE 202 APPLIED ANALYSIS & TECHNICAL COMMUNICATION
F, S 2 cr. LAB 2
PREREQUISITE: MATH 175 or MATH 181.
- Computer applications in civil engineering using math-based software and a programming language. Introduction to engineering communication.

CE 208 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CE 280R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT 1
- Classroom instruction associated with directed undergraduate research/creative activity projects.

CE 280R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

CE 307 CONSTRUCTION ESTIMATING & BIDDING
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: CE 202 or CET 203 and CE 306.
- Preparation of cost estimates and bids for construction projects. Introduction of computer estimating software and procedures.

CE 308 CONSTRUCTION PRACTICE
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: BUS 201 and ME 116.
- Contract documents, insurance, bonding, specifications, drawings, labor and labor law, estimating, bidding and scheduling, business organizations, leadership, and ethics. Significant technical and business writing required.

CE 312 STRUCTURES I
F, S 3 cr. LEC 3
PREREQUISITE: EM 255.
- Study of loading on structures. Study of structural systems and systems modeling. Analysis of determinate and indeterminate structures. Introduction to matrix methods. Introduction to structural analysis software. Introduction to design approaches and philosophies.

CE 315 STRUCTURES II
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: CE 312.
- Structural design of steel and reinforced concrete members used in buildings and bridges. Theory and application of design codes. Laboratory experience utilizing construction materials.

CE 320 GEOTECHNICAL ENGINEERING
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: EM 255.
- The treatment of soil as an engineering material. Fundamental soil mechanics principles and introductory solutions to geotechnical engineering problems. Basic soil mechanics-laboratory tests and procedures.

CE 331 ENGINEERING HYDROLOGY
F 2 cr. LEC 2
PREREQUISITE: I & ME 250.
- Descriptive and quantitative hydrology with applications in water resources engineering.

CE 332 ENGINEERING HYDRAULICS
F, S 2 cr. LEC 1 LAB 1
PREREQUISITE: EM 255.
- Pipe flow, open channel flow, and hydraulic machines with applications in water resources engineering.

CE 340 PRINCIPLES OF ENVIRONMENTAL ENGINEERING
F, S 3 cr. LEC 3
PREREQUISITE: CHEM 132.
- Corequisite: EM 355.
- Fundamentals of environmental engineering with emphasis on water and wastewater.

CE 350 TRANSPORTATION ENGINEERING
F 3 cr. LEC 2 LAB 1
PREREQUISITE: CE 201.
- Introduction to vehicle operating characteristics, geometric and pavement design, traffic flow theory, signal design and analysis, capacity analysis and planning. Laboratory work will introduce various in-practice software packages.

CE 351 LEGAL PRINCIPLES IN SURVEYING
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: CE 201.
- Principles of the profession: case law, legal aspects of boundary location, monumentation, and property descriptions.

CE 352 PUBLIC LAND SURVEY SYSTEM
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CE 201.
- Federal and state laws and regulations governing legal land surveying; case studies and professional responsibilities.

CE 353 ADVANCED SURVEYING COMPUTATIONS
S alternate years, to be offered 2008 3 cr. LEC 2 LAB 1
PREREQUISITE: CE 201.
- Modern instrumental and computational techniques in surveying.

CE 401 PROFESSIONAL PRACTICE AND ETHICS
F, S 1 cr. RCT 1
PREREQUISITE: Concurrent registration with CE 457 required.
- Professional ethics, social responsibility, and public policy.

CE 404 HEAVY CONSTRUCTION EQUIPMENT & METHODS
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: STAT 216, I & ME 325, and CET 302 or CE 320.
COREQUISITE: CE 307.
- Construction equipment operating characteristics, economics, and production rate estimation. Heavy construction methods associated with tunneling, aggregate production, and mass earthwork operations.

CE 405 CONSTRUCTION PROJECT PLANNING & SCHEDULING
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: CE 307.
- Project planning and scheduling procedures involving both network (CPM) and non-network techniques. Introduction to computer scheduling software.

CE 413 REINFORCED CONCRETE DESIGN
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: CE 315.
- Design of reinforced concrete members and systems.
CE 414 STEEL DESIGN
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CE 315.
- Design of structural steel members and systems.

CE 415 DESIGN OF MASONRY STRUCTURES
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: CE 315.
- Introduction to masonry design. Integrated with building design, including load calculations, design of foundations, structural elements and connections. Emphasis on low-rise buildings.

CE 416 DESIGN OF WOOD AND TIMBER STRUCTURES
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CE 320.
- Students will be exposed to the basic behavior of wood and timber structures. They will also be exposed to the current building codes and methodology for the design of wood and timber structures.

CE 420 EARTH AND FOUNDATION ENGINEERING
S 3 cr. LEC 3
PREREQUISITE: CE 320.
- Application of soil mechanics principles to the engineering of shallow and deep foundations, analysis of lateral earth pressures and design of retaining walls, and the stability of natural and engineered slopes.

CE 425 GEOTECHNICAL STRUCTURES
F 3 cr. LEC 3
PREREQUISITE: CE 320.
- Analysis of lateral earth pressures and design of retaining structures and braced excavations. Stability analysis of natural and engineered slopes. Analysis and design of embankments and dams.

CE 431 OPEN CHANNEL HYDRAULICS
S 3 cr. LEC 3
PREREQUISITE: CE 352 or consent of the instructor.
- Principles of open channel flow; hydraulic design of open channel structures.

CE 435 CLOSED-CONDUIT HYDRAULICS
S 3 cr. LEC 3
PREREQUISITE: CE 352.
- Advanced topics in hydraulic engineering, with emphasis on analysis and design of pipe transmission lines, pumps, and pipe distribution networks.

CE 451 HIGHWAY PAVEMENTS
S alternate years, to be offered 2008 3 cr. LEC 2 LAB 1
PREREQUISITE: CE 320, CE 350.
- Design of highway pavements including drainage and base/subbase/subgrade preparation. Laboratory in bituminous materials.

CE 452 TRAFFIC ENGINEERING AND ITS
F alternate years, to be offered 2007 3 cr. LEC 2 LAB 1
PREREQUISITE: CE 350, I&ME 350.
- Application of driver, vehicle, and roadway characteristics to principles of traffic control, operations, and safety. Traditional and advanced technology solutions will be explored.

CE 454 TRANSPORTATION PLANNING
F alternate years, to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: CE 350, I&ME 350.
- Transportation planning process and travel demand forecasting including trip generation, trip distribution, mode split and traffic assignment. Laboratory work will introduce TransCAD software.

CE 456 HIGHWAY GEOMETRIC DESIGN
S 3 cr. LEC 3
PREREQUISITE: CE 201, CE 350.
- Advanced geometric design of highway systems including two-lane and interstate roadways and intersection design and traffic control.

CE 457R SENIOR PROJECT I
F, S 2 cr. RCT 1 LAB 1
PREREQUISITE: Student must be within two semesters of graduation.
COREQUISITE: I&ME 325 and CE 308. Concurrent registration with CE 401 is required.
- Senior capstone course. Discussion of the design process from conceptual/preliminary design to final design, plans, and specifications. Develop proposal for engineering services, including scope of work, data acquisition, and organization of design team.

CE 458R SENIOR PROJECT II
F, S 2 cr. RCT 1 LAB 1
PREREQUISITE: CE 457.
- Senior capstone course. Design of an engineering project. Evaluation of design alternatives and design recommendations. Development of construction documents. Discussion of project management, cost estimates, and engineering services during construction.

CE 465 PHOTOGRAMMETRY
F alternate years, to be offered 2007 2 cr. LEC 1 LAB 1
PREREQUISITE: MATH 175 or MATH 181.
- Measurement and computation techniques for mapping from photographs; photo geometry, flight planning, ground control, cameras, control extension, stereoscopic instruments.

CE 466 PROJECT DESIGN IN SURVEYING
S alternate years, to be offered 2007 3 cr. LEC 2 LAB 1
PREREQUISITE: CE 201.
- Surveying requirements of large project; land subdivision, utilities, topography, and earthwork. Term project research and report required.

CE 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 4 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of Department Head.
- Directed research and study on an individual basis.

CE 476 INTERNSHIP
On Demand 2 cr. IND
COREQUISITE: CE 512.
- Guided experience in the field. Students may not take this course the semester they graduate.

CE 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CE 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: CE 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

CE 499R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-4 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

CE 500 SEMINAR
F, S 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not offered in regular courses. Students participate in preparing and presenting discussion material.

CE 504 CONSTRUCTION PRODUCTIVITY
F 3 cr. LEC 3
PREREQUISITE: One year of experience or one internship (CE 476 or CET 476).
COREQUISITE: CET 408 or equivalent.
- Productivity improvement data collection, analysis, and solutions to include the construction work force and the office. Human factors and economics involved in productivity will be emphasized.

CE 505 QUALITY ASSURANCE/RISK MANAGEMENT IN CONSTRUCTION
F 3 cr. LEC 3
PREREQUISITE: Either I&ME 350, I&ME 354 or STAT 332 and CE 308 or equivalent plus one year of industrial experience or one internship (CE 476 or CET 476).
- Analysis of quality assurance and control concepts to include utilization of statistical analysis. Application of risk analysis principles to the construction process to maximize liability and project costs.

CE 506 ADVANCED CONSTRUCTION MANAGEMENT
S 3 cr. LEC 3
PREREQUISITE: One year of industrial experience or one internship (CE 476 or CET 476).
COREQUISITE: CET 408 or equivalent.
- Quality improvement techniques to include Total Quality Management and Partnering. Enlightened leadership and management concepts.

CE 511 BUILDING STRUCTURAL SYSTEMS
F alternate years, to be offered 2006 2 cr. LEC 2
PREREQUISITE: CE 415 or CE 414 or CE 415 or CE 416.
COREQUISITE: CE 512.
- Analysis of multistory structural systems. Emphasis on lateral force resisting systems in buildings.

CE 512 STRUCTURAL DYNAMICS
F alternate years, to be offered 2006 2 cr. LEC 2
PREREQUISITE: CE 312.
- Response of structures to dynamic loads, including seismic loads.

CE 515 BEHAVIOR OF CONCRETE STRUCTURES
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CE 415.
- Behavior of reinforced concrete members, frames, and shear wall systems. Significance of behavior in design of reinforced concrete structures.
CE 519 BRIDGE 
& PRESTRESSED CONCRETE DESIGN 
F alternate years, to be offered 2007 3 cr. LEC 3 
PREREQUISITE: CE 320. 
– Design of concrete structures utilizing pre- and post-tensioned concrete elements. Introduction to bridge analysis and design.

CE 521 APPLIED 
GEOTECHNICAL ENGINEERING 
F alternate years, to be offered 2006 3 cr. LEC 2 LAB 1 
PREREQUISITE: CE 520. 
– Principles of advanced geotechnical laboratory testing and field investigative techniques. Application of laboratory and field test results to the geotechnical design of soil-supported structures.

CE 524 ADVANCED SOIL MECHANICS 
F alternate years, to be offered 2007 3 cr. LEC 3 
PREREQUISITE: CE 320. 
– Topics leading to an advanced understanding of the engineering behavior of soils with an emphasis on settlement and shear strength.

CE 529 GROUNDWATER CONTAMINATION 
S ret. LEC 4 
PREREQUISITE: BREN 454. 
– Subsurface mass transport and microbial processes and their impact on fate and transport of organic and inorganic contaminants. Bioremediation and other contemporary remediation technologies will be emphasized.

CE 558 STATISTICAL APPLICATIONS IN TRANSPORTATION 
On Demand 3 cr. LEC 2 LAB 1 
PREREQUISITE: CE 454. 
– Statistical model building process, bivariate and multivariate regression, hazard and survival, count data, discrete probability and other model types used to analyze or predict transportation-related phenomena.

CE 570 INDEPENDENT STUDY 
On Demand 1 - 3 cr. IND 
PREREQUISITE: Graduate standing, consent of instructor, approval of Department Head and Dean of Graduate Education. 
– Directed research and study on an individual basis.

CE 575 RESEARCH 
OR PROFESSIONAL PAPER/PROJECT 
F, S, Su 1 - 4 cr. IND Maximum 6 cr. 
PREREQUISITE: Graduate standing: 
– A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

CE 576 INTERNSHIP 
On Demand 2 cr. IND 
PREREQUISITE: Graduate standing, consent of instructor and approval of Department Head. 
– An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

CE 590 SPECIAL TOPICS 
On Demand 1 - 4 cr. Maximum 12 cr. 
PREREQUISITE: Upper division courses and others determined necessary by each offering department. 
– Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CE 599 GRADUATE CONSULTATION 
F, S, Su 3 cr. TUT 
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education. 
– This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

CE 600 MASTER'S THESIS 
F, S, Su 1 - 10 cr. IND Maximum credits unlimited. 
PREREQUISITE: Master's standing. 
– Advanced research associated with directed undergraduate research/creative activity projects.

CE 605 Doctoral thesis 
F, S 3 cr. LEC 2 LAB 1 
PREREQUISITE: Graduate standing, consent of instructor, approval of Department Head. 
– Directed research and study on an individual basis.

CE 703 APPLIED ANALYSIS FOR TECHNOLOGISTS 
F, S 1 cr. LAB 1 
PREREQUISITE: MATH 175. 
– Students will develop computer based solutions to problems encountered in construction engineering technology. Topics include advanced applications of contemporary software and the development of user-defined subroutines for specific applications.

CE 704 SPECIAL TOPICS 
On Demand 1 - 4 cr. Maximum 12 cr. 
PREREQUISITE: None required but some may be determined necessary by each offering department. 
– Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CE 502 SOILS & FOUNATIONS 
F, S 4 cr. LEC 3 LAB 1 
COREQUISITE: EM 215 and ESCI 111. 
– Physical properties of construction materials with emphasis on soils, aggregates and asphalt. Earth pressures, flow nets, bearing capacity, retaining walls and slope stability.

CE 505 CONCRETE technology & STRUCTURES 
S 3 cr. LEC 2 LAB 1 
PREREQUISITE: EM 215. 
– Properties of concrete constituents, mechanical and service properties of concrete, mix design, field practices. Concrete reinforcing requirements and analysis of concrete members.

CE 408 R 
CONSTRUCTION PROJECT MANAGEMENT 
F, S 3 cr. LEC 2 LAB 1 
PREREQUISITE: BUS 301. 
– Properties of concrete constituents, mechanical and service properties of concrete, mix design, field practices. Construction safety.

CE 412 STRUCTURAL ELEMENTS 
S 3 cr. LEC 3 
PREREQUISITE: EM 215. 

CE 470 INDEPENDENT STUDY 
On Demand 1 - 3 cr. Maximum 4 cr. 
PREREQUISITE: Junior standing, consent of instructor, and approval of Department Head. 
– Directed research and study on an individual basis.
CHBE 210 ELEMENTARY PRINCIPLES I
S 3 cr. LEC 3
PREREQUISITE: CHEB 215 and MATH 182.
- Energy balances and combined energy-material balances. Discussion of contemporary issues in engineering and the impact of engineering solutions in a global, economic, environmental and societal context.

CHBE 270 INDEPENDENT STUDY
On Demand 1 - 6 cr. CRN may be repeated. Max 12 cr.
- Directed research and study on an individual basis.

CHBE 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
- Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CHBE 290 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY I
F, S 1-3 cr. RCT may be repeated. Maximum 12 cr.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

CHBE 307 CHEMICAL & BIOLOGICAL ENGINEERING DESIGN I
F 2 cr. LEC 1, LCT 1
PREREQUISITE: CHEB 307 and CHEB 323 and MATH 225.
- Application of the laws of thermodynamics to power, refrigeration and gas liquefaction cycles. Application of thermodynamics to vapor-liquid phase equilibrium for solutions at low pressure.

CHBE 310 INTRODUCTION TO CHEMICAL PROCESS DESIGN
S 3 cr. LEC 3
PREREQUISITE: CHEB 307 and CHEB 322.
- Students learn to combine topics from earlier courses as they develop increasingly sophisticated process designs. The course focuses on design decision-making based on technical knowledge and economic analysis, as well as on creation of software to facilitate the design process.

CHBE 311 FLUID MECHANICS OPERATIONS
S 3 cr. LEC 3
PREREQUISITE: CHEB 215 and MATH 182.
- Theory and equipment for fundamental chemical and biological engineering operations involving fluid mechanics. Equipment design and computations of operational rates.

CHBE 322 HEAT TRANSFER OPERATIONS
F 3 cr. LEC 3
PREREQUISITE: CHEB 311 and CHEB 321.
- Theory and equipment for fundamental chemical and biological engineering operations involving heat transfer. Equipment design and computations of operational rates.

CHBE 330 MASS TRANSFER OPERATIONS
S 3 cr. LEC 3
PREREQUISITE: CHEB 307, CHEB 322.
- Theory and equipment for fundamental chemical engineering operations involving mass transfer. Equipment design and computations of operational rates.

CHBE 339 CHEMICAL REACTION ENGINEERING
S 3 cr. LEC 3
PREREQUISITE: CHEB 216, MATH 325.
- Application of the chemical kinetics of homogeneous and heterogeneous reactions to the design of chemical processing equipment.

CHBE 400 PROFESSIONALISM IN CHEMICAL & BIOLOGICAL ENGINEERING
F 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: CHEB 215, MATH 182.
- Professional ethics and social responsibility in the practice of chemical and biological engineering.

CHBE 407 CHEMICAL ENGINEERING THERMODYNAMICS II
F 2 cr. LEC 2.
PREREQUISITE: CHEB 307 and CHEB 323 and CHEB 328.
- Application of laws of thermodynamics to vapor-liquid phase equilibrium, liquid-liquid phase equilibrium, and chemical reaction equilibrium.

CHBE 411R CHEMICAL & BIOLOGICAL ENGINEERING DESIGN II
F 2 cr. LEC 1, LCT 1
PREREQUISITE: CHEB 323, CHEB 328, CHEB 310, and CHEB 438.
- Senior capstone course. Design and simulation of chemical engineering equipment, processes and plants.

CHBE 412R CHEMICAL & BIOLOGICAL ENGINEERING DESIGN II
S 2 cr. LEC 1, LCT 1
PREREQUISITE: CHEB 323, MATH 224, MATH 225.
- Senior capstone course. Design and economic analysis of chemical engineering equipment, processes and plants.

CHBE 424 TRANSPORT ANALYSIS
F 3 cr. LEC 3
PREREQUISITE: CHEB 323, MATH 224, MATH 225.
- Deterministic modeling techniques are applied to processes for transport of momentum, energy and mass. Analytical and numerical solution techniques for the differential equations commonly encountered in the transport processes.

CHBE 438 BIOPROCESS ENGINEERING
S 3 cr. LEC 3
PREREQUISITE: BCHM 540 or MB 501.
- Biotechnology process engineering - microbial process fundamentals, enzyme catalysis, bioreactor design and analysis, separation of biomaterials.

CHBE 442 CHEMICAL & BIOLOGICAL ENGINEERING LABORATORY I
F 2 cr. LEC 1, LCT 1
PREREQUISITE: CHEB 323, CHEB 438, University Seminar and ENGL 121.
- Experimental studies of unit operations and transport phenomena. Pilot plant studies. Design of chemical processes and equipment from experimental studies.
COURSE DESCRIPTIONS: CHBE 443 - CHBE 590

CHBE 443 CHEMICAL & BIOLOGICAL ENGINEERING LABORATORY II
S 2 cr. LEC 1 LAB 1
PREREQUISITE: CHBE 442.
- Experimental studies of unit operations and transport phenomena. Design of chemical processes and equipment from experimental studies.

CHBE 451 PROCESS DYNAMICS & CONTROL
S 3 cr. LEC 3
PREREQUISITE: CHBE 528, CHBE 323, MATH 225.
- Transient response analysis of controllers and instruments. Design of chemical process control systems.

CHBE 452 ADVANCED ENGINEERING MATERIALS
S 3 cr. LEC 5
PREREQUISITE: ME 250 or CHBE 213, MATH 225.
- Micro and macro properties of electronic materials and material processing.

CHBE 463 COMPOSITE MATERIALS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CHBE 213.
- Structure and properties of composite materials and design procedures for composite structures. Crosslisted with ME 463.

CHBE 467 INTRODUCTION TO POLYMER ENGINEERING
F 3 cr. LEC 5
PREREQUISITE: CHBE 213, CHBE 215.
- The nature and special characteristics of synthetic high polymers and the technology of their manufacture and processing.

CHBE 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: consent of instructor and approval of department head.
- Directed research and study on an individual basis.

CHBE 476 INTERNSHIP
On Demand 1 - 12 cr. IND Maximum 12 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of associate dean.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

CHBE 480 SPECIAL TOPICS
On Demand 1 - 3 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering. CHBE/480.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CHBE 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: CHBE 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

CHBE 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-8 cr. IND May be repeated. Max 12 cr.
PREREQUISITE: Senior Standing.
- Directed undergraduate research/creative activity which may culminate in research paper, journal article, or undergraduate thesis.

CHBE 498 CO-OP EXPERIENCE
On Demand 1-12 cr. IND
PREREQUISITE: Co-op program participant, junior or senior.
- An individualized cooperative education assignment arranged to provide guided experience in the field.

CHBE 500 SEMINAR
F 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

CHBE 503 THERMODYNAMICS
F 5 cr. LEC 5
- Chemical engineering application to phase equilibria and chemical reaction equilibrium. Liquid - liquid, vapor - liquid, and multiple reaction system.

CHBE 506 SEPARATIONS
On Demand 3 cr. LEC 3
PREREQUISITE: CHBE 423.
- Separation topics of interest, including distillation, membranes, specialized separation of low concentration materials.

CHBE 510 REACTION ENGINEERING & REACTION MODELING
S 3 cr. LEC 3
PREREQUISITE: CHBE 329.
- Theory and practice of industrial reactions, kinetics, synthesis, modeling of fixed and fluidized beds, process design problems.

CHBE 511 CATALYSIS AND APPLIED SURFACE CHEMISTRY
On Demand 3 cr. LEC 3
PREREQUISITE: CHBE 328.
- The fundamental principles of catalysis, surface chemistry, and reactor design at a working research level.

CHBE 519 SURFACE ENGINEERING
On Demand 3 cr. LEC 2 LAB 1
PREREQUISITE: Graduate standing.
- Consideration of chemistry and instrumentation needed in engineering design and research, including surface science, and materials.

CHBE 525 ADVANCED ENGINEERING ANALYSIS
F 3 cr. LEC 3
PREREQUISITE: One of the following: ME 450, ME 526, EM 335.

CHBE 550 FAILURE OF MATERIALS
On Demand 1 - 3 cr. IND Maximum 12 cr.
PREREQUISITE: Consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

CHBE 551 ADVANCED COMPOSITE MATERIALS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CHBE 463.
- Advanced treatment of composite materials, including constituent properties, interfaces, micro-mechanics, microscopic behavior, modes and mechanisms of failure. This course is crosslisted with ME 551.

CHBE 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

CHBE 575 RESEARCH OR PROFESSIONAL PAPER PROJECT
On Demand 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing. A research or professional dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.
- Directed research and study on an individual basis.

CHBE 580 SPECIAL TOPICS
On Demand 1 - 3 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CHBE 589 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 10 cr. IND
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their coursework (and thesis if on a thesis plan) but who need additional faculty or staff time or help.

CHBE 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND
PREREQUISITE: Master's standing.

CHBE 593 VISCOS FLUID DYNAMICS
On Demand 3 cr. LEC 3
PREREQUISITE: EM 355.

CHBE 594 MASS TRANSFER
On Demand 3 cr. LEC 3
PREREQUISITE: CHBE 424.
- Mass transfer theory, transport in liquids, porous solids, interfacial effects, related mathematical techniques and application.

CHBE 595 FAILURE OF MATERIALS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: One of the following: CHBE 468, EM 415, ME 450.
- Concepts of brittle and ductile fracture, fatigue, creep-rupture and environmentally assisted fracture. Applications to metals, polymers, ceramics and composite materials. This course is cross listed with ME 550.

CHBE 599 ADVANCED COMPOSITE MATERIALS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CHBE 463.
- Advanced treatment of composite materials, including constituent properties, interfaces, micro-mechanics, microscopic behavior, modes and mechanisms of failure. This course is crosslisted with ME 551.

CHBE 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND
PREREQUISITE: Master's standing.
CHBE 690 DOCTORAL THESIS  
F, S, Su 1 - 10 cr. IND  
PREREQUISITE: Doctoral standing.

CHEM  
Chemistry  
Department of Chemistry & Biochemistry  
(406) 994-4801

CHEM 180 UNDERGRADUATE SEMINAR I  
F 1 cr. SEM I  
- For the new student. Integration into the department and its research and educational program. Scientific communication and chemical literature searching skills.

CHEM 121N  
INTRODUCTORY GENERAL CHEMISTRY  
F, S 4 cr. LEC 3 LAB 1  
PREREQUISITE: High school algebra. - Introductory general chemistry. Measurement systems, atomic structure, chemical periodicity, bonding, chemical reactions, acid-base chemistry, electrochemistry; nuclear chemistry.

CHEM 151 GENERAL CHEMISTRY I  
F, S 4 cr. LEC 3 LAB 1  
PREREQUISITE: Two years of high school math including algebra, or math test score to be eligible for college calculus. - The first of a two-semester course sequence about the general principles of modern chemistry with emphasis on atomic structure, chemical bonding, the periodic table, equilibria, chemical reactivity, and kinetics.

CHEM 152 GENERAL CHEMISTRY II  
F, S 4 cr. LEC 3 LAB 1  
PREREQUISITE: CHEM 151 or CHEM 141. - The second semester of the two-semester general chemistry sequence.

CHEM 141 HONORS GENERAL CHEMISTRY I  
F 4 cr. LEC 3 LAB 1  
PREREQUISITE: High school chemistry and physics, high school algebra, and some additional mathematics. - Topic coverage parallels CHEM 151, with emphasis on critical and analytical thought and with a greater reliance on math skills. For departmental honors program.

CHEM 142 HONORS GENERAL CHEMISTRY II  
S 4 cr. LEC 3 LAB 1  
PREREQUISITE: A grade better than a C in Chem 151 or Chem 141. - Topic coverage parallels CHEM 152, with emphasis on critical and analytical thought and with a greater reliance on math skills. For departmental honors program.

CHEM 201 UNDERGRADUATE SEMINAR II  
S 1 cr. SEM I  
PREREQUISITE: CHEM 100 or BCHM 100. - Introduction to faculty research through faculty mini seminars. Departmental research facilities. Research groups. Research planning decisions (MSU laboratory, summer internship, student exchange, REU, USP, etc).

CHEM 215 ELEMENTS OF ORGANIC CHEMISTRY  
F, S 5 cr. LEC 4 LAB 1  
PREREQUISITE: One of the following: CHEM 121, CHEM 132, or CHEM 142. - A one-semester introduction to organic chemistry. The unique character of carbon: bonding, structure, nomenclature, and common reactions of hydrocarbons and functional organic compounds.

CHEM 228 FUNDAMENTAL ANALYTICAL CHEMISTRY  
S 4 cr. LEC 3 LAB 1  
PREREQUISITE: CHEM 132 or CHEM 142. - Introduction to analytical chemistry with an emphasis on the systematic treatment of equilibria, acid-base chemistry, redox equilibria and titrations, complexometric equilibria and titrations, Beer’s law, fundamental lab skills and chromatography.

CHEM 270 INDEPENDENT STUDY  
On Demand 1 - 3 cr. IND Maximum 6 cr.  
PREREQUISITE: Consent of instructor and approval of department head. - Directed research and study on an individual basis.

CHEM 280 SPECIAL TOPICS  
On Demand 1 - 4 cr. Maximum 12 cr.  
PREREQUISITE: None required, but some may be determined necessary by each offering department. - Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CHEM 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION  
F, S 1-3 cr. RCT may be repeated - Classroom instruction associated with directed undergraduate research/creative activity projects.

CHEM 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY  
F, S 1-6 cr. IND may be repeated - Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

CHEM 300 UNDERGRADUATE SEMINAR II  
F 1 cr. LAB 1  
PREREQUISITE: CHEM 201 or BCHM 201. - Research techniques, procedures, and reports. Seminar reporting and presentation skills. Career planning and resume preparation. May be repeated once.

CHEM 301 ELEMENTS OF PHYSICAL CHEMISTRY  
F 4 cr. LEC 4  
PREREQUISITE: MATH 170, PHYS 206, and CHEM 215 or CHEM 312. - A physical chemistry course directed toward the life sciences, health professions, and agricultural sciences.

CHEM 302 PHYSICAL CHEMISTRY LABORATORY II  
F 4 cr. LEC 3  
PREREQUISITE: CHEM 301. - The advanced laboratory to accompany CHEM 324. In-depth experiments and data analysis. Required of all chemistry majors who take CHEM 324.

CHEM 311 ORGANIC CHEMISTRY I  
F 4 cr. LEC 3 LAB 1  
PREREQUISITE: CHEM 131 or CHEM 141 and CHEM 142 or consent of instructor. - CHEM 311 is the first of a two-semester honors sequence in organic chemistry. Topic coverage parallels CHEM 311, but at an accelerated pace with in-depth coverage of physical organic chemistry, stereochemistry, synthetic organic chemistry, spectroscopy, and nomenclature.

CHEM 315 INORGANIC CHEMISTRY II  
S 4 cr. LEC 3 LAB 1  
PREREQUISITE: A grade of better than a C in CHEM 314. - The second semester of the two-semester honors sequence in organic chemistry. Topic coverage parallels CHEM 312, with more in-depth coverage of mechanisms and more emphasis on retrosynthetic analysis and on solving multi step synthesis problems.

CHEM 325 PHYSICAL CHEMISTRY LABORATORY I  
F 1 cr. LAB 1  
PREREQUISITE or COREQUISITE: CHEM 323 or CHEM 324. - Laboratory to accompany CHEM 323 or CHEM 324. Fundamental experiments in thermodynamics and kinetics.

CHEM 330 ORGANIC CHEMISTRY II  
F 4 cr. LEC 3  
PREREQUISITE: CHEM 324. - The second semester of a two-semester physical chemistry sequence for science/engineering majors. Students should take both semesters of the sequence.

CHEM 350 PHYSICAL CHEMISTRY LABORATORY II  
S 2 cr. LAB 2  
PREREQUISITE: CHEM 325. - The advanced laboratory to accompany CHEM 324. In-depth experiments and data analysis. Required of all chemistry majors who take CHEM 324.

CHEM 351 INORGANIC CHEMISTRY I  
F, S 4 cr. LEC 3  
PREREQUISITE: CHEM 301 or CHEM 324. - A systematic presentation of atomic structure and chemical bonding with emphasis on properties, structure, and the reactions of representative members of the various families of the periodic table.
CHEM 401 CAPSTONE SEMINAR  
1 cr. SEM 1  
PREREQUISITE or COREQUISITE: CHEM 300 or BCHM 300.  
Senior capstone course. Taught in cooperation with departmental Honors Thesis, CHEM 451. The chemistry/biochemistry research undergraduate experience constitutes a synthesis of our (bio)chemistry class room and laboratory education. The projects are orally presented in seminar form, discussed on the basis of acquired knowledge, and analyzed using stringent scientific methods and criteria. A complete personal resume is prepared. May be repeated once.

CHEM 417 SYNTHETIC CHEMISTRY  
S alternate years, to be offered Spring 2007 3 cr.  
LEC 2 LAB 1  
PREREQUISITE: CHEM 312.  
COREQUISITE: CHEM 301 or CHEM 324.  
- Organic and inorganic reaction chemistry for advanced students. Modern reagents and transformations are treated in detail, along with relevant theoretical and mechanistic considerations.

CHEM 426 INSTRUMENTAL ANALYSIS  
F 3 cr. LEC 3  
PREREQUISITE: CHEM 228.  
COREQUISITE: CHEM 301 or CHEM 324.  
- An advanced analytical chemistry course which covers modern instrumental methods based on spectrochemical and electrochemical principles.

CHEM 428 INSTRUMENTAL ANALYSIS LAB  
F 2 cr. LAB 2  
COREQUISITE: CHEM 426.  
- The laboratory to accompany CHEM 426.

CHEM 451 DEPARTMENTAL HONORS THESIS  
S 1 cr. LEC 1  
PREREQUISITE: CHEM 490 or BCHM 490 (minimum of 3 cr.)  
- Thesis format and style will be illustrated, discussed, and monitored. Draft portions of manuscripts are to be completed on a regular schedule. Required of all candidates for departmental honors.

CHEM 470 INDEPENDENT STUDY  
On Demand 1 - 3 cr. IND Maximum 6 cr.  
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.  
- Directed research and study on an individual basis.

CHEM 480 SPECIAL TOPICS  
On Demand 1 - 4 cr. Maximum 12 cr.  
PREREQUISITE: Course prerequisites as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CHEM 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION  
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.  
COREQUISITE: CHEM 490.  
- Classroom instruction associated with directed undergraduate research/creative activity projects.

CHEM 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY  
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.  
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

CHEM 500 SEMINAR  
On Demand 1 cr. SEM Maximum 4 cr.  
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.  
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

CHEM 505 CRITICAL CONCEPTS IN CHEMISTRY  
Su 2 cr. LEC 1 LAB 1  
PREREQUISITE: CHEM 503 or CHEM 505 or equivalent.  
- Course explores innovations in laboratory facilities and new learning strategies that encourage discovery-based learning. Class will explore ways to use computer technology to engage students in discovery-based learning.

CHEM 506 INTEGRATING COMPUTERS INTO LABORATORY INSTRUCTION  
Su 3 cr. LEC 2 LAB 1  
PREREQUISITE: Secondary teacher certification and 2 years teaching experience. One year introductory chemistry course (CHEM 131 and 192) and coursework or experience equivalent to one semester physical chemistry (CHEM 301). A baccalaureate degree and experience teaching science at the secondary level are required.  
- The course will examine and discuss fundamental and critical concepts in chemistry. A practical laboratory component will enable students to develop laboratory and/or demonstration projects for each concept. Individual student-generated presentations are a key course component.

CHEM 507 MODERN ORGANIC AND BIOCHEMISTRY  
S 3 cr. RCT 3  
PREREQUISITE: Secondary teaching certification and 2 years teaching experience. One-year introductory chemistry course (CHEM 131, 132) and coursework or experience equivalent to one semester physical chemistry (CHEM 301). A baccalaureate degree and experience teaching science at the secondary level are required.  
- The course will examine/discuss fundamental information and concepts in organic chemistry and biochemistry. A module based on drug development will exemplify major topics. Information acquired via the internet will be a significant course component. (A distance learning course)

CHEM 515 STRUCTURE AND BONDING IN INORGANIC CHEMISTRY  
F 3 cr. LEC 3  
PREREQUISITE: CHEM 594.  
- Spectroscopy, structure, and bonding of coordination and organometallic compounds.

CHEM 516 MECHANISMS AND DYNAMICS IN INORGANIC CHEMISTRY  
S 3 to 5 cr. LEC 3  
PREREQUISITE: CHEM 594.  
- Mechanisms and dynamics of the reactions of coordination and organometallic compounds.

CHEM 520 ORGANIC REACTION MECHANISMS  
F, S 1 cr. SEM 1  
PREREQUISITE: CHEM 315. One year of undergraduate organic chemistry required.  
COREQUISITE: CHEM 533.  
- A problem solving course concentrating on analyzing organic reactions and transformations via electron-pushing mechanisms. Problems chosen will be from the current chemical literature. Designed for incoming graduate students and upper-class undergraduates who want to learn or brush up on their electron-pushing skills.

CHEM 524 MASS SPECTROMETRY  
F alternate years, to be offered 2007-3 cr. LEC 3  
PREREQUISITE: CHEM 325 or CHEM 501.  

CHEM 525 CHEMICAL REACTIONS AND TRANSPORT IN ANALYTICAL METHODS  
F alternate years, to be offered 2008 3 cr. LEC 3  
PREREQUISITE: CHEM 524.  
- Treatment of complex chemical equilibria, kinetics, and mass transport in the solution and gas phases with respect to their effects on methods of chemical analysis.

CHEM 526 ADVANCED PROTEIN NMR SPECTROSCOPY  
F alternate years, to be offered 2006-3 cr. LEC 3  
PREREQUISITE: CHEM 325.  
- This lecture-based course is designed to teach the fundamental principles of nuclear magnetic resonance (NMR) spectroscopy as it applies to the structural elucidations of proteins in solution. Prerequisites include familiarity with linear algebra and basic trigonometric functions and CHEM 325. Cross-referenced with BCHM 526.

CHEM 527 OPTICAL SPECTROSCOPY  
F alternate years, to be offered 2006-5 cr. LEC 3  
PREREQUISITE: CHEM 325.  
- Use of optical spectroscopic methods for chemical analysis.

CHEM 533 PHYSICAL ORGANIC CHEMISTRY  
F 3 cr. LEC 3  
PREREQUISITE: CHEM 417.  
- A semi-quantitative description of the mechanisms of organic reactions. Topics include M.O. theory, orbital symmetry, addition and elimination reactions, the kinetics and thermodynamics of organic reactions, solvent effects, etc.

CHEM 533 REAGENT CHEMISTRY  
S 3 cr. LEC 5  
PREREQUISITE: CHEM 417.  
- A thorough study of synthetic processes, methodologies and reagents.

CHEM 548 ORGANIC SYNTHESIS  
F 3 cr. LEC 3  
PREREQUISITE: CHEM 533 and CHEM 535.  
- A thorough study of strategies for the synthesis of complex natural products.
COURSE DESCRIPTIONS: CHEM 551 - COLS 101US

CHEM 551 ORGANIC STRUCTURE ELUCIDATION
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: CHEM 417.
- Spectroscopic structure elucidation of small organic molecules. Techniques to be discussed include 1-D and 2-D NMR spectroscopy, UV, IR, MS, and Raman spectrosopies. Emphasis will be on interpreting spectra to deduce the structure of the compound in question.

CHEM 554 ORGANO METALLIC CHEMISTRY
S 3 cr. LEC 3
PREREQUISITE: CHEM 394 and CHEM 417.
- Application of organometallic chemistry to organic transformations.

CHEM 557 QUANTUM MECHANICS
F alternate years, to be offered 2008 5 cr. LEC 3
PREREQUISITE: CHEM 324 or equivalent.
- Applications of quantum mechanics to molecules and spin systems.

CHEM 558 CLASSICAL & STATISTICAL THERMODYNAMICS
F alternate years, to be offered 2007 5 cr. LEC 3
PREREQUISITE: CHEM 324 or equivalent.
- Classical and statistical thermodynamics applied to chemical systems.

CHEM 559 KINETICS AND DYNAMICS
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: CHEM 324 or equivalent.
- Chemical kinetics, theories of reaction rates, molecular reaction dynamics, with applications to chemical reactions in the gas phase, on surfaces, and in solution.

CHEM 560 SYMMETRY, ORBITALS AND SPECTROSCOPY
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CHEM 324.
- Group theory with applications, semi-empirical and ab initio calculations, vibrational and electronic spectroscopy, and their interrelationship will be covered.

CHEM 564 ADVANCED QUANTUM CHEMISTRY
S alternate years, to be offered 2007 5 cr. LEC 3
PREREQUISITE: CHEM 357 or equivalent.
- Time independent and time dependent quantum mechanics with application to chemical bonding and molecular spectroscopy.

CHEM 570 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

CHEM 580 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CHEM 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 5 cr. May be repeated; Maximum 5 cr.
PREREQUISITE: Graduate standing; teaching experience and/or current employment in a school or organization; and consent of instructor and Dean of Graduate Education.
- Courses offered on a one-time basis to fulfill professional development needs of in service educators. A specific focus is given to each course which is appropriately subtitled.

CHEM 589 GRADUATE CONSULTATION
F, S 5 cr. TUT
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

CHEM 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master's standing.

CHEM 689 GRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 3 cr. RCT
PREREQUISITE: Graduate standing.
COREQUISITE: CHEM 590 or CHEM 690.
- Classroom instruction associated with directed graduate research/creative activity projects.

CHEM 690 DOCTORAL THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing.

CLS College of Letters and Science
(406) 994-4288

CLS 101US UNIVERSITY SEMINAR
F, S 3 cr. SEM 3
PREREQUISITE: First year students (less than 30 credits) only.
- Introduction to university studies and the excitement of intellectual inquiry. Participation in a community of learners. Readings in the humanities, social sciences, arts, and natural sciences. Emphasis on critical thinking, effective communication, and active learning. Small seminar-style classes.

CLS 201US UNIVERSITY SEMINAR
F, S 3 cr. SEM 3
- The University Seminar class is similar to CLS 101 but is designed for students beyond their freshman year. CLS 201 is open to students who have completed at least 30 credits, and students will not receive credit if they have passed CLS 101 with a grade of C or better. (Should be treated as a repeat for CLS 101.)

CLS 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

CLS 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.
COM

Communications
Department of Psychology
(406) 994-3801

COM 110US INTRODUCTION TO PUBLIC COMMUNICATION
F, S 3 cr. LEC 1 RCT 2
- Overview of the theories, concepts, and principles of public speaking, to include audience analysis, evidence, intercultural communication, small group communication and media communication. Application of those concepts and principles through preparation and delivery of ceremonial, informative, persuasive, and group presentations.

CS

Computer Science
Department of Computer Science
(406) 994-4780

CS 150 COMPUTER LITERACY
F, S 5 cr. LEC 2 LAB 1
- Computer hardware and software concepts as they apply to all computers. Exposure to software packages such as Windows, word processors, spreadsheets, and Internet applications. Laboratory projects reflect practical usage in resolving real world problems/situations.

CS 160 INTRODUCTION TO COMPUTER SCIENCE
F, S 4 cr. LEC 3 LAB 1
COREQUISITE: MATH 160.
- The first course for CS majors and minors, covering tools used in advanced study: program design, analysis, and implementation in Java, including I/O, assignments, decision, iteration, scalar types, arrays, control structures, methods, classes, and common data types; and Unix fundamentals. No previous programming experience required.

CS 201 PROGRAM DESIGN WITH C
S 5 cr. LEC 2 LAB 1
PREREQUISITE: CS 160.
- C Programming knowledge. Introduces imperative programming and the C standard library. Course covers pointers, memory management and structures.

CS 215 SOCIAL & ETHICAL ISSUES IN COMPUTING
F 2 cr. LEC 1 RCT 1
PREREQUISITE: CS 221 and W core and US core or permission of instructor.
- Social and ethical issues as they relate to computing, including privacy, risks, computer abuse, commerce, professionalism, free speech, intellectual property, social justice, and current issues. History of Computing.

CS 211 ADVANCED PROGRAMMING
S, F, Su 4 cr. LEC 3 LAB 1
PREREQUISITE: CS 160.
- Corequisite: MATH 181.
- An examination of advanced Java and basic data structures and their application in problem solving. Data structures include stacks, queues, hash tables and lists. An introduction to algorithms employing the data structures to solve various problems including searching and sorting, and recursion. Understanding and using Java class libraries. The laboratory uses Java. Introduces Big-O Notation.

CS 213 MATH 181
S, F, Su 3 cr. LEC 3
PREREQUISITE: CS 160.
- Corequisite: MATH 181.
- This course covers logic, discrete probability, recurrence relations, Boolean algebra, sets, relations, counting, functions, maps, Big-O notation, proof techniques including induction, and proof by contradiction.

CS 220 DISCRETE MATHEMATICS
F, Su 3 cr. LEC 3
PREREQUISITE: CS 160.
- Corequisite: MATH 181.
- This course covers logic, discrete probability, recurrence relations, Boolean algebra, sets, relations, counting, functions, maps, Big-O notation, proof techniques including induction, and proof by contradiction.

CS 223 DATA STRUCTURES AND ALGORITHMS
S, Su 4 cr. LEC 3 LAB 1.
PREREQUISITE: CS 221, CS 222.
- Corequisite: MATH 181.
- Advanced data structures and programming techniques and their application. Topics include: trees, balanced trees, graphs, dictionaries, hash tables, heaps. Examines the efficiency and correctness of algorithms. The laboratory uses Java.

CS 270 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND
PREREQUISITE: Consent of instructor and approval of department head.
- Directed research and study on an individual basis.

CS 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: To be determined based on actual topic offered.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CS 280R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

CS 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-4 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

CS 304 MULTIMEDIA DEVELOPMENT METHODS
S, even years 3 cr. LEC 2 LAB 1
PREREQUISITE: CS 301 or CS 221.
- The design and development of multimedia presentations using computerized audio techniques. Methods for combining video, audio, photography, studio techniques, and computer-generated art forms. Computer-assisted studio control and editing. Project-oriented course organization with interdisciplinary project teams.

CS 305 SYSTEMS ADMINISTRATION
S 3 cr. LEC 3
PREREQUISITE: CS 201 and CS 223.
- The administration and management of Linux computer systems. Includes installation, user/process management, configuration of services and device handling. A thorough knowledge of Linux/Unix command structure is required.

CS 324 PROGRAMMING STRATEGIES
F, 3 cr. LEC 3
PREREQUISITE: CS 223.
- An examination of advanced programming techniques and their application. The examination of the efficiency of the algorithms leads to discussions of the applicability of the techniques. Topics include probabilistic algorithms, advanced graph problems and theory, distributed and parallel programming, and real time systems. Issues including working within time and space constraints.

CS 330 COMPUTER ORGANIZATION AND ARCHITECTURE
F 4 cr. LEC 3 LAB 1
PREREQUISITE: CS 221.

CS 350 THEORY OF COMPUTATION
S 3 cr. LEC 3
PREREQUISITE: CS 222.
- Corequisite: MATH 182.
- Formal languages, theory, automata, Turing Machines, computability, the Church-Turing thesis, computational complexity, and intractability.

CS 351 SOFTWARE ENGINEERING I
F 4 cr. LEC 3 LAB 1
PREREQUISITE: CS 223 and ENGL 225.
- Software lifecycles, Unified Modeling Language, design patterns, software engineering standards, requirements analysis, development issues, efficiency tools, verification and validation, configuration management, testing and maintenance.

CS 352 MULTIMEDIA PARADIGMS
S 3 cr. LEC 3
PREREQUISITE: CS 223.
- An examination of several programming paradigms, and languages, as well as their application and underlying execution models. Paradigms examined include imperative, object-oriented, functional, logic and string based. Students will gain exposure to a variety of languages such as C, C++, Scheme, Prolog and Perl.

CS 300 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined by each offering.
- Topics offered at the upper divisional level that are not covered in regular courses. Students participate in preparing and presenting discussion material.

CS 418 OPERATING SYSTEMS
F 3 cr. LEC 3
PREREQUISITE: CS 223 and CS 390 or EE 371.
- Operating systems design including necessary hardware support. Processes, threads, concurrent programming, and scheduling. Memory, file, and I/O management. Security issues.

CS 422 INTRODUCTION TO SIMULATION
F 3 cr. LEC 3
PREREQUISITE: CS 201 and I&M 354 OR STAT 217.
- Discrete and continuous simulation modeling methodology using a computer simulation language: random number generation, output analysis, validation, and verification; application to varied system design and analysis problems. Cross-listed with I&M 422.
CS 425 COMPUTER GRAPHICS
F 4 cr. LEC 3 LAB 1
PREREQUISITE: MATH 221 and CS 223.
- High resolution computer graphics. 3D graphics programming using a high level API. Graphics primitives for lines, circles, and polygons. Curve and surface representations using line segments, polygons, parametric curves and parametric surfaces. 2D and 3D transformations. Fractals and chaotic models. Shading and lighting models.

CS 435 DATABASE SYSTEMS
F 3 cr. LEC 3
PREREQUISITE: CS 223.
- Database architecture; major database models; relational database fundamentals; SQL query language; database file structures, data modeling and management, entity relationship diagram runs.

CS 436 ARTIFICIAL INTELLIGENCE
F 3 cr. LEC 3
PREREQUISITE: CS 223.
- The fundamental bases of artificial intelligence: knowledge representation, search, and learning. Applications include game playing, neural networks, and expert systems. Common Lisp and CLOS are introduced.

CS 440 COMPUTER NETWORKS
F 4 cr. LEC 3 LAB 1
PREREQUISITE: CS 223 and CS 201 and I&ME 354 or STAT 217.
- How computer systems are organized into networks and how communication over networks is organized. Communication protocols and their design with an emphasis on current technology and implementation of software.

CS 445 EMBEDDED SYSTEMS
S odd years 3 cr. LEC 3 LAB 2
PREREQUISITE: CS 223 and CS 350 or EE 371.
- The design and implementation of embedded and real time computing systems including both operating and control systems. The course emphasis will be on the hardware/software interface, programming techniques for asynchronous mechanisms, and state of the art tools for developing and supporting embedded systems.

CS 450 COMPILERS
S 4 cr. LEC 3 LAB 1
COREQUISITE: CS 350 and CS 355.
- Compiler design and construction. Scanning, parsing, symbol tables, semantic analysis, intermediate representations, run-time memory management, target code generation, and optimization. Implementation of a small compiler.

CS 451 SOFTWARE ENGINEERING II
S 4 cr. LEC 3 LAB 1
PREREQUISITE: CS 351.
- Functional specification, formal methods, cost models, project management, software management, risk analysis, fault tolerance, metrics, reverse engineering, safety critical software engineering, real-time systems.

CS 460R SENIOR DESIGN PROJECT I
F, S 3 cr. LEC 1 LAB 2
PREREQUISITE: CS 324, CS 352 and ENGL 223.
- A significant group-based project to solicit requirements, specify design, build, document and test a software artifact. Can be used for multidisciplinary project work. (First semester of a two semester sequence).

CS 461R SENIOR DESIGN PROJECT II
F, S 3 cr. LEC 1 LAB 2
PREREQUISITE: CS 460 and approval of instructor.
- Continuation of CS 460.

CS 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

CS 474 UNDERGRADUATE CONSULTATION
F, S 1 cr. IND 1 cr.
PREREQUISITE: Junior standing and CS 223.
- Directed assistance to, and involvement in labs, with lower division CS students. Can only complete once.

CS 476 INTERNSHIP
On Demand 2 - 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

CS 480 SPECIAL TOPICS
On Demand 1 - 5 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

CS 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
On Demand 1 - 2 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: Junior standing. Consent of instructor and approval of department head.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

CS 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
On Demand 1-6 cr. IND May be repeated. Max 12 cr.
COREQUISITE: CS 489 Consent of instructor and approval of department head.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

CS 499 COMPUTER SCIENCE PROGRAM ASSESSMENT
F 5 cr. IND 0
PREREQUISITE: Graduating Senior.
- Student participation in Computer Science program assessment. Requirements to complete the Computer Science Major Field Test.

CS 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

CS 510 COMPUTABILITY
F 3 cr. LEC 3
PREREQUISITE: CS 350.
- Turing machine computability and decidability; abstract time and space complexity; intractability.

CS 513 COMPUTATIONAL COMPLEXITY
S odd years 3 cr. LEC 3
PREREQUISITE: CS 510.

CS 515 ANALYSIS OF ALGORITHMS
S 3 cr. LEC 3
PREREQUISITE: CS 324 and CS 350.
- Concrete time and space complexity; combinatorial algorithms; greedy algorithms; dynamic programming; probabilistic and randomized algorithms; branch-and-bound algorithms.

CS 518 ADVANCED OPERATING SYSTEMS & SYSTEMS PROGRAMMING RESEARCH
F even years 3 cr. LEC 3
PREREQUISITE: CS 418.
- Contemporary topics in systems programming and operating system design and research.

CS 525 GRAPHICS & SCIENTIFIC VISUALIZATION
S odd years 3 cr. LEC 3
PREREQUISITE: CS 425.

CS 530 PATTERN RECOGNITION
F even years 3 cr. LEC 3
PREREQUISITE: STAT 217 or I&ME 354.
- Statistical and syntactic pattern recognition; neural nets; performing automated recognition of information in a data set. Applications include vision systems, speech understanding, tactile sensing and information retrieval systems.

CS 555 DATABASE THEORY
S odd years 3 cr. LEC 3
PREREQUISITE: CS 455.
- Advanced database models including active, distributed, deductive, temporal, object-oriented, and web-based; normalization theory and query optimization.
CS 556 ADVANCED
ARTIFICIAL INTELLIGENCE
S even years 3 cr. LEC 3
PREREQUISITE: CS 456.
— An exposure to advanced topics from the field of
artificial intelligence. Topics include machine learn-
ing, artificial life, natural language processing, and
cognitive science.

CS 540 DISTRIBUTED COMPUTING
S even years 3 cr. LEC 3
PREREQUISITE: CS 324 and CS 440.
— The design and implementation of software sys-
tems that utilize multiple host computer networks as
a foundation. Concurrency control, homogeneous
and heterogeneous systems, inter process communi-
cation, protocols and application design.

CS 545 PARALLEL COMPUTING
F alternate years, beginning 2007 3 cr. LEC 3
PREREQUISITE: CS 530 and CS 824.
— Models of parallel computation, architectures,
operating systems, and compilers. Algorithm design
for vector, array, and multi-processors.

CS 550 DESIGN & TRANSLATION OF PRO-
GRAMMING LANGUAGES
F odd years 3 cr. LEC 3
PREREQUISITE: CS 450.
— Contemporary topics in programming language
design, advanced compiler design and research.

CS 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of
instructor, approval of department head and Dean of
Graduate Education.
— Directed research and study on an individual basis.

CS 571 RESEARCH EXPERIENCE
F, S, Su 1 cr. IND 1 Maximum 4 cr.
PREREQUISITE: Graduate standing.
— Research experience normally obtained through
participation in a supervised research project accep-
table to the department graduate committee.

CS 575 RESEARCH
OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
— A research or professional paper or project deal-
ing with a topic in the field. The topic must have
been mutually agreed upon by the student and his
or her major advisor and graduate committee.

CS 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others
as determined for each offering.
— Courses not required in any curriculum for which
there is a particular one-time need, or given on a
trial basis to determine acceptability and demand
before requesting a regular course number.

CS 589 GRADUATE CONSULTATION
On Demand 1-3 cr. IND
PREREQUISITE: Master’s standing and approval of
the Dean of Graduate Education.
— This course may be used only by students who
have completed all of their course work, and thesis,
if on a thesis plan but who need additional faculty
or staff time or help.

CS 590 MASTER’S THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master’s standing.

CS 690 DOCTORAL THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing.

ECON 101S ECONOMIC WAY OF THINKING
F, S, Su 3 cr. LEC 3
PREREQUISITE: ECON 101.
— Introduces important tools and methods of the
discipline, including demand and supply analysis,
approaches to critical thinking, and indicators of
economic performance. Emphasis is on current
issues of social importance.

ECON 102 PRINCIPLES
OF MACROECONOMICS
F, S 3 cr. LEC 3
PREREQUISITE: ECON 101.
— Topics include inflation, unemployment, interest
rates, money, and the impact of government sur-
pluses or deficits. Government policies of growth,
employment, income distribution, and international
trade are examined.

ECON 133 ECONOMICS & THE ENVIRONMENT
S 3 cr. LEC 3
PREREQUISITE: ECON 101.
— This course includes topics on renewable (fisher-
ies, wildlife, surface water use) and non-renewable
(oil, natural gas, minerals) natural resource issues,
environmental resources (public lands, resource
preservation), pollution control issues, and the
environmental changes (including climate change, bio-
diversity and population).

ECON 201S INTRODUCTORY
MICROECONOMIC THEORY
F, S 3 cr. LEC 3
PREREQUISITE: ECON 101.
— Consumer theory and the theory of the firm are
utilized to show how independent decisions by con-
sumers and firms interact in markets to determine
the price and output of goods and services.

ECON 250S HONORS ECONOMICS
S 4 cr. SEM 4
— Economic principles are introduced and applied to
a wide range of contemporary and historical
problems including legal, environmental, resource,
health, taxation, poverty, economic development,
and macroeconomic policy issues.

ECON 270 INDEPENDENT STUDY
F, S, Su 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval
of department head.
— Directed research and study on an individual basis.

ECON 280 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Independent or permission of
the instructor.
— Courses not required in any curriculum for which
there is a particular one-time need, or given on a
trial basis to determine acceptability and demand
before requesting regular course number.

ECON 290 UNDERGRADUATE RESEARCH
F, S, Su 1 - 8 cr. IND
PREREQUISITE: ECON 101 and approval of
instructor.
— Intended for lower division undergraduate
research/undergraduate scholars program. The stu-
dent will work closely with the supervising faculty.

ECON 300 SEMINAR
F, S 1 cr. SEM 1
PREREQUISITE: Junior standing.
— Current economic problems and current writings
of people in the profession. Topics vary each semes-
ter; students should check with the department
before registering.

ECON 301 INTERMEDIATE
MACROECONOMIC THEORY
F, S 3 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250, MATH
170 or MATH 181.
— A study of microeconomic theory and selected
applications with emphasis on theory of consumer
behavior and theory of the firm. A major objective
of the course is to prepare students for additional
upper-division courses in economics.

ECON 302 INTERMEDIATE
MACROECONOMIC THEORY
F, S 3 cr. LEC 3
PREREQUISITE: ECON 201 and ECON 250 or
ECON 250; MATH 170 or MATH 181.
— The economic theory of economy-wide aggregates
such as national income, levels of employment,
income distribution; the determinants of the per-
formance of entire economies: nations, groups of
nations, and the world.

ECON 309 MANAGERIAL ECONOMICS
S 5 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250, MATH
170.
— An integration of various principles and concepts
from different areas of economics. These are com-
bined with several tools of analysis and related to
problems of economic decision making and policy
formulation at the firm level.

ECON 312 LABOR
& HUMAN RESOURCE ECONOMICS
S 5 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250.
— Economics of labor markets, wage determina-
tion, and human capital. The theoretical framework
of labor market analysis is presented, along with
empirical research results and descriptive aspects of
current labor issues.

ECON 313 MONEY & BANKING
F, S 3 cr. LEC 3
PREREQUISITE: ECON 102 or ECON 250.
— Principles and problems of money, banking, and
credit. Monetary and banking history; monetary
theory and policy; structure and operation of our
financial system.

ECON 314 INTERNATIONAL ECONOMICS
F 3 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250.
— A survey of international economic theory and
policy. Major concepts explored are comparative
advantage, impacts of tariffs, exchange rates, and
international payments.

ECON 317 ECONOMIC DEVELOPMENT
S 3 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250.
— The plight of the world’s low income countries,
and the many national and international programs
devoted to its alleviation. Primary emphasis directed
to economic factors, but attention given to political
and social characteristics vital to economic develop-
ment.
ECON 320 PUBLIC FINANCE
F 3 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250.
- Analysis of public expenditure programs, government behavior, and public decision making. Topics such as health care and welfare programs, and principles of taxation will be covered.

ECON 382 ECONOMICS OF NATURAL RESOURCES
F 3 cr. LEC 3
PREREQUISITE: ECON 201 or ECON 250.
- Economic principles regarding the allocation and use of natural resources and the impact of institutional factors within which these decisions are implemented. Emphasis on property rights, economic rent, and impact of regulations on resources such as forests, fisheries, land, and water.

ECON 372 ECONOMIC HISTORY OF THE US
S 3 cr. LEC 3
PREREQUISITE: ECON 101 or ECON 250.
- Interpretation of American economic growth in the context of economic theory. Examines specific issues in U.S. history while focusing on the question of how the U.S. has been able to sustain increases in per capita income.

ECON 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ECON 401 MICROECONOMIC THEORY
F 3 cr. LEC 3
PREREQUISITE: ECON 301.
- Advanced price theory. Objectives of this course include further development of students' intuitive understanding of price theory and learning how to use calculus in economics. Topics covered include comparative statics, consumer and producer theory, and pricing in competitive and non-competitive product and factor markets.

ECON 406 INDUSTRIAL ORGANIZATION
F 3 cr. LEC 3
PREREQUISITE: ECON 301.
- Offers students the opportunity to use training in price theory by focusing on issues concerned with public policy toward business. The subject matter should appeal to students in pre-law and business as well as economic majors.

ECON 432R BENEFIT-COST ANALYSIS
S 3 cr. LEC 3
PREREQUISITE: ECON 301.
- Senior capstone course. Applied welfare economics and methods and criteria for evaluating benefits and costs of public policies and investment. Applications include environmental and natural resource issues.

ECON 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

ECON 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Determined by each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ECON 489 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr.RCT May be repeated. Max 4 cr.
COREQUISITE: ECON 400.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ECON 490 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-8 cr. IND
PREREQUISITE: ECON 201, junior standing, and approval of instructor.
- Intended for upper division undergraduate research/undergraduate scholars program. The student will work closely with the supervising faculty.

ECON 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by permission. Course prerequisites as dependent on the offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ECON 501 MICROECONOMIC THEORY
S 3 cr. LEC 3
PREREQUISITE: ECON 401.
- Economic models of optimization as they apply to consumer and firm decision making. Topics covered include comparative statics, theory of the firm and consumer; and consumer and producer surplus.

ECON 502 MACROECONOMIC THEORY
S 3 cr. LEC 3
PREREQUISITE: ECON 302.
- Systematic review of accepted macroeconomic theory and critical study of the functional relationships contained therein.

ECON 561 ECONOMETRICS I
F 3 cr. LEC 3
PREREQUISITE: ECON 301, STAT 216, MATH 221.
- The use of regression analysis in the estimation of economic relationships, with emphasis on development of the least squares technique, the properties of estimators, and hypothesis testing in the context of the regression model.

ECON 569 RESEARCH METHODOLOGY
S 1 cr. LEC 1
PREREQUISITE: Graduate standing. ECON 301, ECON 302.
- The research process as a means of acquiring knowledge which is reliable and relevant to problems.

ECON 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor; and approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

ECON 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
- A research or professional project or project dealing with a topic in a field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

ECON 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ECON 589 GRADUATE CONSULTATION
F, S, Su 3 cr. TUT
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

ECON 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND May be repeated.
PREREQUISITE: Master’s standing.

EDCI
Education, Curriculum & Instruction
Department of Education
(406) 994-3120

EDCI 102 IN-SCHOOL EXPERIENCE
F, S 1 cr. LAB 1
- Students will explore the profession of teaching by attending an orientation, conducting in-school observations and interviews, recording personal reflections in a portfolio, and participating in two seminar sessions to debrief/discuss their experiences.

EDCI 208 EDUCATIONAL PSYCHOLOGY & HUMAN DEVELOPMENT OF SCHOOL AGE CHILDREN
F, S, Su alternate years, to be offered 2007 3 cr.
LEC 3
PREREQUISITE: EDCI 102, HDCF 150, or EDCI 102.
- Human growth and psychological development of school age students, to include physical, cognitive, and psychosocial development within an educational, familial, and societal context.

EDCI 299 EDUCATIONAL PSYCHOLOGY AND ADOLESCENT DEVELOPMENT
F, S, Su alternate years, to be offered 2006 3 cr.
LEC 3
PREREQUISITE: HDCF 150 or HDCF 260 and one of the following:
COREQUISITE: EDCI 102, HDPE 102, or AGED 251.
- An examination of theory and research related to the development, learning and motivation of middle and high school students. Implications for effective classroom teaching will be identified throughout the course.

EDCI 223 BASIC MEDIA PRODUCTION
F, S, Su 1 cr. IND 1
- A self-paced/self-instructional course in which students will learn to operate presentation and classroom equipment such as video recorders, optical disc players, and slide and overhead projectors. Students also produce simple visuals such as transparencies and mounted pictures.
EDCI 240 INTRODUCTION TO MULTICULTURAL EDUCATION
F, Su 2 cr. LEC 2
- Examination of the impact of cultures on present educational process and recognition of the multi-cultural nature of U.S. society through multiple perspectives of ethnic diversity in relation to learning and teaching.

EDCI 280 SPECIAL TOPICS
On Demand 1 - 5 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EDCI 298R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-5 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

EDCI 298R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

EDCI 320 FOUNDATIONS OF EDUCATIONAL TECHNOLOGY
F, S, Su 2 cr. LEC 1 LAB 1
PREREQUISITE: EDCI 280 or EDCI 289.
- To prepare teachers to use and integrate a variety of technologies to enhance student learning in the content areas. Topics include: use of computer assisted instruction, development of web-based teaching tools, legal issues, teacher electronic portfolio creation and collaborative learning.

EDCI 350 FOUNDATIONS OF ASSESSMENT
F, S, Su 2 cr. RCT 2
PREREQUISITE: EDCI 280 or EDCI 289.
- Fundamental concepts of educational assessment for classroom teachers including the relationship of assessment to curriculum standards and educational aims, quality of assessment, principles of item construction, evaluation of student responses, interpretation of results, and improvement of techniques. Begins with an overview of instructional planning, the relationship of objectives to standards, and strategies for ensuring alignment between standards, curriculum & instruction, and assessment.

EDCI 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

EDCI 402 EDUCATIONAL STATISTICS I
F, S, Su 3 cr. RCT 3
PREREQUISITE: STAT 216
- The application of statistical processes to the analysis of educational data. Educational problems that require hypothesis testing, regression, estimation and the T-distribution, analysis of frequencies, and ANOVA in their solution will be included.

Note: The following Library Media certification courses, EDCI 406, 411, 412, 415 and 416, have been replaced by graduate level courses, EDCI 522, 545, 546, 547 & 548. These new courses are available to qualified undergraduates seeking library media endorsement. See instructor for permission.

EDCI 406 YOUNG ADULT LITERATURE
F alternate years; to be offered 2006 5 cr. RCT 2
PREREQUISITE: EDCI 320
- Survey of materials for young adult readers. Includes curriculum integration, electronic resources, and critical theories.

EDCI 425 TECHNOLOGY IN THE CLASSROOM
F 3 cr. LEC 2 LAB 1
- The use of educational technologies to enhance student learning. Emphasis on how to create and teach with various media. Students will produce multimedia tools for classroom use: videos, multimedia web pages, animation, and other interactive learning technologies.

EDCI 427 MEDIA DESIGN:
DYNAMIC CLASSROOM ENVIRONMENTS
S 3 cr. LEC 2 LAB 1
- To construct effective documents and classroom displays utilizing various materials, desktop publishing, and graphic design techniques. Excellent for those in education, library media, marketing, engineering, graphic design, and others requiring professional visual presentations.

EDCI 434 LITERACY ASSESSMENT AND INSTRUCTION
S 3 cr. LEC 2 LAB 1
PREREQUISITES: EDEL 305 or EDEL 405.
- Current theory and techniques in literacy assessment and individualization. Emphasis will be on specific instructional strategies that focus on independence in reading and writing. A practicum is included.

EDCI 450 EDUCATIONAL COMPUTING MANAGEMENT AND APPLICATION
F, S 1 - 6 cr.
PREREQUISITE: EDCI 320.
- A flexible format that allows the student to select from the following modules: design and maintenance of an instructional computing lab, enhanced software competency, or instruction technology leadership in the schools.

EDCI 460 APPLICATIONS OF EDUCATIONAL TECHNOLOGY
S 3 cr. LEC 1 RCT 1 LAB 1
PREREQUISITE: EDCI 320.
- Strategies for integrating technology into the classroom environment to enhance learning. Topics include: application of educational technology standards into the content areas, project-based learning, design of WWW teaching tools, current issues in educational technology, and actual classroom practice.

EDCI 462 METHODS OF TEACHING MODERN LANGUAGES
S 4 cr. LEC 4
PREREQUISITE: EDCI 350, 20 or more credits in subject area, and good standing in Teacher Education Program.
COREQUISITE: EDSD 301 (for Teaching majors in this subject).
- Provides prospective foreign language instructors with a practical and theoretical foundation for planning (including lesson/unit), implementing teaching, and evaluating programs and learning for levels K-12. Counseling skills are also addressed. Includes classroom paraprofessional experience for majors only.

EDCI 469 PUBLIC SCHOOLING IN THE AMERICAN SOCIETY
F, S 2 cr. LEC 2
PREREQUISITE: EDCI 208 or EDCI 209 and junior standing.
- A survey of the historical, political, philosophical, and socioeconomic foundations of American public schooling with an examination of the implications for our current context.

EDCI 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

EDCI 474 LEADERSHIP IN LITERACY PROGRAMS
S 2 cr. LEC 2
PREREQUISITE: One of the following: EDSD 450, EDEL 305, or EDEL 405.
- The organization, management, and evaluation of staff development programs in literacy that include ongoing training, assisting teachers with instruction, promoting and modeling flexible application of effective instructional strategies through regular conversations about learners, literacy theory and instruction.

EDCI 476 INTERNSHIP
On Demand 25 cr. IND
PREREQUISITE: EDCI 360, consent of instructor, and approval of department head.
- An individualized assignment with a professional agency to provide a guided field experience.

EDCI 480 SPECIAL TOPICS
On Demand 1 - 5 cr. Maximum 12 cr.
PREREQUISITE: Core prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EDCI 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: EDCI 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

EDCI 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, S 6 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

EDCI 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing and as determined for each offering.
- Topics offered at the graduate level that are not covered in regular courses. Students participate in preparing and presenting discussion material.

EDCI 502 EDUCATIONAL STATISTICS II
S 3 cr. RCT 3
PREREQUISITE: EDCI 402.
- The application of statistical processes to the analysis of educational data. Educational problems that apply multivariable ANOVA, multiple comparison techniques, ANCOVA, multiple regression, and factor analysis in their solution are included.
EDCI 504 ASSESSMENT AND EVALUATION IN EDUCATION
F 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- Evaluation as an ongoing process in education.
  This course will engage students in a discussion regarding the construction, selection and use of criterion-referenced, norm-referenced, and alternative assessment methods. In addition, students will be involved in special projects which allow them to explore evaluation at the classroom, program, and/or institutional levels.

EDCI 505 FOUNDATION OF ACTION RESEARCH IN TEACHING AND LEARNING
S 3 cr. LEC 1 RCT 1 IND 1
PREREQUISITE: Graduate standing.
- This course presents an overview of classroom-based research for practicing teachers. Students will explore the role of action research in teacher professional development, and review multiple models and methods for action research. Participants will gain experience in data collection and, analysis, and will prepare an action research proposal.

EDCI 506 APPLIED EDUCATIONAL RESEARCH
F, S, Su 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- Students are introduced to systematic scientific inquiry, its purpose in an educational environment, the different approaches to conducting educational research, and the major components of an educational research study. Providing a foundation for further study of research methodologies, students will identify and evaluate existing literature on a topic and conduct an educational research study.

EDCI 507 QUALITATIVE EDUCATIONAL RESEARCH
S 3 cr. LEC 3
PREREQUISITE: Graduate standing and EDCI 506.
- This course explores the implications and application of the qualitative research paradigm to systematic inquiry within the field of education. Methods used in qualitative research including techniques of data collection, analysis, and reporting will be reviewed. Students will plan and complete a qualitative research project.

EDCI 508 ADVANCED EDUCATIONAL PSYCHOLOGY
S 3 cr. LEC 3
PREREQUISITE: Graduate standing or permission of the instructor.
- An examination of theory and research related to learning and motivation for students from diverse cultural backgrounds. Practical implications for effective teaching will be identified throughout the course.

EDCI 509 IMPLEMENTING ACTION RESEARCH IN TEACHING AND LEARNING
F 3 cr. LEC 1 RCT 1 IND 1
PREREQUISITE: EDCI 505 or another foundational course in action research.
- In this course, students will implement the research design created in EDCI 505 or in a similar course. This will include developing and refining techniques for gathering classroom data, using multiple strategies for data analysis, and communicating the results in a professional report and in presentation to more than one audience (e.g., other educators, community members.)

EDCI 510 ISSUES & TRENDS IN SOCIAL STUDIES INSTRUCTION
Su alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: EDEL 515, EDSD 556.
- Addresses the design and learning of social studies in public schools. Specific focus is given to concept teaching, teaching for thinking and value education in a democratic society. There is emphasis on a reflective approach to social studies education within the course.

EDCI 511 IMPROVEMENT OF INSTRUCTION IN HEALTH ENHANCEMENT
On Demand 3 cr. LEC 2 LAB 1
PREREQUISITE: EDEL 410.
- Health enhancement curriculum content, integration concepts amongst instructional topics such as skill acquisition, physical fitness, nutrition, mental health, sexuality and drug and alcohol education. Identification and development of appropriate value orientation and curriculum framework for health enhancement instructional design activities.

EDCI 512 WRITING AND ITS IMPROVEMENT
Su alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EDEL 410.
- Advanced study in language arts pedagogy. Special attention is given to the writing process.

EDCI 520 VISUAL ARTS AND LEARNING
(Replaces EDEL 532)
Su alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EDEL 392, EDEL 410.
- Explores art education. Topics include the use and evaluation of traditional and electronic information resources, design and selection of resources for classrooms and libraries, digital ethics.

EDCI 522 INFORMATION RESOURCES AND SERVICES
S 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- A course in the use of information resources in research, reference, integration, and online learning. Topics include the use and evaluation of traditional and electronic information resources, design and selection of resources for classrooms and libraries, digital ethics.

EDCI 525 IMPROVEMENT OF INSTRUCTION IN SCIENCE
On Demand 3 cr. LEC 3
PREREQUISITE: EDEL 410 OR EDSD 466.
- This course focuses on the theoretical and practical concerns in science education. Research, conceptual frameworks and policy issues will be introduced, as well as teaching and learning activities for elementary and secondary science classrooms.

EDCI 531 CONTEMPORARY ISSUES IN EDUCATION
Su 3 cr. LEC 2 LAB 1
- An overview course designed to establish the necessary social, technical, conceptual, research, and pedagogical foundations for cohort groups in the masters degree program. This course will examine critical issues and trends in education, and will serve as an advance organizer for program content.

EDCI 532 GENERAL SCHOOL CURRICULUM
Su alternate years, to be offered 2007 Su 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- A survey of current curriculum issues including the relationship of school curriculum to educational philosophy, school policy decisions, the impact on learning, curriculum and teaching, and the supervision of curriculum changes.

EDCI 533 MIDDLE YEARS SCHOOL
Su alternate years, to be offered 2006 2 cr. RCT 2
PREREQUISITE: EDEL 410 or EDSD 410, graduate standing.
- History, philosophy and organization of Junior High and middle schools, emphasizing curriculum and instruction based on the characteristics and needs of 10 to 15 year olds.

EDCI 534 LITERACY ASSESSMENT AND INSTRUCTION
Su alternate years, to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: EDEL 505, EDEL 405, teaching experience.
- Current theory and techniques in assessment of reading. Emphasis on instructional strategies and assessment tools developing the literacy of all students. A practicum is included.

EDCI 535 NEEDS ASSESSMENT IN EDUCATION
On Demand 2 cr. LEC 2
PREREQUISITE: EDCI 532 or EDLD 540 or EDLD 501 or EDLD 565, graduate standing.
- Understanding the strategies and techniques for determining educational needs in a variety of settings, and disseminating and utilizing the data and information for program planning and development.

EDCI 536 CONSTRUCTION OF CURRICULUM
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: EDCI 532 or EDEL 510, graduate standing.
- The development and evaluation of curriculum based on psychological and social foundations of curriculum, curriculum theory, developmental models, design issues, purposes, implementation plans and techniques for assessing the impact of curriculum change.

EDCI 537 CONTEMPORARY ISSUES IN SCIENCE EDUCATION
Su 2 cr. LEC 1 IND 1
PREREQUISITE: Must be enrolled in graduate program in Education or related field.
- This seminar style course focuses on current problems and controversial issues in science education. Emphasis is placed on those issues which relate directly to science teaching, learning and curriculums. Students investigate a variety of issues especially as they relate to their own teaching practices and student learning in their classroom.

EDCI 540 AMERICAN INDIAN STUDIES FOR EDUCATORS
Su, F 3 cr. DIS 3
PREREQUISITE: Graduate standing or the consent of the instructor.
- To equip teachers with the skills, knowledge, and dispositions to meet Indian Education for All requirements. Instruction pertains to the history, traditions, customs, values, beliefs, and contemporary affairs of American Indians, particularly tribal groups in the Northern Plains Region.

EDCI 541 HISTORY & PHILOSOPHY OF EDUCATION
On Demand 5 cr. LEC 3
PREREQUISITE: Graduate standing.
- In its classical obligation, philosophy meant "a love of learning." This course traces the growth of cultural and intellectual awareness in human civilizations and examines how we humans learned to create tools for the mind. Teachers learn to see the nature of formal cultural systems in the way they developed, and to recognize the central concepts that are the key to learning any subject.
EDCI 542 CREATIVE PROCESSES IN EDUCATION
Su alternate years, to be offered 2006 5 cr. LEC 3
PREREQUISITE: EDEL 410 or EDSD 410, teaching experience.
- Reviews historical and current issues in art education, aesthetic education and related areas which inform how we know our world and construct meaningful ways to pursue creative endeavors. Emphasizes documentation and research while acknowledging growth as teachers and artists.

EDCI 544 PHILOSOPHICAL ISSUES IN EDUCATION
On Demand 5 cr. LEC 5
- Exams examination of contemporary educational issues using the perspectives of traditional and contemporary philosophical documents.

EDCI 545 ORGANIZATION OF INFORMATION IN SCHOOL LIBRARY MEDIA CENTERS
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: EDCI 280 or equivalent; EDCI 531; and graduate standing or approval from instructor.
- In this course students learn application of descriptive and subjective cataloging content and procedures including: Dewey Decimal Classification, Library of Congress headings, AACR II rules, and examine technology issues for automation and management of library holdings.

EDCI 546 THE SCHOOL LIBRARY MEDIA SPECIALIST
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EDCI 280 or equivalent; EDCI 531; and graduate standing or approval from instructor.
- This course will examine the management and leadership role of the school library media specialist and how the library media center fits into the educational setting.

EDCI 547 INFORMATION INQUIRY AND EDUCATIONAL CHANGE
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EDCI 280 or equivalent; EDCI 531; and graduate standing or approval from instructor.
- This course presents students, primarily prospective school library media specialists, with content and strategies for working with teachers to incorporate information literacy and media literacy into a changing curriculum and explore information inquiry models. Also included are topics affecting change in libraries and education such as: filtering, censorship, digital ethics, new technologies and other topics as relevant to inquiry and integration.

EDCI 548 MANAGEMENT AND INFORMATION RESOURCES
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: EDCI 280 or equivalent, EDCI 531, and graduate standing or permission of instructor.
- In this course students learn the management, development, use, and evaluation of library collections in K-12 library media centers.

EDCI 549 APPLICATIONS OF LITERATURE FOR CHILDREN AND YOUNG ADULTS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EDCI 280 or equivalent; EDCI 531; and graduate standing or approval from instructor.
- This course presents an overview of materials for educational, informational, and literary use by children and young adults (YA) with an emphasis on critical selection and analysis, knowledge of age-level developmental stages, and motivational techniques in libraries. Materials include print, visual, and electronic resources.

EDCI 551 EDUCATIONAL TECHNOLOGY: CREATIVE INTEGRATION
Su alternate years, to be offered 2007 3 cr. LEC 1
- LAB 2
PREREQUISITE: Graduate standing.
- Implementing technology based, constructivist strategies to improve student learning. Topics include: educational technology standards, legal issues, software evaluation, development of educational WWW teaching tools, and electronic portfolios, learning styles, project-based learning, and designs for technology integration into the curriculum.

EDCI 554 THE COMPREHENSIVE PORTFOLIO
Su 3 cr. LEC 9
PREREQUISITE: For NPTT candidates: EDCI 552, EDCI 553, EDCI 555, EDCI 554, EDCI 556, EDCI 558, EDCI 559. For C&I Practitioners: EDCI 505, EDCI 509.
- This course provides advanced training on the preparation of a professional teaching portfolio for candidates in the NPTT program or final project portfolio in the practitioner stand of the master's degree in Curriculum & Instruction. Based upon the standards and practices established by the National Board for Professional Teaching Standards (NBPTS), the Interstate New Teacher Assistance and Support Consortium (INTASC), and the National Council for Accreditation of Teacher Education (NCATE) these portfolios are designed to provide comprehensive evidence of effectiveness in practice, the habit of reflection, and a command of the knowledge, skills, and dispositions expected of professional educators as developed in the student's graduate program. Portfolios developed in this course may in turn serve as the basis for the student's comprehensive exam.

EDCI 570 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

EDCI 571 IN-SERVICE EDUCATION
On Demand 1-4 cr. RCT/DIS/LAB
PREREQUISITE: Graduate standing and employment by sponsoring school organization.
- An approved supervised group study of an educational problem within a local school supervised by an MSU faculty member which culminates in a special report to be filed with the local district and the Department of Education.

EDCI 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1-4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.
EDEL
Education, Elementary
Department of Education
(406) 994-3120

EDEL 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

EDEL 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

EDEL 501 PARAPROFESSIONAL EXPERIENCE
F, S, Su 1-3 cr. LAB 1-5
PREREQUISITE: EDCI 208 and EDCI 240.
- Students will be assigned to school classrooms to observe children, teachers, and teaching strategies and to serve as teacher aides. Students will teach lessons in subject areas corresponding to the methods classes in which they are currently enrolled.

EDEL 503 METHODS OF TEACHING ELEMENTARY HEALTH ENHANCEMENT/PE
F, Su alternate years, to be offered 2007 3 cr.
PREREQUISITE: HDHL 106, EDCI 560, good standing in Teacher Education Program.
- The class is designed to provide the elementary education student with a conceptual understanding of school-age health enhancement (health and physical education), to include relationships between movement concepts and skill analysis, the ten comprehensive school health areas, and health-related behaviors.

EDEL 504 CHILDREN'S LITERATURE
F, S 3 cr. LEC 3
PREREQUISITE: EDCI 208 or EDCI 209 and junior standing.
- A survey of children’s books with an emphasis on their use in K-8 classrooms. Introduces the history and current genres of children’s literature, selection criteria, award-winning books, and strategies for sharing books with students.

EDEL 505 PRINCIPLES AND PRACTICES OF EMERGENT LITERACY K-3
F, S, Su alternate years, to be offered 2006 4 cr.
PREREQUISITE: EDEL 504, EDCI 560, and good standing in Teacher Education Program.
- Current theory concerning emergent literacy and developmentally appropriate classroom practices. Emphasis is on a balanced approach which includes phonics and other cue systems, use of authentic children's literature, and use of programmed reading materials.

EDEL 507 TEACHING THE MULTICULTURAL CHILD
On Demand 3 cr. RCT 3
PREREQUISITE: EDCI 208 and EDCI 240.
- To recognize the factors impacting minority language and ethnic group students in the elementary classroom with an emphasis on Native Americans, and to apply pedagogical principles to the teaching of reading and language arts in multicultural classrooms.

EDEL 513 TEACHING SOCIAL STUDIES
F, S, Su alternate years, to be offered 2007 3 cr.
PREREQUISITE: Completion of social science core including POLS 806, one additional restricted social science elective course, and good standing in the Teacher Education Program.
- Identification of goals, objectives, and instructional strategies for elementary social studies.
- Concurrent paraprofessional experience registration during the academic year.

EDEL 525 TEACHING ELEMENTARY SCIENCE
F, S, Su alternate years, to be offered 2007 3 cr.
PREREQUISITE: PHYS 103, EDCI 560, either BIOL 100 or MB 101, and good standing in Teacher Education Program.
- This course focuses upon methods of teaching science inquiry skills, content, and attitudes in the elementary classroom.

EDEL 525 TEACHING ART AND THE ELEMENTARY CURRICULUM
F, S, Su alternate years, to be offered 2006 3 cr.
PREREQUISITE: ART 110 or ART 114, EDCI 560, and good standing in Teacher Education Program.
- Experiences which enhance student understanding of how children make art, appreciate historical aspects of art, and construct their place in a social world. Students explore these concerns through studio experiences, readings, written reports, and locating and gathering resources for teaching art.

EDEL 555 TEACHING MATHEMATICS
F, S, Su alternate years, to be offered 2006 3 cr.
PREREQUISITE: EDCI 560, MATH 131, and good standing in Teacher Education Program.
- Math methods and materials for the prospective elementary teacher. Classroom organization, operation, management, applied technology, evaluation, and current theory.

EDEL 555 TEACHING HEALTH ENHANCEMENT
F, S 3 cr. LEC 3
PREREQUISITE: EDCI 560, good standing in Teacher Education Program.
- The theoretical and practical aspects of teaching health enhancement in the elementary schools.

EDEL 556 TEACHING MUSIC
F, S, Su alternate years, to be offered 2006 3 cr.
PREREQUISITE: EDCI 560, good standing in Teacher Education Program.
- Improving musical skills to incorporate methods of integrating music into the elementary classroom through singing, listening, instrument playing, creating, and movement in order to further the goals and standards of the elementary music program as well as the general elementary curriculum.

EDEL 557 ELEMENTARY MUSIC METHODS
S 3 cr. LEC 3
PREREQUISITE: MUS 104, EDCI 560, and good standing in Teacher Education Program.
- Elementary music methods for the music education majors; in-depth study and application of elementary music methods using singing, listening, instrument playing, creating, and movement; materials, management, sequencing, planning, and assessment for K-6 music classes.

EDEL 401 EDUCATIONAL PLANNING AND MANAGEMENT
F, S, Su 1 cr. RCT
PREREQUISITE: EDCI 560, good standing in Teacher Education Program.
- An introduction to instructional planning (lesson and unit planning,) classroom management and organization, and working with parents. General teaching issues and problems associated with the paraprofessional practicum will also be explored and discussed.

EDEL 402 EDUCATIONAL MANAGEMENT AND DISCIPLINE
F, S, Su 1 cr. RCT 1
PREREQUISITE: EDCI 401, good standing in Teacher Education Program.
- An introduction to the models of various management and discipline techniques. General control issues and problems associated with the paraprofessional practicum will also be explored and discussed.

EDEL 405 TEACHING LITERACY TO ESTABLISHED READERS (4-6)
F, S, Su alternate years, to be offered 2007 4 cr.
PREREQUISITE: EDCI 208, and either HDCF 150 or PSY 100.
- Preparing teachers to teach kindergarten and the primary grades one through three. Understanding of the characteristics of the age-level child; establishing curriculum methods, materials, learning environments, and activities for teaching; and investigation of the relevant subject areas.

EDEL 410 STUDENT TEACHING
F, S, Su 5 - 12 cr. IND
PREREQUISITE: Senior standing, completion of all required EDEL methods courses, and good standing in Teacher Education Program.
- Corequisite: EDEL 414.
- Observation and teaching in a classroom setting; preparation and delivery of lesson plans. The student teaching experience will occur under the supervision of experienced teachers and MSU staff supervisors.

EDEL 414 PROFESSIONAL ISSUES
F, S, Su 2 cr. LEC 2
PREREQUISITE: Senior standing, completion of all required EDEL methods courses, and good standing in Teacher Education Program.
- Corequisite: EDEL 410.
- Senior capstone course. Review the role of teachers and elementary school; school law; teacher contracts; certification; professional organizations; ethics; job seeking; job success; cooperative learning; and other critical issues for elementary education majors.

EDEL 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.
EDEL 480 SPECIAL TOPICS
On Demand 1 - 3 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EDEL 480R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 3 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: EDEL 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

EDEL 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

EDEL 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing and as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

EDEL 505 CONTEMPORARY ISSUES IN CHILDREN'S LITERATURE
Su alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EDEL 504 and EDEL 505 and EDEL 410
- Examination and interpretation of the themes of current, award-winning children's literature and their relevance to today's children. Inquiry projects will focus on topics of critical literacy. Emphasis will be on classroom application.

EDEL 505 ISSUES AND TRENDS IN LITERACY
Su alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: EDEL 410.
- Contemporary issues in reading, addressed through advanced study of recent research, with a focus on standards-based classroom application. Topics include the reading/writing relationship and the complexities if the reading process.

EDEL 510 ELEMENTARY SCHOOL CURRICULUM
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: EDEL 410 or EDSD 410.
- Understandings, attitudes and skills for inservice teachers and administrators to be applied to selection and implementation of learning experiences for elementary school children.

EDEL 552 VISUAL ARTS AND LEARNING
(Replaced by EDCI 590)
Su alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EDEL 532, EDEL 410.
- Explores the importance of art in the lives of children and adolescents while finding ways to include art experiences in an integrated curriculum. Emphasizes philosophical and cultural groundings for teaching art, studio experiences and research potentials.

EDEL 553 IMPROVEMENT OF MATHEMATICS INSTRUCTION
Su alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: EDEL 333, EDEL 410.
- Stresses use of appropriate knowledge from mathematics education, learning theory, developmental psychology, readiness, evaluation, curriculum development and individual differences in selecting, designing, organizing and presenting mathematical content for elementary school children.

EDEL 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

EDEL 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: EDGI 506, graduate standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

EDEL 576 INTERNSHIP
On Demand 2 - 12 cr. IND Maximum credits unlimited
PREREQUISITE: Graduate standing, consent of instructor and approval of department head.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

EDEL 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EDEL 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 3 cr. May be repeated; maximum 3 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
- Courses offered on a one-time basis to fulfill professional development needs of inservice educators. A specific focus is given to each course which is appropriately subtitled.

EDEL 589 GRADUATE CONSULTATION
F, S, Su 3 cr. IND Maximum credits unlimited
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their coursework (and thesis if on a thesis plan) but who need additional faculty or staff time or help.

EDEL 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited
PREREQUISITE: Master's standing.

EDLD 505 COMMUNITY EDUCATION
S On Demand 2 cr. LEC 2
PREREQUISITE: EDLD 501.
- Prerequisites: Graduate standing; Students also may take EDLD 589 in consultation with EDLD 505.
- Emphases on the historical and philosophical development, understanding the concepts, goals and objectives, emerging models and institutions and agencies of community education.

EDLD 504 TEACHING AND LEARNING IN ADULT EDUCATION
F alternate years, to be offered 2007, Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This is a study of the adult learner, adult learning theories, and teaching strategies appropriate for adult education strategies. Practice teaching will be evaluated.

EDLD 505 HIGHER EDUCATION HISTORY AND PHILOSOPHY
F alternate years, to be offered 2006, Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course studies the historical and philosophical development of American higher education against the background of political, social, economic, cultural and intellectual issues from its founding to the present.
EDLD 507 FOUNDATIONS OF EDUCATIONAL LEADERSHIP
F alternate years, to be offered 2007, Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing, BA/BS in Education.
- This is the entry course to the K-12 Educational Leadership program. Topics included are leadership theory and practice; instructional leadership; basic organization theory; working with students, staff, parents, and community; creating a vision and a strategic plan; and realizing the vision; and the identification and development of leadership skills, including a personal and professional code of ethics.

EDLD 508 SUPERVISION OF INSTRUCTION
S alternate years, to be offered 2007, Su 3 cr. LEC 3
PREREQUISITE: Graduate standing, BA/BS in Education.
- This course emphasized the improvement of teaching and learning. There is emphasis on supervision of instruction, professional development, creating a learning community, and leading schools to meet high academic standards. School and staff accountability is also included.

EDLD 509 ISSUES AND TRENDS IN HIGHER EDUCATION
S alternate years, to be offered 2006; 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course emphasized the improvement of teaching and learning. There is emphasis on supervision of instruction, professional development, creating a learning community, and leading schools to meet high academic standards. School and staff accountability is also included.

EDLD 510 ORGANIZATION AND ADMINISTRATION OF HIGHER EDUCATION
S alternate years, to be offered 2008, Su On Demand 3 cr. LEC 3
PREREQUISITE: EDLD 505.
- An examination of pressing contemporary issues facing higher education administrators in the workplace. The emphasis will be on analyzing issues and addressing situations arising from these issues.

EDLD 511 PLANNING PROGRAM ASSESSMENT
F alternate years, to be offered 2007, Su On Demand 3 cr. LEC 3
PREREQUISITE: EDLD 506 and graduate standing.
- This is a study of the literature, models, standards, strategies, and skills needed to plan and implement the assessment of post secondary educational programs, services, and administration for various internal and external clients including accrediting agencies.

EDLD 512 FINANCE AND ADMINISTRATION IN HIGHER EDUCATION
F alternate years, to be offered 2007, Su On Demand 3 cr. LEC 3
PREREQUISITE: EDLD 505 or consent of instructor.
- The study of financial governance across higher education: from macro-systems (national and state governing boards) to micro-systems (university, college, and department). In the course, students assess the impact of various decisions and levels of funding on students and an institution’s financial status.

EDLD 513 RESOURCE AND PROGRAM MANAGEMENT
S alternate years, to be offered 2007, Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- The study of program/department management in higher and adult education for both academic and administrative support units. Includes issues that deal with the management of faculty, support personnel, programs, facilities and budgeting.

EDLD 515 PLANNED CHANGE
F, Su alternate years, to be offered 2006/3 cr. LEC 3
PREREQUISITE: EDLD 540.
- A study of the change process as applied to schools. Includes the theory and process of change; research about change, roles and practice, change models and systems, and leadership in school improvement planning and implementation, and evaluation of changed systems.

EDLD 520 SCHOOL AND THE COMMUNITY
S alternate years, to be offered 2006, Su 3 cr. LEC 3
PREREQUISITE: Graduate standing, BA/BS in Education.
- This course covers the techniques for connecting the school with parents and the community. Additionally, the course covers various curriculum models that promote community involvement in teaching, community use of school facilities, responding to community interests, and using the news media. Developing effective communication with various cultural, ethnic, racial, and special interest groups in the community will be stressed.

EDLD 524 INSTRUCTIONAL LEADERSHIP IN THE ELEMENTARY SCHOOL
F alternate years, to be offered 2007, 3 cr. LEC 3
PREREQUISITE: EDLD 506.
- A study of principal leadership responsibilities in improving elementary school student achievement with focus on how principals impact their schools by shaping school goals; providing direction, structure, and organizational and social networks; by guiding school policies, procedures, curriculum and learning.

EDLD 525 INSTRUCTIONAL LEADERSHIP IN THE SECONDARY SCHOOL
S alternate years, to be offered 2008, 3 cr. LEC 3
PREREQUISITE: EDLD 506.
- A study of principal leadership responsibilities in improving secondary school student achievement at the high school level. The course focuses on improving secondary schools through collaborative leadership, effective learning communities, personalization, and curriculum and instruction which contribute directly to student learning.

EDLD 526 ORGANIZATION & SUPERVISION OF SCHOOL READING PROGRAMS
On Demand 3 cr. LEC 3
PREREQUISITE: EDLD 410 or EDSD 410.
- The role of the supervisor or administrator in improving reading instruction; different approaches to reading instruction; the purpose and place of basal readers and children's literature; what research indicates; what conditions promote effective reading instruction.

EDLD 528 COLLEGE STUDENTS
F alternate years, to be offered 2007, Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This foundations course reviews theory and research on undergraduate college students' learning, development, culture, demographics, and sub-populations which inform current educational practice.

EDLD 529 POST SECONDARY EDUCATION ENROLLMENT MANAGEMENT
S alternate years, to be offered 2008, Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- Higher, Continuing, and Adult Education professionals will study the specialized literature, strategies, and practices involved in leading, managing, and marketing their institutions' programs' efforts to enroll and retain prospects, students, and alumni as consumers in their educational environments.

EDLD 530 COLLEGE TEACHING
S alternate years, to be offered 2007; Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- The study of the learning - teaching nexus, traditional and non-traditional college-level teaching methods, the assessment of learning and teaching, and faculty as teacher-researchers.

EDLD 531 THEORETICAL FOUNDATIONS OF COLLEGE STUDENTS
F alternate years, to be offered 2006, 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course will introduce the theories which have been advanced regarding college students and the professional practice of student affairs. The course will examine the similarities and differences among college student and the impact which different environments and policies may have on student psycho-social development, learning attitudes, values, behaviors, and satisfaction with college.

EDLD 532 SCHOOL LAW
F alternate years, to be offered 2006; Su 3 cr. LEC 3
PREREQUISITE: Graduate standing, BA/BS in Education.
- This K-12 School Law course is a general examination of law and court decisions relative to the administration of schools. Specific attention is given to Montana education laws.

EDLD 533 LAW AND POLICY IN HIGHER EDUCATION
F alternate years, to be offered 2006, Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- Analysis and interpretation of landmark legislation affecting American higher education since 1960 and the resulting policies that govern the management of universities and colleges. Topics include: separation of church and state, access, collective bargaining, intercollegiate athletics, affirmative action, and relations with state and federal governments.

EDLD 535 STUDENT SERVICES
S alternate years, to be offered 2007, Su On Demand 3 cr. LEC 3
PREREQUISITE: EDLD 510.
- Students will examine philosophical, organizational and programmatic aspects of post secondary student services and the ethical and legal dimensions of student affairs professional practice.

EDLD 537 INSTITUTIONAL RESEARCH AND ASSESSMENT
S alternate years, to be offered 2008, Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- Students will explore the roles of institutional research and assessment in higher education identifying appropriate measures for academic and administrative assessment, internal and external data sources, analytic techniques, and the communication of information to academic and administrative decision makers.
COURSE DESCRIPTIONS: EDLD 538 - EDLD 690

EDLD 588 COLLEGE CURRICULUM
S alternate years, to be offered 2008, Su On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing.
– This course considers the definition, philosophical and historical roots, disciplinary organization, current issues, designs, administration, and evaluation of the college curriculum.

EDLD 545 SOCIAL EQUITY IN EDUCATION
On Demand 3 cr. LEC 3
PREREQUISITE: EDEL 410 or EDSD 410.
– Consideration of social equity issues in education to include disabilities, gender, ethnic, social, and economic issues.

EDLD 555 SCHOOL FINANCE
S alternate years, to be offered 2007,Su 3 cr. LEC 3
PREREQUISITE: Graduate standing, BA in Education.
– This course prepares school leaders to identify and analyze sources of fiscal and non-fiscal resources for schools and school districts, to manage financial and material assets, to develop an efficient budget planning process, and to perform budget management functions. There will be an emphasis on Montana school finance.

EDLD 564 THE COMPREHENSIVE PORTFOLIO
S, Su 5 cr. LEC 3
PREREQUISITE: EDLD 507, EDLD 508, EDLD 515, EDLD 550, EDLD 555 and EDCL 592 or EDEL 510.
– Students create a professional portfolio to evidence their vision of learning, the culture of teaching and learning, community/school relationships, and the social, cultural, ethical, legal, political, and economic context of schooling.

EDLD 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of the Dean of Graduate Education.
– Directed research and study on an individual basis.

EDLD 571 IN-SERVICE EDUCATION
On Demand 1 - 4 cr. RCT/DIS/LAB
PREREQUISITE: Graduate standing and employment by sponsoring school organization.
– A carefully supervised group study of an educational problem. The study will culminate in a special report, syllabus, blueprint, course of study or guide book or report to be filed with the local administrator and with the Department of Education.

EDLD 574 FIELD EXPERIENCE
F, S, Su 1-6 cr. LAB 1-6
PREREQUISITE: Graduate standing, consent of instructor, EDLD 510, EDLD 512, EDLD 515.
– This is a capstone course that offers students the opportunity for guided field experience as a principal or superintendent in K-12 schools.

EDLD 576 RESEARCH
S, Su 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
– A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

EDLD 576 INTERNSHIP
On Demand 3 - 18 cr. IND Maximum credits may be restricted by program.
PREREQUISITE: EDLD 507, EDLD 508, EDLD 552. Graduate standing, consent of instructor and approval of advisor.
– The internship course is designed for those seeking certification to be a principal or superintendent in Montana schools. Course content is designed around further bridging theory with practice and the on-the-job expectations and responsibilities. The course is designed for the building level educational leader as well as superintendents and other district level leadership.

EDLD 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
– Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EDLD 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 3 cr. May be repeated; maximum 5 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
– Courses offered on a one-time basis to fulfill professional development needs of in-service educators. A specific focus is given to each course which is appropriately subtitled.

EDLD 589 GRADUATE CONSULTATION
F, S, Su 5 cr. TUT
PREREQUISITE: Master’s standing and approval of the Dean of Graduate Education.
– This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

EDLD 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master’s standing.

EDLD 610 LEADERSHIP AND ORGANIZATIONAL THEORY
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: MA in Educational Leadership, or Principal’s Certification, EDLD 507.
– The course will provide existing school leaders with theories, concepts, and behaviors of effective leadership that address the challenges of schools today. The course encourages a deeper understanding of personal beliefs, style, values, and ethics required of school leaders. The development of a shared vision and strategic plan will be emphasized.

EDLD 620 THE SCHOOL SUPERINTENDENT
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: MA in Educational Leadership or Principal’s Certification, EDLD 520.
– This course focuses on the leadership skills necessary for the school superintendent. There is emphasis on superintendent relations with the school board and the school community, and on working with stakeholders to identify school priorities. The development of effective and appropriate communication strategies and interpersonal skills that promote public confidence for schools is stressed.

EDLD 650 SUPERVISION AND INSTRUCTIONAL LEADERSHIP
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MA in Educational Leadership or Principal’s Certification, and EDLD 508.
– The course focuses on increasing the knowledge and skills of supervising and leading instruction on a district or school systems basis. Emphasis is given to dimensions of leadership at the district level including supervision of the leadership team, aligning the vision, mission, and strategic plan with student needs, professional growth, and maximizing resources to support teaching and learning.

EDLD 655 DATA DRIVEN DECISIONS
Su alternate years, to be offered 2006 5 cr. LEC 3
PREREQUISITE: MA in Educational Leadership or Principal’s Certification, and EDLD 515.
– The course focuses on acquiring, synthesizing, assessing, and using a variety of data to make decisions related to student achievement and program improvement.

EDLD 645 PERSONNEL MANAGEMENT IN EDUCATION
F, S, Su 3 cr. LEC 3
PREREQUISITE: MA in Educational Leadership or Principal’s Certification, and EDLD 512, EDLD 530.
– This course is designed to prepare educational leaders to apply effective job analysis procedures, to understand performance appraisal for instructional and non-instructional staff, formulate professional growth plans, and apply appropriate policies, criteria, processes for recruitment, selection, induction, and compensation of personnel with an emphasis on equity and diversity.

EDLD 650 RESOURCE MANAGEMENT: FINANCE AND FACILITIES
S alternate years, to be offered 2006 5 cr. LEC 3
PREREQUISITE: MA in Educational Leadership or Principal’s Certification, and EDLD 512, EDLD 530.
– This course is designed to facilitate a more in-depth understanding of legal issues relative to education and their policy implications. Students will increase their understanding of how legal decisions impact their school. They will explore policy analysis and implementation, and develop an understanding of how laws, policies, and systemic organizational life are intertwined.

EDLD 655 LEGAL AND POLICY STUDIES
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MA in Educational Leadership or Principal’s Certification, and EDLD 555 and EDLD 552.
– This course is designed to facilitate a more in-depth understanding of legal issues relative to education and their policy implications. Students will increase their understanding of how legal decisions impact their school. They will explore policy analysis and implementation, and develop an understanding of how laws, policies, and systemic organizational life are intertwined.

EDLD 680 DOCTORAL THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing. Restricted Entry.
**EDSD**  
Education, Secondary  
Department of Education  
- (406) 994-5120

### COURSE DESCRIPTIONS: EDSD 301 - EDSD 489R

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 301 PARAPROFESSIONAL EXPERIENCE** | F, S 1 cr. LAB 1 | PREREQUISITE: EDCI 360 and good standing in Teacher Education Program.  
COREQUISITE: Methods course in teaching major.  
- Students will be assigned to school classrooms to observe children, teachers, and teaching strategies, and to serve as teacher aides. Students will teach lessons in the subject area corresponding to the methods class in which they are currently enrolled (45 contact hours required). |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 563 MULTICULTURAL EDUCATION** | F, S 1 cr. LEC 1 | COREQUISITE: EDSD 462 and EDSD 464  
- Provides students with an opportunity to reflect on their own culture/heritage as they explore the backgrounds and experiences of other cultural groups in this country. An emphasis is placed on democratic community building in a multicultural society. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 400 SEMINAR** | On Demand 1 cr. SEM 1 Maximum 4 cr. | PREREQUISITE: Junior standing and as determined for each offering.  
- Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 410 STUDENT TEACHING** | F, Su 5 - 12 cr. IND | PREREQUISITE: Senior standing, completion of all required EDSD special methods courses, and good standing in Teacher Education Program.  
COREQUISITE: EDSD 413.  
- Observation and teaching in a classroom setting; preparation and delivery of lesson plans. The student teaching experience will occur under the supervision of experienced teachers and MSU staff supervisors. Observational participation at grades five and/or six also takes place. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 415 PROFESSIONAL ISSUES** | F, S 2 cr. LEC 2 | PREREQUISITE: Senior standing, completion of all EDSD special methods courses, and good standing in Teacher Education Program.  
COREQUISITE: EDSD 410.  
- Senior capstone course. Role of the teacher in the contemporary secondary school. Overview of salient issues to include applied evaluation, classroom management and discipline, cooperative learning, law, contracts, certification, professional organizations, ethics, resume, job seeking, and professionalism. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 450 CONTENT AREA READING** | S 2 cr. LEC 2 | PREREQUISITE: EDEL 505 or EDEL 405.  
- Techniques, materials, organization, and theory in teaching effective reading skills in all content fields, grades 5-12. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 455 METHODS OF TEACHING VOCATIONAL AGRICULTURE & TECHNOLOGY EDUCATION** | F 3 cr. LEC 5 | PREREQUISITE: EDSD 360, 20 or more credits in subject area and good standing in Teacher Education program.  
COREQUISITE: EDSD 451 (for teaching majors in this subject).  
- Problem solving approach to planning (including lesson/unit), teaching and evaluating vocational and technology education at the middle and secondary school levels. Content area reading will be investigated. Includes classroom paraprofessional experience. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 458 METHODS OF TEACHING SOCIAL STUDIES** | F, S 3 cr. LEC 2 LAB 1 | PREREQUISITE: EDSD 460, 20 or more credits in subject area and good standing in Teacher Education Program.  
COREQUISITE: EDSD 451 (for teaching majors in this subject).  
- Teaching strategies, methods and materials for planning (including lesson/unit), implementing and evaluating social studies programs in secondary schools. Includes classroom paraprofessional experience. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 461 METHODS OF TEACHING SENIOR HIGH MATHEMATICS** | F 3 cr. LEC 2 LAB 1 | PREREQUISITE: EDSD 460, 20 or more credits in subject area, and good standing in Teacher Education Program.  
COREQUISITE: EDSD 451 (for teaching majors in this subject).  
- Effective techniques in presenting materials, and planning class activities (including lesson/unit). Methods of teaching and evaluating algebra, geometry, trigonometry, probability/statistics; application of current mathematics education research and reading in the content area of mathematics. Includes classroom paraprofessional experience. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 465 METHODS OF TEACHING SECONDARY HEALTH ENHANCEMENT** | F, S 3 cr. LEC 3 | PREREQUISITE: EDSD 460, 20 or more credits in subject area, and good standing in Teacher Education Program.  
- Developing pedagogical content knowledge by focusing on research based instructional strategies, methods, materials, and content reading for planning, implementing, and evaluating health enhancement lessons, units, and programs in secondary schools. Includes classroom paraprofessional experience. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 480 SPECIAL TOPICS** | On Demand 1 - 3 cr. Maximum 12 cr. | PREREQUISITE: EDCI 360, 20 or more credits in subject area, admission to the Teacher Education Program.  
- Focused on methods of planning (including lesson/unit), teaching, and evaluating science inquiry skills, content, attitudes, and safety in the secondary classroom. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDS 718 METHODS OF TEACHING MIDDLE SCHOOL MATHEMATICS** | S 3 cr. LEC 3 | PREREQUISITE: EDSD 460, 20 or more credits in subject area, and good standing in Teacher Education Program.  
- Effective techniques in presenting materials, planning class activities, and creating good learning experiences. Methods of teaching and evaluating arithmetic, remedial mathematics, basic geometry, introductory algebra, and reading/writing mathematics. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **EDSD 480 SPECIAL TOPICS** | On Demand 1 - 3 cr. Maximum 12 cr. | PREREQUISITE: Course prerequisites as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number. |

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDSD 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION</strong></td>
<td>F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.</td>
<td>PREREQUISITE: Course instruction associated with directed undergraduate research/creative activity project.</td>
</tr>
</tbody>
</table>
EDSD 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

EDSD 570 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Good standing, consent of instructor, approval of department head, and approval of Dean of Graduate Education.
- Directed research and study on an individual basis.

EDSD 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EE Electrical Engineering
Department of Electrical & Computer Engineering
(406) 994-2505

EE 101 INTRODUCTION TO ELECTRICAL FUNDAMENTALS
F, S 2 cr. LEC 1 LAB 1
PREREQUISITE: MATH 160 or equivalent.
- Lecture/laboratory introduction to electrical fundamentals including Kirchhoff's and Ohm's Laws, using meters and oscilloscopes, time-varying signals in electric circuits, inductors and capacitors, series and parallel circuits, introduction to digital circuits, problem solving including computer applications, technical communications, team work.

EE 205 CIRCUITS I
F, S 4 cr. LEC 3 LAB 1
PREREQUISITE: EE 101, MATH 182.
COREQUISITE: PHYSICS 212.
- Introduction to circuit analysis including Ohm's and Kirchhoff's Laws, nodal and mesh methods; network theorems; resistors, capacitors, inductors, independent and dependent sources, diodes, ideal OP-AMP and transistor circuits; R-L, R-C, and R-L-C responses; complex frequency and phasors; steady-state AC circuits.

EE 207 CIRCUITS II
S 4 cr. LEC 3 LAB 1
PREREQUISITE: EE 206, MATH 225.
- Complete response of R-L-C circuits to step and harmonic excitations, coupled inductors and ideal transformers, two port networks, network functions and Bode plots, frequency response of circuits with non-ideal OP-AMP and transistor based amplifiers, Laplace Transform and Fourier series.

EE 250 CIRCUITS, DEVICES, AND MOTORS
F, S 4 cr. LEC 3 LAB 1
PREREQUISITE: MATH 182 or MATH 176.
COREQUISITE: PHYS 212 or PHYS 206.
- Introduction to non-sinusoidal to electrical circuit principles, voltage and current laws, frequency response; introduction to electronic circuits including transistors, operational amplifiers, and power electronics; digital logic; introduction to electronic energy conversion devices, DC and AC machines, special purpose machines.

EE 251 INTRODUCTION TO LOGIC CIRCUITS
F, S 3 cr. LEC 3
COREQUISITE: MATH 181.
- An introductory course in the fundamental concepts of classical digital design. Course covers design and implementation of combinational logic circuits, asynchronous sequential circuits and information storage circuits. Basic concepts of programmable logic devices and computer-aided design tools are presented.

EE 252 LOGIC CIRCUITS LABORATORY
F, S 1 cr. LAB 1
PREREQUISITE: EE 251.
- Application of digital circuit theory and logic circuit design, utilizing both discrete and programmable logic. Design of IC timing circuits for digital clock applications.

EE 270 INDEPENDENT STUDY
On Demand 1 - 2 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Directed research and study on an individual basis.

EE 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EE 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

EE 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

EE 301 MULTIDISCIPLINARY SEMINAR
F, S 1 cr SEM 1
PREREQUISITE: Junior standing.
- Students attend seminars presented by variety of departments and disciplines to gain an appreciation of multidisciplinary environments leading to a greater understanding of the impact of engineering solutions in a global and societal context.

EE 308 SIGNAL AND SYSTEM ANALYSIS
F 3 cr. LEC 3
PREREQUISITE: EE 207, MATH 224, and CS 160.
- Discrete and continuous time signals and systems. Properties, application, synthesis and analysis for the CT and DT Fourier Series, the Fourier transform, the DTFT, z and Laplace transform. Applications in differential and difference equations, sampling, feedback, and communications. Introduction to the DFT.

EE 317 ELECTRONICS
F 4 cr. LEC 3 LAB 1
PREREQUISITE: EE 207.
- This is an introductory course in electronics. It introduces diodes, bipolar junction transistors, field effect transistors and bipolar and MOS analog and digital circuits.

EE 321 INTRODUCTION TO CONTROLS
S 3 cr. LEC 3
PREREQUISITE: EE 308.

EE 354 ELECTROMAGNETIC THEORY I
F 3 cr. LEC 3
PREREQUISITE: PHYS 212, MATH 224.
- Basic electric and magnetic fields including transmission lines. The materials covered will include both static and dynamic fields, traveling waves, and transmission line concepts such as the definition of impedance, power flow, and the use of the Smith Chart.

EE 355 ELECTROMAGNETIC THEORY II
S 3 cr. LEC 3
PREREQUISITE: EE 354.
- This course provides students the opportunity to gain more depth in EM fields topics such as Maxwell's equations, plane wave propagation, radiation, and antennas, and the use of the scattering matrix.

EE 555 INDUSTRIAL ELECTRIC AND ELECTRONIC SYSTEMS
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: PHYS 212 or PHYS 206 and MATH 182 or MATH 176.
- Electric industrial system overview and requirements, selection of electric industrial drives and associated power converters, industrial power systems, illumination, load estimation and feeder design, power quality and system security.

EE 554 ELECTRIC POWER APPLICATIONS
F 3 cr. LEC 2 LAB 1
PREREQUISITE: MATH 176 or MATH 181 and PHYS 206 or PHYS 212.
- An applied study of electricity and electrical power circuits, with laboratory experience, for that person not expected to deal with electronics or advanced circuit techniques. Topics covered include electrical circuit laws; power and energy; alternating current circuits; industrial power systems; transformers, single phase and special purpose motors, and power electronic converters; introduction to power systems. Laboratory experience includes construction and demonstration of energy conversion circuits.

EE 567 LOGIC DESIGN
S 4 cr. LEC 3 LAB 1
PREREQUISITE: EE 262, EE 371.
- Advanced combinational, synchronous and asynchronous sequential logic system design including hardware descriptive languages. Laboratory experience in advanced logic circuit design.
230

COURSE DESCRIPTIONS: EE 371 - EE 475

EE 371 MICROPROCESSOR
HARDWARE AND SOFTWARE SYSTEM
F 4 cr. LEC 3 LAB 1
PREREQUISITE: EE 261 and knowledge of a programming language or consent of instructor.
- Introduction to the structure of microprocessors, arithmetic and logic units, processor control, interrupts, memories, and input/output. Laboratory experience in assembly level programming of microprocessor applications.

EE 391 ELECTRICAL ENGINEERING DESIGN I
F, S 1 cr. LEC 1
PREREQUISITE: Within three semesters of graduation.
- Activities involved in planning, budgeting, and implementing a design project. Design teams are formed and projects are proposed with a formal proposal. Design solutions are examined, a final solution is chosen, and implementation is begun.

EE 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 1 cr.
PREREQUISITE: Junior standing.
- Engineers from industry and others present weekly seminars about new developments in EE research at MSU, law and the EE, starting companies, etc. The course is designed to expose students to different career options and present background in related areas.

EE 407 INTRODUCTION TO MICROFABRICATION
S 3 cr. LEC 2 LAB 1
PREREQUISITE: Junior standing and PHYS 212 or PHYS 285.
- Provide an introduction to clean room safety protocol and micro fabrication. Lectures will introduce micro fabrication methods, models and equipment. Laboratories will perform the steps to produce and characterize a metal-oxide-semiconductor transistor.

EE 409 MATERIAL SCIENCE
F 3 cr. LEC 3
PREREQUISITE: EE 317.
- Basic material properties of dielectrics, magnetic materials, conductors, and semiconductors. Practical applications of materials to circuit design.

EE 411 ADVANCED ANALOG ELECTRONICS
S 3 cr. LEC 2 LAB 1
PREREQUISITE: EE 317.
- This course covers differential and multistage amplifiers, frequency response, feedback, analog integrated circuits, filters, and tuned circuits, analog to digital and digital to analog conversion, noise in electronics, current topics.

EE 412 ELECTRONIC INSTRUMENTATION DESIGN
F 5 cr. LEC 2 LAB 1
PREREQUISITE: EE 317.
- Applications of integrated instrumentation amplifiers, comparators, sample and hold devices, and A-D and D-A converters. Design using electrical transducers, signal conditioning and filtering circuits, passive elements, and ground-loop considerations. Lab experience in graphical programming applications for data acquisition and instrument control. Analog and digital I/O considerations to control processes and generate patterns for testing and communication with peripheral equipment.

EE 414 INTRODUCTION TO VLSI DESIGN
F 3 cr. LEC 3
PREREQUISITE: EE 262, EE 317.
- Introduction to CMOS fabrication, CAD tools setup, MOSFET operation, metal, active and poly layers, CMOS passive elements, design rules and layout, BSIM SPICE simulation, the inverter, static logic and transmission gates, dynamic logic, and CMOS opamps.

EE 415 ANALOG INTEGRATED CIRCUIT DESIGN
S 3 cr. LEC 3
PREREQUISITE: EE 414.
- Topics include passive components, parasite elements, component matching, IC layout techniques, computer simulations, amplifiers, current sources, comparators, op amps, noise, switched capacitor circuits.

EE 417 ACOUSTICS AND AUDIO ENGINEERING
F alternate years, to be offered 2006 3 cr. LEC 3.
PREREQUISITE: PHYS 212.

EE 422 INTRODUCTION TO MODERN CONTROL
F 3 cr. LEC 3
PREREQUISITE: EE 321.

EE 423 CONTROL SYSTEMS LAB
F 1 cr. LAB 1
PREREQUISITE: EE 321.
- Identification of characteristics and parameters of physical systems, hardware implementation of various modes of feedback control on physical systems, simulation and control application design.

EE 433 PLANAR MICROWAVE CIRCUIT DESIGN
F 3 cr. LEC 2 LAB 1
PREREQUISITE: EE 333.
- An introductory course on microwave circuits emphasizing the design, fabrication and measurement of planar circuits (matching networks, filters, couplers, mixers, etc.) for frequencies above 1 GHz. Students will learn to use state-of-the-art CAD tools and a vector network analyzer.

EE 445 TELECOMMUNICATIONS SYSTEMS
S 3 cr. LEC 3
PREREQUISITE: EE 308, EE 317.
- Analog and digital communication systems performance in noisy environments; noise characteristics; bandwidth considerations; probability of error; analog and digital modulation; frequency domain analysis; matched filter applications.

EE 446 TELECOMMUNICATIONS LAB
S 1 cr. LAB 1
COREQUISITE: EE 445.
- Fourier analysis and use of spectrum analyzers. Experiment involving modulation and demodulation of analog and digital signals, sampling theory, and aliasing.

EE 447 MOBILE WIRELESS COMMUNICATIONS
S 3 cr. LEC 3
PREREQUISITE: EE 445.
- Characteristics of the radio environment, propagation, cellular concepts, channel allocation, modulation techniques, multiple access techniques, Shannon's Capacity Theorem, error-correcting codes, data compression, spread spectrum modulation, current wireless communication systems.

EE 451 POWER ELECTRONICS
S alternate years, to be offered 2008 5 cr. LEC 2 LAB 1
PREREQUISITE: EE 317, EE 321, EE 355.
- This course incorporates a design oriented study of power electronic devices such as DC-DC, DC-AC, AC-DC, and AC-AC converters used in various electrical and electronic systems. Laboratory experience includes construction and demonstration of a regulated power converter.

EE 454 ELECTRIC POWER SYSTEMS
F 3 cr. LEC 3
PREREQUISITE: EE 355.
- Power system components, transmission system design, power flow studies, automatic generation control, symmetrical components, faulted power systems, protection, introduction to transient stability.

EE 465 REAL TIME MICROCONTROLLER APPLICATIONS
F 4 cr. LEC 2 LAB 2
PREREQUISITE: EE 371.
- Lecture/laboratory exposure to micro controller hardware and software applications, serial and parallel I/O, timing, interrupts LCDs, keyboards, A to D conversion, and a project realizing a real time control problem.

EE 466 COMPUTER ARCHITECTURE AND SYSTEM ORGANIZATION
S 3 cr. LEC 3
PREREQUISITE: EE 371.
- Design of computer system instruction sets, data path, storage, and memory systems. Cost and speed relations, tradeoffs between hardware and software architectures including CISCs and RISCs, multiprocessors, and distributed processors. Control and implementation tradeoffs.

EE 467 ADVANCED EMBEDDED SYSTEMS LAB
S 1 cr. LAB 1
PREREQUISITE: EE 367, CS 201.
COREQUISITE: EE 466.
- Principles and applications of embedded systems using FPGAs. Students will implement micro controllers, soft processors, and custom logic in FPGAs.

EE 470 INDEPENDENT STUDY
On Demand 1 - 2 cr. IND Maximum 4 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

EE 475 HARDWARE AND SOFTWARE ENGINEERING FOR EMBEDDED SYSTEMS
F 3 cr. LEC 2 LAB 1
PREREQUISITE: EE 371 and CS 201.
- Topics in embedded system design, real-time operating systems, high level language programming of embedded systems, software and hardware tradeoffs, and laboratory experience with embedded systems.
EE 476 INTERNSHIP
F, S, Su 1-2 cr. IND Maximum 3 cr.
PREREQUISITE: Sophomore standing and consent of instructor.
- On-site, one semester practicum under guidance of employer designated mentor.

EE 477 DIGITAL SIGNAL PROCESSING
S 4 cr. LEC 5 LAB 1 PREREQUISITE: EE 508.
- Analysis and design of discrete-time systems, including frequency response. Sampling and reconstruction of continuous signals. Analysis, design, and applications of FIR and IIR digital filters. Properties and applications of the discrete Fourier transform. Laboratory experience implementing off-line and real-time digital signal processing algorithms.

EE 480 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EE 482 ELECTRO-OPTICAL SYSTEMS
F 3 cr. LEC 2 LAB 1 PREREQUISITE: EE 534 or PHYS 317 or equivalent.
- Provides an overview of electro-optic systems and components. Lectures will cover ray optics, scalar wave optics, laser and Gaussian beam optics, light sources, detectors, and electro-optic and acoustooptic photonic devices. Laboratory experiments will introduce basic photonic instrumentation and measurement techniques.

EE 483 FIBER AND OPTICAL COMMUNICATIONS
S 3 cr. LEC 2 LAB 1 PREREQUISITE: PHYS 215 AND EE 534 or PHYS 318.
- This introduction to fiber and integrated optics for telecommunications systems includes: ray tracing, graded index lenses, single mode and multimode optical fiber, fiber Bragg gratings, wave guides, WDM components, light sources and detectors, optical link design, link budgets and optical system architectures.

EE 484 LASER ENGINEERING
S alternate years, to be offered 2007 3 cr. LEC 3.
PREREQUISITE: PHYS 212.
- The laser engineering course provides a basic understanding of the design and operational principles of lasers. Discussions of design and operation of several types of lasers will be covered including solid state lasers, gas lasers, and semiconductor lasers.

EE 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. RCT May be repeated. Max 4 cr. COREQUISITE: EE 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

EE 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND May be repeated. Max 6 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

EE 492B ELECTRICAL ENGINEERING DESIGN II
F, S 3 cr. SEM 1 LAB 2 PREREQUISITE: EE 391.
- Senior capstone course. The design project proposed culminates with the actual construction and demonstration of the project. Design teams report progress to the design supervisor periodically. Students are required to write a technical paper, orally present it, and generate a technical manual for the project.

EE 495 PROFESSIONALISM, ETHICS AND ENGINEERING PRACTICES
S 1 cr. LEC 1 PREREQUISITE: Junior standing.
- Engineers from industry and others give presentations on professionalism, ethics, and engineering practices. Included are specific well-known, historical engineering ethics cases and professional practices of engineering, intellectual property issues, and new developments.

EE 498 COP-OP EXPERIENCE
F, S, Su 3 cr. IND PREREQUISITE: Junior standing, GPA of 3.00 or better.
- On-site cooperative work experience for electrical engineering co-op students.

EE 503 ADVANCED ANALOG CIRCUIT DESIGN
F alternate years, to be offered 2007 3 cr. LEC 3.
PREREQUISITE: EE 517.
- Solid state device models, p-n junction and other components. Single and multiple state amplifier design, current sources, operation amplification design, frequency response, feedback and feed forward amplifier analysis, noise and distortion in electronics.

EE 505 MEMS SENSORS AND ACTUATORS
S alternate years, to be offered 2008 3 cr. LEC 3.
PREREQUISITE: EE 334 or equivalent.
- Provides an overview of MEMS technologies, equipment selection, system design and devices. Theory of various mechanical transducers and physical sensors including optical MEMS, RF MEMS, and Bio/Chemical MEMS. Microfabrication of electrical and Mechanical MEMS, RF, and Bio/Chemical MEMS. Applications will be explored in wireless communication, remote sensing, and related fields. Numerical electromagnetic simulation techniques are used for antenna modeling.

EE 506 ADVANCED TOPICS IN ELECTROMAGNETICS AND OPTICS
On Demand 3 cr. LEC 3.
PREREQUISITE: None.
- Advanced topics in applied electromagnetics and optics, chosen to represent current research in this field.

EE 514 ADVANCED COMMUNICATIONS ENGINEERING
F alternate years, to be offered 2006 3 cr. LEC 3.
PREREQUISITE: EE 445.
- Signal spectrum analysis, random processes, correlation functions, functional transformations of random variables, optimal linear filtering and estimation, statistical analysis of digital and analog modulation systems, orthogonality and related signal and bandwidth, and dimensionality.

EE 522 ADAPTIVE CONTROL
S alternate years, to be offered 2008 3 cr. LEC 3.
PREREQUISITE: EE 422.
- On-line parameter estimation, self tuning regulators, model reference adaptive controls. Robust control.

EE 523 SYSTEM IDENTIFICATION
F alternate years, to be offered 2007 3 cr. LEC 3.
PREREQUISITE: EE 422.

EE 528 SEQUENTIAL STATE ESTIMATION
F alternate years, to be offered 2006 3 cr. LEC 3.
PREREQUISITE: EE 422.
- Sequential state estimation, with emphasis on Kalman filtering and smoothing. Continuous and discrete time.

EE 529 ADVANCED TOPICS - CONTROLS & SIGNALS
On Demand 3 cr. LEC 3.
PREREQUISITE: EE 422 or equivalent.
- Reading, discussion and exploration of original source material on advanced control systems and signal processing. Topics selected to complement current interest and existing courses; for example, computational statistical methods, estimation, modeling, compression, advanced analytical techniques, multi-dimensional systems, spectral analysis, and implementation.

EE 531 ANTENNA ENGINEERING
F alternate years, to be offered 2006 3 cr. LEC 3.
PREREQUISITE: EE 334 or equivalent.
- Introduction to the electromagnetic theory and practice of antenna design and analysis. Common antenna structures are studied, including dipoles, arrays, horns, and reflectors. Applications will be explored in wireless communication, remote sensing, and related fields. Numerical electromagnetic simulation techniques are used for antenna modeling.

EE 533 ANTENNA ENGINEERING
F alternate years, to be offered 2006 3 cr. LEC 3.
PREREQUISITE: EE 422.
- Advanced topics in applied electromagnetics and optics, chosen to represent current research in this field.

EE 534 ADVANCED COMMUNICATIONS ENGINEERING
F alternate years, to be offered 2007 3 cr. LEC 3.
PREREQUISITE: EE 445.
- Digital and analog switching systems, packet and circuit telecommunication transmission networking and media selection (fiber optics, cable, microwave and satellite), network configuration, network technologies, equipment selection, system design examples and project.
EE 552 ADVANCED POWER SYSTEMS ANALYSIS & CONTROL
On Demand 3 cr. LEC 3
PREREQUISITE: EE 454.
— Representation of power system elements, fast-decoupled power flow, optimal power flow, voltage control, load-frequency control, control of active and reactive power flow, application of FACTS devices in power flow control, electrical faults and contingency calculations, transient stability, dynamic stability.

EE 555 ALTERNATIVE ENERGY DISTRIBUTED GENERATION SYSTEMS
S alternate years, to be offered 2007 5 cr. LEC 3
PREREQUISITE: EE 355.
— Exploration and analysis of alternative power generation sources and systems such as wind, solar, and fuel cell, combined sources and their design, power electronic interfacing, and energy storage systems.

EE 556 ADVANCED POWER ELECTRONICS
S alternate years, to be offered 2008 5 cr. LEC 3
PREREQUISITE: EE 451.
— Mathematical modeling of switching power converters, advanced power converter topologies, design constraints and control methods, design-oriented analysis techniques for applications in electromechanical systems, power systems, transportation systems, etc.

EE 558 ADVANCED TOPICS - ELECTRICAL POWER
On Demand 3 cr. LEC 3 Max 6 cr.
PREREQUISITE: EE 454 or equivalent.
— Reading, discussion and exploration of advanced electrical power topics including power system operation and control, power dynamics, power markets, protection, electric drives, or power electronics.

EE 564 ADVANCED COMPUTER ARCHITECTURE
F alternate years, to be offered 2007 5 cr. LEC 3
PREREQUISITE: EE 466.
— Advanced design considerations in modern digital computers including: CISC and RISC designs, tightly coupled multiprocessors and software decomposition, network architectures, database computer design, array processors, hardware and software adaptive processors, and distributed memory processors.

EE 565 PARALLEL & ASSOCIATIVE PROCESSORS
F alternate years, to be offered 2007 5 cr. LEC 3
PREREQUISITE: EE 466.
— Architecture and applications of parallel processors, major design issues, fault tolerant computing, associative processors, performance measures of parallel and associative processors.

EE 570 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
— Directed research and study on an individual basis.

EE 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 3 cr. IND 3
PREREQUISITE: Graduate standing.
— A research or professional paper dealing with a topic in the field. The topic must have been mutually agreed upon by the student and the advisor and graduate committee. This course is required for students in the Electrical Engineering nonthesis (plan B) master's degree program.

EE 577 ADVANCED DIGITAL SIGNAL PROCESSING
S alternate years, to be offered 2007 5 cr. LEC 3
PREREQUISITE: EE 477.
— Advanced topics in digital signal processing. Review of LTI discrete-time systems; signal and coefficient quantization; sample rate conversion and multirate filter structures; time-varying and adaptive systems; fast algorithms; system implementation alternatives; DSP applications in current research.

EE 578 SPEECH SIGNAL PROCESSING
F alternate years, to be offered 2006 3 cr. LEC 3.
PREREQUISITE: EE 477.
— Speech processing techniques are used to analyze and manipulate discrete-time speech signals. Topics include modification, coding, enhancement, and speech recognition.

EE 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EE 581 FOURIER OPTICS AND IMAGING THEORY
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EE 554 or consent of instructor.
— Optical propagation and diffraction using scalar wave approach and Fourier Theory of imaging. Introduces concepts of pupil function, point and line spread function and optical transfer function, image formation with coherent and incoherent light, holography and diffractive optical elements.

EE 582 OPTICAL DESIGN
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EE 482 or PHYS 426.
— Optical design using geometrical optics and computer ray-tracing software. Introduces ray and wave front aberrations and the modulation transfer function for describing the imaging and beam-conditioning properties of typical optical systems, including lenses, mirrors, cameras, and telescopes.

EE 583 REMOTE SENSING SYSTEMS
S alternate years, to be offered 2005 3 cr. LEC 3
PREREQUISITE: EE 354.
— Design, analysis, and calibration of electromagnetic remote sensing systems, including basic atmospheric physics, radiative transfer, and wave propagation principles. The course considers the full electromagnetic spectrum, but emphasizes optical system (including cameras, spectrometers, radiometers, laser radars, etc.).

EE 589 GRADUATE CONSULTATION
F, S, Su 3 cr. TUT
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
— This course may be used only by students who have completed all of their course work (and thesis if on a thesis plan) but who need additional faculty or staff time or help.

EE 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master's standing.

EE 690 DOCTORAL THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing.

EM
Engineering Mechanics
Department of Civil Engineering
(406) 994-2111

EM 205 MECHANICS
F, S 3 cr. LEC 3
PREREQUISITE: PHYS 205.
— Force systems in equilibrium and applications to structural trusses and frames; section properties; distributed force systems; shear and moment distributions in beams; basic particle dynamics.

EM 215 STRENGTH OF MATERIALS
F, S 3 cr. LEC 3
PREREQUISITE: EM 205.
— Equilibrium and deformation of structural elements; concepts of stress and strain and interrelationship; representation and transformation of combined stress states; axial, torsional and flexural stresses and deformation; column buckling.

EM 251 STATICS AND PARTICLE DYNAMICS
F, S 3 cr. LEC 3
PREREQUISITE: PHYS 211.
— Equilibrium of particles and rigid bodies; analysis of structures, coulomb friction, kinematics, kinetics, work-energy for particles.

EM 252 RIGID BODY MECHANICS
F, S 3 cr. LEC 3
PREREQUISITE: EM 251.
— Mass centers and centroids, moments and products of inertia, kinematics, kinetics, work-energy, impulse-momentum for rigid bodies, vibration of rigid bodies, and beams.

EM 253 MECHANICS OF MATERIALS
F, S 3 cr. LEC 3
PREREQUISITE: EM 251.
— Stress and strain, Hooker's Law, thermal strain, torsion, bending of beams, combined stress, limit analysis, energy methods, virtual work, column theory.

EM 290 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EM 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1 - 3 cr.
— Classroom instruction associated with directed undergraduate research/creative activity projects.

EM 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 12 cr.
— Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

EM 351 APPLIED FLUID MECHANICS
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: EM 215 or EM 253.
— Basic principles of fluid mechanics: pressure measurement, forces on submerged areas, fluid flow through conduits, parallel pipe systems, open channel flow, forces caused by fluids in motion, pumps, flow of air in ducts. Laboratory to demonstrate theoretical principles.
EM 335 MECHANICS OF FLUIDS
F, S 3 cr. LEC 3
PREREQUISITE: EM 252, EM 253.
Introduction to modern fluid mechanics.

EM 415 ADVANCED MECHANICS OF SOLIDS
F 3 cr. LEC 3
PREREQUISITE: EM 253.
Introduction to contemporary engineering problems. Computer applications.

EM 435 FLUID DYNAMICS
S 3 cr. LEC 3
PREREQUISITE: EM 335.
Equations governing steady and unsteady fluid flow; applications to contemporary engineering problems. Computer applications.

EM 470 INDIVIDUAL PROBLEMS
On Demand 1-3 cr. IND Maximum 4 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of Department Head.
Directed research and study on an individual basis.

EM 480 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EM 490 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: EM 490.
Classroom instruction associated with directed undergraduate research/creative activity projects.

EM 490 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-4 cr. IND May be repeated. Max 12 cr.
Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

EM 506 ADVANCED DYNAMICS
On Demand 3 cr. LEC 3
PREREQUISITE: EM 335.
Kinematics of particles, rigid bodies, and mechanisms. Lagrange’s equations, constraints, applications, and numerical solutions.

EM 510 ELASTIC AND INELASTIC ANALYSIS I
S 3 cr. LEC 3
PREREQUISITE: EM 525 or EM 415.
Fundamentals of linear elasticity, linear viscoelasticity and plasticity. A previous knowledge of Cartesian tensors in conjunction with small deformation stress and strain theory are expected. Correspondence principles for elastic and viscoelastic materials and analogy between elastic and inelastic materials will be presented. Constitutive theories of linear elasticity, linear viscoelasticity, and plasticity. Application to static structural theories for beams, torsion, plane stress, and plane strain will be covered for elastic and inelastic behavior.

EM 512 ELASTIC AND INELASTIC ANALYSIS II
On Demand 3 cr. LEC 3
PREREQUISITE: EM 510.
Topics in two and three dimensional linear and nonlinear elasticity, viscoelasticity, and plasticity, including large deformation theory, computer applications.

EM 518 THEORY OF PLATES & SHELLS
S alternate years, to be offered 2008 2 cr. LEC 2
PREREQUISITE: EM 415.
Theory of small plate deformations, membrane shell theory, shell bending.

EM 525 CONTINUUM MECHANICS
F 3 cr. LEC 3
PREREQUISITE: EM 415 or ME 426.
Solid and fluid mechanics, laws of vector and tensor transformations, vector and tensor calculus using cartesian tensors, theory of deformation, principles of thermodynamics, constitutive equations for elastic solids and viscous fluids.

EM 526 ADVANCED CONTINUUM MECHANICS
On Demand 3 cr. LEC 3
PREREQUISITE: EM 525.
Laws of vector and tensor transformations using non-orthogonal tensors. Large deformation theory, constitutive equations for nonlinear solids and fluids.

EM 560 FINITE ELEMENT ANALYSIS IN ENGINEERING
F 3 cr. LEC 3 LAB 1
PREREQUISITE: EM 415 or EM 435.
General finite element analysis. Application to the classical equations of fluid, solid, and thermal mechanics.

EM 570 INDIVIDUAL PROBLEMS
On Demand 1-3 cr. IND Maximum 4 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of Department Head and Dean of Graduate Education.
Directed research and study on an individual basis.

EM 580 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ENGL

English
Department of English
(406) 994-3768

ENGL 001 BASIC WRITING I
F, S 3 cr. RCT 3
PREREQUISITE: Available only to Advance By Choice students.
Introduction and practice in basic writing skills, to gain confidence and fluency with sentence structure and sequence of ideas. If needed, students may enroll in ENGL 002 and ENGL 003 for additional basic instruction prior to ENGL 121.

ENGL 002 BASIC WRITING II
F, S 3 cr. RCT 3
PREREQUISITE: ENGL 001. Available only to TRIO/Sudent Support Services students.
A second semester of instruction in basic writing skills for students requiring additional preparation for or supporting instruction concurrent with ENGL 121.

ENGL 003 BASIC WRITING III
F, S 3 cr. RCT 3
PREREQUISITE: ENGL 002. Available only to Advance By Choice students.
A third semester of instruction in basic writing skills for students requiring additional preparation for or supporting instruction concurrent with ENGL 121.

ENGL 005 BASIC READING SEMINAR
S 3 cr. RCT 5
PREREQUISITE: Available only to Advance By Choice students.
Improvement of reading skills for students who have difficulty understanding what they read. Emphasis on reading comprehension, critical thinking, and inquiry.

ENGL 109 INTRODUCTION TO COLLEGE READING AND WRITING
F, S 4 cr. LEC 4
Introduces students to critical reading practices by focusing on textual analysis of non-fiction works and writing for academic purposes by focusing on sentence and paragraph development. Offered in partnership with the COT in Bozeman.

ENGL 119 CRITICAL READING AND WRITING
F, S 4 cr. LEC 4
Offers a bridge for students to advance into college writing by providing an opportunity to develop paragraphs and short essays and introduces students to critical reading practices by focusing on textual analysis of non-fiction works. Offered in partnership with the COT in Bozeman.

ENGL 121W COLLEGE WRITING I
F, S 3 cr. RCT 3
Studies in the discovery and written expression of ideas, stressing organization, support, audience awareness, clarity, and persuasive presentation. Taught around a particular topic or theme varying with each offering.

ENGL 125H INTRODUCTION TO LITERARY STUDY
F, S 3 cr. RCT 3
Introduction to basic concepts including but not limited to: plot, character, theme, symbol, and the primary literary modes of poetry, fiction, and drama. Students will be introduced to terms through a standard handbook which should accommodate all future English courses.

ENGL 210D MYTHOLOGIES
F, S 3 cr. RCT 3
The study of specific cultural mythologies to explore the nature, function, and theory of myth.

ENGL 211 BIBLICAL FOUNDATIONS OF LITERATURE
F 3 cr. LEC 3
PREREQUISITE: ENGL 123.
Study of the Bible and related texts and how this tradition has influenced subsequent literature.

ENGL 213 CLASSICAL FOUNDATIONS OF LITERATURE
S 3 cr. LEC 3
PREREQUISITE: ENGL 123.
Study of the literature of Classical Greece and Rome and how this tradition has influenced subsequent literature.
ENGL 214D REGIONAL LITERATURE
F, S 3 cr. RCT 3
- Examination of American literary regions in the context of critical multiculturalism. Analyzes topics such as the development of local color writing, borderlands/transnational studies, and the concept of the frontier as contact zone. May focus on a specific regional literature or adopt a comparative approach.

ENGL 216 SURVEY OF BRITISH LITERATURE I
F, S 3 cr. LEC 3
PREREQUISITE: ENGL 123.
- A survey of selected works and writers of British literature from the early period through the 18th century in the context of cultural, historical, and social patterns.

ENGL 217 SURVEY OF BRITISH LITERATURE II
F, S 3 cr. LEC 3
PREREQUISITE: ENGL 123.
- A survey of selected works of British literature from the 18th century to the present in the context of cultural, historical, and social patterns.

ENGL 218 SURVEY OF AMERICAN LITERATURE I
F, S 3 cr. LEC 3
PREREQUISITE: ENGL 123.
- Survey of selected works and authors of the American literary tradition from the early period to 1865. Taught within the contexts of historical, social, and cultural developments.

ENGL 219 SURVEY OF AMERICAN LITERATURE II
F, S 3 cr. LEC 3
PREREQUISITE: ENGL 123.
- Survey of selected works and authors in the American literary tradition from 1865 to the present. Taught within the contexts of historical, social, and cultural developments.

ENGL 221 COLLEGE WRITING II
F, S 3 cr. RCT 3
PREREQUISITE: ENGL 121.
- Study and practice of strategies and devices of expository and argumentative prose. Builds upon writing skills learned in ENGL 121.

ENGL 223 TECHNICAL WRITING
F, S 3 cr. RCT 3
PREREQUISITE: ENGL 121.
- Focuses on kinds of writing done in technical or business environments: business letters, proposals, formal reports, technical presentations, user manuals, etc. Prepares students for technical writing in a range of disciplines and with attention to the social implications of technology.

ENGL 256H INTRO TO LANGUAGE & LINGUISTICS
F, S 3 cr. LEC 3
- Examines the nature and function of linguistic systems, the psychology of language, the relationship between language and culture, usage patterns, linguistic variety and change, and levels of linguistic analysis.

ENGL 258 THE STRUCTURE AND FUNCTION OF LANGUAGE
F, S 3 cr. LEC 3
- Focused study of how meaning is made in the English language, primarily through grammar. From parts of speech to sentence construction, this course will assist students in evaluating literary writing styles as well as in improving their own.

ENGL 270 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Directed research and study on an individual basis.

ENGL 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by the department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ENGL 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ENGL 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

ENGL 300 SURVEY OF LITERARY CRITICISM
F, S 3 cr. RCT 3
PREREQUISITE: ENGL 123 and one other literature course.
- Historical survey of principles, problems, and strategies of literary criticism.

ENGL 304 STUDIES IN CHILDREN'S AND YOUNG ADULT LITERATURE
F alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: ENGL 218 or ENGL 219.
- Intensive studies in selected literary works for children and young adults. The course may focus on genres, authors, themes, and/or critical approaches.

ENGL 308 MULTICULTURAL LITERATURE
S 3 cr. RCT 3
PREREQUISITE: ENGL 123 and one other literature course.
- Designed specifically for English Education students. Focuses on literature by American minorities, women, and ethnic subcultures. Includes young adult literature and popular literature.

ENGL 326 ADVANCED COMPOSITION
F 3 cr. RCT 3
PREREQUISITE: ENGL 221, junior standing.
- Advanced composition with attention to research writing, academic standards of evidence, logic, and development of style.

ENGL 330 WOMEN AND LITERATURE
F alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: ENGL 218 or ENGL 219.
- Intensive studies in selected literary works by women, and ethnic subcultures. Includes young adult literature and popular literature.

ENGL 338 LANGUAGE FOR TEACHERS
S 3 cr. RCT 3
PREREQUISITE: ENGL 121.
- Designed to provide English Teaching option students with an overview of linguistic systems, such as phonetics, phonemics, and semantics, and an intensive study of the structure of American English.

ENGL 339 TEACHING COMPOSITION, RHETORIC & SPEECH
F 3 cr. RCT 3
PREREQUISITE: ENGL 121.
- This course explores practical and theoretical issues around writing instruction (introducing several approaches to composition pedagogy and working with student texts), rhetoric (attending to, for example, theories of argument and audience), and speech (focusing on preparing students for oral presentation).

ENGL 340 STUDIES IN BRITISH LITERATURE: OLD/MIDDLE ENGLISH
F alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: ENGL 216.
- Intensive studies in selected Old English and/or Medieval literary works, with attention to historical and cultural context.

ENGL 341 STUDIES IN BRITISH LITERATURE: 16TH/17TH CENTURIES
F alternate years, to be offered 2005 3 cr. RCT 3
PREREQUISITE: ENGL 216.
- Intensive studies in selected literary works of the 16th and 17th centuries, with attention to historical and cultural context.

ENGL 342 STUDIES IN BRITISH LITERATURE: RESTORATION/18TH CENTURY
S alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: ENGL 216 or ENGL 217.
- Intensive studies in selected literary works by writers of the Restoration period and 18th-century England, with attention to historical and cultural context.

ENGL 343 STUDIES IN BRITISH LITERATURE: 19TH CENTURY
S alternate years, to be offered 2008 3 cr. RCT 3
PREREQUISITE: ENGL 217.
- Intensive studies in early American literature, with attention to historical and cultural context.

ENGL 360 STUDIES IN AMERICAN LITERATURE: EARLY AMERICAN
S alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: ENGL 218.
- Intensive studies in early American literature, with attention to development of a distinct national literature and culture.

ENGL 361 STUDIES IN AMERICAN LITERATURE: 19TH CENTURY
S alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: ENGL 218.
- Intensive studies in early American literature, with attention to development of a distinct national literature and culture.
ENGL 371 STUDIES IN BRITISH/AMERICAN LITERATURE20TH CENTURY
F alternate years, to be offered 2006 5 cr. RCT 3
PREREQUISITE: ENGL 217 or ENGL 219.
— Intensive study of selected English literary works by British and American authors, and in various genres written between the end of the 19th century and World War II, with attention to historical and cultural contexts and current literary trends and issues.

ENGL 372 CONTEMPORARY BRITISH/AMERICAN LITERATURE
S alternate years, to be offered 2007 5 cr. RCT 3
PREREQUISITE: ENGL 217 or ENGL 219.
— Intensive studies in English literary works by British and American authors and in various genres written since World War II with attention to historical and cultural contexts and current literary trends and issues.

ENGL 383 HISTORY OF THE ENGLISH LANGUAGE
S alternate years, to be offered 2008 5 cr. LEC 3
PREREQUISITE: ENGL 256, or ENGL 288, or ENGL 338.
— Development of the English language from Old English to contemporary English, with focus on structure, phonology, dialects, and external influences. Readings in Old and Middle English.

ENGL 414 LITERATURE OF PLACE
F 5 cr. RCT 3
PREREQUISITE: ENGL 125.
— Examines the relationship between environment and literary production. Variable topics.

ENGL 420 CRITICAL THEORY
S alternate years, to be offered 2008 5 cr. RCT 3
PREREQUISITE: ENGL 300.
— An intensive study of one or more of the major themes, issues, schools, or critics related to literary theory.

ENGL 428 CREATIVE WRITING
F S 3 cr. RCT 5 Maximum 6 cr.
PREREQUISITE: ENGL 121, junior standing and consent of instructor based on review of writing sample provided by student.
— Exploration of creative writing techniques in a particular genre, such as fiction, poetry, playwriting, autobiographical writing, creative nonfiction.

ENGL 429 PROFESSIONAL WRITING
S alternate years, to be offered 2007 5 cr. RCT 3
PREREQUISITE: ENGL 221 and junior standing.
— Intended for students who already have considerable skill and experience in expository writing. Focuses on professional writing designed to be read by the general public or a specialized audience.

ENGL 431RH STUDIES IN A MAJOR AUTHOR
F 5 cr. LEC 5 Maximum 6 cr.
PREREQUISITE: ENGL 123 and at least one other literature course.
— Intensive study in the works, biography, and criticism of a particular author.

ENGL 432RH SHAKESPEARE
S 3 cr. RCT 8
PREREQUISITE: ENGL 123.
— Studies in selected Shakespearean works, drawn from tragedies, comedies, histories, romances, and poetry. Development of Shakespeare's philosophy, poetics, and dramaturgy in the context of the Renaissance.

ENGL 440 WORLD LITERATURE
F S alternate years, to be offered 2007 5 cr. LEC 3
PREREQUISITE: ENGL 123.
— Selected literary works in translation from non-English cultures and/or from English speaking cultures outside the United States and Britain.

ENGL 441 STUDIES IN EMERGENT LITERATURES
S 5 cr. LEC 3 Maximum 6 cr.
PREREQUISITE: ENGL 125 and at least one other literature course.
— Studies in non-traditional literatures such as popular literature, cultural studies, gender studies, literature of American minoritiees, and post-colonial literatures. Selection and approach will vary with each offering.

ENGL 442 STUDIES IN IMAGINATIVE GENRES
F alternate years, to be offered 2006 5 cr. RCT 5 Maximum 6 cr.
PREREQUISITE: ENGL 123 and at least one other literature course.
— Intensive study of a single genre, such as the epic, novel, poem, dream vision, hyperetext, or the idea of "genre" itself. Selection and approach will vary with each offering.

ENGL 450 HISTORY AND THEORY OF RHETORIC/COMPOSITION
F alternate years, to be offered 2006 5 cr. RCT 3
PREREQUISITE: ENGL 221.
— Intensive study in composition/rhetorical theory, with attention to writing pedagogy.

ENGL 460RH CAPSTONE: RESEARCH ISSUES IN ENGLISH
S 5 cr. RCT 3
PREREQUISITE: Senior standing. Consent of instructor.
— Senior capstone course for literature majors. Integration and assessment of students' cumulative experiences as English literature majors through specific seminar-style research issues which vary with each offering. Restricted entry.

ENGL 461R INTEGRATIVE TEACHING METHODS
F 5 cr. RCT 3
PREREQUISITE: EDSD 457, senior standing.
— Senior capstone course for senior English teaching majors and minors. Integration of methodologies and English content for secondary school instruction through unit plans and videotaped mini-lessons. Class will include close analysis of issues and tasks central to the preparation of secondary teachers.

ENGL 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department chair.
— Directed research and study on an individual basis. May not be used in lieu of another required course in the English curriculum.

ENGL 476 INTERNSHIP
On Demand 1 - 12 cr. IND
PREREQUISITE: Junior standing, consent of instructor and approval of department chair.
— An individual assignment arranged with an agency, business or other organization to provide guided experience in the field.

ENGL 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ENGL 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: ENGL 490.
— Classroom instruction associated with directed undergraduate research/creative activity projects.

ENGL 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F S, Su 1-6 cr. IND May be repeated. Max 12 cr.
— Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

ENGL 510 STUDIES IN CRITICAL THEORY AND PRACTICE
S 5 cr. RCT 3
PREREQUISITE: Graduate standing and upper division literary theory courses.
— Topics in critical theory and practice. Explores how historical and contemporary theories of literature have shaped the ways readers, teachers, and critics have thought about such fundamental questions as canon formation, pedagogical practice, and the goals and purposes of literary studies as a field.

ENGL 530 STUDIES IN WRITING THEORY AND PRACTICE
F alternate years, to be offered 2006 5 cr. RCT 3
PREREQUISITE: Graduate standing and upper division writing courses.
— Topics in rhetoric and composition. Examines a variety of models that have historically governed composition theory and writing practice.

ENGL 540 STUDIES IN THEORY AND PRACTICE OF LITERARY HISTORY
F alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: Graduate standing and upper division literary history courses.
— Topics in the theory and practice of literary history. Examines debates in the discipline on topics such as the production and reception of literary texts, the practice of periodization, and the relationship between literary studies and historiography.

ENGL 550 FOCUSED RESEARCH SEMINAR
F S 3 cr. SEM Maximum 6 cr.
PREREQUISITE: Graduate standing. Course prerequisites as determined for each offering.
— Topics offered at the graduate level not covered in the required courses. Involves directed research resulting in paper, as well as participation in preparing and presenting discussion material. Topics will vary.

ENGL 570 INDEPENDENT STUDY
On Demand 1-4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing. Consent of instructor, approval of department chair, and Dean of Graduate Education.
— Directed research and study on an individual basis.

ENGL 575 PROFESSIONAL PAPER
F S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
— A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.
ENGL 576 INTERNSHIP
On Demand 1 - 12 IND
PREREQUISITE: Graduate standing, consent of instructor, approval of the department chair, and completion of 15 credits of graduate work in English.
   - An individualized assignment arranged with an agency, business, school, or other organization to provide guided experience in the field.

ENGL 580 SPECIAL TOPICS
On Demand 1 - 4 cr. SEM Maximum 9 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
   - Advanced study of topics in the discipline, in courses not required in any curriculum, including experimental offerings of visiting professors, trial offerings of new courses, or one-time offerings of current topics.

ENGL 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 5 cr. May be repeated; maximum 5 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
   - Courses offered on a one-time basis to fulfill professional development needs of in-service educators.
     - A specific focus is given to each course, which is appropriately subtitled.

ENGL 590 MASTER'S THESIS
F, S 1 - 10 cr. IND
PREREQUISITE: Graduate standing.
   - A thesis dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

ENGR 100 INTRODUCTION TO ENGINEERING
F, S 1 cr. LEC 1
   - Provides students an opportunity to explore the fields of engineering, engineering technology, and computer science. Other topics include engineering design, career opportunities, professionalism, and ethics.

ENGR 125GS TECHNOLOGY, INNOVATION, AND SOCIETY
F 3 cr. LEC 2 RCT 1
   - This course explores the innovative engineering processes that connect the creative elements of science and engineering with solving problems of everyday life. Topics include understanding the role of creativity, public safety and ethics in creating technological solutions. Case studies are investigated, including applying critical thinking to exploring how innovation can help society.

ENGR 200 DESIGNING OUR COMMUNITY
F, S 1 cr. SEM 1
   - This course is designed to explore issues in engineering and college academics for American Indian students in the Designing Our Community Program. The course will provide a learning community among students to ensure success in achieving their professional goals.

ENGR 401R MULTIDISCIPLINARY DESIGN I
F, S 1 - 5 cr. RCT
PREREQUISITE: Senior standing in an Engineering discipline.
   - A course intended for multidisciplinary design projects. Students work on a common goal of determining technical, environmental, and economic design/analysis of a society or industry impact project. (First semester of two semester sequence.)

ENGR 402R MULTIDISCIPLINARY DESIGN II
F, S 1 - 5 cr. RCT
PREREQUISITE: Senior standing in an Engineering discipline.
   - Continuation of ENGR 401.

ENGR 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
   - Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ENGR 499 ENGINEERING PROGRAM ASSESSMENT
F, S 0 cr. IND 0
PREREQUISITE: Must be in final two semesters of program.
   - Student participation in engineering program assessment. Requirement to complete the Fundamentals of Engineering (FE) examination or the Major Field Test in Computer Science (CS majors only). Applications for the exams must be obtained from the students' departments. Application deadlines: fall semester - August 1st; spring semester - February 1st.

ENGR 500 SEMINAR
S 1 cr. SEM Required, 2 cr.
PREREQUISITE: Doctoral standing.
   - Seminar experience. Initial enrollment immediately follows completion of ENGR 610. First time students will present and defend their thesis topics. The second enrollment will be during the student's final year where they will prepare and defend a formal research proposal.

ENGR 610 RESEARCH AND METHODS IN ENGINEERING
F 3 cr. LEC 3
PREREQUISITE: Doctoral standing.
   - Exploration of experimental design, statistical methods, models, and teaching issues. Methods of modern information access will also be covered.

ENTO 500 SEMINAR
F, S 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
   - Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ENTO 510 INSECT ECOLOGY
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: BIOL 100 and one of the following: STAT 410, STAT 412.

ENTO 514 BEHAVIORAL ECOLOGY
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: One of the following: BIOL 303, BIOL 403, BIOL 405, ENTO 516.
   - Functional and evolutionary aspects of the behavior of insects and vertebrates, concentrating on the structure and tests of present-day theory; optimal foraging theory, habitat selection, mating systems, parental investment, game theory and social behavior.

ENTO 516 BIOSYSTEMATICS
F alternate years, to be offered 2007 3 cr. LEC 2
PREREQUISITE: One of the following: ENTO 432, BIOL 230, BIOL 415, BIOL 418, BIOL 419, BIOL 433, BIOL 434, BIOL 436.

ENTO 520 INSECT PHYSIOLOGY
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: ENTO 204 and one of the following: BIOL 312, BIOL 402, BIOL 411, BIOL 413, BIOL 430, ENTO 301, ENTO 432, ENTO 514, or ENTO 525.
   - Principles of insect physiology and insect physiological ecology; digestive, respiratory, and circulatory processes, neurophysiology, endocrinology, reproductive systems, muscular systems and locomotion, defensive mechanisms, thermoregulation and water balance.

ENTO 525 INSECT MORPHOLOGY
S alternate years, to be offered 2006 2 cr. LEC 1
PREREQUISITE: ENTO 204 and one of the following: BIOL 310, BIOL 405, ENTO 401, ENTO 482, ENTO 510, ENTO 514, ENTO 516, or ENTO 520.
   - The principles of insect morphology and the evolutionary principles behind the diversity of form and function of the major insect and arthropod groups.

ENTO 590 MASTER'S THESIS
F, S, Su 1-10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master's standing.

ENVE 443 AIR POLLUTION CONTROL
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: EM 335, CHEM 131 and ME 324 or equivalent.
   - Fundamentals of air quality management with emphasis on the design of processes and equipment for controlling gaseous and particulate emissions.
ENVE 444 HAZARDOUS WASTE MANAGEMENT
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: Junior standing and one of the following: CHEM 215 or EM 355
- Introduction to the technologies, regulations, political and social issues, and environmental impacts of hazardous wastes. Management approaches are developed through fundamental studies and review of case histories.

ENVE 445 HAZARDOUS WASTE TREATMENT
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CE 340 or equivalent.
- Principles, theory, and practice of treating hazardous materials.

ENVE 534 ENVIRONMENTAL ENGINEERING INVESTIGATIONS
F 5 cr. LEC 3
PREREQUISITE: CE 340 and one of the following: CE 451, BRR 454, CE 485.
- Laboratory and field investigations for design and analysis of environmental engineering systems.

ENVE 535 HAZARDOUS WASTE MANAGEMENT
On Demand 3 cr. LEC 3
PREREQUISITE: ENVE 580 (Bioremediation) or previous graduate level courses in environmental engineering.
- Examination of the technologies, regulations, political and environmental impacts of hazardous wastes. Management approaches are developed through fundamental studies of case histories.

ENVE 560 ENVIRONMENTAL ENGINEERING PROCESSES
F 2 cr. LEC 2
PREREQUISITE: CE 340.
- Physical, chemical, and biological processes in water quality management.

ENVE 561 ENVIRONMENTAL ENGINEERING REACTOR THEORY
F 2 cr. LEC 2
PREREQUISITE: CE 340.
- Theory and mathematics of reactors commonly used in water and wastewater operations.

ENVE 562 WATER TREATMENT PROCESSES & DESIGN
S 3 cr. LEC 3
PREREQUISITE: ENVE 560, ENVE 561.
- Principles, theory, and practice of water treatment plant design.

ENVE 563 WASTEWATER TREATMENT PROCESSES & DESIGN
S 3 cr. LEC 3
PREREQUISITE: ENVE 560, ENVE 561.
- Principles, theory, and practice of wastewater treatment plant design.

ENVE 564 ENVIRONMENTAL ENGINEERING APPLICATIONS LABORATORY
On Demand 3 cr. LAB 3
COREQUISITE: Graduate standing or equivalent.
- The laboratories will be modular units based on environmental engineering application areas such as bioremediation, water and wastewater treatment, and biofilm systems. Students will learn analytical methods for determining chemical and biological components and will become familiar with laboratory and pilot scale reactors. Where appropriate, students will cooperate with field investigations.

ENVE 585 CHEMICAL SENSORS AND INSTRUMENTATION FOR ENVIRONMENTAL BIOTECHNOLOGY
S alternate years, to be offered 2008 2 cr. LEC 2
PREREQUISITE: CE 340 or consent of instructor.
- The course provides the knowledge necessary to design, manufacture, and use chemical sensors in the area of environmental biotechnology. Principles of manufacture and examples of application of chemical sensors along with the principles of measurement, signal conditioning, and data acquisition are presented to an extent that is necessary for the operation of sensors. The measurement techniques are preceded with an adequate theoretical introduction. Demonstrations of the sensors are organized in the Microsensors Laboratory located at the Center for Biofilm Engineering.

ENVE 586 FUNDAMENTALS OF BIOFILM ENGINEERING
F 3 cr. LEC 3
PREREQUISITE: MATH 225.
- Development of quantitative descriptions of processes of microbial growth, diffusive and convective soluble transport, and cell attachment and detachment. Integration of these processes in mathematical models of biofilm accumulation and activity. Application of these approaches to the analysis of biofilms in diverse industrial and natural environments.

ENVE 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing; consent of instructor, approval of Department Head and Dean of Graduate Education.
- Directed research and study on an individual basis.

ENVE 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

ENVE 576 INTERNSHIP
On Demand 2 cr.
PREREQUISITE: Graduate standing, consent of instructor and approval of Department Head.
- An individual assignment arranged with an agency, business or other organizations to provide guided experience in the field.

ENVE 580 SPECIAL TOPICS
On Demand 1 - 3 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined necessary by each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ESC 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITES: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ESC 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ESC 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

ESC 301 EARTH SCIENCE WRITING
F 2 cr. LEC 1, RCT 1
PREREQUISITE: Junior standing in Earth Sciences, ENGL 121.
- Library research and writing techniques in Earth Science. Bibliography and Index of Geology, Science and Social Science Citation Indices, bibliographic formats, citation, Earth Science writing styles, figure formats, table formats, position formulation, rewriting, peer review, audience identification, and writing strategies.

ESC 307 PRINCIPLES OF GEOMORPHOLOGY
F 4 cr. LEC 3 LAB 1
PREREQUISITE: ESCI 111 and ESCI 112; familiarity with spreadsheets and word-processing is assumed.
- Junior standing
- Framework, process, system, and time as factors which control the generation of land forms. Laboratories involve field trips and map interpretation, and computer modeling.
ESCI 310 AERIAL PHOTO INTERPRETATION
F 4 cr. LEC 3 LAB 1
PREREQUISITE: Junior standing, and either ESCI 111 and ESCI 112.
- Interpretation of aerial photographs to obtain quantitative and qualitative information about the physical and cultural features on earth's surface.

ESCI 452 SURFACE-WATER RESOURCES
F 3 cr. LEC 2 LAB 1
PREREQUISITE: Junior standing, STAT 216 or STAT 332, and ESCI 112. PHYS 205 recommended.
- Physical analysis of the surface portion of the hydrologic cycle: climate, evapotranspiration, precipitation, runoff, flooding, stream channels, sediment production, sediment transport and drainage basins. The surface-water resource in terms of regional supply and human use and intervention.

ESCI 494 SENIOR THESIS
F, S 5 cr. RCT 3
PREREQUISITE: Senior standing; minimum 3.0 cumulative grade point average; faculty recommendation.
- Senior thesis provides an opportunity to conduct research under the supervision of a faculty member leading to the production of a research paper ("mini-thesis") and an oral presentation to the department or at a professional meeting. Excellent preparation for graduate school and professional work.

ESCI 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ESCI 502 FLUVIAL GEOMORPHOLOGY
S 3 cr. LEC 3
PREREQUISITE: ESCI 307 or other introduction to fluvial systems or instructor permission.
- This course provides a foundation for understanding fluvial processes, interpreting fluvial forms, and teaches basic tools for use in watershed and river assessment. Course will cover drainage networks, channel form, and apply these concepts to a river assessment problem.

ESCI 505 GEOMICROBIOLOGY
On Demand 1 cr. SEM 2 Maximum 4 cr.
- Electronic acquisition, analysis and interpretation of hydrologic data for K-12 teachers. Data acquired through the world wide web and telnet. Students will learn to download, analyze and interpret data including rainfall, snowfall, precipitation probability, temperature, stream flow, flood frequency, evapotranspiration, and reservoir capacity.

ESCI 510 HYDROLOGY OF STREAMS AND LAKES
Su alternate years, to be offered 2007 3 cr. SEM 3
PREREQUISITE: Introductory geology/physical geography; two years K-12 teaching experience; recommended ESCI 516, and a basic course in physics.
- Streams in the mountains and plains: drainage basin analysis, stream hydraulics, slope, channel plan, channel cross section, channel types, geologic origin, evaporation, ground water recharge/discharge. Applications in the K-12 science classroom (habits of a scientific mind).

ESCI 517 ELECTRONIC HYDROLOGY
On Demand 2 cr. SEM 2
PREREQUISITE: ESCI 111, ESCI 112; secondary teaching certification plus two years teaching experience; access to the world wide web linked with telnet. Recommended ESCI 511 or ESCI 519.
- Electronic acquisition, analysis, and interpretation of hydrologic data for K-12 teachers. Data acquired through the world wide web and telnet. Students will learn to download, analyze and interpret data including rainfall, snowfall, precipitation probability, temperature, stream flow, flood frequency, evapotranspiration, and reservoir capacity.

ESCI 519 AERIAL PHOTO INTERPRETATION
F 4 cr. LEC 3 LAB 1
PREREQUISITE: Junior standing, and either ESCI 111 and ESCI 112.
- Interpretation of aerial photographs to obtain quantitative and qualitative information about the physical and cultural features on earth's surface.

ESCI 452 SURFACE-WATER RESOURCES
F 3 cr. LEC 2 LAB 1
PREREQUISITE: Junior standing, STAT 216 or STAT 332, and ESCI 112. PHYS 205 recommended.
- Physical analysis of the surface portion of the hydrologic cycle: climate, evapotranspiration, precipitation, runoff, flooding, stream channels, sediment production, sediment transport and drainage basins. The surface-water resource in terms of regional supply and human use and intervention.

ESCI 494 SENIOR THESIS
F, S 5 cr. RCT 3
PREREQUISITE: Senior standing; minimum 3.0 cumulative grade point average; faculty recommendation.
- Senior thesis provides an opportunity to conduct research under the supervision of a faculty member leading to the production of a research paper ("mini-thesis") and an oral presentation to the department or at a professional meeting. Excellent preparation for graduate school and professional work.

ESCI 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

ESCI 502 FLUVIAL GEOMORPHOLOGY
S 3 cr. LEC 3
PREREQUISITE: ESCI 307 or other introduction to fluvial systems or instructor permission.
- This course provides a foundation for understanding fluvial processes, interpreting fluvial forms, and teaches basic tools for use in watershed and river assessment. Course will cover drainage networks, channel form, and apply these concepts to a river assessment problem.

ESCI 505 GEOMICROBIOLOGY
On Demand 1 cr. SEM 2 Maximum 4 cr.
- Electronic acquisition, analysis and interpretation of hydrologic data for K-12 teachers. Data acquired through the world wide web and telnet. Students will learn to download, analyze and interpret data including rainfall, snowfall, precipitation probability, temperature, stream flow, flood frequency, evapotranspiration, and reservoir capacity.

ESCI 510 HYDROLOGY OF STREAMS AND LAKES
Su alternate years, to be offered 2007 3 cr. SEM 3
PREREQUISITE: Introductory geology/physical geography; two years K-12 teaching experience; recommended ESCI 516, and a basic course in physics.
- Streams in the mountains and plains: drainage basin analysis, stream hydraulics, slope, channel plan, channel cross section, channel types, geologic origin, evaporation, ground water recharge/discharge. Applications in the K-12 science classroom (habits of a scientific mind).

ESCI 517 ELECTRONIC HYDROLOGY
On Demand 2 cr. SEM 2
PREREQUISITE: ESCI 111, ESCI 112; secondary teaching certification plus two years teaching experience; access to the world wide web linked with telnet. Recommended ESCI 511 or ESCI 519.
- Electronic acquisition, analysis, and interpretation of hydrologic data for K-12 teachers. Data acquired through the world wide web and telnet. Students will learn to download, analyze and interpret data including rainfall, snowfall, precipitation probability, temperature, stream flow, flood frequency, evapotranspiration, and reservoir capacity.
COURSE DESCRIPTIONS: ESCI 689 - FIN 352

ESCI 689 GRADUATE RESEARCH/CREATIV ACTIVITY INSTRUCTION
F, S 1 - 3 cr. RCT Maximum 5 cr.
PREREQUISITE: Doctoral candidate standing.
- Directed doctoral research/creative activity project; may include reading research publications in the field in preparation for beginning dissertation research.

ESCI 690 DISSERTATION RESEARCH
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral candidate standing.

ESL
English as a Second Language
A.C.E. Language Institute
(406) 585-9832
The A.C.E. Language Institute, affiliated with Montana State University, offers a full range of English as a Second Language classes. The Institute is located at 1106 South 6th (across the street from Hannon Hall). Please contact the A.C.E. Language Institute director for a complete list of classes and registration information.

F&W/L
Fish & Wildlife Management
Department of Ecology
(406) 994-4548

F&W/L 201 INTRODUCTION TO FISH & WILDLIFE
F 1 cr. SEM 1
- An introduction to the issues, ethics, challenges, and opportunities associated with management of wildlife and fisheries. For Fish and Wildlife Majors or those interested in the field.

F&W/L 301 PRINCIPLES OF FISH & WILDLIFE MANAGEMENT
S 3 cr. LEC 5
PREREQUISITE: BIOL 101 and BIOL 102.
- Overview of history and ecological principles underlying fish and wildlife management. In-depth discussion of current issues.

F&W/L 401 FISH & WILDLIFE TOPICS
S 2 cr. LEC 1 LAB 1
PREREQUISITE: F&W/L 301.
- Senior capstone course. Course emphasizes solving problems related to management of fish and wildlife. Students will be introduced to field techniques, analysis approaches, and scientific literature used to develop management plans for terrestrial and aquatic vertebrates. For Fish and Wildlife Majors.

F&W/L 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructors, and approval of department head.
- Directed research and study on an individual basis.

F&W/L 476 INTERNSHIP
On Demand 2 - 12 cr. IND
PREREQUISITE: Junior standing, F&W/L 301, consent of instructor, and approval of department head.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

F&W/L 489R UNDERGRADUATE RESEARCH/CREATIV ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated, Max 4 cr.
COEREUITITE: F&W/L 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

F&W/L 490R UNDERGRADUATE RESEARCH/CREATIV ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

F&W/L 501 APPLIED POPULATION/ECOLOGY
S 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 305 or F&W/L 301.
- An in-depth review of (1) animal population ecology and (2) the application of theory in contemporary population management.

F&W/L 502 ANALYSIS OF POPULATION & HABITAT DATA
F alternate years, to be offered 2007 3 cr. LEC 2
LAB 1
PREREQUISITE: Completion of, or concurrent enrollment in a four-hundred level statistics course.
- Study of the theory and methods of sampling and analyzing population and habitat data for vertebrates. Estimation of population site, survival, recruitment, habitat selection and home range with contemporary software packages. Computer lab.

F&W/L 504 WILDLIFE HABITAT RELATIONSHIPS
S alternate years, to be offered 2007 3 cr. LEC 2
LAB 1
PREREQUISITE: BIOL 303, F&W/L 301 and graduate standing.
- An exploration of current understanding of the relationships between wildlife populations and communities and characteristics of the landscape they occupy. A cooperative learning laboratory focuses on the evaluation and management of wildlife habitat on local lands.

F&W/L 510 FISHERIES MANAGEMENT
F 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 404, BIOL 415, F&W/L 301.
- An in-depth review of the scientific literature concerning the theory and practice of contemporary fishery management emphasizing ecology, life history, fish population sampling and manipulation and multiple use concepts.

F&W/L 511 ADVANCED STREAM ECOLOGY
S alternate years, to be offered 2006 5 cr. LEC 3
PREREQUISITE: BIOL 305, BIOL 404.
- Overview of physical and biological interactions in streams and how these are affected by man's activities.

F&W/L 513 FISHERIES HABITAT MANAGEMENT
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: Graduate standing or consent of instructor.
- Techniques of protection, restoration, and improvement of habitats required by recreationally, commercially, or culturally important fishes and associated organisms.

F&W/L 520 MAMMAL MANAGEMENT
S 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 418, F&W/L 301.
- An in-depth review of the scientific literature emphasizing the ecology, theory, methods and results in the management of large mammals and their habitats.

F&W/L 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1-4 cr. IND
- Graduate standing and committee approval.
- A research or professional paper or project dealing with a topic in the field. The topic must be mutually agreed upon by the student and his or her major advisor and graduation committee.

FIN
Finance
College of Business
(406) 994-4423

FIN 251 PERSONAL FINANCE
On Demand 3 cr. LEC 3
PREREQUISITE: Completion of University Core mathematics course.
- Financial concepts as they apply to daily life. Basics of consumer credit, personal investment, insurance, and personal financial planning. This course may not substitute for any required business course.

FIN 270 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of Associate Dean.
- Directed research and study on an individual basis.

FIN 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

FIN 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

FIN 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-4 cr. IND may be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

FIN 335 INTERMEDIATE FINANCE
F, S 3 cr. RCT 3
PREREQUISITE: Junior standing, BUS 351 and for business majors, Formal Admission to the College.
- In-depth extension of financial management topics introduced in BUS 351. Topics include: risk, valuation, cost of capital, capital budgeting, capital structure, dividend policy, ethical and professional standards for finance professionals, and quantitative methods essential for effective financial analysis.
COURSE DESCRIPTIONS: FIN 400 - GEOG 330

FIN 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper-division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

FIN 450 REAL ESTATE AND INVESTMENT ANALYSIS
On Demand 3 cr. LEC 3
PREREQUISITE: BUS 351 or permission of instructor.
- To prepare students for careers in real estate, construction lending, real estate valuation, acquisition and asset management, and market and investment analysis. Much of the course material is also applicable to personal financial planning.

FIN 451 ENTREPRENEURIAL FINANCE
F, S 5 cr. LEC 3
PREREQUISITE: BUS 351.
- Study of corporate finance issues confronting entrepreneurial firms. Focus is on financial forecasting and assessing financial needs. Students utilize fundamental financial principles to make small-business decisions. Topics include: strategic financing, financing alternatives, financial contracting, venture valuation, real options, and risk-sharing.

FIN 453 FINANCIAL STATEMENT ANALYSIS
F 3 cr. RCT 3
PREREQUISITE: FIN 352.
- Analysis with emphasis on how managers’ investing and financing decisions have financial statement implications. Coverage includes: revenue recognition methods, cash flow analysis, ratios, inventory analysis, capitalization vs. expensing, depreciation, leasing vs. buying, and overall financial health and earnings quality of the firm.

FIN 455 INVESTMENTS
F 3 cr. RCT 3
PREREQUISITE: FIN 352.
- Investment principles, practices, analysis, and policies.

FIN 456 INVESTMENTS MANAGEMENT
S 3 cr. RCT 3
PREREQUISITE: FIN 455.
- Individual projects are used for in-depth study of the characteristics of stocks, bonds, and other investments with emphasis on specific selection processes.

FIN 457R FINANCIAL INSTITUTIONS AND MARKETS I
F 3 cr. RCT 3
PREREQUISITE: FIN 352.
- Builds upon basic financial principles by developing a sound understanding of why financial institutions and markets exist, what they do, and how financial risk is managed most effectively. Focus on applied “real world” analysis of financial institution risk, market operation, and products.

FIN 458 FINANCIAL INSTITUTIONS AND MARKETS II
S 3 cr. LEC 5
PREREQUISITE: FIN 457.
- Concepts of managerial finance are applied to the internal operations of financial institutions with in-depth banking simulation. Builds on FIN 457 through exploration of increasingly complex financial markets and products such as foreign exchange, futures, options, swaps, and other derivative securities.

FIN 459 CURRENT TOPICS INVESTMENTS
On Demand 3 cr. SEM 3 May be repeated. Max 6 credits
PREREQUISITE: FIN 352, FIN 453, FIN 455, FIN 457, and senior standing.
- Investigation of key issues which will determine future practices in finance.

FIN 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of Associate Dean.
- Directed research and study on an individual basis.

FIN 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

FIN 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
On Demand 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: FIN 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

FIN 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
On Demand 1 - 6 cr. IND May be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

FIN 500 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper-division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOG 105D WORLD REGIONAL GEOGRAPHY
S 3 cr. LEC 3
S alternate years, to be offered 2006, 2008 3 cr.
GEOG 302 BIOGEOGRAPHY
S 3 cr. LEC 3
GEOG 303 WEATHER AND CLIMATE
F 3 cr. LEC 3
PREREQUISITE: ESCI 112.
- The climates of the continents, and their classification, characteristics and interrelationships with other factors of the physical and human environment.

GEOG 305 GEOGRAPHIC INFORMATION SCIENCE AND SPATIAL ANALYSIS
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: GEOG 211 recommended.
- Spatial data principles and models to support analytical methods and modeling processes. Focus on vector analysis with introduction to raster analysis. Database design principles and data modeling to support analysis and modeling applications.

GEOG 315 CULTURAL GEOGRAPHY
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: GEOG 201.
- American cultural landscape evolution; origins and diffusions of American culture traits; evolution of American culture regions.

GEOG 330 GEOGRAPHICAL PLANNING
S 3 cr. LEC 3
PREREQUISITE: GEOG 105 and GEOG 201.
- Main factors, elements, principles, methods, tools, organization, and issues of urban and rural planning in a geographical context; integration of physical and human variables into the planning process.
GEOG 331 URBAN GEOGRAPHY  
S alternate years, to be offered 2008 3 cr. LEC 3  
PREREQUISITE: GEOG 201 or GEOG 294  
- Historical evolution and spatial patterns of urban phenomenon; human-environment interaction in urban area; distribution of economic and social activities in the city; spatial structure of urban system in national and regional background.

GEOG 332 ECONOMIC GEOGRAPHY  
S alternate years, to be offered 2007 3 cr. LEC 3  
PREREQUISITE: GEOG 201.  
- Contemporary research questions and methodologies in economic geography; geographical distribution of economic activities; principles of spatial interaction; application of locational theory in urban and rural settings.

GEOG 400 SEMINAR  
On Demand 1 cr. SEM 1 Maximum 4 cr.  
PREREQUISITE: Junior standing and as determined for each offering.  
- Topics at the upper division level not covered in regular courses. Students participate in preparing and presenting discussion material.

GEOG 401 HISTORICAL GEOGRAPHY  
S alternate years, to be offered 2008 3 cr. LEC 3  
PREREQUISITE: GEOG 201  
- Past geographies of North America, political, cultural, economic, and urban evolution of North American regions from the colonial era to 1900.

GEOG 485 GEOGRAPHIC THOUGHT  
S 3 cr. LEC 3  
PREREQUISITE: Senior standing in Geography program.  
- A senior capstone course for the geography major. Exploration of the history of geographic thought: the emergence and evolution of modern academic and applied geography. Contemporary trends and issues in geography.

GEOG 411 ADVANCED GIS AND SPATIAL ANALYSIS  
S 3 cr. LEC 3  
PREREQUISITE: GEOG 305.  
- Advanced data models and analytical methods, focusing on raster applications. Semester projects apply theory and concepts to a project related to student's discipline. Students learn to develop GIS applications to address a variety of issues.

GEOG 425 TOURISM PLANNING  
S alternate years, to be offered 2007 3 cr. LEC 3  
PREREQUISITE: GEOG 211 and GEOG 294.  
- A geographical, economic and planning perspective about the contemporary tourism and recreation of international, national and local scales. Topics include evolution, dynamics, types and patterns, analysis tools, planning issues and policies.

GEOG 450 MOUNTAIN GEOGRAPHY  
F 4 cr. LEC 2 LAB 2  
PREREQUISITE: ESCL 112 or BIOL 101 and ESCL 301.  
- Local, regional, and global importance of mountains, geomorphology, climatology, plants and animals of mountain environments, and their relationship to human activities.

GEOG 451 EAST ASIA IN THE GLOBAL SYSTEM  
F alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: ESCL 112, GEOG 105, GEOG 201.  
- The geographical perspective on the contemporary East Asia as a region of the world and the countries involved. Systematic themes include physical environment, history, population, culture, economy, politics, social life and international relationship.

GEOG 452 URBAN GEOGRAPHY INSTRUCTION  
F, S, Su 1 - 2 cr. LAB  
PREREQUISITE: Junior or senior standing in geography and consent of instructor and Department Head.  
- Student works as a tutor and undergraduate teaching assistant in a teaching laboratory under close academic supervision. Weekly meeting focuses on geography teaching, organization of class materials, and student supervision. Weekly lab emphasizes applying active learning concepts in a geography laboratory context.

GEOG 453 LAND USE PLANNING  
F alternate years, to be offered 2007 3 cr. SEM 3  
PREREQUISITE: Graduate standing.  
- History and philosophy of land use planning; application of geographical skills to contemporary land use planning issues. Selected topics include population pressure and land requirement, law, eminent domain, property right, public control over private land use, institution, and economics in land use planning.

GEOG 454 HISTORICAL GEOGRAPHY  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.  
- Directed research and study on an individual basis.

GEOG 455 SPECIAL TOPICS  
On Demand 1 - 4 cr. Maximum 12 cr.  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand.

GEOG 520 LAND USE PLANNING  
F alternate years, to be offered 2007 3 cr. SEM 3  
PREREQUISITE: Graduate standing.  
- History and philosophy of land use planning; application of geographical skills to contemporary land use planning issues. Selected topics include population pressure and land requirement, law, eminent domain, property right, public control over private land use, institution, and economics in land use planning.

GEOL Geology  
Department of Earth Sciences  
(406) 994-3351  
GEOL 100N DINOSAURS  
F alternate years, to be offered 2006 3 cr. LEC 2 RCT 1  
- This course provides an introduction to dinosaur paleontology. Students will learn how hypotheses about extinct animals are formulated and tested, with comparisons to modern sedimentary environments and living animals. Recitation sections allow discussion of current research and hands-on experience with sedimentary rocks and fossils. Field trips provide additional education opportunities.

GEOL 102CS ENVIRONMENTAL GEOLOGY  
S 4 cr. LEC 3 LAB 1  
PREREQUISITE: Upper division courses and others as required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand.

GEOL 204R GEOLOGY  
F alternate years, to be offered 2007 3 cr. LEC 2 RCT 1  
- This course provides an introduction to the Earth sciences. Students learn about the Earth's materials and energy, Earth's history and evolution, Earth processes, Earth systems, and Earth Resources. The exploration of the history of geographic thought: the emergence and evolution of modern academic and applied geography. Contemporary trends and issues in geography.

GEOL 204R MINERALOGY  
S 4 cr. LEC 3 LAB 1  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R GEOLOGICAL SYSTEMS  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R MINERALOGY  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R GEOLOGICAL SYSTEMS  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R MINERALOGY  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R GEOLOGICAL SYSTEMS  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R MINERALOGY  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R GEOLOGICAL SYSTEMS  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R MINERALOGY  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R GEOLOGICAL SYSTEMS  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R MINERALOGY  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R GEOLOGICAL SYSTEMS  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 204R MINERALOGY  
S alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.
GEOL 210 HISTORICAL GEOLOGY
F 3 cr. LEC 3
PREREQUISITE: ESCI 111.
- Evolution of the earth and its life from origin to present configuration. Role of plate tectonic processes in the geologic development of the continents and ocean basins. Major evolutionary developments and crises in the history of life.

GEOL 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F S 1-3 cr. CRT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

GEOL 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

GEOL 306 IGNEOUS PETROLOGY
S 3 cr. LEC 2 LAB 1
PREREQUISITE: GEOL 204.
- Detailed analysis and interpretation of the mineralogy, fabric, and genesis of terrigenous classic and carbonate sedimentary rocks. Use of thin-section microscopy, the scanning electron microscope, and x-ray diffraction techniques are emphasized in the laboratory.

GEOL 307 SEDIMENTARY PETROLOGY
S 3 cr. LEC 2 LAB 1
PREREQUISITE: GEOL 204.
- Detailed analysis and interpretation of the mineralogy, fabric, and genesis of terrigenous classic and carbonate sedimentary rocks. Use of thin-section microscopy, the scanning electron microscope, and x-ray diffraction techniques are emphasized in the laboratory.

GEOL 308 METAMORPHIC PETROLOGY
S 3 cr. LEC 2 LAB 1
- Introduction to the principles of metamorphic petrology: metamorphic facies, reactions, phase equilibria, processes, petrographic analysis, deformation, and interpretation of metamorphism in the context of global tectonics.

GEOL 309 SEDIMENTATION AND STRATIGRAPHY
S 4 cr. LEC 3 LAB 1
PREREQUISITE: GEOL 210, GEOL 307, MATH 182.
- Physical, chemical, and biological processes and their effects on sediment dispersal, deposition, and diagenesis. Geometry and lateral and vertical relationships between sedimentary rock bodies. Labs emphasize the description and analysis of sedimentary rock bodies.

GEOL 310 INVERTEBRATE PALEONTOLOGY
F alternate years, to be offered 2007 3 cr. LEC 2 LAB 1
- Investigation of invertebrate organisms and their evolution through time as preserved in the sedimentary rock record. Emphasis is on the morphology, paleoecology, evolution, and stratigraphic and environmental significance of important fossil groups. Labs stress fossil recognition.

GEOL 312 DINOSAUR PALEONTOLOGY
F alternate years, to be offered 2007 3 cr. LEC 2 LAB 1
PREREQUISITE: GEOL 210 and BIOL 101.
- Dinosaur Paleontology covers the origin, evolution and extinction of dinosaurs. Topics of special emphasis include phylogeny, the origin of birds, and functional adaptations. Labs examine dinosaur skeletons, their novel adaptations and role in developing evolutionary trees.

GEOL 315 STRUCTURAL GEOLOGY
F 4 cr. LEC 3 LAB 1
PREREQUISITE: GEOL 306 or GEOL 307, MATH 181.
- Geometry, kinematics, and dynamics of normal rock deformation. Laboratory will focus on analytical and graphical techniques of modern structural analysis. Field trip fee required.

GEOL 316 COMPARATIVE VERTEBRATE ANATOMY
S 4 cr. LEC 2 LAB 2
PREREQUISITE: BIOL 101.
- A comparative study of organ systems of vertebrates. Laboratory utilizes representative vertebrate types. Cross-listed with BIOL 310.

GEOL 330 PALEONTOLOGY LABORATORY AND RESEARCH TECHNIQUES
F 2 cr. LEC 1 LAB 1
- Provides laboratory and research experience in vertebrate paleontology, including: identification of osteological specimens, scientific illustration, use of image analysis software, fossil preparation, and other skills necessary for professional presentation of research.

GEOL 400 SEMINAR
On Demand 1 cr. SEM 1
- Topics at the upper division level not covered in regular courses. Students participate in preparing and presenting discussion material.

GEOL 411 VERTEBRATE PALEONTOLOGY
S alternate years, to be offered 2008 3 cr. LEC 2 LAB 1
PREREQUISITE: ESCI 111, GEOL 210, BIOL 101.
- This course traces the history of vertebrates from the earliest chordates to synapsids, dinosaurs, and hominids. Lectures and labs emphasize phylogeny, anatomy, novel adaptations, and major evolutionary events such as the conquest of land, flight, and mass extinctions.

GEOL 413 MACROEVOLUTION AND THE FOSSIL RECORD
S alternate years, to be offered 2007 3 cr. SEM 3
PREREQUISITE: GEOL 310 or GEOL 312 or BIOL 301.
- Macroevolution explores major trends in evolution through geologic time. The course examines such topics as whether communities evolve, cladogenesis, mass extinctions, rates of speciation and extinction, controls of biodiversity, and the role of sex and body size in evolution.

GEOL 417 TAPHONOMY: FOSSIL PRESERVATION
S alternate years, to be offered 2007 3 cr. LEC 2 SEM 1
PREREQUISITE: GEOL 307 or GEOL 309 or BIOL 310.
- Scattered dinosaur bones lie entombed in a rock; what do they mean? Taphonomy examines the processes that act on an organism from the time of its death until its discovery and how these processes bias or help in fossil interpretation.

GEOL 419 FIELD PALEONTOLOGY
Su 2 cr. LEC 1 LAB 1
PREREQUISITE: GEOL 210 or GEOL 307.
- Dinosaur Paleontology covers the origin, evolution and extinction of dinosaurs. Topics of special emphasis include phylogeny, the origin of birds, and functional adaptations. Labs examine dinosaur skeletons, their novel adaptations and role in developing evolutionary trees.

GEOL 423 FIELD GEOLOGY
Su 6 cr. LAB 6
PREREQUISITE: ESCI 307, GEOL 309, GEOL 315.
- In-depth study of the processes of glaciation and paleontology including sedimentology, facies analysis, measuring stratigraphic sections, microsite screening, field identification of vertebrate and invertebrate fossils, excavation of fossil specimens, and taphonomic data collecting.

GEOL 425 GEOPHYSICS
On Demand 3 cr. LEC 3
PREREQUISITE: GEOL 204, GEOL 210, MATH 181.
PREREQUISITE: PHYS 206.
- Geophysical surveying, seismology, gravity, isostasy, magnetism and paleomagnetism, electrical methods, radioactivity, geothermics, applications of geophysics.

GEOL 430 VOLCANOLOGY
F alternate years, to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: GEOL 306.
- Overview of current ideas concerning volcanic eruptions and their resulting deposits, concentrating on examination of processes as elucidated from the study of modern volcanic environments. Required weekend field trip and field trip fee.

GEOL 435 GLACIAL GEOLOGY
S alternate years, to be offered 2007 3 cr. LEC 1 LAB 1 SEM 1
PREREQUISITE: ESCI 307.
- In-depth study of the processes of glaciation and the resulting land forms. Includes class and library readings, quantitative laboratory exercises and modeling, and field examination of features of mountain and continental glaciation.
COURSE DESCRIPTIONS: GEOL 451 - HDFC 280

GEOL 451 GEOLOGY INSTRUCTION
F, S, Su 1-2 cr. LAB
PREREQUISITE: Junior or senior standing in geology and consent of instructor and Department Head. —Student works as a tutor and undergraduate teaching assistant in a teaching laboratory under close academic supervision. Weekly meeting focuses on geology, teaching, organization of class materials, and student supervision. Weekly lab emphasis on applying active learning concepts in a geological laboratory context.

GEOL 470 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
—Directed research and study on an individual basis.

GEOL 480 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
—Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand.

GEOL 490 UNDERGROUND RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: GEOL 490.
—Classroom instruction associated with directed undergraduate research/creative activity projects.

GEOL 490 UNDERGROUND RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND May be repeated. Max 12 cr.
—Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

GEOL 500 DEPOSITIONAL SYSTEMS
F alternate years, to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: GEOL 309.
—Facies models for terrestrial and marine depositional environments and their application to interpreting the stratigraphic record.

GEOL 510 IGNEOUS GEOCHEMISTRY
S alternate years, to be offered 2005 3 cr. LEC 3
PREREQUISITE: GEOL 306, consent of instructor.
—Major element, trace element, and isotopic distribution in igneous rocks obtained from natural and experimental systems. Emphasis on models describing the origin of compositional diversity in rock suites.

GEOL 515 STRUCTURAL GEOLOGY
F alternate years, to be offered 2007 3 cr. LEC 2 LAB 1
PREREQUISITE: GEOL 315.
—Advanced topics in structural geology. Topics and emphasis may change with each offering.

GEOL 521 HELL CREEK PALEONTOLOGY
S alternate years, to be offered 2008 2 cr. LEC 2 PREREQUISITE: ESCI 111 and consent of instructor.
—This course is an introduction to Dinosaur Paleontology and Hell Creek Formation of Eastern Montana. It will provide information and hands-on experience in field techniques used in vertebrate paleontology, including interpretation of sedimentary environments and taphonomy.

GEOL 530 TECTONICS OF SEDIMENTARY BASINS
F alternate years, to be offered 2007 3 cr. SEM 5 PREREQUISITE: GEOG 307 and GEOG 309 and GEOG 315.
—This course examines the plate tectonic setting and controls on development of modern and ancient sedimentary basins. Includes investigation of sediment provenance, facies patterns, methods of basin analysis, and subsidence history.

GEOL 570 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of Department Head and Dean of Graduate Education.
—Directed research and study on an individual basis.

GEOL 580 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
—Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

GEOL 581 QUATERNARY ENVIRONMENTS
S alternate years, to be offered 2008 3 cr. LEC 2 RCT 1
PREREQUISITE: ESCI 307.
—The last two million years of earth history as interpreted from geologic, biologic, and pedologic proxy data. Includes both global and regional analyses of changing climates and their effects on earth surface processes and land forms.

GEOL 583 APPLIED GEOLOGICAL HYDROLOGY
F alternate years, to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: Graduate standing or ESCI 440.
—Application of ground-water principles to ground-water resource, contamination and remediation problems.

HDFC
Human Development, Child Development/Family Science
Department of Health & Human Development
(406) 994-3242

HDFC 160 HUMAN DEVELOPMENT: CONCEPTION THROUGH ADOLESCENCE
F 3 cr. LEC 3
—Human growth and development from conception through early childhood focusing on the interactive nature of three domains: physical, cognitive, and psychosocial. Context influences of cultural background, cohort, ethnicity, or socioeconomic status are included. Emphasis on research, theory, and family interactions.

HDFC 218 FASHION AND TEXTILES
S alternate years, offered 2008 3 cr. LEC 2 LAB 1
—Methods of teaching textiles and apparel; wardrobe management; planning, selection, and purchase; design principles including color, lines, and emphasis; and the care of clothing and types and characteristics of fibers, production and properties of fabrics.

HDFS 219 APPAREL CONSTRUCTION
S 3 cr. alternate years, offered 2007 LEC 1 LAB 2
—Students will learn how to construct basic apparel. Emphasis will be placed on pattern reading and state-of-the-art construction techniques. A second emphasis will be on pedagogy techniques related to the construction of apparel and other items.

HDFS 250 CONSUMER ISSUES
F, S 3 cr. LEC 3
—Theories of consumer economics will be introduced and applied to current consumer issues such as housing, food, health care, and energy.

HDFS 250 SIGNING EXACT ENGLISH I
F, S 3 cr. LEC 3
—Examines the rationale and structure of S.E.E. and provides Level I skill acquisition in sign language to meet federal demand for inclusion practices in ECE and public school settings for hearing impaired, cognitive and language disorders, pervasive developmental disorders, etc.

HDFS 263 RELATIONSHIPS AND FAMILY SYSTEMS
F 3 cr. LEC 3
PREREQUISITE: HDFC 138.
—Relationship development across the life cycle from a family systems perspective. Relationship dynamics through major relationship transitions including couple formation, cohabitation, marriage, parenthood, death, divorce, and remarriage will be examined. The diversity of family experiences will be emphasized.

HDFS 270 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
—Directed research and study on an individual basis.

HDFS 271 PARAPROFESSIONAL EXPERIENCE
F, S, Su 1 cr. LAB 1 May be repeated.
PREREQUISITE: Sophomore standing in major.
—Participation in a professional work situation related to career choice.

HDFS 280 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
—Courses not required in any curriculum for which there is a particular one-time need or given on a trial basis to determine acceptability and demand before requesting a regular course number.
HDCF 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

HDCF 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

HDCF 319 THEORIES AND SKILLS FOR HELPING RELATIONSHIPS
F, S 3 cr. LEC 3
PREREQUISITE: Junior standing in HHD.
- An introduction to various family, consumer science, and counseling theories, skills, and modalities.
- An overview of the helping profession. Development of interpersonal and professional skills for working with others.

HDCF 335 PROGRAM PLANNING IN FAMILY AND CONSUMER SCIENCES
S 3 cr. LEC 2 LAB 1
PREREQUISITE: EDSD 359.
- How to plan, develop, teach, supervise, and evaluate programs in family and consumer sciences education. A second focus will be to learn about responsible actions and decision making as leaders in family, community, and work settings through the use of FCCLA.

HDCF 338 PERSONAL AND FAMILY FINANCE I
F 3 cr. LEC 5
PREREQUISITE: HDCF 138, Math core, or permission of instructor.
- Planned use of financial resources to meet the goals of individuals and families. Concepts include time value of money concepts, credit, budgeting, risk management, taxation and basic investments, First in a series of courses to prepare students for the accredited financial counselors exam.

HDCF 350 RELATIONS AND MANAGEMENT IN EARLY CHILDHOOD EDUCATION
F 3 cr. LEC 3
PREREQUISITE: HDCF 160 and HDCF 271 for majors; HDCF 150 or HDCF 250 for Education majors.
- Current research, theory, and practice related to relationships and management principles in early childhood settings with respect to the following: teacher and child relationships, environments in early childhood settings, nurturing diversity and social justice, promoting positive guidance, family and school relationships, ethics and professionalism. Observations in early childhood programs are required.

HDCF 352 CURRICULUM IN EARLY CHILDHOOD EDUCATION
S 4 cr. LEC 2 LAB 2
PREREQUISITE: HDCF 350
- Curriculum planning, implementation, and evaluation in early childhood settings. Laboratory experience in an early childhood setting from birth to age 8 is required.

HDCF 356 EXCEPTIONAL CHILDREN 0-21
F, S, Su 3 cr. LEC 3
PREREQUISITE: HDCF 160 and junior standing in major; HDCF 150 or EDG 208 or EDCI 209 and junior standing for Education majors. HDCF 271 for HHD majors.
- Historical, societal, familial and educational attitudes regarding disabilities; exceptionality in a family, school, cultural, and community context; legal requirements of IDEA and subsequent amendments, ADA and 504; categories of exceptionality; appropriate identification and intervention techniques.

HDCF 357 EXCEPTIONAL CHILDREN LABORATORY
F, S 1 cr. LAB 1
PREREQUISITE: HDCF 356.
- COREQUISITE: HDCF 356.
- Direct experience with children and young adults with special needs in infant-preschool settings, public schools (K-12), and community-based settings.

HDCF 360 HUMAN DEVELOPMENT: ADULTHOOD AND AGING
S 3 cr. LEC 5
PREREQUISITE: HDCF 160 for majors, social science core for non-majors.
- Focus on the adult stages of the life span and families with adult children; issues include inter-generational relationships, gender differences in individual, family, and career development; and the demographic and economic consequences of an aging population.

HDCF 371 RESEARCH METHODS
F, S 3 cr. LEC 5
PREREQUISITE: STAT 216 or an equivalent statistics course, and junior standing.
- Basic social science research principles and application to solution of health and human development problems. Emphasis on types of abstracting, research design, and the research process.

HDCF 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Senior standing.
- Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting class materials.

HDCF 425 FAMILY LAW AND PUBLIC POLICY
F, S 5 cr. LEC 5
PREREQUISITE: HDCF 263 or permission of instructor.
- An in-depth review of current laws and public policies impacting family life including marriage, cohabitation, divorce, remarriage, parenthood, and child custody. The impact of workplace and social policies on families is also examined.

HDCF 429 SMALL BUSINESS OPERATIONS IN HHD
S 3 cr. LEC 3
PREREQUISITE: HDCF 138.
- This course introduces basic finance, accounting, marketing, and management concepts for owning and operating a successful small family-owned business. Special attention is given to small, family-owned businesses involving areas of study in health and human development.

HDCF 432 SOCIAL COMPETENCE IN EARLY CHILDHOOD
S, alternate years 3 cr. RCT 3
PREREQUISITE: HDCF 350 or consent of instructor.
- Understanding social competence in young children in relation to familial, social and cultural contexts. Development of social skills, self-concept, peers and friendships, emotional development and resiliency.

HDCF 440 PARENTING
S 3 cr. LEC 3
PREREQUISITE: HDCF 263 and HDCF 371.
- This course focuses on how families acquire and use resources from work and the household to meet family goals and demands. Special attention to managing the dual demands of work and family in relation to the family's time, money, marital, and child-rearing responsibilities.

HDCF 442 LITERACY IN EARLY CHILDHOOD
Su, alternate years, 2006 3 cr. REC 3
PREREQUISITES: HDCF 253 and HDCF 371.
- Examines parenting processes and parent-child relationships based on scientific study of child development and family relations. Diverse parenting issues (e.g., parenting through divorce; parental stress and adaptation) will be explored across the lifespan using family systems and ecological frameworks.

HDCF 444 LITERACY IN EARLY CHILDHOOD
Su, alternate years, 2006 3 cr. REC 3
PREREQUISITES: HDCF 350 and HDCF 352.
- The course will focus on the development of literacy from birth to five by integrating early childhood education and adult literacy into a unified approach to literacy that supports early childhood education and family literacy. Scientifically-based reading/literacy research, policy and advocacy, literacy development in children and adults, learning environments, community supports and identification and development of early literacy materials.

HDCF 447 FAMILY LIFE EDUCATION
F 3 cr. RCT/DIS 3
PREREQUISITE: HDCF 371 and junior standing in the major.
- Students will gain an understanding for the general philosophy and broad principles of family life education in conjunction with the ability to plan, implement, and evaluate such educational programs. This course will be taught in accordance with the guidelines from the National Council of Family Relations on becoming a Certified Family Life Educator.
HDCF 454 PRACTICUM
IN EARLY CHILDHOOD TEACHING
F, S 3 - 8 cr. LEC 3, LAB Maximum 8 cr.
PREREQUISITE: HDCF 160, HDCF 271, HDCF 356, HDCF 352 and screening required.
— Supervised experience in programs for young children. Students will be responsible for planning, presenting, supervising, and evaluating early childhood activities in a child development laboratory setting.

HDCF 455 ADMINISTRATION OF HUMAN SERVICE PROGRAMS
F, S 3 cr. LEC 3
PREREQUISITE: HDCF 271, and senior standing.
— Knowledge and skills necessary for establishing and administering various human service programs including early childhood, youth, family, and agency settings. Students will design a program including preparation of a grant application.

HDCF 456 CREATIVITY AND THE YOUNG CHILD
Su On Demand 3 cr. LEC 3
— Introduction the history, framework, concepts, and terms of Reggio Emilia, project approach, and documentation in early childhood education; acquaint the student with recent trends in research, theory, and practice; provide experiences in planning, implementing, and evaluating the three approaches to early childhood education.

HDCF 458 ASSESSMENT AND INTERVENTION
F, S 4 cr. LEC 3 LAB 1
PREREQUISITE: HDCF 160, HDCF 271, HDCF 356 and senior standing in the HHD major; HDCF 150, EDCI 208 or EDI 209, HDCF 356, and senior standing for Education majors.
— Knowledge, application and interpretation of data related to formal and informal assessment instruments; formal report writing; CSE, IEP, 504 and IFSP procedures, parent and professional roles. Intervention model and practices for the child in family, educational, human service, and community settings.

HDCF 459 CHEMICAL DEPENDENCY TREATMENT
On Demand 3 cr. LEC 3
PREREQUISITE: Senior standing.
— This course will present an overview of philosophical and procedural components as well as practical applications for providing addictions services; professional characteristics, ethical and legal issues, care options, helping processes, care styles, and case management.

HDCF 465 FAMILY STRESS AND CRISIS
F, S 3 cr. LEC 3
PREREQUISITE: HDCF 263, HDCF 371 or equivalent, and junior standing.
— Family’s response to stressful circumstances such as changing finances, parenthood, abuse, chronic illness, divorce, and death. Stress and crisis theories will be utilized and crisis intervention techniques introduced.

HDCF 466 GENDER, SOCIAL CLASS, AND FAMILY DIVERSITY
S 3 cr. LEC 3
PREREQUISITE: HDCF 263, HDCF 371 or equivalent, and junior standing.
— Examines gender, social class, and racial/ethnic diversity in family life as well as the interaction of class, race, location (rural, urban) and household composition (single-parent, nuclear) using family systems, ecological, cultural, and feminist frameworks.

HDCF 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
— Directed research and study on an individual basis.

HDCF 472 PROGRAM EVALUATION
F 3 cr. LEC 3
PREREQUISITE: HDCF 371
— Provides a working knowledge of process and outcome evaluation techniques used to assess programs in health and human development. The course is designed to develop a conceptual basis for conducting program evaluations and enable the student to actually implement program evaluations for private and public organizations.

HDCF 474 SENIOR SEMINAR-
PROFESSIONAL ISSUES
F, S Su 6 cr. LEC 1 LAB 3
PREREQUISITE: HDCF 371 and screening procedures as specified on the HHD Website.
— Senior capstone course. Establishing a professional identity and transitioning to a career in the field of family and consumer sciences. The lab section of this course will entail the scientific application of family and consumer sciences theory and methods. In consultation with course instructor, students will participate in a lab assignment.

HDCF 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HDCF 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S Su 1 - 2 cr. RCT May be repeated.
Maximum 4 cr.
COREQUISITE: HDCF 490.
— Classroom instruction associated with directed undergraduate research/creative activity projects.

HDCF 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S Su 1-6 cr. IND May be repeated.
Maximum 12 cr.
— Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

HDCF 500 SEMINAR
F, S 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
— Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

HDCF 555 CURRENT RESEARCH IN CHILD AND ADOLESCENT DEVELOPMENT
S alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: Graduate standing.
— Current research, issues and trends in child and adolescent development are examined.

HDCF 556 EARLY CHILDHOOD EDUCATION: A CONSTRUCTIVIST PERSPECTIVE
S alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: Upper division course work in early childhood education or elementary education.
— To introduce the history, framework, concepts, and critiques of constructivism in early childhood education; to understand recent trends in constructivist early childhood research, theory, and practice; to apply practices in early childhood education to program planning, implementation, and evaluation.

HDCF 557 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Gradua.t standing, consent of instructor, approval of department head and Dean of Graduate Education.
— Directed research and study on an individual basis.

HDCF 558 MULTICULTURAL AWARENESS
F 3 cr. LEC 3
PREREQUISITE: Graduate standing.
— This course explores the relationships between social organizations, processes of historical change, social stratification (race, gender, sexuality), individuals and family structure.

HDCF 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
— This course may be used only by students who have completed all of their course work (and thesis if on a thesis plan) but who need additional faculty or staff time or help.

HDCF 571 PROFESSIONAL PRACTICUM
F, S 2 - 6 cr. LAB Maximum 9 cr.
PREREQUISITE: HDCF 554, HDCF 555, graduate standing and consent of instructor.
— Practicum experience in the field of human development.

HDCF 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
— A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

HDCF 576 INTERNSHIP
On Demand 2 - 12 cr. IND
PREREQUISITE: Graduate standing, consent of instructor and approval of department head.
— An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

HDCF 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
— Course not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HDCF 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 5 cr. May be repeated.
Maximum 3 cr.
— This course may be used only by students who have completed all of their course work (and thesis if on a thesis plan) but who need additional faculty or staff time or help.
COURSE DESCRIPTIONS: HDCF 589 - HDCO 525

HDCF 589 GRADUATE CONSULTATION
F, S, Su 1-3 cr. TUT 1-3 cr.
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course is used only by students who have completed all of their course work (and thesis if on a thesis plan) but who need additional faculty or staff time or help.

HDCF 590 MASTER'S THESIS
F, S, Su 1-10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master's standing.
- Directed graduate research/creative activity.

HDCO
Human Development, Counseling
Department of Health & Human Development
(406) 994-3242

HDCO 460 STUDENT LEADER TRAINING
F 2 cr. LEC 1 RCT 1
PREREQUISITE: Orientation leader status; restricted entry.
- Knowledge and skills necessary for interaction, presentation, and facilitation with regard to new student group leading, peer advising, and campus representation.

HDCO 463 STUDENT ASSISTANT TRAINING
F 1 cr. RCT 1
PREREQUISITE: Resident Assistant status; restricted entry.
- Course includes training in various aspects related to the performance of the Resident Advisor position duties. It includes areas such as self-understanding, interpersonal skills, intervention techniques, and perspectives on college students and the campus environment, which are fundamental to the effective functioning of Resident Assistants.

HDCO 464 STUDENT ASSISTANT CANDIDATE TRAINING
S 1 cr. RCT 1
PREREQUISITE: Resident Assistant candidate status; pass/fail grading; restricted entry.
- Course includes exposure to college student development theories, advising, and communication skill development areas within a residence hall setting. Emphasis is given to working with individuals and groups in a peer counseling/educational role. Resident Advisor roles and responsibilities are also addressed.

HDCO 500 SEMINAR
F, S, Su 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing in counseling program or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

HDCO 502 COUNSELING ETHICS AND PROFESSIONAL ORIENTATION
Su 2 cr. RCT 2
PREREQUISITE: Graduate standing in counseling program.
- This course will prepare the student with a strong orientation to professional and ethical issues as they apply to counseling. Contents of the course will examine historical aspects of counseling professions, professional counseling roles, professional organizations, consultation models, professional preparation standards, and credentialing. It will also introduce appropriate ethical codes for conduct and study case studies representing ethical dilemmas a counselor may face in schools, agencies, and private practice.

HDCO 503 PROFESSIONAL ISSUES IN MARITAL AND FAMILY COUNSELING
F 1 cr. RCT 1
PREREQUISITE: Graduate standing in counseling program.
- This course will address professional and ethical issues as they apply specifically to marriage and family therapists. Group discussion and a variety of hands-on experiences will provide the student with numerous opportunities to obtain and apply ethical and professional knowledge.

HDCO 504 PROFESSIONAL ISSUES IN MENTAL HEALTH COUNSELING
F 1 cr. RCT 1
PREREQUISITE: Graduate standing in counseling program.
- Exploration of professional issues including: philosophy, identity, organizations, training, credentialing, ethics, research, financing, politics, treatment settings, populations, laws, administration, and evaluation as applied specifically to mental health counseling.

HDCO 505 PROFESSIONAL ISSUES IN SCHOOL COUNSELING
F 3 cr. LEC 2 LAB 1
PREREQUISITE: Graduate standing in counseling program.
- Presentation of professional and ethical issues in school counseling. Group discussion and various experiential activities will provide students with numerous opportunities to understand current issues and trends in the field of school counseling.

HDCO 506 SCHOOL COUNSELING PROGRAMS
Su 3 cr. LEC 3
PREREQUISITE: Graduate standing in counseling program.
- Foundations of the school counseling profession including historical and conceptual perspectives of the field, and the knowledge and skills necessary to be a professional school counselor. Particular emphasis will be placed on a thorough understanding of planning, design, implementation, and evaluation of comprehensive school counseling programs.

HDCO 508 COUNSELING THEORIES I
Su 3 cr. LEC 3
PREREQUISITE: Graduate standing in counseling program.
- This course will acquaint the student with a wide range of counseling theories used in the diagnosis and treatment of children and families with an emphasis on approaching presenting problems from a system's theoretical base. Various forms of therapy will be presented along with suggestions as to how each can be applied to treatment of children, premarital and marital couples, and entire families to include family of origin. Team management and consultation with families, school systems, and other professionals will also be presented.

HDCO 510 COUNSELING THEORIES II
F 3 cr. LEC 3
PREREQUISITE: Graduate standing in counseling program.
- This course provides an overview of the major counseling theories and practical applications with various populations. Teaching modalities will include lecture, class discussion, study of taped counseling sessions, and small group interaction.

HDCO 521 COUNSELING SKILLS LAB
F 1 cr. LAB 1
PREREQUISITE: Graduate standing in counseling program.
- COREQUISITE: HDCO 510
- Practice and application of basic counseling skills across a variety of professional settings. Students will experience the role of client as well as counselor.

HDCO 522 GROUP COUNSELING
F 3 cr. LEC 2 LAB 1
PREREQUISITE: Graduate standing in counseling program.
- The following information will be covered in relation to group counseling: theories, research, developmental stages, therapeutic factors, leadership functions, consultation and ethics. Use of leadership skills in structured and unstructured groups will be practiced.

HDCO 523 THEORY AND PRACTICE OF ADDICTIONS
Su 2 cr. RCT 2
PREREQUISITE: HDCO 510 and graduate standing in counseling program.
- This course is designed to review current developments in the field of addictions, as well as, evaluate research and treatment trends within addiction practice. Students will be required to synthesize addictions theory and apply it to practice cases.

HDCO 524 CONSULTATION: THEORY AND PRACTICE
Su 2 cr. RCT 2
PREREQUISITE: Graduate standing in counseling program.
- The study of consultation theories, strategies, and models. Includes specific applications related to collaboration among schools, mental health agencies, and private practitioners.

HDCO 525 COUNSELING CHILDREN AND ADOLESCENTS
S 3 cr. RCT 3
PREREQUISITE: Graduate standing in counseling program.
- Application of counseling theories and techniques to preschool and school age (K-12) children and their families. A special emphasis will be placed on implementing appropriate intervention strategies according to age, developmental level, and the counseling setting.
HDCO 526 ADVENTURE COUNSELING
On Demand 3 cr. RCT 3
PREREQUISITE: Graduate standing in counseling program.
- An introduction to the theory and practice of adventure-based counseling and experiential learning. The course will focus on the goals, concepts, and techniques of adventure work. Students will learn numerous adventure games, problem-solving initiatives, and how to design adventure programs.

HDCO 550 MIND-BODY
MEDICINE AND THE ART OF SELF-CARE
S 3 cr. LEC 1 LAB/STU 2
PREREQUISITE: Graduate standing or consent of the instructor and HDCO 510.
- The objective of this course is two-fold: 1) designed to familiarize students with mind-body interventions; 2) course provides practical methods for health care providers to engage in self-care.

HDCO 551 APPRAISAL
Su 3 cr. LEC 2 LAB 1
PREREQUISITE: EDCI 402, Graduate standing in counseling program.
- Study includes test standardization, reliability and validity, developing understanding of appraisal instruments and needs assessment used with individuals and systems; using information derived from selected appraisal instruments.

HDCO 556 SEXUALITY COUNSELING
On Demand 3 cr. LEC 2 LAB 1
PREREQUISITE: HDCO 510, Graduate standing in counseling program.
- Exploration of sexual issues and the counseling process. Examination of foundations needed to respond to clients' sexual concerns.

HDFN 221C HUMAN NUTRITION
S 3 cr. LEC 3
- Basic concepts of human nutrition which include carbohydrates, lipids, proteins, vitamins, minerals, absorption, digestion, metabolism, and energy utilization as they relate to health and food consumption at different stages of the life cycle.

HDFN 227 CULINARY FUNDAMENTALS
S 2 cr. LAB 2
COREQUISITE: HDFN 226 or equivalent course.
- Practical experiences which illustrate the principles of ingredient functionality, methods of preparation, preservation, food safety and sensory evaluation. Utilizes knowledge from HDFN 226.

HDFN 228 CULINARY FUNDAMENTALS LAB
S 2 cr. LAB 2
COREQUISITE: HDFN 226 or equivalent course.
- Practical experiences which illustrate the principles of ingredient functionality, methods of preparation, preservation, food safety and sensory evaluation. Utilizes knowledge from HDFN 226.
HDFN 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need; or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HDFN 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

HDFN 321 LIFE CYCLE NUTRITION
F 3 cr. LEC 3
PREREQUISITE: HDFN 221.
- Nutritional needs and health concerns during the different stages of life: pregnancy, lactation, infancy, preschool years, middle childhood, adolescence, adulthood, and later maturity. Special reference to agencies offering nutrition services.

HDFN 322 CULINARY SKILLS AND MANAGEMENT
F alternate years, offered 2006 5 cr. LEC 3
PREREQUISITE: HDFN 221, HDFN 226, and HDFN 227.
- Principles of quantity food procurement, production, and presentation. Emphasizes food safety and sanitation principles and organizational management in dietseticsc professions.

HDFN 323 CULINARY MANAGEMENT PRACTICUM
F alternate years, offered 2007 3 cr. LEC 3
PREREQUISITE: HDFN 221, HDFN 226, HDFN 227, and HDFN 322.

HDFN 351 NUTRITION AND SOCIETY
S 3 cr. LEC 3
PREREQUISITE: HDFN 321 and HDFC 343.
- Factors in the community influencing nutritional status, techniques to assess community nutritional needs, and methodology for planning, implementing, and evaluating community nutrition programs. Cultural food diversity emphasized. Major community nutrition project completed for a public or private agency.

HDFN 400 SEMINAR
F 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Senior standing.
- Senior capstone course for food and nutrition students in the dietetics program. Emphasis on establishing a professional identity, preparing a portfolio, and transitioning to a career in the field of human services. Includes dietetic internship application preparation.

HDFN 401 NUTRITIONAL ASSESSMENT AND COUNSELING
S 3 cr. LEC 3
PREREQUISITE: HDFC 319, HDFN 351 and PS 318.

HDFN 411 NUTRITION FOR SPORTS AND EXERCISE
S alternate years, offered 2006 2 cr. LEC 2
PREREQUISITE: HDFN 221, BCHM 122, BIOL 210 or BIOL 211.
- Nutrition for physical activity, sport performance, health and fitness. Nutritional needs are discussed for endurance, strength, low-body weight, team sport athletes and other physically active people. Energy balance and weight management examined.

HDFN 421 MACRONUTRIENT METABOLISM
F & S cr. LEC 3
PREREQUISITE: HDFN 221, BCHM 340, BIOL 208.
- Digestion, absorption, and metabolism of macronutrients: carbohydrate, protein, fat, and other nutrients pathophysiological conditions.

HDFN 422 MICRONUTRIENT METABOLISM
F 3 cr. LEC 3
PREREQUISITE: HDFN 401, HDFN 421, and HDFN 425.
- Digestion, absorption, and metabolism of micronutrients; metabolic roles of vitamins and minerals, and changes that occur in metabolism under different physiological conditions.

HDFN 425 MEDICAL NUTRITION THERAPY
F 3 cr. LEC 3
PREREQUISITE: HDFN 401.
- Examination of physiological and biochemical changes in selected conditions and implications for medical nutrition therapy. Extensive case studies utilized to facilitate critical thinking for appropriate nutritional care.

HDFN 451 U.S. FOOD SYSTEM
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: HDFN 321, and HDFN 351 or consent of instructor.
- Application of principles of critical nutrition. Supervised practice in a hospital for one week under the supervision of a registered dietician (requires relocation for one week).

HDFN 451R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY ON DEMAND
1-2 cr. RCT may be repeated. Maximum 12 cr.
- Directed research and study on an individual basis.

HDFN 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need; or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HDFN 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

HDFN 511 EXERCISE METABOLISM AND NUTRITION
F 3 cr. LEC 3
PREREQUISITE: BIOL 207 or BIOL 208, HDFN 411, BCHM 122
- The aim of this course is to examine the elements of nutritional metabolism that are affected by exercise. Specific goals are to examine carbohydrates, amino acids, lipids, vitamins, and minerals from perspectives such as utilization during exercise and recovery from exercise, how exercise changes the need for each of the nutrients, the need for nutrient balance, how specific conditions alter nutrient metabolism in response to exercise.

HDFN 514 NUTRITION AND DISEASE
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: HDFN 221 and BCHM 540.
- This course will investigate the contribution of carbohydrate, protein, fat, and other nutrient pathophysiological conditions to the development and treatment of major human diseases.

HDFN 521 METABOLIC ROLES OF NUTRIENTS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: HDFN 421 and BCHM 540.
- Homeostatic integration of the micro nutrients in the human cell and in various organ systems.

HDFN 526 NUTRITION FOR FITNESS AND PERFORMANCE
F 3 cr. LEC 3
PREREQUISITE: HDFN 221N, BIOL 208N, CHEM 121N BCHM 340.
- Examine energy metabolism and physical activity. Use nutrition strategies to meet the energy, power output, and nutrient demands of exercise, and athletic performance. Examine behavioral relationships that affect fitness and health, including disordered eating and the female athlete triad, evaluation of nutrition information and dietary supplements, with extensive use of internet resources.
COURSE DESCRIPTIONS: HDFN 545 - HDFP 560

HDFP

Human Development, Family Financial Planning Courses
Department of
Health & Human Development
(406) 994-3242

HDFP 505 FAMILY SYSTEMS
F 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This class explores the family as a system within the broader context of society. The developmental stage of the family will be the framework for studying the family system over the family life cycle and for exploring critical aspects of the family such as communication, economics, relationships, quality, and interaction with other systems. We will also explore how Family Science approaches different issues and what scientists choose to study about families. This course is offered as a distance-delivered course from North Dakota State University.

HDFP 510 FUNDAMENTALS OF FINANCIAL PLANNING
F 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course provides an overview of family financial planning by integrating concepts and issues with planning and counseling applications. Students will be introduced to the key concepts of family financial planning, including: insurance, tax instruments, retirement, and estate planning. The family financial planning process is introduced with an emphasis on the integration and application of concepts in meeting individual and family financial goals and objectives. Other topics presented include an ethics overview, compensation trends within the industry, and regulatory frameworks. This course is offered as a distance-delivered course from Kansas State University.

HDFP 515 INSURANCE PLANNING FOR FAMILIES
S 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course covers risk management concepts, tools, and strategies for individuals and families, as well as ethical considerations. Case studies provide experience in selecting insurance. This course is offered as a distance-delivered course from the University of Nebraska.

HDFP 520 INVESTING FOR THE FAMILY'S FUTURE
F 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course covers various aspects of the principles of investments and their application to family financial planning. Topics include risk analysis, risk reduction, expected returns of various investments, and the nature of securities markets and investment companies. This course is offered as a distance-delivered course from the University of Nebraska.

HDFP 525 RETIREMENT PLANNING, EMPLOYEE BENEFITS AND THE FAMILY
F 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course covers retirement planning for the individual and the family. Topics include qualified retirement plans, nonqualified plans, IRAs and other plans that offer tax advantages to the individual and family. This course is offered as a distance-delivered course from Iowa State University.

HDFP 530 ESTATE PLAN FOR FAMILY
S 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course covers the basics of estate planning for families including understanding the basic elements of estate planning, analyzing case studies of estate planning situations, and developing skills to work with families on estate planning problems.

HDFP 540 PERSONAL INCOME TAXATION
F 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course covers the basics of personal income taxation including taxation terminology, taxation issues in investments, taxes and retirement planning, tax management techniques, tax implications in marriage and other close relationships, and other tax topics related to family financial well-being.

HDFP 545 FAMILY ECONOMICS
Su 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course will cover the major issues relative to the economics of families, including household production and human capital development. It will also cover the economics of crises, public policy and family life cycle spending, saving and borrowing. A theoretical and research perspective will be used to illuminate the concepts in the course. This course is offered as a distance-delivered course from South Dakota State University.

HDFP 550 HOUSING/REAL ESTATE
Su 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course will cover the major issues related to the economics of families, including household production and human capital development. It will also cover the economics of crises, public policy and family life cycle spending, saving and borrowing. A theoretical and research perspective will be used to illuminate the concepts in the course. This course is offered as a distance-delivered course from South Dakota State University.

HDFP 555 FINANCIAL COUNSELING
S 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course emphasizes the development of professional skills for assisting individuals and families to become responsible financial managers through the financial counseling process. Professionals with financial counseling preparation may assist in pre-vesting, alleviating, and/or eliminating financial problems. This course is offered as a distance-delivered course from North Dakota State University.

HDFP 560 PRACTICES IN FAMILY FINANCIAL PLANNING
S 3 cr. LEC 3
PREREQUISITE: Graduate standing.
- This course will cover the professional practice of family financial planning including the process of planning and counseling, ethics of professional practice, types of organizations offering planning and counseling services, and the evaluation of effectiveness in planning and counseling. This course is offered as a distance-delivered course from Kansas State University.
HDFP 572 FINANCIAL PLANNING-CASE STUDIES
F 3 cr. LEC 3
PREREQUISITE: Graduate standing.
This course is a capstone course in the FFP masters and involved the analysis and presentation of case studies that require the application of all material gained in the masters courses to the financial planning process for families. This course is offered as a distance-delivered course form Kansas State University.

HDFP 575 PROFESSIONAL PAPER
F, S, Su 1-4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

HDFP 576 PROFESSIONAL PRACTICUM IN FAMILY FINANCIAL PLANNING
F, S, Su 3 cr. LEC 3
PREREQUISITE: Graduate standing and consent of instructor.
- Practicum experience in the field of family financial planning.

HDHL Human Development, Health Department of Health & Human Development
(406) 994-3242

HDHL 106 DRUG HEALTH ISSUES FOR EDUCATORS
F, S, Su On Demand 1 cr. LEC 1
- Drug education and health concerns for educators of schoolaged children. Covers topics required by Office of Public Instruction for health-related teacher education.

HDHL 221 FIRST EMERGENCY RESPONSE
F, S 1 cr. LEC 1
PREREQUISITE: Concurrent enrollment in HDHL 222.
- American Red Cross first aid procedures and skills, including certification in community C.P.R. and responding to emergencies.

HDHL 222 FIRST EMERGENCY RESPONSE LAB
F, S 1 cr. LEC 1
- Practical application of procedures, skills, and safety for responding for an emergency.

HDHL 230 DRUGS AND SOCIETY
F, S 3 cr. LEC 3
- Individual and social implications of psychoactive drug use. Basic pharmacological concepts, legal issues, common pharmaceutical preparations, and over-the-counter products are studied.

HDHL 240 HUMAN SEXUALITY
F, S 3 cr. LEC 3
- A study of all aspects of human sexuality including the sexual reproductive systems, sexual behaviors, contraception, gender roles, sexual functioning, and sexually transmitted diseases.

HDHL 270 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Directed research and study on an individual basis.

HDHL 276 INTERNSHIP
On Demand 2 - 12 cr. IND Maximum 12 cr.
PREREQUISITE: Consent of instructor.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

HDHL 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HDHL 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

HDHL 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-4 cr. IND may be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

HDHL 402 FIRST AID INSTRUCTOR LAB
On Demand 1 cr. LAB 1
PREREQUISITE: HDHL 221, HDHL 222 or current American Red Cross advanced first aid and CPR cards.
- American Red Cross Advanced first aid instructors certification.

HDHL 410 HUMAN RESPONSE TO STRESS
F 3 cr. LEC 3
PREREQUISITE: PSY 100, junior standing.
- Analysis of human response to stress in relation to a variety of biopsychosocial factors; techniques for managing stress are also investigated.

HDHL 440 PRINCIPLES OF EPIDEMIOLOGY
S 3 cr. LEC 2 RCT 1
PREREQUISITE: STAT 216 and a research methods course.
- Senior capstone course. The goal of this course is to provide an introduction to epidemiologic concepts (e.g. incidence, prevalence, bias) and methods (e.g. study designs and measures).

HDHL 445 PROGRAM PLANNING IN HEALTH
F 3 cr. LEC 2 RCT 1
PREREQUISITE: HDFC 471, HDFC 472, HDPE 425.
- Senior capstone course. Health program planning and evaluation with emphasis on applications in Montana communities.

HDHL 451 HEALTH AND HEALING
F, Su On Demand 3 cr. LEC 3
PREREQUISITE: PSY 100.
- A comparative study of different systems of health and healing. Systems include Allopathic (Western), Ayurvedic (East Indian), Chinese, and Native American. This course includes in and out of class practice components (e.g. Qi Gong, Yoga, Meditation).

HDHL 455 THE ETHIC OF CARE
F 3 cr. LEC 3
PREREQUISITE: PSY 100 or SOC 100 or HDFC 150.
- This course, intended for students interested in working in human service professions (education, health, social work, counseling, human relations and resources) will focus on understanding and applying the theory of the ethic of care in real world situations. Theoretical support for the ethic of care found in diverse areas of philosophy, social justice, education, feminism, parenting, nursing, theology, and medicine will be explored. Utilizing a service learning approach, students will be engaged in understanding theories related to the ethic of care through both in-class lecture and discussion and outreach in the community.

HDHL 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

HDHL 475 SENIOR SEMINAR-PROFESSIONAL ISSUES
F, S, Su 1 cr. LEC 1
COREQUISITE: HDH 476 and consent of instructor.
- Senior capstone course for community health majors and preprofessional therapy majors. Establishing a professional identity and transitioning to a career in the field of human services.

HDHL 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HDHL 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1 - 2 cr. RCT May be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

HDHL 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1 - 6 cr. RCT May be repeated.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

HDHL 570 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

HDHL 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
COURSE DESCRIPTIONS: HDHL 588 - HDPE 320

HDHL 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 5 cr. May be repeated;
Maximum 3 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
- Courses offered on a one-time basis to fulfill professional development needs of inservice educators.
- A specific focus is given to each course which is appropriately subtitled.

HDPE Human Development, Physical Education
Department of
Health & Human Development
(406) 994-3242

HDPE 101 PARAPROFESSIONAL EXPERIENCE I
S 1 cr. LAB 1
- Observation of teaching and data collection in elementary, middle, and high school physical education/health enhancement classes. Placement of students to assist in youth coaching or intramural programs.

HDPE 105 LIFE SKILLS FOR STUDENT ATHLETES
F, S 2 cr. LEC 2
- This course is designed to introduce student athletes to psychological and educational theories and models associated with learning, self-management, personal and career development, and stress, coping and health. Through this course, student athletes will identify and address issues that pertain to learning and development among college students and issues that are unique to you as an student athlete.

HDPE 184 VARSITY ATHLETICS
F, S 1 cr. LAB 1 Maximum, repeat 2 cr.
- The participation in an intercollegiate sport which requires a minimum of two to three hours of meeting/participation per week per athletic season.

HDPE 201 FOOTBALL COACHING THEORY
F alternate years, to be offered 2007 2 cr. LEC 2
- Basic fundamentals and techniques used in coaching football.

HDPE 202 PARAPROFESSIONAL EXPERIENCE II
F 1 cr. LAB 1
PREREQUISITE: HDPE 102.
- Assisting in instruction in physical education activity classes, Young at Heart, Employee Wellness programs, and placement in the public school setting.

HDPE 204 ETHICS IN SPORTS AND HEALTH ENHANCEMENT
S 2 cr. LEC 2
- Foundation of moral reasoning and ethical behavior in health enhancement, sports, and health education.

HDPE 210 EXERCISE PROGRAMMING FOR OLDER ADULTS
S 5 cr. LEC 2 LAB 1
- Students will examine the special exercise-related needs of older adults and learn how to safely and effectively meet those needs. The lab will provide practical experience working with older adults in the MSU "Young at Heart" exercise program for seniors.

HDPE 221 HEALTH ANATOMY AND PHYSIOLOGY
F S 5 cr. LEC 3
- This course will focus on the key elements of anatomy and physiology necessary for students in allied health professions, specifically those who will work in the area of community health, health enhancement education, health promotion, and kinesiology. The aim of this course is for students to demonstrate working knowledge of the muscular, nervous, cardiovascular, and respiratory systems, and to demonstrate an understanding of the endocrine and digestive systems and body metabolism.

HDPE 222 FOUNDATIONS OF EXERCISE SCIENCE
S 3 cr. LEC 3.
- The aim of this course is to integrate the subdisciplines of exercise science (functional anatomy, biomechanics, exercise physiology, motor control, and exercise psychology) from the perspective of definitions, basic science, and application to health, fitness, and athletic performance.

HDPE 224 METHODS OF TEACHING MOVEMENT EXPLORATION
S 3 cr. LEC 2 LAB 1
- Practice skills in music fundamentals; teaching and learning folk, square, social, and various types of rhythmic activities.

HDPE 251 TEACHING FITNESS AND PHYSICAL ACTIVITY CONCEPTS
S 3 cr. LEC 3.
- Teaching practices for physical activity and fitness concepts appropriate for children and adolescents in school and recreational programs. Content includes pedagogical methods, strategies, styles, and techniques that encourage individuals to participate in and adhere to physical activity programs.

HDPE 252 TEACHING FOR SEQUENTIAL SKILL DEVELOPMENT
S 3 cr. LEC 3
- Introduction to motor skills teaching from novice to advanced performer. Includes techniques and technologies used in skill acquisition, and feedback to enhance and assess performance. Students will improve their own performance as they learn to teach skills progressively.

HDPE 253 TEACHING GAME CONCEPTS AND TACTICS
S 3 cr. LEC 3
PREREQUISITES: HDPE 251 or HDPE 252.
- Teaching progressions for game concepts and tactics. Emphasis will be placed on sequential development of temporal and spatial concepts through progressively more complex offensive and defensive strategies using modified games.

HDPE 267 INTRODUCTION TO COACHING
F, S 3 cr. LEC 3
- Introductory coaching course which will cover basic information from the beginning level in the American Coach Effectiveness Program.

HDPE 270 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Directed research and study on an individual basis.

HDPE 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HDPE 288 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
S 1-3 cr. IND may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

HDPE 290 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

HDPE 302 PARAPROFESSIONAL EXPERIENCE III
S 1 cr. LAB 1
PREREQUISITE: HDPE 102; HDPE 202
COREQUISITE: EDSD 465
- This course will provide an in-school health enhancement teaching experience at the middle or high school level.

HDPE 314 HEALTH ENHANCEMENT FOR ATYPICAL POPULATIONS
S 3 cr. LEC 3
PREREQUISITE: HDPE 223
- Health enhancement (physical education and health) issues for school-aged populations who have physical, mental, and/or emotional disabilities. This course is specifically for future teachers in the public schools.

HDPE 317 BASKETBALL COACHING THEORY
F alternate years, to be offered 2007 2 cr. LEC 2
PREREQUISITE: HDPE 257.
- This course is set up to provide the student a working knowledge of basketball coaching techniques and philosophies. The course should assist the student in developing his/her own basketball coaching philosophy.

HDPE 318 SOCCER COACHING THEORY
F alternate years, to be offered 2007 2 cr. LEC 2
PREREQUISITE: HDPE 267.
- A working knowledge of soccer coaching tactics and techniques.

HDPE 319 VOLLEYBALL COACHING THEORY
S alternate years, to be offered 2007 2 cr. LEC 2
PREREQUISITE: HDPE 257.
- A working knowledge of volleyball coaching tactics and techniques.

HDPE 320 ANATOMICAL KINESIOLOGY
F 4 cr. LEC 3 LAB 1
PREREQUISITE: BIOL 207, HDPE 221, Math core or permission of instructor.
- A kinesiology course is designed for health enhancement, health promotion, and exercise science and pre-physical therapy students. Topics include structure and function of the musculoskeletal system and qualitative movement analysis. Emphasis is placed on applying foundational anatomy in evaluation of human movement.
**HDPE 322 EXERCISE PHYSIOLOGY**  
F 4 cr. LEC 3 LAB 1  
**PREREQUISITE:** Grade of "C" or better in BIOL 207, HDPE 221, or permission of instructor.  
Topics include factors and mechanisms involved with causing changes and adaptations in the physiological responses associated with training and participating in strength and endurance sports and activities. Lectures and labs emphasize explaining common observations and practices from the physiological viewpoint.

**HDPE 323 BIOMECHANICS**  
S 4 cr. LEC 3 LAB 1  
**PREREQUISITE:** MATH 160 or MATH 170, BIOL 207, PHYS 205 and HDPE 320.  
A biomechanics course designed for exercise science and pre-physical therapy students. Topics include kinematics and kinetics of human motions, function of the musculoskeletal system and mechanical analysis of movement. Emphasis is placed on biomechanical analysis of normal and pathological movement.

**HDPE 362 TRACK & FIELD THEORY**  
F 2 cr. LEC 1 LAB 1  
**PREREQUISITE:** HDPE 267.  
The technique of all track and field events. Emphasis on teaching progressions in all events. Classroom sessions include development of training schedules, tactics, strategy, philosophy, meet organization, and officiating. A "Learn by Doing" approach used in the lab.

**HDPE 367 COACHING APPLICATION**  
F, S 1 cr. RCT 1 Maximum 3 cr.  
**PREREQUISITE:** HDPE 267.  
Assignment of prospective coaches to specific sports. Discussion and feedback on planning and implementation in practical setting.

**HDPE 390 CURRICULUM MODELS IN HEALTH ENHANCEMENT**  
S 8 cr. LEC 5  
**PREREQUISITE:** HDPE 224, HDPE 251, HDPE 252, and HDPE 253.  
Examination of the relationships between curriculum planning and instructional design as implemented in concept-based Health Enhancement curriculum approaches. Students are encouraged to synthesize theoretical and clinical knowledge to develop a problem-based learning approach to curricular decision making as applied to public school settings.

**HDPE 410 INTERNATIONAL PERSPECTIVE OF HISTORY AND PHILOSOPHY IN HEALTH, SPORT, AND PHYSICAL EDUCATION**  
F 5 cr. LEC 5  
**PREREQUISITE:** Junior standing.  
Analysis of historical, philosophical and contemporary cultural forces and value orientation in physical education, health education, and sport.

**HDPE 415 MANAGEMENT IN HEALTH ENHANCEMENT AND FITNESS**  
S 3 cr. LEC 3  
**PREREQUISITE:** Junior standing.  
Management of sports, fitness, and physical education programs, including budget and finance, supplies and equipment, marketing and public relations, facilities, legal liability, stress and time management, and functions of sport management.

**HDPE 425 HEALTH-PSYCHOLOGY**  
S 3 cr. SEM 3  
**PREREQUISITE:** PSY 100 and SOC 101.  
The study and application of theoretical models of exercise and health with emphasis on behavior change in the individual and group levels.

**HDPE 430 INSTRUCTIONAL DESIGN IN HEALTH ENHANCEMENT**  
F 3 cr. LEC 3  
**PREREQUISITE:** Upper division standing and acceptance into the professional teacher education program, or consent of instructor.  
A conceptual and practical approach to the design, implementation, and maintenance of various curricula for future teachers.

**HDPE 436 PRINCIPLES OF STRENGTH AND CONDITIONING**  
S alternate years, to be offered 2007 3 cr. LEC 3  
**PREREQUISITE:** HDPE 221; HDPE 267.  
Course designed to introduce strength training concepts to students preparing to be Health Enhancement Educators and for coaches. Strength training principles will be applied to a variety of student populations and ages, be combining anatomy, physiology, biomechanics, pathology, and kinesiology.

**HDPE 445 APPLIED SPORT PSYCHOLOGY**  
F 5 cr. LEC 5  
**PREREQUISITE:** HDPE 267  
The application of basic principles of sport psychology for teachers and coaches, with specific emphasis on motivation, anxiety, arousal, and selected groups of athletes.

**HDPE 465 EXERCISE TESTING AND PRESCRIPTION**  
S 4 cr. LEC 3 LAB 1  
**PREREQUISITE:** HDPE 322, BIOL 208, STAT 216, with grade "C" or better in each course, or permission of instructor.  
Students are familiarized with the hands-on training and theoretical background needed to competently assess levels of health/fitness in an "apparently healthy" population. Lecture/lab content is structured to prepare students for taking the ACSM Health/Fitness exam.

**HDPE 467 ADVANCED CONCEPTS IN COACHING**  
F, S 5 cr. LEC 3  
**PREREQUISITE:** HDPE 267; HDPE 367 or coaching experience.  
The primary goal of this course is to implement the content of an advanced coach certification curriculum in cooperation with the Montana High School Association (MHSA). The class is intended for experienced coaches who wish to examine current issues in coaching such as the female athlete, sportsmanship, or coach/parent relationships in detail.

**HDPE 470 INDEPENDENT STUDY**  
On Demand 1 - 4 cr. Maximum 6 cr.  
**PREREQUISITE:** Junior standing, consent of instructor, and approval of department head.  
Directed research and study on an individual basis.

**HDPE 475 SENIOR SEMINAR-PROFESSIONAL ISSUES**  
F, S, Su 1 cr. LEC 1  
**COREQUISITE:** HHD 476.  
Senior capstone course for majors in exercise, wellness, and athletic training. Establishing a professional identity and transitioning to a career in the field of human services.

**HDPE 480 SPECIAL TOPICS**  
On Demand 1 - 4 cr. Maximum 12 cr.  
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

**HDPE 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION**  
F, S, Su 1 - 2 cr. RCT May be repeated. Maximum 4 cr.  
**COREQUISITE:** HDPE 490.  
Classroom instruction associated with directed undergraduate research/creative activity projects.

**HDPE 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY**  
F, S, Su 1 - 6 cr. RCT May be repeated. Maximum 12 cr.  
Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

**HDPE 500 SEMINAR**  
F, S 1 cr. SEM 1 Maximum 4 cr.  
**PREREQUISITE:** Graduate standing or seniors by petition. Course prerequisites as determined for each offering.  
Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

**HDPE 501 THEORIES AND MODELS IN HEALTH**  
S alternate years 2008 and Su alternate years 2007 3 cr. LEC 3  
**PREREQUISITE:** HDPE 425 or graduate standing.  
Understanding and application of theory and models in the promotion of health. The course will focus on applications at the individual, organizational, community, and environmental levels.

**HDPE 506 EXERCISE AND CHRONIC DISEASE**  
S alternate years 2007 and Su alternate years 2008 3 cr. LEC 3  
**PREREQUISITE:** HDPE 314, graduate standing.  
Theory and practice in the effects of exercise on various diseases, disabilities, and atypical conditions.

**HDPE 520 CURRICULUM DESIGN**  
F alternate years, to be offered 2007 3 cr. LEC 3  
**PREREQUISITE:** Graduate standing or consent of instructor.  
This course provides an overview of the curricular process necessary to create traditional and nontraditional curricular models currently popular in health enhancement, health promotion, and community health.

**HDPE 540 BIOMECHANICAL ANALYSIS OF HUMAN MOVEMENT**  
S alternate years, to be offered 2007 cr. LEC 3  
**PREREQUISITE:** Graduate standing; undergraduate biomechanics or consent of instructor.  
This course covers the concepts and procedures of using mechanics in the analysis of human movement. Topics will include: anthropometry, kinematics, kinetics, and electromyography. Clinical and sport applications will be examined.
HDPE 541 INSTRUMENTATION IN BIOMECHANICS
F alternate years, to be offered 2007 cr. LEC 3
PREREQUISITE: Graduate standing; undergraduate biomechanics or consent of instructor.
- This course introduces students to instrumentation used in biomechanical research. Topics include the design and use of instrumentation used in kinematic and kinetic analyses. Instrumentation will include 2D and 3D motion analysis, force platforms, and electromyography.

HDPE 545 GRADUATE EXERCISE PHYSIOLOGY
F 5 cr. LEC 3
PREREQUISITE: Graduate standing; undergraduate exercise physiology.
- This course defines and explains a conceptual mechanistic-driven model that explains the basis for maximizing human performance. The instructor relies heavily on readings from the current research literature and student participation to understand the plethora of topics covered.

HDPE 567 PROFESSIONAL ISSUES IN COACHING
S, Su 5 cr. LEC 3
PREREQUISITE: HDPE 267, HDPE 367 or three years of successful coaching in public schools
- In depth examination of at least one sub-topic from the Montana High School Coach Certification curriculum; i.e., prevention, care and rehabilitation of injuries, risk management in sport; sociological and psychological aspects of coaching; coaching the female athlete.

HDPE 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr
PREREQUISITE: Graduate standing, consent of instructor and approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

HDPE 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1 - 3 cr. IND Maximum 6 cr
PREREQUISITE: Graduate standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

HDPE 576 INTERNSHIP
On Demand 2 - 12 cr. IND Maximum credits unlimited
PREREQUISITE: Graduate standing, consent of instructor and approval of department head.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

HDPE 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HDPE 589 PROFESSIONAL DEVELOPMENT
On Demand 1 - 3 cr. May be repeated; maximum 3 cr
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
- Courses offered on a one-time basis to fulfill professional development needs of in service educators. A specific focus is given to each course which is appropriately subtitled.

HDPE 590 MASTER’S THESIS
F, S, Su 1 - 10 cr. IND May be repeated.
PREREQUISITE: Master’s standing.
- Directed graduate research/creative activity.

HDPE 599 DANCE AS CULTURAL EXPRESSION
S 1 cr. LAB 1
PREREQUISITE: Consent of instructor and approval of department head and Dean of Graduate Education.
- The course provides instruction in preparation for and execution of the various skills involved in cross country skiing from the beginner through advanced depending on the student’s ability and skill level. Fee required.

HHD Health & Human Development Department of Health & Human Development (406) 994-3242

HHD 100 SPECIAL ACTIVITY
On Demand 1 cr. LAB 1 May be repeated
- Special Activity classes offered as needed using the unique skills of the instructional faculty in any given semester.

HHD 105 AIKIDO FUNDAMENTALS
On Demand 1 cr. LAB 1 Maximum 2 cr.
- The fundamentals of Japanese Aikido as taught by the World Aikido Headquarters will be explored.

HHD 110 POCKET BILLIARDS
On Demand 1 cr. LAB 1
- Pocket billiard fundamentals, most popular games, and appropriate rules will be stressed. Fee required.

HHD 117 BOWLING FUNDAMENTALS
On Demand 1 cr. LAB 1
- Bowling fundamentals will be stressed along with bowling etiquette and equipment. Fee required.

HHD 128 DANCE, SOCIAL
F, S 1 cr. LAB 1
- Traditional and popular styles of ballroom dancing, including jitterbug, polka, waltz, cha cha, western dance, and fox trot.

HHD 145 FLY FISHING
On Demand 1 cr. LAB 1
- Basic skills and knowledge of fly fishing including: casting, entomology, habitat, stream ethics, tackle, tactics, and strategy.

HHD 161 SKIING, SNOWBOARDING, AND TELEMARKING
S 1 cr. LAB 1
- Instruction at all levels of skill from beginner to advanced. Transportation, tickets, and equipment not included.
COURSE DESCRIPTIONS: HHD 501 - HIST 313

HHD 501 PROFESSIONAL COMMUNICATION SKILLS
F 2 cr. LEC 2
PREREQUISITE: Admission to graduate program at MSU.
- Students will develop writing and verbal communication skills as they relate to scholarly pursuits in the areas of health and human development. They will also gain a working understanding of the various types of grants and their applications within public and private settings. Students will develop skills needed to write a successful grant concept paper and will have a working knowledge of the various components of a grant proposal and research papers and thesis.

HHD 512 RESEARCH DESIGN IN HEALTH AND HUMAN DEVELOPMENT
S alternate years, to be offered 2007; 5 cr. LEC 3
- A study of the tools necessary to conduct research in the movement sciences and health fields. Includes the writing of a research proposal.

HIST History
Department of History & Philosophy
(406) 994-4395

HIST 105IH ORIGINS OF WESTERN CIVILIZATION
F, S 4 cr. LEC 3 RCT 1
- Survey of the ancient Near East, Greece, Rome, and the European world to the end of Reformation. Emphasis on social, economic, and cultural history.

HIST 107IH WESTERN CIVILIZATION: 1600 TO PRESENT
F, S 4 cr. LEC 3 RCT 1
- Survey of European history from 1600 to the present.

HIST 109D MODERN ASIA
S 4 cr. LEC 3 RCT 1
- Survey of the social, political, and economic history of East Asia (China and/or Japan) in the 20th century.

HIST 110D LATIN AMERICAN HISTORY
S 4 cr. LEC 3 RCT 1
- The history of Latin America from the Pre-Columbian period to the present day, focused primarily on the period since Independence in the 1820s. The course examines the origins and legacies of economic and political inequalities both within Latin America and the "first world", with attention to questions of class, race, ethnicity, and gender.

HIST 115H AMERICA AND THE WORLD BEFORE 1865
F, S 4 cr. LEC 3 RCT 1
- European exploration, Pre-Columbian Native Americans, the American Colonial, Revolutionary, Early National, Jacksonian, and Civil War periods, in the context of world history.

HIST 156IH AMERICA AND THE WORLD AFTER 1865
F, S 4 cr. LEC 3 RCT 1
- Reconstruction after the Civil War, industrialization during the late 19th century, and the domestic and international transformation of the U.S. during the 20th century in the context of world history.

HIST 160D WORLD HISTORY
F 4 cr. LEC 3 RCT 1
- Introduction to themes important for understanding the world in the 20th century through an examination of commodities from 1000-present: world systems, global interconnections, identity and difference, the rise of mass society, technology and the environment.

HIST 205CS SCIENCE, TECHNOLOGY, AND RISK
On Demand 3 cr. LEC 3
- Examines the history, science, and ethics of risk, focusing on the complex relationship of science, technology, and risk in modern age. Includes exploration of knowledge production in science and technology, case studies such as industrial health and safety, the atomic age, "natural" disasters, and global warming to understand how risk has been defined, perceived, and remedied; and team research projects on such topics as automobile safety, earthquakes, and maquiladoras.

HIST 206CS DARWINIAN REVOLUTION: ITS HISTORY, SCIENCE, AND IMPACT
On Demand 3 cr. LEC 3
- Covers the history, philosophy, and our current understanding of the biological sciences, focusing especially on the theory of evolution. Explores Darwin's ideas, the manner in which he came to them, his argument's explanatory power, and the diverse ramifications of evolutionary theory, including the modern debates in science and religion, stem cell research, cloning, sociobiology, and other tricky contemporary issues.

HIST 280S SCIENCE AND TECHNOLOGY IN WORLD HISTORY
On Demand 3 cr. LEC 3
- Surveys the role of science and technology in relation to social, political, and economic change in global history. Special attention is given to the historical developments of scientific and technological knowledge, the ways different societies have linked ideas of progress and science, and how history can provide valuable perspective to contemporary debates over potentially revolutionary scientific and technological practices.

HIST 211RH RESEARCH IN AMERICAN SLAVERY
S 3 cr. SEM
PREREQUISITE: CLS 101, or US 101, or BUS 101, or UH 201.
- This course focuses on helping non-history majors to understand and apply various research methods in the discipline of history. The topical focus is slavery, an institution which shaped American society in the past and present. Students will learn to analyze the accounts of historians as well as first-hand reports written by slaves and owners.

HIST 224RH SCIENCE, ENVIRONMENT, TECHNOLOGY, SOCIETY: COMMON EXPERIENCE
On Demand 3 cr. LEC 3
- Science and technology have become pervasive investigators of social change. This course aims to understand the nature, causes, and consequences of the growth of science and technology from a humanistic perspective, including recent advances in stem-cell research, the human genome, atomic energy and weapons, and space technology. We will explore the immense social, cultural, political, and economic consequences of these advances and how they have affected our relationship to the natural world.

HIST 291S UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

HIST 292S UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-3 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

HIST 305 MEXICO
On Demand 3 cr. LEC 3
PREREQUISITE: Take one of the following: HIST 105, HIST 107 or HIST 110.
- This course examines the historical processes that resulted in the creation of Modern Mexico: pre-Columbian civilization, European conquest, colonialism, and the struggle over nation building since independence in 1821.

HIST 311 EARLY AMERICA
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156.
- The development of the British American colonies and the establishment of the U.S. before 1800. Topics include pre-Columbian Native Americans, the European invasion and settlement of America, the social, economic and political evolution of the colonies, the American Revolution, and the establishment of the new nation.

HIST 312 CIVIL WAR AND RECONSTRUCTION
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156.
- Political, economic, and social developments leading to sectional division. Breakdown of political accommodation, Civil War, and Reconstruction.

HIST 313 THE GILDED AGE TO 1940
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156.
- This course explores the social, economic, and political development of the U.S. from 1877 to 1940, including the rise of big business, urbanization, progressive reform, the Great Depression, and the New Deal.
HIST 316 HISTORY OF RUSSIA TO 1917
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 105 or HIST 107.
– Emergence of Russia as a modern nation and developments which led to the Bolshevik Revolution.

HIST 318 HISTORY OF ANCIENT GREECE
On Demand 3 cr. LEC 3
– Origins to Alexander the Great, with special attention to life in classical Athens. Emphasis on reading ancient sources in translation.

HIST 319 HISTORY OF ANCIENT ROME
On Demand 3 cr. LEC 3
– From the foundations of the city to the fall of the empire, with special attention to social and military history. Emphasis on reading ancient sources in translation.

HIST 320 UNITED STATES SINCE 1940
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 156.
– Political, cultural, and economic history of the U.S. since the end of World War II.

HIST 323 AGE OF ABSOLUTISM & REASON
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 105 or HIST 107.
– Political, intellectual, and social history of Europe during the 17th and 18th centuries.

HIST 325 19TH CENTURY EUROPE
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 105 or HIST 107.
– Ideas and events in Britain and on the continent from the Congress of Vienna to the outbreak of World War I. Social and intellectual ideas as well as political and economic events.

HIST 326 20TH CENTURY EUROPE
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 105 or HIST 107.
– Events and forces in 20th century Europe from World War I to the present. The rise of fascism, communism, and the interwar crisis along with post-World War II developments.

HIST 333 EARLY BRITAIN:
PREHISTORY TO 1714
On Demand 3 cr. LEC 3
PREREQUISITE: Sophomore standing and HIST 107.
– History of the British Isles from prehistory to 1714. Topics of study include the Reformation, Civil War, unification of Scotland and England, and rise of Britain as a world power.

HIST 334 MODERN BRITAIN
On Demand 5 cr. LEC 3
PREREQUISITE: Sophomore standing and one of the following: HIST 160, HIST 107 or POLS 241.
– The emergence and fall of Britain as a world power. Topics of study include industrialization, the slow emergence of democracy in Britain, the role of the family in Victorian Britain, and the impact of the empire within Britain.

HIST 335 HISTORY OF THE MIDDLE EAST IN THE 20TH CENTURY
On Demand 3 cr. LEC 3
PREREQUISITE: One of the following: HIST 160, HIST 105 or POLS 241.
– Investigate major diplomatic, economic, cultural and religious themes from the Middle East in the 20th century. Students will choose topics and countries of interest for specific, instructor-guided research. The Arab-Israeli conflict will be one case study.

HIST 356 HISTORY OF MODERN FRANCE
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and one of the following: HIST 160, HIST 105 or HIST 107.
– An interdisciplinary course which focuses on the construction of the modern French nation-state.

HIST 358 TWENTIETH CENTURY WAR
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 105 or HIST 107.
– This course examines the history of U.S. military activity in the Pacific Rim from the Philippine-American War to Vietnam, investigating the geopolitical, economic, social, and cultural factors that culminated in the nation's longest war: Vietnam.

HIST 371 AGE OF THE SHOGUNS
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 100 or HIST 115.
– Exploration of the political, cultural, and diplomatic issues involved in the development of the Tokugawa state.

HIST 372 JAPAN'S LONG 19TH CENTURY
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 109 or HIST 115.
– Investigates the revolutionary changes that Japan underwent between the 1770's and 1910.

HIST 374 MODERN CHINA
F 5 cr. LEC 3
PREREQUISITE: Junior standing and one of the following: HIST 160, HIST 107 or HIST 109.
– Social, political, and economic history of the People’s Republic of China.

HIST 375 MODERN INDIA, PAKISTAN, AND BANGLADESH
S 5 cr. LEC 3
PREREQUISITE: Junior standing and one of the following: HIST 160, HIST 107 or HIST 109.
– Social, economic, political, and intellectual history of India, Pakistan, and Bangladesh during the 19th and 20th centuries.

HIST 401 SEMINAR
IN HISTORICAL METHODOLOGY
F, S 5 cr. SEM 3
PREREQUISITE: Senior standing, HIST 160, HIST 105 or HIST 107 and HIST 155 or HIST 156.
– Senior capstone course. History majors practice sound research and writing methods, using appropriate bibliographical tools and in light of contemporary historiography.

HIST 402 TRANS-MISSISSIPPI WEST
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156.
– Exploration of major themes in the development of the American West, including conquest and settlement, economic development, racial and ethnic diversity, urbanization, and popular culture.

HIST 403 GENDER IN THE U.S. & CANADIAN WEST
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156 or HIST 408.
– An examination of the experiences of women in the western U.S. and Canada. Focus on topics of race and ethnicity, families and intimacy, politics and the law, paid and unpaid work, art and culture.

HIST 404 MONTANA AND THE WEST
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156.
– A survey of Montana history which will cover the development of the territory and state, and will examine the social, economic, cultural, and political patterns that connect Montana with the rest of the American West.

HIST 406 ANTI-COMMUNISM IN THE TRUMAN-EISENHOWER YEARS
S 5 cr. SEM 3
PREREQUISITE: HIST 155 or HIST 156.
– An analysis of the ways the Truman and Eisenhower administrations dealt with anti-communism, with a focus on McCarthyism.

HIST 408 GENDER IN AMERICA
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156.
– History of women in America from colonial times to the present. Analysis of gender relations, the family, the struggle by women to achieve civil rights and social reform, the problems of working women, and the rise of feminism.

HIST 409 JAPANESE WOMEN'S HISTORY
On Demand 3 cr. SEM 3
PREREQUISITE: HIST 109 or HIST 115.
– The role of women in Japanese history from ancient time to the present.

HIST 410 LATIN AMERICAN SOCIAL HISTORY
On Demand 3 cr. SEM 3
PREREQUISITE: HIST 110.
– Social history of Latin America from colonial times to the present with a focus on social history methodology, theories of economic development and social change, and on the experiences of Latin America’s diverse popular classes.

HIST 412 RACE AND CLASS IN AMERICA
S 5 cr. LEC 5
PREREQUISITE: HIST 155 or HIST 156.
– Race in the history of the U.S. from early European and Native American contact until the present. Considers issues of racism, race relations, slavery, African-American culture, the modern Civil Rights movement, and current policy and racial questions.

HIST 413 RACE IN LATIN AMERICA
On Demand 3 cr. SEM 3
PREREQUISITE: One of the following: HIST 110, HIST 155 or HIST 156.
– This course explores the history of race relations in Latin America, focusing on the traditional links between "race" and power. Topics include examinations of Indigenous, African, and European cultures/ethnicities, from the Conquest to the present day.
HIST 419 FAMILY, GENDER AND LAW IN ANCIENT GREECE AND ROME
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 105, HIST 318 or HIST 319.
- Marriage, family life, and the position of women from Homer to Saint Augustine. Special emphasis on private law. Reading and discussion of ancient sources in translation.

HIST 422 HISTORY OF THE AMERICAN CONSTITUTION
On Demand 4 cr. LEC 4
PREREQUISITE: HIST 155 or HIST 156.
- Development of American Constitutional theory and practice.

HIST 423 PROTESTANT REFORMATION
On Demand 5 cr. LEC 3
PREREQUISITE: Junior standing and HIST 105 or HIST 107.
- The rise of Protestantism, 1500-1640, and its impact on European society. Emphasis on Germany and France.

HIST 425 GENDER, SEXUALITY, AND SOCIAL CHANGE IN LATIN AMERICAN HISTORY
On Demand 3 cr. LEC 3
PREREQUISITE: Background in Latin American and/or Women's Studies.
- An exploration of the ways in which transformations in the historical construction of gender and sexuality shaped and were shaped by broader processes of socioeconomic, political, and cultural change in Latin American history.

HIST 426 THE RENAISSANCE
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 105 or HIST 107.
- Emphasis on the transition from medieval to early modern society in England, Italy, France, and Germany, 1300-1525.

HIST 431 SCIENCE, TECHNOLOGY & SOCIETY: 1500-1800
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and one of the following: HIST 105, HIST 325, HIST 423 or HIST 424.
- The Scientific Revolution in Europe. Topics of study include the relationships between religion and science, science and gender, and technological change and the structure of society.

HIST 432 MODERN SCIENCE
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and one of the following: HIST 107, HIST 156, HIST 325, HIST 326, or HIST 456.
- The emergence of modern science in Europe and America. Topics of study include the relationships between science, gender, ethnicity, and race.

HIST 447 HISTORY OF THE NORTH AMERICAN INDIAN
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156.
- Indian affairs in America from 1600-1970. Emphasis on white reaction to the American Indians and the effect of the European invasion on Indian culture.

HIST 455 HISTORY OF AMERICAN TECHNOLOGY
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 155 or HIST 156.
- This course investigates fundamental questions about the role of technological change in U.S. history, focusing on issues of the environment, concepts of progress, consumerism, power, work, and freedom. In addition to standard historical sources, the course uses popular films, novels, and art to discuss the changing meaning and significance of technology in America.

HIST 456 AMERICAN THOUGHT AND CULTURE
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 155 or HIST 156.
- The fundamental purpose of this course is to show the interconnectedness of science, philosophy, literature, and religion in shaping the American intellectual tradition from the Puritan founding to the present.

HIST 457 MUSEUM HISTORY
S alternate years, to be offered 2007-3 cr. LEC 3
PREREQUISITE: Junior standing.
- An examination of the development of American museums and their relationship to other exhibitionary forms including wild west shows and world's fairs. The course also introduces students to theoretical arguments about the nature and function of cultural representations.

HIST 460 EUROPEAN INTELLECTUAL HISTORY
On Demand 3 cr. LEC 3
PREREQUISITE: Junior standing and HIST 105 or HIST 107.
- The ideologies and major thinkers who have influenced European history from the French Revolution to the present day.

HIST 464 HISTORY OF YELLOWSTONE NATIONAL PARK
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156.
- Historical analysis of changing perceptions of nature on development of Yellowstone and on the park's place in the context of a modernizing American nation.

HIST 465 SCIENCE, TECHNOLOGY, AND ENVIRONMENT IN JAPAN
S alternate years, to be offered 2007-3 cr. LEC 3
PREREQUISITE: HIST 109 or HIST 115.
- Traces the role of images of nature and the natural environment in the formation of Japanese, political, cultural, and economic practice from ancient times to the present.

HIST 466 UNITED STATES ENVIRONMENTAL HISTORY
On Demand 3 cr. LEC 3
PREREQUISITE: HIST 155 or HIST 156.
- Survey of changing perceptions and uses of the natural world from the colonial era to the present.

HIST 467 GENDER IN ASIA
S 3 cr. LEC 3
PREREQUISITE: Junior standing and one of the following: HIST 160, HIST 105, HIST 107 or HIST 109.
- Analysis of gender relations, the family, the struggle by women in Asia to achieve civil rights and social reform, the problems of working women and various alternatives to western feminism. Focus on the 19th and 20th centuries.

HIST 468 ANIMAL HISTORIES
F, S alternate years, 3 cr. LEC 3
PREREQUISITE: Junior standing or consent of instructor.
- An intensive and creative research experience. This course allows students to explore the multidisciplinary side of history by investigating the relationship of human and nonhuman animals in a historical setting.

HIST 469 WORLD ENVIRONMENTAL HISTORY
F, S alternate years, 3 cr. LEC 3
PREREQUISITE: HIST 160,107,115,109 or 110.
- This course examines the intersection of the natural world with major themes in world history and places typical subjects in environmental history, including diseases, agriculture, pollution, and environmentalism in global context.

HIST 470 INDEPENDENT STUDY
On Demand 1-4 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

HIST 476 INTERNSHIP
On Demand 2-12 cr. IND
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

HIST 480 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HIST 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. RCT May be repeated. Maximum 4 cr.
COREQUISITE: HIST 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

HIST 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND May be repeated. Max 12 cr.
PREREQUISITE: Junior standing in History and consent of department head.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

HIST 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

HIST 502 PUBLIC HISTORY
F On Demand 3 cr. SEM 3
PREREQUISITE: HIST 540 or equivalent. May be repeated. Maximum 6 cr.
- Advanced readings and discussion in the practice of public history, including oral history, historic preservation, and museum studies.
HIST 503 HISTORY OF AMERICA BEFORE 1860  
F 4 cr. LEC 4  
PREREQUISITE: HIST 511 or HIST 412.  
- Topics in the social, cultural, economic, and political history of Early America in the Atlantic world.

HIST 504 TOPICS IN ENVIRONMENTAL HISTORY  
ON Demand 3 cr. SEM 3 May be repeated.  
Maximum 6 cr.  
PREREQUISITE: HIST 496 or equivalent.  
- Advanced readings and discussion in environmental history.

HIST 505 U.S. HISTORY 1860 TO PRESENT  
S 4 cr. LEC 4 May be repeated.  
Maximum 6 cr.  
PREREQUISITE: Graduate Standing  
- Graduate research and analysis of important issues in recent American history.

HIST 506 TOPICS IN HISTORY OF SCIENCE, TECHNOLOGY AND SOCIETY  
On Demand 3 cr. SEM 3 May be repeated.  
Maximum 6 cr.  
PREREQUISITE: HIST 541 or equivalent.  
- Advanced readings and discussion in the history of science, technology and society.

HIST 507 HISTORICAL WRITING  
On Demand 3 cr. SEM 3  
PREREQUISITE: HIST 540 or equivalent.  
- Advanced seminar in contemporary historiography, historical theory and narrative style.

HIST 512 TOPICS IN WORLD HISTORY  
F 3 cr. SEM 3  
PREREQUISITE: Graduate standing.  
May be repeated.  
Maximum 6 cr.  
- Examination of topics of current scholarly concern in history other than United States.

HIST 513 TOPICS IN SOCIAL AND CULTURAL HISTORY  
S 5 cr. SEM 3  
PREREQUISITE: Graduate standing.  
May be repeated.  
Maximum 6 cr.  
- Examination of topics in social and cultural history of current scholarly concern.

HIST 515 THE AMERICAN WEST  
S 5 cr. LEC 3  
PREREQUISITE: HIST 492 or equivalent.  
May be repeated.  
Maximum 6 cr.  
- Directed readings and analysis of major problems in the history of the American West.

HIST 540 HISTORICAL METHODS  
F 3 cr. LEC 3  
May be repeated.  
Maximum 6 cr.  
- Consideration of historical thinking, the uses of evidence and historical methodology.

HIST 570 INDEPENDENT STUDY  
On Demand 1 - 8 cr. IND Maximum 6 cr.  
PREREQUISITE: Graduate standing, consent of instructor, approval of department head, and Dean of Graduate Education.  
- Directed research and study on an individual basis.

HIST 575 PROFESSIONAL PAPER  
F, S, Su 1 - 4 cr. IND Maximum 6 cr.  
PREREQUISITE: Graduate standing.  
- A research or professional paper or project dealing with a topic in the field.  
The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

HIST 576 INTERNSHIP  
On Demand 2 - 12 cr. IND  
PREREQUISITE: Graduate standing, consent of instructor and approval of department head.  
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

HIST 580 SPECIAL TOPICS  
On Demand 1 - 4 cr. Maximum 12 cr.  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HIST 588 PROFESSIONAL DEVELOPMENT  
On Demand 1-5 cr. May be repeated; maximum 3 cr.  
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.  
- This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

HIST 589 GRADUATE CONSULTATION  
F, S, Su 3 cr. TUT  
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.  
- This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

HIST 590 MASTER'S THESIS  
F, S, Su 1 - 10 cr. IND May be repeated.  
PREREQUISITE: Master's standing.

HIST 601 DISSERTATION WORKSHOP  
F 1 cr. SEM 1  
- Presentation and discussion of dissertation research and writing.

HIST 609 DOCTORAL READING AND RESEARCH  
On demand 3-5 cr. IND, may be repeated, maximum 15 cr.

HIST 690 DOCTORAL THESIS  
On Demand 1-10 cr. may be repeated

HUM 280 SPECIAL TOPICS  
On Demand 1 - 4 cr. Maximum 12 cr.  
PREREQUISITE: None required but some may be determined necessary by each offering department.  
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

HUM 301RH INTEGRATIVE SEMINAR IN WOMEN'S STUDIES  
S 3 cr. SEM 3 Maximum 9 cr. (WS 301RH, effective Fall 2007.)  
- The seminar builds on the theoretical issues in women's studies and addresses special topics each year from a variety of disciplines.

I&ME Industrial & Management Engineering Department of Mechanical & Industrial Engineering (406) 994-2203

I&ME 101 INTRODUCTION TO INDUSTRIAL ENGINEERING  
F 1 cr. LEC 1  
PREREQUISITE: Must be taken the first year enrolled in IE program.  
- Overview of the industrial engineering profession.  
Lectures will concentrate on tools and methods of industrial engineering, and their application in manufacturing and service industries.

I&ME 143 INTRODUCTION TO PRODUCTION SYSTEMS  
S 2 cr. LEC 1 LAB 1  
PREREQUISITES: Must be taken the first year enrolled in IE program.  
- Introduction to system design and improvement methods.  
Lectures concentrate on data gathering; diagramming; facility layout with flow time and inventory relationships.  
Diagramming software used. Case studies and plant tours may be part of lab activities.

I&ME 264 INTRODUCTION TO MODELS AND COMPUTERS IN INDUSTRIAL ENGINEERING  
S 3 cr. LEC 3  
PREREQUISITE: CS 160, MATH 182.  
- Introduction to model formulation and numerical solution methods in industrial engineering.  
Emphasis on decisions, constraints, and objectives in problem solving.  
Introduction to relational database design and computer decision support.

I&ME 271 MICROCOMPUTERS IN INDUSTRY  
F 1 cr. LEC 2 LAB 1  
PREREQUISITE: CS 160 or equivalent.  
COREQUISITE: ME 116 or equivalent.  
- Basic skills in the programming and application of fundamental automation technologies, including digital logic, programmable logic controllers, microprocessors, robotics and flexible manufacturing systems.  
Laboratories are "mini" design problems where theory is implemented via software and hardware control of industrial devices.
COURSE DESCRIPTIONS: I&ME 280 - I&ME 470

I&ME 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

I&ME 300 PROFESSIONAL
PRACTICE AND RESPONSIBILITY
F 2 cr. SEM 2
PREREQUISITE: Junior, standing in IE.
- Transition to professional practice. Career planning, professional ethics, social responsibility, communications, job interviewing, and related professional topics.

I&ME 313 WORK DESIGN & ANALYSIS
S 3 cr. LEC 2 LAB 1
PREREQUISITE: ENGL 121W, and I&ME 142 for IE majors.
- Design and analysis principles of occupational tasks with emphasis on work standards development, productivity improvement, and industrial safety. Principles covered include operations and methods analysis, time and motion study, work sampling, synthetic time standards, human factors, and ergonomics.

I&ME 325 ENGINEERING ECONOMY
F, S, Su 3 cr. LEC 3
PREREQUISITE: Junior standing, MATH 181 or MATH 175, ENGL 121, COM 110 or CLS 101; or instructor approval.
- Methods for comparing and evaluating capital investment alternatives. Concepts include the time value of money, rates of return, cash flows, incremental analysis, depreciation, influences of taxes, inflation and deflation, depreciation, replacement analysis. Emphasis is placed upon evaluating various engineering alternatives. Some open-ended design problems are included.

I&ME 344 CONCURRENT ENGINEERING
On Demand 3 cr. LEC 3
PREREQUISITE: Engineering or Technology Junior or Senior standing.
- The business environment, process management, design process, manufacturability, life cycle designs, quality, compressing the design-to-market cycle, process integration, coordination and communication, world class design, manufacturing, and marketing.

I&ME 350 APPLIED
ENGINEERING DATA ANALYSIS
F, S, Su 2 cr. LEC 2
PREREQUISITE: MATH 176 or MATH 182.
- An overview of data variability and applied statistical experimental design with analysis techniques for a broad range of engineering disciplines. Topics include essential probability distributions, experimental design strategies, hypothesis testing, and regression with applications to traditional engineering functions.

I&ME 354 ENGINEERING
PROBABILITY AND STATISTICS I
F 3 cr. LEC 3
PREREQUISITE: MATH 182, junior standing, or instructor approval.
- Understanding the statistical nature of engineering processes. Emphasis on proper data collection and classification, characteristics of variables and their distributions, joint probability distributions, and establishing hypotheses and statistical significance over engineering design specifications.

I&ME 355 ENGINEERING STATISTICS LAB
F 1 cr. LAB 1
PREREQUISITE: MATH 182, junior standing, or instructor approval. COREQUISITE: I&ME 354.
- Laboratory experience emphasizing the design and analysis of engineering data. Includes Excel applications software.

I&ME 364 PRINCIPLES
OF OPERATIONS RESEARCH I
F 3 cr. LEC 3
PREREQUISITE: MATH 221 or MATH 224, I&ME 264.
- Formulation of models and optimization techniques to facilitate engineering management decisions. Resource allocation, transportation and multiple goals via networks, linear, and integer programming with primal-dual emphasis. Introduction to EOQ and probabilistic inventory models.

I&ME 375 PRODUCTION
INVENTORY COST ANALYSIS
S 3 cr. LEC 3
PREREQUISITE: One of the following: MATH 170, MATH 175, MATH 181.
- Industrial cost systems, accounting processes, and cost estimation; cost analysis of manufacturing processes, economic decision making and uses of cost information in making product design and product line decisions.

I&ME 415 ERGONOMICS & SAFETY I
F 3 cr. LEC 3
PREREQUISITE: Junior standing, I&ME 313 for IE majors only.
- Fundamentals of ergonomics and safety engineering. Topics include principles of anthropometry, biomechanics, work physiology, psychophysics, and engineered safety applied to common problems faced by engineers and industrial health professionals. Emphasis on design and analysis of occupational systems and consumer products which best "fit" job tasks or user requirements to human capabilities. Issues regarding regulatory environments (e.g., OSHA) are also covered.

I&ME 422 INTRODUCTION TO SIMULATION
F 3 cr. LEC 3
PREREQUISITE: CS 160 or equivalent, I&ME 354 or equivalent, I&ME 264 for IE majors.
- Fundamentals of logic representation, random number generation, sampling, output analysis, validation, and verification; application to varied systems design and analysis problems. Cross-listed with CS 422.

I&ME 425 ENTREPRENEURSHIP
AND ECONOMIC FEASIBILITY
F 3 cr. LEC 3
PREREQUISITE: I&ME 325 or consent of instructor.
- In-depth analysis of managerial decision-making methods culminating in a comprehensive economic feasibility study. Emphasis on entrepreneurship, sensitivity analysis, cost-volume-profit analysis, taxation, and computer application. Applications are demonstrated in a design project.

I&ME 434 PROJECT
AND ENGINEERING MANAGEMENT
F 3 cr. LEC 3
PREREQUISITE: I&ME 325 or consent of instructor.
- Fundamental principles of planning, estimating, budgeting, scheduling, implementing, evaluation, and controlling engineering and research projects. Common engineering management concerns such as labor scheduling, human resources management, and related governmental compliance also explored.

I&ME 442 FACILITY
AND MATERIAL HANDLING SYSTEMS DESIGN
F 3 cr. LEC 2 LAB 1
PREREQUISITE: I&ME seniors in their last full academic year, I&ME 313, ME 255.
COREQUISITE: I&ME 300.
- Senior capstone course. The first course in the senior capstone sequence. Principles and techniques for planning and designing production facilities and material handling systems. Product and process analysis, requirements, layout and support facilities. Computer-aided analysis and design.

I&ME 444R SENIOR DESIGN PROJECT
S 2 cr. LEC 1 RCT 1
PREREQUISITE: I&ME 442 and I&ME 454.
- Senior capstone course. Second course in senior capstone sequence. A comprehensive open-ended team design project emphasizing the use of computers to plan and evaluate facility designs, their location, and materials handling systems. Technical and economic feasibility studies. Oral and written communication emphasized.

I&ME 445R INDEPENDENT
I&ME SENIOR DESIGN
S 1 cr. IND 1
COREQUISITE: Concurrent enrollment in I&ME 444R required.
- Senior capstone course. Independent study associated with I&ME 444R.

I&ME 454 ENGINEERING
PROBABILITY AND STATISTICS II
S 3 cr. LEC 3
PREREQUISITE: I&ME 354 and I&ME 355.
- Identification, characterization, and analysis of variation in engineering data. Includes inferential statistics, goodness of fit, applications of non-parametric statistics, curve fitting, regression, and the design of engineering experiments. A team design project is required.

I&ME 458 PRODUCTION
AND ENGINEERING MANAGEMENT
S 3 cr. LEC 3
PREREQUISITE: I&ME 264.
- Design and management of efficient production/delivery systems for goods and services, emphasizing quantitative analysis and systems approaches. Topics include forecasting, inventory management, production planning, scheduling, material planning, and lean manufacturing systems; plus introduction to organization and management theory.

I&ME 464 PRINCIPLES
OF OPERATIONS RESEARCH II
S 3 cr. LEC 3
PREREQUISITE: I&ME 354 and I&ME 364
- Advanced formulation of models, optimization techniques and application to engineering design and operations management decision making. Nonlinear and integer programming algorithms. Stochastic models including advanced queuing and general markov processes. Integration of models and relational databases for decision support.

I&ME 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 3 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of IE faculty and department head.
- Directed research and study on an individual basis.
I&ME 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

I&ME 589 GRADUATE CONSULTATION
F, S, Su 1 - 5 cr. IND
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their coursework (and thesis if on a thesis plan) but who need additional faculty or staff time or help.

I&ME 590 MASTER'S THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master’s standing.

I&ME 690 DOCTORAL THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing.

ICS
Intercultural Studies
Office of International Programs
(406) 994-4031

ICS 270 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Independent study on topics related to intercultural and/or global issues.

ICS 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ICS 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-5 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ICS 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

ICS 404 INTERCULTURAL EXPERIENCE
On Demand 1 - 3 cr. LEC RCT.
- Students must spend a minimum of three weeks in a non-US cultural setting, and must be accompanied by one or more MSU faculty members. Number of credits to be awarded will be determined by the Director of International Programs.

ICS 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis of intercultural and/or global issues.

ICS 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ICS 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: ICS 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ICS 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

INTD
Interior Design
School of Architecture
(406) 994-4255

INTD 457 INTERIOR DESIGN V
On Demand 5 cr. LEC 2 STU 5
PREREQUISITE: INTD 356.
- Large multifunction design problems are given that require an increased understanding of programming and an efficient design process. Complete synthesis of design, function, and building systems integration is expected.

INTD 458 SENIOR PROJECT
On Demand 7 cr. STU 7
PREREQUISITE: INTD 457.
- An interior design project chosen by the student and subject to approval by senior project advisor and coordinator. Advanced study, research, and data collection leading to the development of the graphic and three dimensional materials required to illustrate the design process and the project solution. Passing grade of C or better is required.

INTD 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: INTD 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

INTD 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

LIBR
Library
Library
(406) 994-3119

LIBR 121 ELECTRONIC LIBRARY RESEARCH SKILLS
F, S 2 cr. RCT 2
- Electronic Library Research Skills is a course focusing on both the concepts and skills needed to conduct library research with an emphasis on electronic information sources. The purpose of the course is to provide individuals with a basic understanding of the library research process and the skills by which they can successfully find information for research, presentations, and other class assignments. This course may be taught solely online given semester.

LIBR 221 INFORMATION LITERACY
F, S 2 cr. LEC 2
- Decisions we make are affected by information we read, hear, or watch. Viewing information as a commodity, we all develop skills required to become effective information consumers who apply critical thinking and evaluation processes to all types of information resources.

LIBR 290 SPECIAL TOPICS
On Demand 1 - 3 cr. Max 12 cr.
- Information literacy involves the capacity to recognize when information is needed and the ability to locate, evaluate, and use it effectively. Students in this course will learn to find information of increasing degrees of complexity in print and electronic formats.

LIBR 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1 - 3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

LIBR 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1 - 6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written, work or other creative project.

LIBR 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: HIST 156
- Internship for archival arrangement and description.

LIBR 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: LIBR 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

LIBR 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.
LRES 10 LAND RESOURCES & ENVIRONMENTAL SCIENCES
F 3 cr. LEC 3
PREREQUISITE: MATH 103 or equivalent.

LRES 110 LAND RESOURCES & ENVIRONMENTAL SCIENCES
F 3 cr. LEC 3
Introduction to land resource assessment and environmental science associated with managed landscapes. Students will learn how to identify scientific questions from issues, and how to develop scientifically-based objective information for answering environmental and land management questions. The class is a survey of agroecology, environmental biology, land rehabilitation, land resource analysis, and soil and water science. Students must be proficient in basic algebra and have an understanding of biological principles.

LRES 201 SOIL RESOURCE
F 3 cr. LEC 2 LAB 1
PREREQUISITE: MATH 103 or equivalent.

LRES 251 SOIL ECONOMICS
F 1 cr. LAB 1
PREREQUISITE: LRES 201.

LRES 261 SOIL EVALUATION
F 1 cr. LAB 1
PREREQUISITE: MATH 103 or LRES 201.

LRES 270 INDEPENDENT STUDY
On Demand 1-6 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.

LRES 287 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required, but some may be determined necessary by each offering department.

LRES 290 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT may be repeated. Maximum 4 cr.
PREREQUISITE: LRES 290.

LRES 301 PROFESSIONAL PREPARATION
S 1 cr. LEC 1
PREREQUISITE: Junior standing.

LRES 351 NUTRIENT CYCLING
S 3 cr. LEC 3
PREREQUISITE: LRES 201, CHEM 132.

LRES 355 SOIL & ENVIRONMENTAL CHEMISTRY
S alternate years, to be offered 2007 3 cr. LEC 2 REC 1
PREREQUISITE: CHEM 215, LRES 201.

LRES 357 GPS FUNDAMENTALS & APPLICATIONS IN MAPPING
F, S 5 cr. LEC 1, LAB 2
PREREQUISITE: LRES 201 and GEOG 211.

LRES 401 INTEGRATED PEST MANAGEMENT
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: ENTO 204; and one of the following: BIOL 100, BIOL 101, or BIOL 102.

LRES 415 MICROBIAL DIVERSITY, ECOLOGY & EVOLUTION
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: BCHM 340, MB 301 or consent of instructor.

LRES 418 MICROBIAL DIVERSITY, ECOLOGY & EVOLUTION LABORATORY
S alternate years, to be offered 2008 1 cr. LAB 1
PREREQUISITE: MB 301 and BCHM 540 or consent of instructor.

LRES 421 HOLISTIC THOUGHT & MANAGEMENT
S 4 cr. LEC 4
PREREQUISITE: Junior standing.

LRES 429 CROPPING SYSTEMS & SUSTAINABLE AGRICULTURE
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: LRES 201 and either: PS 341 or PS 342.

LRES 441R CAPSTONE 1-FIELD APPLICATIONS
S 2 cr. LEC 2
PREREQUISITE: LRES major; Junior standing or consent of instructor.

LRES 441R CAPSTONE 2-PAPER APPLICATIONS
S 2 cr. LEC 2
PREREQUISITE: LRES major; Junior standing or consent of instructor.

LRS 441R CAPSTONE 3-RESEARCH APPLICATIONS
S 2 cr. LEC 2
PREREQUISITE: LRES major; Junior standing or consent of instructor.

LRS 441R CAPSTONE 4-SPECIAL APPLICATIONS
S 2 cr. LEC 2
PREREQUISITE: LRES major; Junior standing or consent of instructor.

LRS 441R CAPSTONE 5-INTERDISCIPLINARY APPLICATIONS
S 2 cr. LEC 2
PREREQUISITE: LRES major; Junior standing or consent of instructor.

LRS 441R CAPSTONE 6-COMMUNITY APPLICATIONS
S 2 cr. LEC 2
PREREQUISITE: LRES major; Junior standing or consent of instructor.
LRES 442R CAPSTONE 2-FIELD APPLICATIONS
F 2 cr. LEC 1 LAB 1
PREREQUISITE: LRES 441.
— Senior capstone course, second of two required semesters. Provides disciplinary and interdisciplinary knowledge, experiences, and skills related to Land Resource and Environmental Sciences. Topic of course will be current land management issue in local area, and students will conduct laboratory analyses to provide information to local agencies. Course emphasizes field measurement and analysis techniques related to soils, plants, water, and microclimate, writing and presentation skills, and application of basic science to land management decisions.

LRES 443 WEED ECOLOGY & MANAGEMENT
F 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 303, LRES 201, MATH 170, FS 102, STAT 216.
— The principles of weed ecology including plant population demographics, biotic and abiotic regulating mechanisms, and plant community temporal and spatial dynamics in managed ecosystems. Weed population model construction, spreadsheet calculations and thorough assessment of pest threshold theory. The study of ecologically-based weed management approaches including cultural, mechanical, biological, and chemical control practices.

LRES 444 WATERSHED HYDROLOGY
F 4 cr. LEC 2 LAB 2
PREREQUISITE: ESCI 112, LRES 110, LRES 201 (or equivalent understanding).—Introduction to watershed hydrology. The course will examine how rainfall and snowmelt become streamflow, evapotranspiration, and groundwater with an emphasis on hydrological processes. Discussion will revolve around state of the science, linkages to other disciplines, and management implications. Topical areas include: water balances, snow hydrology, hydrogeology, hyporheic zones, riparian zones, runoff process, and biogeochemical budgets.

LRES 451 SOILS FIELD COURSE
F 2 cr. LAB 2
PREREQUISITE: LRES 201.
— Field examination, description, and classification of landscapes and their soils; determination of soil use potential; field application of pedology, geology, and ecology to landscape management.

LRES 452 SOIL & ENVIRONMENTAL MICROBIOLOGY
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: CHEM 152, LRES 201, and MB 301.
— Microorganisms in soil environments: Emphasis on soil microbial ecology, plant-microbe interactions, biotransformations of inorganic or organic contaminants.

LRES 453 SOIL & ENVIRONMENTAL PHYSICS
F alternate years, to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: LRES 201 recommended, MATH 170 or equivalent, computer literacy.
— Soil physical properties and processes governing distribution and transport of water, heat, and soluble chemicals. Topics include water content and potential, infiltration, surface energy balance, evaporation, temperature and heat flow, saturated and unsaturated water and chemical flow. Laboratory stresses measurements and analyses.

LRES 454 LANDSCAPE PEDOLOGY
F 3 cr. LEC 2 LAB 1
PREREQUISITE: LRES 201.
— Processes leading to the formation and spatial distribution of soils on the landscape. Describing, classifying, and mapping soils. Management issues related to organic and mineral soil materials. The course includes a substantial hands-on field component.

LRES 458 TEACHING APPLICATIONS IN LRES
F 1 cr. RCT 1
PREREQUISITE: LRES 201.
— Application of teaching philosophies and methods through classroom, laboratory, and field teaching experiences.

LRES 460 SOIL REMEDIATION
S 3 cr. LEC 3
PREREQUISITE: LRES 201 or permission of instructor.
— Principles of soil remediation in impacted landscapes. Soil reconstruction practices are presented for drastically disturbed lands. Treatment science is presented for repair soil systems contaminated by metals and salts as a result of resource extraction and landscape disturbance by man. Protection of water resources are examined as related to sediment loss control, acid rock drainage science and treatment, and selective handling of geologic stratum. A field trip to a contaminated landscape will demonstrate ongoing soil remediation practices.

LRES 461 RESTORATION ECOLOGY
F 3 cr. LEC 3
PREREQUISITE: BIOL 101, and either ARNR 240 or BIOL 303.
— Reviews ecosystem structure and function, and community and population processes in intact systems, along with the effects of major disturbances on natural systems. Restoration amendments will be discussed in terms of their effects on ecosystem structure and function. The course includes local, regional, and national case studies, and students will write a restoration plan.

LRES 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
— Directed research and study on an individual basis.

LRES 476 INTERNSHIP
On Demand 2 - 4 cr. IND Maximum 12 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
— An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

LRES 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

LRES 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Maximum 4 cr.
PREREQUISITE: LRES 490.
— Classroom instruction associated with directed undergraduate research/creative activity projects.

LRES 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, 1 - 4 cr. IND May be repeated. Maximum 12 cr.
PREREQUISITE: Junior or Senior standing and approval of instructor.
— Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis. USP scholarships or project support grants are available in many cases.

LRES 500 SEMINAR
F, S, Su 1 cr. SEM Maximum 6 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering. Students prepare, present, and critique scientific presentations.

LRES 507 BIOLOGICAL RISK ASSESSMENT
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: BIOL 101, BIOL 303, STAT 401.
— Principles of risk analysis, including risk assessment, perception, communication, and management. Emphasis on human toxicology, ecotoxicology, dose-response relationships, exposure analysis, environmental fate, and deterministic and probabilistic risk assessment. Case studies will include examples from pesticides, biotechnology, and invasive species.

LRES 515 MICROBIAL ECOLOGY
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: LRES 415.
— Critical review of literature on the distribution and activity of microorganisms in natural microbial communities based on microbial adaption and physical, chemical and biological features of the environment. A critical discussion of literature and approaches. Cross-listed with MB 515.

LRES 525 APPLIED REMOTE SENSING
S 3 cr. LEC 2 LAB 1
PREREQUISITE: LRES 426 or consent of instructor.
— Applications of remote sensing for graduate students, including advanced studies of multispectral and hyperspectral sensors and image processing algorithms. Emphasis is on using remote sensing technologies for solving applied land resource issues. Students will participate in discussions of current remote sensing literature.

LRES 530 NATURAL RESOURCE LAW
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: none
— The course examines major natural resources laws, emphasizing the federal model. A modified case study approach is used to review legislation and related court cases governing natural resources, including water, minerals, timber, range, wildlife, recreation, and wilderness.

LRES 535 TECHNIQUES OF SPATIAL ANALYSIS
F alternate years, to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: STAT 410 or consent of instructor.
— Exploration and understanding of analytical techniques needed to deal with spatially correlated data. Emphasis is placed on practical applications within geographic information systems and image processing.
LRES 543 AGROECOLOGY / APPLIED PLANT ECOLOGY
S alternate years, to be offered 2008 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 305, MATH 181, LRES 443, STAT 216
- Focus on the principles and theories of popula-
- tions and community ecology as they relate to inva-
sive plant species in natural and agroecosystems.
- Measuring plant interference and assessing popula-
tion interactions and dynamics through empirical
- and theoretical models. Review theory and method-
ology concerning plant population demographics,
- dispersal, and natural trait selection. Examine the
role of biodiversity and evolution in determining
sustainable management of ecosystems.

LRES 551 SOIL SCIENCE & PLANT NUTRITION
S alternate years, to be offered 2008 3 cr. LEC 2 RCT 1
PREREQUISITE: BIOL 450 and LRES 551.
- Chemical, physical and biological influences on
- plant nutrition relationships.

LRES 553 ADVANCED SOIL & ENVIRONMENTAL MICROBIOLOGY
S alternate years, to be offered 2008 3 cr. LAB 3
PREREQUISITE: Graduate standing or consent of
- instructor.
- Advanced laboratory course. Microorganisms are
- targeted for isolation and characterization, emphaz-
sing those not normally encountered in general
microbiology laboratory. Biogeochemical cycling,
- contaminant biodegradation, extremophiles, and
- plant-microbe interactions are typical topics investi-
gated. Students employ classic and novel cultivation
- approaches, identifying microbes based morphology,
- physiology, and phylogeny. Crosslisted with MB 552.

LRES 555 PLANT & SOIL WATER RELATIONSHIPS
S alternate years, to be offered 2007 3 cr. LEC 3 RCT 1
PREREQUISITE: BIOL 430/PS 450 recommended.
- Status and transport of water in the soil-plant-
- atmosphere continuum, including cellular and
- whole plant water relations, root and plant interac-
tions with the environment, plant canopy biophys-
- ica, measurements and instrumentation, advanced
current topics of particular interest.

LRES 554 SOIL-LANDSCAPE MODELING
S alternate years, to be offered 2007 3 cr. LEC 2 LAB 1
PREREQUISITE: LRES 454 and STAT 410.
- Quantitative soil-landscape modeling with an
- emphasis on multi-variante spatial statistics, digital
- terrain modeling, and underlying landscape processes.
The course is built around "hands-on" projects and
discussions of peer-reviewed literature.

LRES 555 SOIL AND AQUATIC CHEMISTRY
S alternate years, to be offered 2007 3 cr. LEC 2 REC 1
PREREQUISITE: CHEM 215, CHEM 228, LRES 201N or equivalent.
- Advanced coverage of aqueous geochemistry in
- terrestrial and aquatic systems including chemical
- processes such as complexation, precipitation-dis-
- solution, sorption-desorption, partitioning, oxidiza-
tion-reduction and gas-water equilibria. Applications
- of these principles will be demonstrated in subject
areas including biogeochemical cycling, bioremedia-
tion, contaminant fate and transport, salt-affected
soils and wetland processes. Recitation will focus on
current literature, applied problems, and case
studies.

LRES 556 ENERGETICS IN AQUATIC SYSTEMS
ON Demand 2 cr. LEC 2
PREREQUISITE: BCHM 122 or BCHM 340, MATH 170, BIOL 404, and BIOL 427.
- Covers advanced aspects of heat flow, light per-
estion, advection, and diffusion dynamics of gases
- and nutrients within a liquid, and gas transfer at the
- air-water interface. Examines how aquatic microor-
ganisms (bacteria and algae) reciprocate with each
- other and with their surrounding environment.
- Particular emphasis is placed on physiological
- adaptations by organisms to changing environmen-
tal conditions. The course stresses how these pro-
cesses relate to the biological component of aquatic
systems.

LRES 557 THERMAL BIOLOGY
IN YELLOWSTONE NATIONAL PARK
Su 2 cr. LEC 1 RCT/DIS 1
PREREQUISITE: B.S. Science/Science Education;
- Enrollment limited to M.S. Science Education
- Graduate Program
- A survey of the ecology of important organisms
- common in thermal habitats of Yellowstone National
- Park, including a review of different life forms
- (prokaryotes and eukaryotes) and their modes of
- metabolism, and the physical, and chemical habitats
- that define their environment. Course includes lec-
ture, laboratory, and field components. Students will
be asked to design curricula for K-12 audiences.

LRES 560 ENVIRONMENTAL REGULATION
& LAND RECLAMATION DESIGN ANALYSIS
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: LRES 460, LRES 461.
- State and federal legislation and regulation influ-
- ence on land rehabilitation procedures and project
design. Advanced land rehabilitation problem
- solving and design including data quality control,
erosion control, landscape assessment using spatial
analysis, wetland evaluation, management of toxic
soil, and repair of contaminated riparian zones.

LRES 561 BELOWGROUND PLANT ECOLOGY
S alternate years, to be offered 2007 3 cr. LEC 3 PREREQUISITE: STAT 401 or equivalent; BIOL 503
- Quantitative belowground interactions are typical topics investig-
gated. Students employ classic and novel cultivation
- approaches, identifying microbes based morphology,
- physiology, and phylogeny. Crosslisted with MB 552.

LRES 562 LAND REHABILITATION FIELD PROBLEMS
Su alternate years, to be offered 2007 2 cr. LAB 2
PREREQUISITE: LRES 460, LRES 461.
- Extended field trip to numerous drastically dis-
turbed sites across the Northern Plains. On-site
review of land rehabilitation problems, solutions,
and methodologies. Participation by industry, regu-
- latory agency staff, and rehabilitation professionals
- will occur at most sites.

LRES 570 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of
- instructor, approval of department head, and Dean
of Graduate Education.
- Directed research and study on an individual basis.

LRES 575 PROFESSIONAL RESEARCH PAPER
On Demand 1-4 IND Maximum 6 cr.
PREREQUISITE: Graduate standing,
- A research or professional paper or project deal-
ing with a topic in the field. The topic must have
been mutually agreed upon by the student, the
major advisor, and graduate committee.

LRES 576 INTERNSHIP
On Demand 2-4 IND Maximum 12 cr.
PREREQUISITE: Graduate standing, consent of
instructor and approval of department head, and
Dean of Graduate Education.
- An individualized assignment arranged with an
agency, business or other organization to provide
guided experience in a field of study.

LRES 580 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others
as determined for each offering.
- Courses not required in any curriculum for which
there is a particular one-time need or given on a
trial basis to determine acceptability and demand
before requesting a regular course number.

LRES 589 GRADUATE CONSULTATION
F, S, Su 3 cr. TUT
PREREQUISITE: Master's and standing of the
Dean of Graduate Education.
- This course may be used only by students who
have completed all of their coursework (and thesis,
if on a thesis plan), but who need additional faculty
or staff time or help.

LRES 590 MASTER'S THESIS
F, S, Su 1-10 cr. IND Maximum credits unlimited,
PREREQUISITE: Master's standing.

LRES 690 DOCTORAL THESIS
F, S, Su 1-10 cr. IND Maximum credits unlimited,
PREREQUISITE: Doctoral standing.

LS
Liberal Studies
(406) 994-7835
LS 101U WAYS OF KNOWING
F 3 cr. SEM 5
- Introduction to the processes of academic
- inquirv, through examination of topics in disciplines
- encompassed by the Fine Arts, Humanities, Natural
- Sciences, and Social Sciences.

LS 289R UNDERGRADUATE RESEARCH/
CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed
undergraduate research/creative activity projects.

LS 290R UNDERGRADUATE RESEARCH/
CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activ-
ity which may culminate in a written work or other
creative project.

LS 301 INTEGRATIVE SEMINAR
F, S 1 cr. SEM 1 Maximum 5 cr.
PREREQUISITE: University Seminar and sopho-
more standing.
- The integration of knowledge, theories, and con-
cepts across different disciplines in the Fine Arts,
Humanities, Natural Sciences, and Social Sciences.
LS 401 SENIOR PROJECT
F, S 4 cr. SEM 4
PREREQUISITE: CLS 101 or LS 101 and LS 301.
- Senior capstone course. Opportunity for Liberal Studies majors to apply knowledge and experiences acquired throughout the program in researching and designing solutions to contemporary public policy issues.

LS 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
- Directed research and study on an individual basis.

LS 489R UNDERGRADUATE RESEARCH/
CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: LS 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

LS 499R UNDERGRADUATE RESEARCH/
CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MAS
Military Aerospace Studies -
Air Force ROTC
Department of
Military Aerospace Studies
(406) 994-4022

MAS 110 FOUNDATIONS OF THE AIR FORCE I
F 1 cr. LEC 1
COREQUISITE: MAS 115.
- A study of the organization and mission of the U.S. Air Force with emphasis in oral/written communication, and leadership.

MAS 111 FOUNDATIONS OF THE AIR FORCE II
S 1 cr. LEC 1
COREQUISITE: MAS 116.
- Continuing study of the organization and mission of the U.S. Air Force with emphasis in oral/written communication, and leadership.

MAS 115 LEADERSHIP LABORATORY 115
F 0 cr. LAB 0
PREREQUISITE: Consent of instructor and approval of Department Head.
COREQUISITE: MAS 110.
- Laboratory exercises introduce: uniform wear, drill and ceremonies, physical fitness training, and military customs and courtesies.

MAS 116 LEADERSHIP LABORATORY 116
S 0 cr. LAB 0
PREREQUISITE: Consent of instructor and approval of Department Head.
COREQUISITE: MAS 111.
- Laboratory exercises introduce: uniform wear, drill and ceremonies, physical fitness training, and military customs and courtesies.

MAS 209 FIELD TRAINING, 5 WEEK
Su 5 cr. LAB 3
PREREQUISITE: Approval of Department Head.
- Substitute for the General Military Course.
Selection during Fall or Spring semesters by head of department. Conducted on an Air Force base. Study of U.S. Air Force mission and organization, career opportunities, customs and courtesies, drill and ceremonies, survival, physical fitness training and small arms training.

MAS 210 THE EMPLOYMENT OF AIR & SPACE POWER I
F 1 cr. LEC 1
COREQUISITE: MAS 215.
- Focuses on factors contributing to the development of air power from its earliest beginnings through the Korean war; the evolution of air power competencies, functions, and doctrine, with emphasis in communication skills.

MAS 211 THE EMPLOYMENT OF AIR & SPACE POWER II
S 1 cr. LEC 1
COREQUISITE: MAS 216.
- Continuing study of development of air power from the Vietnam conflict through present day, with emphasis in communication skills.

MAS 212 FLIGHT GROUND SCHOOL
S 2 cr. LEC 2
PREREQUISITE: Approval of instructor. (This MAS course is available only through Burns Telecom Center under separate registration).
- Basics required for learning to fly single-engine land type aircraft. Covers material tested on the FAA Private Pilot written exam, to include performance, the science of flight, meteorology, FAA regulations, navigation, and the physiology of flight.

MAS 213 FLIGHT TRAINING
F 1 cr. LAB 1
PREREQUISITE: Approval of instructor. (This MAS course is available only through Burns Telecom Center under separate registration).
- Practical application of material taught in MAS 212. Flight training from an MSU-approved instructor to include all that is required to achieve solo flight (15 hours flying). Fee will include tuition and flight instruction; students must pay for their own aircraft rental.

MAS 214 INSTRUMENT GROUND SCHOOL
S 2 cr. LEC 2
PREREQUISITE: Private Pilot Certificate or permission of instructor. (This MAS course is available only through Burns Telecom Center under separate registration).
- An introduction to flight under IFR conditions. Course includes basic instrument flying, flight instruments, IFR charts and approach plates, IFR regulations and procedures, ATC clearances and IFR flight planning. Completion of the course will prepare the student for the Instrument Knowledge Exam.

MAS 215 LEADERSHIP LABORATORY 215
F 0 cr. LAB 0
PREREQUISITE: Consent of instructor and approval of department head.
- Laboratory exercises include group leadership problems, drill and ceremony, customs and courtesies, physical fitness training, and field training preparation activities.

MAS 216 LEADERSHIP LABORATORY 216
S 0 cr. LAB 0
PREREQUISITE: Consent of instructor and approval of department head.
COREQUISITE: MAS 211.
- Laboratory exercises include group leadership problems, drill and ceremony, customs and courtesies, physical fitness training and field training preparation activities.

MAS 260 USAF AEROSPACE WEAPONS
S 2 cr. LEC 2
- The study of the weapons systems employed by the United States Air Forces. It also presents the basics of their integration and employment at the operations level.

MAS 270 INDEPENDENT STUDY
On Demand 1 - 8 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of the director.
- Directed research and study on an individual basis.

MAS 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MAS 281 LEADERSHIP AND FITNESS
F, S 2 cr. LAB 2
- An introduction to leadership principles and practicum through organized group fitness. Leadership and Fitness uses group fitness workouts as a means to improve personal fitness, examine leadership techniques, and give students a hands-on leadership experience by personally leading the group.

MAS 299 FIELD TRAINING, 4 WEEK
Su 2 cr. LAB 2
PREREQUISITE: MAS 110, MAS 111, MAS 210, MAS 211 and junior standing.
- Required for all AFROTC cadets except those who have completed MAS 209. Orientation on an Air Force base, flying orientation, survival and small arms training, physical training, drill and ceremonies.

MAS 310 AIR FORCE LEADERSHIP
AND MANAGEMENT I
F 3 cr. LEC 3
COREQUISITE: MAS 315.
- Study of leadership and quality management fundamentals, professional knowledge and leadership ethics, with emphasis in communication skills.

MAS 311 AIR FORCE LEADERSHIP
AND MANAGEMENT II
S 3 cr. LEC 3
COREQUISITE: MAS 316.
- Continuation of the study of leadership, quality management fundamentals, professional knowledge and leadership ethics, with emphasis in communication skills.
MAS 315 LEADERSHIP LABORATORY 315
F 0 cr. LAB 0
PREREQUISITE: Consent of instructor and approval of department head.
COREQUISITE: MAS 310.
– Laboratory includes advanced group leadership problems, planning and orchestrating cadet corps activities.

MAS 316 LEADERSHIP LABORATORY 316
S 0 cr. LAB 0
PREREQUISITE: Consent of instructor and approval of department head.
COREQUISITE: MAS 311.
– Laboratory includes advanced group leadership problems, planning and orchestrating cadet corps activities.

MAS 410 NATIONAL SECURITY AFFAIRS/ PREPARATION FOR ACTIVE DUTY I
F 3 cr. LEC 3
PREREQUISITE: Approval of department head (for students not pursuing a commission in the U.S. Air Force)
COREQUISITE: MAS 415.
– Examines the evolution of national security, analyzes the evolution and formulation of the American defense policy, strategy, and joint doctrine; methods for managing conflict; overview of regional security, arms control, and terrorism. Also focuses on the military as a profession, officership, military justice system, and current issues affecting military professionalism. Communication skills are emphasized.

MAS 411 NATIONAL SECURITY AFFAIRS/ PREPARATION FOR ACTIVE DUTY II
S 3 cr. LEC 3
PREREQUISITE: MAS 410, approval of department head (for students not pursuing a commission in the U.S. Air Force)
COREQUISITE: MAS 416.
– Continuation of MAS 410.

MAS 415 LEADERSHIP LABORATORY 415
F 0 cr. LAB 0
PREREQUISITE: Consent of instructor and approval of department head.
COREQUISITE: MAS 410.
– Laboratory component includes advanced group leadership problems and commanding and supervising all cadet corps activities.

MAS 416 LEADERSHIP LABORATORY 416
S 0 cr. LAB 0
PREREQUISITE: Consent of instructor and approval of department head.
COREQUISITE: MAS 411.
– Laboratory component includes advanced group leadership problems and commanding and supervising all cadet corps activities.

MAS 470 INDEPENDENT STUDY
On Demand 1 - 8 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
– Directed research and study on an individual basis.

MAS 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
– Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MATH Mathematics

Department of Mathematical Sciences
(406) 994-3601

The Department of Mathematical Sciences enforces prerequisites. By University policy, in order for any course to serve as the prerequisite you must earn a "C" or better. In addition to the specific prerequisite courses listed, students in 100 level math courses and STAT 216 may also meet the prerequisite with the appropriate Math ACT, Math SAT, or Math Placement Exam score. Specific levels and scores for these courses can be found at: www.math.montana.edu/undergrad/prereq_flow.html

MATH 005 PRE-ALGEBRA (COT)
F, S, Su 4 cr. LEC 4
– This instructor-taught course introduces basic concepts relating to fractions, decimals, ratios, proportions, percent, simple equations, topics of signed numbers, and 1-variable linear equations are offered as a review and/or preparation for further studies in mathematics. Offered in partnership with the COT in Bozeman. Pass/Fail course.

MATH 008 PRE-ALGEBRA
F, S, 3 cr. LEC 3
PREREQUISITE: Available only to TRIO students.
– Topics include number systems, integers, fractions, decimals, percents, variable expressions, linear equations, and selected geometry topics.

MATH 101 INTRODUCTORY ALGEBRA (COT)
F, S, Su 4 cr. LEC 4
PREREQUISITE: Qualifying admission assessment score within the past 3 years, or instructor approval.
– This instructor-taught course initiates development in students' ability to organize thought processes and systematically solve problems while preparing students for studies in other courses. Includes manipulation of variables, exponential expressions, scientific notation, polynomials, factoring trinomials, solving equations, systems of equations, and graphing quadratic equations. This course is intended for students who have not studied algebra but have a firm background in basic mathematics or who wish it as a review. Offered in partnership with the COT in Bozeman.

MATH 105 INTRODUCTORY ALGEBRA
F, S, Su 3 cr. IND 3
PREREQUISITE: MATH 005 or Math Placement Test within the past 12 months.
– Topics include linear equations and inequalities and their graphs, systems of linear equations and inequalities, exponents, polynomials, factoring, rational expressions, and square roots.

MATH 105 ALGEBRA FOR COLLEGE STUDENTS
F, S, Su 3 cr. LEC 3
PREREQUISITE: MATH 105 or Math Placement Test within the past 12 months.
– Further development of algebraic skills through the study of linear, quadratic, polynomial, exponential, and logarithmic functions.

MATH 108 MATH FOR ELEMENTARY TEACHERS I
F, S, Su 4 cr. LEC 4
PREREQUISITE: MATH 103 or Math Placement Test within the past 12 months.
– An introduction to problem solving, sets, functions, logic, numerations systems as a mathematical structure, introductory number theory, rational, and irrational numbers and probability for prospective elementary school teachers.

MATH 115Q MATH FOR ELEMENTARY TEACHERS II
F, S, Su 3 cr. LEC 4
PREREQUISITE: MATH 130.
– Introductory geometry, constructions, congruence and similarity, concepts of measurement, coordinate geometry, problem solving revisited, and computer applications for prospective elementary school teachers.

MATH 149Q SECRETS OF THE INFINITE
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: MATH 103 or Math Placement Test within the past 12 months.
– Intriguing problems, puzzles, and paradoxes studied from an historical perspective. Hands-on thought experiments follow mathematical ideas as they evolved from ancient beginnings into their modern contexts. Topics vary by semester.

MATH 150Q LIBERAL ARTS MATHEMATICS
F, S, Su 3 cr. LEC 3
PREREQUISITE: MATH 103 or Math Placement Test within the past 12 months.
– Basic skills in applicable mathematics including linear, quadratic, and exponential models; financial mathematics, trigonometry and some elementary statistics.

MATH 151Q LANGUAGE OF MATH
F, S 3 cr. LEC 3
PREREQUISITE: MATH 103 or Math Placement Test within the past 12 months.
– Reading comprehension and writing skills in the language of mathematics; vocabulary, grammar, syntax, and logic; emphasis on understanding, expressing, proving, and thinking mathematical thoughts.

MATH 160Q PRECALCULUS
F, S, Su 4 cr. LEC 4
PREREQUISITE: MATH 105 or Math Placement Test within the past 12 months.
– Functions, graphs, and the use symbols for expressing mathematical thoughts. Polynomials, rational, exponential, logarithmic, and trigonometric functions.

MATH 170Q SURVEY OF CALCULUS
F, S, Su 4 cr. LEC 4
PREREQUISITE: MATH 105 or Math Placement Test within the past 12 months.
– A survey of basic calculus including limits, differentiation, and integration with applications to business, biology, and social science problems.

MATH 175Q CALCULUS FOR TECHNOLOGY I
F, S 3 cr. LEC 3
PREREQUISITE: MATH 160 or Math Placement Test within the past 12 months.
– Calculus with emphasis on problems of interest to engineering technologists. Includes analytic geometry, differentiation, and introduction to integration.
MATH 176 CALCULUS FOR TECHNOLOGY II  
F, S 3 cr. LEC 3  
PREREQUISITE: MATH 175.  
- Calculus with emphasis on problems of interest  
to engineering technologies. Includes integration,  
infinite series, and differential equations.

MATH 181Q CALCULUS & ANALYTIC GEOMETRY I  
F, S, Su 4 cr. LEC 4  
PREREQUISITE: MATH 160 or Math Placement  
Test within the past 12 months.  
- Functions, elementary transcendental functions,  
limits and continuity, differentiation, applications  
of the derivative, curve sketching, and integration  
theory.

MATH 211Q CALCULUS & ANALYTIC GEOMETRY II  
F, S, Su 4 cr. LEC 4  
PREREQUISITE: MATH 176 or Math Placement  
Test within the past 12 months.  
- Vectors, vector algebra, geometry in Euclidean  
3-space, eigenvalues, eigenvectors.

MATH 225Q CALCULUS OF FUNCTIONS OF SEVERAL VARIABLES  
F, S, Su 4 cr. LEC 4  
PREREQUISITE: MATH 182.  
- Topics in two and three dimensional geometry.  
Manipulation and application of vectors. Functions  
of several variables, contour maps, graphs, partial  
derivatives, gradients, double and triple integrals,  
vector fields, line integrals, surface integrals,  
Green's Theorem, Stoker's Theorem, the Divergence  
Theorem.

MATH 225 INTRODUCTION TO DIFFERENTIAL EQUATIONS  
F, S, Su 4 cr. LEC 4  
PREREQUISITE: MATH 182.  
- An introduction to qualitative, quantitative, and  
numerical methods for ordinary differential  
equations. Topics include modeling via differential  
equations, linear and nonlinear first order differential  
equations and systems, elementary phase plane  
analysis, forced oscillations, and Laplace transform  
techniques.

MATH 256 FOUNDATIONS OF HIGHER MATHEMATICS  
S 3 cr. LEC 3  
PREREQUISITE: MATH 182.  
- Reasoning and communication in mathematics,  
including logic, generalization, definition, proof,  
and the language of mathematics. Topics include  
elementary number theory, recursion, set theory,  
relations, functions, and abstract algebra.

MATH 280 SPECIAL TOPICS  
On Demand 1 - 4 cr. Maximum 12 cr.  
PREREQUISITE: None required but some may be  
determined necessary.  
- Courses not required in any curriculum for which  
there is a particular one-time need, or given on  
a trial basis to determine acceptability and demand  
before requesting a regular course number.

MATH 298R UNDERGRADUATE RESEARCH/  
CREATIVE ACTIVITY INSTRUCTION  
F, S, Su 1 - 2 cr. RCT may be repeated. Max 4 cr.  
COREQUISITE: MATH 290.  
- Classroom instruction associated with directed  
undergraduate research and creative activity  
projects.

MATH 320Q MODERN GEOMETRY  
S 3 cr. LEC 3  
PREREQUISITE: MATH 329.  
- Euclidean, hyperbolic, spherical, projective, finite,  
and fractal geometries; linear transformations and  
fractal geometries; linear transformations and  
vector communications tools for geometry. NCTM  
Standards.

MATH 330 HISTORY OF MATHEMATICS  
F alternate years, to be offered 2006 3 cr. LEC 3  
PREREQUISITE: MATH 224 and MATH 225 or  
consent of instructor.  
- Topics will be selected from the entire span of  
history from Egyptian, Babylonian, and Greek times  
through the 20th century. The course may focus on  
milestones that lead to the development of modern  
mathematics as well as the contributions of great  
mathematicians from ancient times until today.  
Some ideas will require mathematical sophistication  
at the upper division level.

MATH 353 LINEAR ALGEBRA  
F 3 cr. LEC 3  
PREREQUISITE: MATH 221.  
- Vector spaces, subspaces, bases, and dimension.  
Linear transformations, representation by matrices,  
nullity, rank, isomorphism. Eigenvalues, eigenvectors,  
and diagonalization. Inner products, ad joints,  
unitary, and orthogonal transformations. Jordan  
form and minimal polynomials.

MATH 348 TECHNIQUES OF APPLIED MATHEMATICS I  
F 3 cr. LEC 3  
PREREQUISITE: MATH 224 and MATH 225.  
- An introduction to advanced analytical techniques  
frequently used by scientists and engineers to  
study ordinary differential equations and two-point  
boundary value problems. Topics include series  
solution techniques, method of Frobenius, Laplace  
transforms, Fourier series, and boundary value  
problems.

MATH 349 TECHNIQUES OF APPLIED MATHEMATICS II  
S 3 cr. LEC 3  
PREREQUISITE: MATH 348.  
- Science and engineering majors often encounter  
partial differential equations in the study of heat  
flow, vibrations, electric circuits, and similar areas.  
Topics include Sturm-Liouville theory, partial  
differential equations boundary value problems, and  
Laplace Transform methods.

MATH 511 ADVANCED CALCULUS I  
F 3 cr. LEC 3.  
PREREQUISITE: MATH 224.  
- A rigorous development of calculus with formal  
proofs. Functions, sequences, limits, continuity, dif-  
ferentiation, and integration.

MATH 594R SOFTWARE FOR MATHEMATICAL COMPUTATION  
F 3 cr. LEC 3  
PREREQUISITE: MATH 221, MATH 224, and  
MATH 225.  
- An introduction to the use of modern scientific  
computing software to solve and investigate math- 
etical and scientific problems. The software  
package MAPLE or Mathematica will be used for  
visualization and computer algebra systems. Also the  
software package MATLAB will be used for doing  
numerics and visualization.

MATH 604 SEMINAR  
On Demand 1 cr. SEM 1 Maximum 4 cr.  
PREREQUISITE: Junior standing and as deter-  
mined for each offering.  
- Topics offered at the upper division level which  
are not covered in regular courses. Students partici-  
pate in preparing and presenting material.

MATH 416 MODERN ALGEBRA  
S 3 cr. LEC 3  
PREREQUISITE: MATH 333.  
- Senior capstone course. The integers, integers  
modulo n, the Euclidean algorithm. Groups,  
subgroups, normal subgroups, quotient groups,  
homomorphism and isomorphism theorems, and  
abelian groups. Rings, ideals, homomorphism and  
isomorphism theorems. Integral domains, fields,  
and fields of quotients.

MATH 420 GEOMETRY FOR THE MIDDLE GRADES  
On Demand 3 cr. LEC 3  
PREREQUISITE: MATH 256 and EDSD 361 or  
EDSD 371, or MATH 131 and MATH 151 and regis-  
tered in the Elementary Education math option.  
- This course will survey aspects of Euclidean geom-  
etry appropriate to middle school, explore the use  
of manipulative materials and computer technolo-  
gies, and discuss related pedagogical issues and  
national standards.

MATH 424 ALGEBRAIC INVESTIGATIONS FOR THE MIDDLE GRADES  
To be offered Su 2006 3 cr. LEC 3  
PREREQUISITE: MATH 256 and EDSD 361 or  
EDSD 371, or MATH 131 and MATH 151 and regist-  
tered in the Elementary Education math option.  
- Developing algebraic knowledge necessary to  
teach the middle school mathematics curriculum  
will be the focus of this course. Investigating  
the underlying conceptual structure of algebraic  
topics including variables and patterns; functions;  
exponential and quadratic relationships, and alge-  
bric reasoning.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 427</td>
<td>INTEGRATING MATHEMATICS AND SCIENCE THROUGH MODELING</td>
</tr>
<tr>
<td></td>
<td>Su alternate years, to be offered 2007 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>Distance format.</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: At least junior standing in math or science education certification program or teacher certification and consent of instructor.</td>
</tr>
<tr>
<td></td>
<td>Generally taught via the Internet.</td>
</tr>
<tr>
<td></td>
<td>This course focuses on the mathematical methods broadly labeled mathematical modeling - underlying scientific inquiry and discovery. Through hands-on exploration and reflection, students will examine topics such as historical connections between mathematics and science, empirical modeling, model validation, proportionality, and simulation.</td>
</tr>
<tr>
<td>MATH 428</td>
<td>MATHEMATICAL MODELING FOR TEACHERS</td>
</tr>
<tr>
<td></td>
<td>F 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: Junior or senior standing in mathematics education, or consent of instructor.</td>
</tr>
<tr>
<td></td>
<td>- Senior capstone course. The use of pre-college mathematics to explore a variety of application areas.</td>
</tr>
<tr>
<td></td>
<td>Overview of the modeling process, review of relevant technology, strategies to initiate modeling in the secondary classroom, modeling in the secondary curriculum, and the classroom assessment of modeling activities.</td>
</tr>
<tr>
<td>MATH 430</td>
<td>PROBABILITY</td>
</tr>
<tr>
<td></td>
<td>F 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 224.</td>
</tr>
<tr>
<td></td>
<td>- Fundamentals of probability; discrete and continuous random variables; expected value; variance; joint, marginal, and conditional distributions; conditional expectations; applications; simulations; central limit theorem; order statistics. Also, listed as STAT 420.</td>
</tr>
<tr>
<td>MATH 454</td>
<td>MATHEMATICAL STATISTICS</td>
</tr>
<tr>
<td></td>
<td>S 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: STAT 420 or MATH 430.</td>
</tr>
<tr>
<td></td>
<td>- Introduction to the theory of point estimation, interval estimation, and hypothesis testing. Also, listed as STAT 424.</td>
</tr>
<tr>
<td>MATH 441</td>
<td>NUMERICAL LINEAR ALGEBRA &amp; OPTIMIZATION</td>
</tr>
<tr>
<td></td>
<td>F 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 221 and MATH 224.</td>
</tr>
<tr>
<td></td>
<td>- Numerical solution of nonlinear equations.</td>
</tr>
<tr>
<td></td>
<td>Numerical solutions of linear systems and eigenvalue problems. Least squares, data smoothing, and optimization techniques.</td>
</tr>
<tr>
<td>MATH 442</td>
<td>NUMERICAL SOLUTION OF DIFFERENTIAL EQUATIONS</td>
</tr>
<tr>
<td></td>
<td>S 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 221 and MATH 225.</td>
</tr>
<tr>
<td>MATH 449</td>
<td>INTRODUCTION TO COMPLEX ANALYSIS</td>
</tr>
<tr>
<td></td>
<td>S alternate years, to be offered 2008 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 224.</td>
</tr>
<tr>
<td></td>
<td>- An introduction to the techniques of complex analysis that are frequently used by scientists and engineers. Topics include complex numbers, analytic functions, Taylor and Laurent expansions, Cauchy's theorem, and evaluation of integrals by residues.</td>
</tr>
<tr>
<td>MATH 450</td>
<td>APPLIED MATHEMATICS I</td>
</tr>
<tr>
<td></td>
<td>F alternate years, to be offered 2007 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 224 and MATH 225.</td>
</tr>
<tr>
<td></td>
<td>- An introduction to modern methods in applied mathematics. Topics include introductions to dimension analysis and scaling, perturbation and WKB methods, boundary layers, calculus of variations, stability, and bifurcation analysis.</td>
</tr>
<tr>
<td>MATH 451</td>
<td>APPLIED MATHEMATICS II</td>
</tr>
<tr>
<td></td>
<td>S alternate years, to be offered 2008, 5 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 450.</td>
</tr>
<tr>
<td></td>
<td>- This is the second semester of a course that introduces modern methods in applied mathematics. Topics include methods for linear and nonlinear partial differential equations, including introductions to Green's functions, Fourier analysis, shock waves, conservation laws, maximum and minimum principles, and integral equations.</td>
</tr>
<tr>
<td>MATH 454</td>
<td>INTRODUCTION TO DYNAMICAL SYSTEMS</td>
</tr>
<tr>
<td></td>
<td>F alternate years, to be offered 2006 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 224 and MATH 225.</td>
</tr>
<tr>
<td>MATH 455</td>
<td>INTRODUCTION TO DYNAMICAL SYSTEMS II</td>
</tr>
<tr>
<td></td>
<td>S alternate years, to be offered 2007 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 454.</td>
</tr>
<tr>
<td></td>
<td>- Gradient systems, Poincare'-Bendixson theory, Poincare' maps, structural stability and chaotic systems.</td>
</tr>
<tr>
<td>MATH 470</td>
<td>INDEPENDENT STUDY</td>
</tr>
<tr>
<td></td>
<td>F, S, Su 1 - 5 cr. IND Maximum 6 cr.</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: Junior standing, consent of instructor, and approval of department head.</td>
</tr>
<tr>
<td></td>
<td>- Directed research and study on an individual basis.</td>
</tr>
<tr>
<td>MATH 476</td>
<td>INTERNSHIP</td>
</tr>
<tr>
<td></td>
<td>F, S, Su 1 - 12 cr. IND</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: Junior standing, consent of instructor, and approval of department head.</td>
</tr>
<tr>
<td></td>
<td>- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.</td>
</tr>
<tr>
<td>MATH 480</td>
<td>SPECIAL TOPICS</td>
</tr>
<tr>
<td></td>
<td>On Demand 1 - 4 cr. Maximum 12 cr.</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: Course prerequisites as determined for each offering.</td>
</tr>
<tr>
<td></td>
<td>- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.</td>
</tr>
<tr>
<td>MATH 489</td>
<td>UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY</td>
</tr>
<tr>
<td></td>
<td>F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: Junior standing in mathematics and consent of department head.</td>
</tr>
<tr>
<td></td>
<td>- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.</td>
</tr>
<tr>
<td>MATH 500</td>
<td>SEMINAR</td>
</tr>
<tr>
<td></td>
<td>F, S, Su 1 cr. SEM 1 Maximum 6 cr.</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.</td>
</tr>
<tr>
<td></td>
<td>- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.</td>
</tr>
<tr>
<td>MATH 505</td>
<td>ADVANCED LINEAR ALGEBRA</td>
</tr>
<tr>
<td></td>
<td>S cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 335 or consent of instructor.</td>
</tr>
<tr>
<td></td>
<td>- Topics include abstract vector spaces, diagonalization, Schur's Lemma, Jordan canonical form, and spectral theory for finite dimensional operators.</td>
</tr>
<tr>
<td>MATH 504</td>
<td>ABSTRACT ALGEBRA</td>
</tr>
<tr>
<td></td>
<td>S cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 416 or consent of instructor.</td>
</tr>
<tr>
<td></td>
<td>- The theory of groups, rings and fields with particular emphasis on finite groups, polynomial rings and fields of characteristic zero.</td>
</tr>
<tr>
<td>MATH 505</td>
<td>PRINCIPLES OF MATHEMATICAL ANALYSIS</td>
</tr>
<tr>
<td></td>
<td>F 3 cr. LEC 5</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 502 or consent of instructor.</td>
</tr>
<tr>
<td></td>
<td>- Principles of analysis in Euclidean spaces and metric spaces.</td>
</tr>
<tr>
<td>MATH 511</td>
<td>GENERAL TOPOLOGY</td>
</tr>
<tr>
<td></td>
<td>F 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 502 or consent of instructor.</td>
</tr>
<tr>
<td></td>
<td>- Definition of a topology, relative topology, metric topology, quotient topology, and the product topology. Connectedness, local connectedness, components and path components. Compactness and local compactness, countability and separation axioms, the Urysohn Lemma, metrization and compactification.</td>
</tr>
<tr>
<td>MATH 516</td>
<td>GEOMETRIC &amp; ALGEBRAIC TOPOLOGY</td>
</tr>
<tr>
<td></td>
<td>S 3 cr. LEC 5</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: MATH 511 or consent of instructor.</td>
</tr>
<tr>
<td></td>
<td>- Topics in continua theory, topics in dimension theory, covering spaces and the fundamental group, simplicial complexes, topics in homology and cohomology theory.</td>
</tr>
<tr>
<td>MATH 516</td>
<td>THE LANGUAGE OF MATHEMATICS: AN ADVANCED PERSPECTIVE</td>
</tr>
<tr>
<td></td>
<td>Su alternate years, to be offered 2007 3 cr. LEC 3</td>
</tr>
<tr>
<td></td>
<td>PREREQUISITE: Graduate standing in mathematics education, teaching endorsement in mathematics, or consent of instructor.</td>
</tr>
<tr>
<td></td>
<td>- The features of the language of mathematics, particularly as they apply to high school and middle school curricula. Includes grammar, syntax, vocabulary, synonyms, negation, sentence structure, paragraph structure, logic, and proof. Comparison of oral and written modes of communication.</td>
</tr>
</tbody>
</table>
MATH 517 ADVANCED MATHEMATICAL MODELING FOR TEACHERS
S alternate years, to be offered 2007 3 cr. LEC 3
Distance format.
PREREQUISITE: Graduate standing in mathematics education, teaching endorsement in mathematics, or consent of instructor.
- Hands-on focus on the use of modeling to solve real-world problems. Topics include the modeling process, and the use of relevant technology, strategies to initiate modeling in the secondary classroom, and classroom assessment of modeling activities.

MATH 518 STATISTICS FOR TEACHERS
Su 2 cr. LEC 2 Distance format.
PREREQUISITE: Graduate standing in mathematics or science education, teaching endorsement in mathematics or science, or consent of instructor.
- Focus on stochastic concepts that arise in mathematics and science education, including probabilistic underpinnings of statistics, measures of central tendency, variability, correlation, distributions, sampling, and simulation.

MATH 519 APPLICATIONS OF STATISTICS IN MATHEMATICS CLASSROOMS
Su 2 cr. LEC 2 Distance format.
PREREQUISITE: MATH 518 or consent of instructor.
- Exploratory data analysis including experiments, surveys, measures of association and inferential statistics. Issues relating to the methods, materials, and teaching of statistics at the pre-college level will be discussed as well.

MATH 520 STANDARDS-BASED MATHEMATICS: CONCEPTS AND METHODS
On Demand 3 cr. LEC/RCT
PREREQUISITE: Graduate standing in mathematics education, teaching endorsement in mathematics, or consent of instructor.
- Study of key content themes and connections in algebra, geometry, probability/data analysis, number, and measurement with a focus on the NCTM process standards. Exploring, extending, designing, and teaching standards-based classroom activities for middle/high school students and reflecting on student outcomes.

MATH 521 THEORY OF LEARNING MATH
S alternate years, to be offered 2007 3 cr. LEC/RCT Distance format.
PREREQUISITE: EDSD 461 and graduate standing in mathematics education, or consent of instructor.
- Examine theories of learning as they apply to the mathematics classroom. The course focuses on theories of and research about learning, human development, personality and motivation. The theories and research are used (a) to understand mathematics learning among students of all cultural, linguistic and socioeconomic backgrounds, and (b) to formulate effective teaching and learning strategies.

MATH 522 ASSESSMENT IN THE MATHEMATICS CLASSROOM
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EDCI 360 or Equivalent
- Connects assessment theory and models to teachers’ practice through classroom observations and hands-on activities. Focus on assessment practices consistent with standard-based mathematics, classroom assessment of student learning, evaluation of mathematics programs and curricula, and standardized testing practices.

MATH 523 NUMBER STRUCTURE FOR TEACHERS
F alternate years, to be offered 2006 2 cr. LEC 2
PREREQUISITE: EDSD 410
- Develop the relationship and distinction between mathematics behind the structure of number and learning and teaching of number structure in schools. Educational ideas of representation and abstraction examined via relevant and timely research about learning about the structure of number.

MATH 524 LINEAR ALGEBRA FOR TEACHERS
Su alternate years, to be offered 2006 5 cr. LEC 5
PREREQUISITE: MATH 224 or MATH 528, EDSD 561.
- Algebraic systems, special matrices, determinants, vector spaces, linear programming with applications, graph theory, transportation, economics and engineering using computer software such as MATLAB.

MATH 525 ANALYSIS FOR TEACHERS
Su alternate years, to be offered 2007 5 cr. LEC 5
PREREQUISITE: MATH 224 and EDSD 561.
- A study of calculus reform and concepts from graphical, numerical and algebraic perspectives.

MATH 526 DISCRETE MATHEMATICS FOR TEACHERS
Su alternate years, to be offered 2006 5 cr. LEC 5
PREREQUISITE: MATH 256 or MATH 516, EDSD 561 or EDSD 571 or equivalent, and K-14 teaching experience.
- Investigations of paradigm problems from the history of math.

MATH 527 GEOMETRY FOR TEACHERS
S alternate years, to be offered 2008 3 cr. LEC 3
Distance format.
PREREQUISITE: MATH 329 and EDSD 561.
- Geometry of transformations including Euclidean motions and similarity, projective geometry, geometric topology and geometry of inversion.

MATH 528 CURRICULUM DESIGN
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MATH 522 or EDCI 552 or equivalent.
- Focuses on the design and evaluation of curricula in mathematics and science. Historical changes in mathematics and science curriculum as well as research results are studied in depth. This course is an on-line course.

MATH 529 ASSESSMENT MODELS AND ISSUES
S alternate years, to be offered 2008 3 cr. LEC 3
- Examines critical K-12 issues including: alignment and interaction of assessment with standards, curriculum, and instruction; role of assessment systems at local, state, and national levels; evaluation of assessment tools and programs; equity considerations in assessment. This is an online course.

MATH 530 HISTORICAL STRATEGIES AND THE TEACHING OF MATHEMATICS
F alternate years, to be offered 2007 3 cr. LEC 3
Distance format.
PREREQUISITE: EDCI 506.
- Quantitative and qualitative research methodology in mathematics education. Review of the literature. Writing for publication and proposals.

MATH 531 TECHNOLOGY & THE TEACHING OF MATHEMATICS
F alternate years to be offered 2006 3 cr. LEC 3
Distance format.
PREREQUISITE: Graduate standing or consent of instructor.
- Calculators, computers, CD-ROM and telecommunications (internet) technologies for K-16 mathematics education, software, curricular materials and online high performance computers, analysis of impact of technology on K-12 math curriculum. Emphasis on classroom implementation vis-a-vis corequisite course.

MATH 540 INTRODUCTION TO CALCULUS ON MANIFOLDS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MATH 503 and MATH 506 or consent of instructor.
- An introduction to: manifolds and their atlases, fiber bundles, vector fields, tensor fields and differential forms, the exterior and Lie derivatives, Stokes Theorem, and de Rham cohomology.

MATH 544 PARTIAL DIFFERENTIAL EQUATIONS I
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MATH 562 and MATH 451, or consent of instructor.
- An extended survey of the origins of a large number of scientific and mathematical partial differential equations and an overview of the theoretical techniques which are available to solve them.

MATH 545 PARTIAL DIFFERENTIAL EQUATIONS II
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: MATH 544 and MATH 547.
- Linear partial differential equations and the function spaces and functional analysis which one uses to study them. Topics include: Holder and Sobolev functions, Sobolev and Poincare inequalities, embedding density, semigroup theory for evolution equations.

MATH 546 REAL ANALYSIS
F 3 cr. LEC 3
PREREQUISITE: MATH 562 or MATH 505.
**MATH 551 COMPLEX ANALYSIS**
5 cr. LEC 3
PREREQUISITE: MATH 505.
- Analytic functions and conformal maps, contour integrals, Cauchy's theorem, Cauchy's integral formula, the maximum modulus theorem, harmonic functions, Taylor's theorem and Laurent series. Classification of singularities, the residue theorem and evaluation of definite integrals, Rouché's theorem and the argument principle.

**MATH 560 METHODS OF APPLIED MATHEMATICS I**
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: MATH 451.

**MATH 561 METHODS OF APPLIED MATHEMATICS II**
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MATH 560.
- Calculus of variations, Hamilton's principle, asymptotic and perturbation methods, transform techniques and scattering theory. Partial differential equations, Green's functions, separation of variables and transform methods.

**MATH 570 INDEPENDENT STUDY**
F, S, Su 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

**MATH 571 INSERVICE MATHEMATICS EDUCATION: ACTION RESEARCH**
Su 1 - 5 cr. LEC 3
PREREQUISITE: Graduate standing and employment by sponsoring school organization.
- An approved supervised group study of a mathematics education problem within a school supervised by an MSU faculty member which culminates in a high quality, special report, syllabus, blueprint, educational program, course of study or guide book to be filed with the appropriate school district and the Department of Mathematical Sciences.

**MATH 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT**
F, S, Su 1 - 4 cr. IND, Maximum 6 cr.
PREREQUISITE: Graduate standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

**MATH 576 INTERNSHIP**
F, S, Su 2 - 12 cr. IND Maximum credits unlimited
PREREQUISITE: Graduate standing, consent of instructor and approval of department head.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

**MATH 577 IMPROVING STUDENT ACHIEVEMENT IN MATHEMATICS: ACTION RESEARCH APPROACHES**
F, S, Su 1 - 3 cr. SEM
PREREQUISITE: Must be a graduate student in the M.S. in Math - Math Education Option.
- With guidance from faculty, student identifies problem at their school or teaching setting which impinges on student achievement in mathematics. Work team to address the problem. Present findings on Web page and in public demonstration.

**MATH 580 SPECIAL TOPICS**
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

**MATH 581 NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS I**
F 3 cr. LEC 3
PREREQUISITE: MATH 442.
- Finite difference and finite element solution techniques for elliptic, parabolic, and hyperbolic partial differential equations, numerical linear algebra.

**MATH 582 NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS II**
S 3 cr. LEC 3
PREREQUISITE: MATH 581.
- A continuation of topics from MATH 581.

**MATH 584 FUNCTIONAL ANALYSIS I**
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: MATH 547.
- Banach spaces, fixed point theorems, Hilbert spaces, the Dirichlet principle, generalized Fourier series, and spectral theory.

**MATH 585 FUNCTIONAL ANALYSIS II**
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MATH 584.
- The Hahn Banach theorem, variational principles, weak convergence, uniform boundedness theorem, the open mapping theorem and the implicit function theorem.

**MATH 586 PROBABILITY THEORY**
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MATH 547.

**MATH 588 PROFESSIONAL DEVELOPMENT**
On Demand 1 - 3 cr. May be repeated; maximum 5 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
- Courses offered on a one time basis to fulfill professional development needs of inservice educators. A specific focus is given to each course which is appropriately subspecialized.

**MATH 589 GRADUATE CONSULTATION**
F, S, Su 5 cr. IND
PREREQUISITE: Master’s standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

**MATH 590 MASTER'S THESIS**
F, S, Su 1-10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master's standing.

**MATH 591 TOPICS IN APPLIED MATHEMATICS I**
F 3 cr. LEC 3
PREREQUISITE: Graduate standing and consent of instructor.
- Topics may include numerical solution of linear and nonlinear problems, eigenvalue problems, continuation methods, numerical optimization, computational mechanics, spectral methods, bifurcation theory, invariant manifold theory, index theory, nonlinear analysis, reaction-diffusion equations, nonlinear oscillations, asymptotic methods and perturbation methods.

**MATH 592 TOPICS IN APPLIED MATHEMATICS II**
S 3 cr. LEC 3
PREREQUISITE: Graduate standing and consent of instructor.
- Topics may include numerical solution of linear and nonlinear problems, eigenvalue problems, continuation methods, numerical optimization, computational mechanics, spectral methods, bifurcation theory, invariant manifold theory, index theory, nonlinear analysis, reaction-diffusion equations, nonlinear oscillations, asymptotic methods and perturbation methods.

**MATH 595 DYNAMICAL SYSTEMS I**
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MATH 505.
- Topics in differential equations including existence and uniqueness, continuous dependence on parameters, extendability, the existence and stability of equilibria and limit cycles and the Poincare-Bendixon theorem.

**MATH 596 DYNAMICAL SYSTEMS II**
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: MATH 595.
- Topics include Hartman's theorem, invariant manifold theory, Smale-Birkhoff theorem, horseshoe chaos, and the Melnikov method. Topics in discrete dynamical systems may also be covered.

**MATH 597 TOPICS IN MATHEMATICS**
F 3 cr. LEC 3
PREREQUISITE: Graduate standing and consent of instructor.
- Topics selected from: differential topology, differential geometry and complex dynamics.

**MATH 598 TOPICS IN MATHEMATICS II**
S 3 cr. LEC 3
PREREQUISITE: Graduate standing and consent of instructor.
- Topics selected from: continuum theory, symbolic dynamics, ergodic theory and low dimensional topology.

**MATH 689 DOCTORAL READING & RESEARCH**
F, S, Su 3 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: Doctoral standing.
- This course may be used by doctoral students who are reading research publications in the field in preparation for beginning doctoral thesis research.

**MATH 690 DOCTORAL THESIS**
F, S, Su 1-10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing.
MB
Microbiology
Department of Microbiology
(406) 994-2903

MB 100 CAREERS IN MICROBIOLOGY
F 1 cr. LEC 1
— The course introduces students to educational
and career opportunities in the fields of medical,
molecular, ecological, and environmental microbio-
ology. The course introduces students to the various
options in the microbiology degree program. It will
emphasize the differences in the options and the
employment opportunities in each one a degree
has been obtained.

MB 101N MICROBIOLOGY
IN TODAY'S WORLD
F, S 4 cr. LEC 5
— Microbiology is a science with important applica-
tions. Examples of how microorganisms are relevant
to the needs, activities, and success and failure of
individuals and societies will be studied. Laboratory
exercises introduce the scientific method and illus-
trate important microbiological principles.

MB 105CS MOLECULES OF LIFE
S 3 cr. LEC 5
— Introduction to uses of biological molecules for
improving health and agriculture. Gene therapy
and DNA fingerprinting are discussed in relation
to social/moral issues. Intent of course is to help
students develop a rational approach to evaluate
cost/benefits of biotechnology to society.

MB 110CS INTRODUCTION
TO BIOTECHNOLOGY
F 3 cr. LEC 5 SEM 1
— Introduction to an ever growing industry. Course
is designed to demonstrate the current significance
of biotechnology. Course is a multi-lecture series
dealing with ethics, business, and scientific technol-

MB 201 INFECTIOUS DISEASES
F, S 3 cr. LEC 3
— Introduction to the world of microorganisms;
procaryotic cell structure, function and genetics; the
immune response; etiology, pathogenesis, epidemi-
ology, treatment and control of important infectious
diseases of humans.

MB 280 SPECIAL TOPICS
On Demand - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be
determined necessary by each offering department.
— Courses not required in any curriculum for which
there is a particular one time need, or given on a
trial basis to determine acceptability and demand
before requesting a regular course number.

MB 289R UNDERGRADUATE RESEARCH/
CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
— Classroom instruction associated with directed
undergraduate research/creative activity projects.

MB 290R UNDERGRADUATE RESEARCH/
CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
— Directed undergraduate research/creative activ-
ity which may culminate in a written work or other
creative project.

MB 301 GENERAL MICROBIOLOGY
F, S 5 cr. LEC 3 LAB 2
PREREQUISITE: BIOL 102.
COREQUISITE: CHEM 206 or CHEM 301.
— An introduction to major topics and subdisciplines
in microbiology including microbial diversity and
classification, microbial anatomy and physiology,
microbial genetics, microbial ecology, medical
microbiology and immunology, epidemiology and
public health, and biotechnology.

MB 400 SEMINAR
F, S 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: MB 301 and junior standing.
— Senior capstone course. Topics offered at the
upper division level which are not covered in regu-
lar courses. Students participate in preparing and
presenting discussion material. When taken in the
senior year, this course fulfills the senior capstone
course requirement.

MB 401 IMMUNOLOGY
F 3 cr. LEC 3
COREQUISITE: CHEM 215 or CHEM 311.
— Fundamentals of cellular and molecular immuno-
logy including consideration of structure, genetics
and function of immunoglobulins, T-cell receptors
and major histocompatibility antigens; regulation of
the immune response; transplantation and immuno-
logical diseases.

MB 402 IMMUNOLOGY LABORATORY
F 2 cr. LAB 2
PREREQUISITE: MB 401 (may be taken as coreq-
quisite).
— A laboratory study of basic and clinical
immunology.

MB 403 VIROLOGY
F 4 cr. LEC 3 LAB 1
PREREQUISITE: BCHM 340.
— Fundamentals of virology with emphasis on animal
viruses. Consideration of the molecular aspects of
structure, multiplication, and host response to viral
infection. The laboratory emphasizes principles and
laboratory applications of molecular virology.

MB 405 HEMATOLOGY
S 3 cr. LEC 3
PREREQUISITE: BIOL 102, BIOL 207 or BIOL
208. MB 401 and BCHM 340 are recommended.
COREQUISITE: MB 405.
— A study of the function, biochemistry, cell biology,
and pathology of blood and its constituents.

MB 406 HEMATOLOGY LABORATORY
S 1 cr. LAB 1
PREREQUISITE: BIOL 207 or BIOL 208.
COREQUISITE: MB 405.
— Methods of examining white blood cells, red
blood cells, and platelets. Also included is the
examination of abnormal blood cells, hemostasis,
and florescent antibody cell sorting analysis.

MB 407 MICROBIOLOGY INSTRUCTING
F, S, Su 2 cr. LEC 2
PREREQUISITE: MB 390.
— Instruction and practice in effective teaching
methods; practice in preparing laboratory materials,
assisting a class and grading.

MB 408 GENERAL PARASITOLOGY
S alternate years, to be offered 2007 3 cr. LEC 2
LAB 1
— Study of the life cycles, biochemistry, molecular
parasitology, pathogenesis, identification and
treatment of the major parasitic groups, including
parasitic protozoa, monogeneans, digeneneans, ces-
todes, nematodes, acanthocephalans, and parasitic
arthropods.

MB 409 GENERAL PATHOLOGY
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: BIOL 208, MB 301, or consent of
instructor.
— Patterns of cell and tissue response to injury and
aging. Chemical, physical, and biological aspects of
cell injury; acute and chronic inflammation, regen-
eration and repair; hemostasis; thrombosis, embo-
liasis and infarction; atherosclerosis; neoplasia.

MB 415 MICROBIAL DIVERSITY,
ECOLOGY & EVOLUTION
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: MB 301, BCHM 340, or consent
of instructor.
— The diversity of procaryotic and eucaryotic micro-
organisms will be explored from both classical
phenotypic and contemporary genotypic perspec-
tives. The linkage between microbial diversity, its
evolutionary origins, and its ecological value will be
emphasized. Cross-listed with LRES 415.

MB 418 MICROBIAL DIVERSITY,
ECOLOGY & EVOLUTION LABORATORY
S alternate years, to be offered 2006 1 cr. LAB 1
PREREQUISITE: MB 301 and BCHM 340 or con-
sent of instructor.
COREQUISITE: MB 415.
— Traditional and contemporary methods used for
analysis of microbial diversity, ecology and evolution,
including microscopy, selective enrichment culture
and micro sensor, molecular and chemical analysis.
Cross-listed with LRES 418.

MB 420 MICROBIAL PHYSIOLOGY
F 5 cr. LEC 3
PREREQUISITE: BCHM 340, MB 301.
— An in-depth examination of microbial cell
structure and function, bioenergetics, intermediary
metabolism and its control, and the orchestration
and regulation of cellular functions that enable
microbes to adapt to and survive in their
environment.

MB 429 THE BIOLOGY OF HUMAN CANCER
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: MB 101 or BIOL 102, or MB 301.
— Integration of subjects on the molecular biology,
cell biology, and genetics of cancer with the clinical
realities of classification, diagnosis, and treatment
of the important human cancers. Major focus will
be on the correlation between current molecular
research and clinical medicine. Cross-listed with
BIOL 429.

MB 430 MEDICAL BACTERIOLOGY
S 3 cr. LEC 3
PREREQUISITE: MB 301.
— Epidemiology and etiology of bacterial and viral
diseases in humans with emphasis on biologic mech-
anisms; host defenses and responses to infections;
chemotherapy, prevention, and control of bacterial
and viral diseases.
MB 431 MEDICAL BACTERIOLOGY LAB
S 2 cr. LAB 2
PREREQUISITE: MB 430.
- Laboratory methods designed to teach techniques used in culturing and identifying bacterial pathogens and normal flora from clinical specimens. Procedures used to test the antibiotic susceptibility of pathogenic bacteria.

MB 432 INDUSTRIAL MICROBIOLOGY AND BIOTECHNOLOGY
S 3 cr. LEC 6
PREREQUISITE: MB 301, BCHM 340 or permission of instructor.
- Review of biochemistry of industrial microorganisms, design of fermentation equipment (vessels, sterilization, downstream processing, scale-up), anaerobic processes (solvents, ethanol, beer), aerobic processes (antibiotics, amino acids, including MSG, microbial insecticides, bioplastic), bacterial, fungal, algal, mammalian cell processes.

MB 433 APPLIED AND ENVIRONMENTAL MICROBIOLOGY
F 4 cr. LEC 3 LAB 1
PREREQUISITE: MB 301.
- The course introduces students to complex concepts in water microbiology, food microbiology, sterility and disinfection, the use of microorganisms in manufacturing processes and in the degradation of contaminants in the environment.

MB 437 MOLECULAR EVOLUTION
F 3 cr. LEC 3
PREREQUISITE: BIOL 102 or permission of instructor.
- The educational objectives of this course are to provide advanced, upper division undergraduates and graduate students with a basic introduction to molecular evolution. The study of molecular evolution encompasses the origin and evolution of life on earth at the molecular level.

MB 441 EUKARYOTIC PATHOGENS
S 4 cr. LEC 3 LAB 1
PREREQUISITE: BCHM 340 or equivalent.
- The study of fungal structure, physiology and taxonomy, disease and host-parasite relationships; and procedures used to isolate and identify pathogenic fungi. Also, the study of biology, pathogenesis, diagnosis and treatment of medically important parasites.

MB 449 MICROBIAL GENETICS
S 3 cr. LEC 3
PREREQUISITE: MB 301, BCHM 340.
- The students will become familiar with concepts in microbial genetics, including DNA replication, RNA, and protein biosynthesis. Other concepts covered in the course include bacteriophage and plasmid biology, gene regulation, mobile genetic elements, and the fundamentals of genetic engineering.

MB 450 RESEARCH METHODS IN MICROBIOLOGY
S 4 cr. LEC 3 LAB 1
PREREQUISITE: BCHM 340.
- Fundamentals of research methodology for undergraduate and graduate students in microbiology and related disciplines. Theory and application of techniques, reagents, and instrumentation will be emphasized in the lecture and laboratory. The emphasis in the course will be on recombinant DNA methodology, and the safe and effective use of radioisotopes.

MB 460 CLINICAL LABORATORY SCIENCE SUMMER PRACTICUM
Su 12-15 cr. LEC LAB
PREREQUISITE: To take this course, students must be accepted into the professional training program.
- MB 460 is a clinical laboratory science course, which will be conducted at affiliate hospitals during the summer of a student's senior year. It includes student lecture and laboratory instruction in clinical immunohematology, clinical chemistry, clinical hematology, clinical microbiology, clinical immunology, medical mycology, and phlebotomy techniques. Students will perform patient laboratory testing under the guidance of trained professionals.

MB 463 APPLIED CLINICAL LABORATORY SCIENCE PROFESSIONAL TRAINING I
F 13-15 cr. LEC LAB
PREREQUISITE: MB 460.
- MB 463 is the first semester of professional training at a clinical laboratory affiliate. Students will review basic and advanced information in immunohematology, clinical chemistry, clinical hematology, clinical microbiology, clinical immunology, medical mycology, and phlebotomy techniques. Students will perform patient laboratory testing under the guidance of trained professionals.

MB 464 APPLIED CLINICAL LABORATORY SCIENCE PROFESSIONAL TRAINING II
S 12-15 cr. LEC LAB
PREREQUISITE: MB 461.
- MB 464 is the second semester of professional training at a clinical laboratory affiliate. Students will learn financial and quality management information of the clinical laboratory and study advanced immunohematology, clinical chemistry, clinical microbiology, and clinical hematology. During this course, students will perform actual patient laboratory testing under the guidance of trained professionals.

MB 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

MB 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined by each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MB 480R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. BCT May be repeated. Max 4 cr.
COREQUISITE: MB 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MB 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND May be repeated. Max 12 cr.
PREREQUISITE: Senior standing.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MB 500 SEMINAR
F, S 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material. There are separate sections for departmental seminar, general/environmental and biomedical microbiology journal clubs and graduate reading; consult the Department of Microbiology Graduate Student Handbook for specific requirements.

MB 501 PRINCIPLES & TECHNIQUES OF ANIMAL EXPERIMENTATION
S alternate years, to be offered 2007 5 cr. LEC 2 LAB 1
PREREQUISITE: MB 301.
- Ethical, humane, anaesthetical, physiological, environmental and legal considerations involved in the use of laboratory animals will be discussed and information on non-animal alternatives provided. Bio-methodological procedures, including anesthetic and surgical techniques will be demonstrated and/or practiced in the laboratory.

MB 515 ADVANCED MICROBIAL ECOLOGY
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: MB 415/LRES 415.
- Critical review of literature on the distribution and activity of microorganisms in natural microbial communities based on microbial adaption and physical, chemical and biological features of the microenvironment. A critical discussion of literature and approaches. Cross-listed with LRES 515.

MB 525 ADVANCED IMMUNOLOGY
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: MB 401.
- Recent advances in immunochromatography, immunogenetics, immunopathology, molecular and cellular immunology. Cross-listed with VTMB 501.

MB 528 ADVANCED GENETICS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MB 420 or equivalent.
- Recent advances in microbial genetics with an emphasis on molecular genetics and eukaryotic gene expression.

MB 535 GENOMIC ANALYSIS
F 4 cr. LEC 3 Lab 1
PREREQUISITE: Permission of instructor needed.
- The quantity of sequence information deposited into databases necessitates that scientists train in both discovery and hypothesis-based research that utilizes these resources. This class will cover experimental design, database searching and management, sequence alignment, molecular pattern recognition, and phylogenetics.

MB 537 ADVANCES IN MOLECULAR EVOLUTION
F 3 cr. LEC 3
PREREQUISITE: MB 420 or 449 or 450 or 528 or 538 or BIOL 402 or BCHM 340 or BCHM 441 or VTMB 421.
- The educational objectives of this course are to provide graduate students with a basic introduction to molecular evolution. The study of molecular evolution encompasses the origin and evolution of life on earth at the molecular level.
MB 538 CELL AND MOLECULAR BIOLOGY
Su 3 cr. LEC 2 LAB 1
PREREQUISITE: MB 301, BCHM 340 or BIOL 402, or the equivalent, plus graduate standing or petition approval from the Dean of Graduate Education.
– Microorganisms are emphasized in this inquiry-based study of prokaryotic and eukaryotic cell and molecular biology. The course, designed for practicing science teachers in the MSSE degree program, provides rigorous treatment of topics including molecular phylogeny, cell structures, cell cycle, gene expression, and protein processing. Current literature discussions and the integrated laboratory cover molecular approaches for investigating complex cellular mechanisms and provide training in microbiological techniques essential to biotechnology. Individual projects include the design of new teaching activities for future classroom participation.

MB 559 INFECTION AND IMMUNITY
F 3 cr. RCT 3
PREREQUISITE: MB 390, MB 401, or MB 403, or the equivalent. Graduate standing or petition approved from Dean of Graduate Education.
– An inquiry-based study of recent advances in understanding the etiology, pathogenesis, chemoth-erapy, and prevention of infectious disease which includes analysis of current literature, case histories, and online sources of information. Course offered by asynchronous, computer-mediated communication.

MB 552 ADVANCED SOIL & ENVIRONMENTAL MICROBIOLOGY
S alternate years, to be offered 008 3 cr. LAB 3
PREREQUISITE: LRES 432 or consent of instructor.
– Advanced laboratory course. Microorganisms are targeted for isolation and characterization, emphasizing those not normally encountered in general microbiology laboratory. Biochemical cycling, contaminant biodegradation, extremophiles, and plant-microbe interactions are typical topics investigated. Students employ classic and novel cultivation approaches, identifying microbes based morphology, physiology, and phylogeny. Cross-listed with LRES 552.

MB 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
– Directed research and study on an individual basis.

MB 576 INTERNSHIP
On Demand 2 - 12 cr. IND Maximum credits unlimited
PREREQUISITE: Graduate standing, consent of instructor and approval of department head.
– An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

MB 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
– Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MB 589 GRADUATE CONSULTATION
F, Su 3 cr. TUT
PREREQUISITE: Master’s standing and approval of the Dean of Graduate Education.
– This course may be used only by students who have completed all of their coursework (and thesis if on a thesis plan) but who need additional faculty or staff time or help.

MB 590 MASTER’S THESIS
F, S, Su 1-10 cr. IND Maximum 20 crs.
PREREQUISITE: Master’s standing.

MB 690 DOCTORAL THESIS
F, S, Su 1-10 cr. IND Maximum 30 crs.
PREREQUISITE: Doctoral standing.

ME
Mechanical Engineering
Department of Mechanical & Industrial Engineering
(406) 994-2203

ME 101 INTRODUCTION TO MECHANICAL ENGINEERING
F 1 cr. LEC 1
– The mechanical engineering profession, logical process of problem solving and design, professionalism, ethics.

ME 102 ENGINEERING COMPUTER APPLICATIONS
F, S 1 cr. LEC 1
PREREQUISITE: ME and MET majors only. MATH 182 for ME majors.
COREQUISITE: Concurrent enrollment or prior completion of MATH 176 (or equivalent course) for MET majors.
– Computer methodology, use of various computer software packages in mechanical engineering and mechanical engineering technology applications.

ME 115 ENGINEERING DESIGN GRAPHICS
F, S 1 cr. LEC 1
– Introductory course developing freehand sketching for engineering design graphics. Skills will be developed for sketching and interpreting dimensioned multi-view drawings, pictorials, sections, and assemblies.

ME 116 ENGINEERING DESIGN GRAPHICS LABORATORY
F, S 1 cr. LAB 1
COREQUISITE: ME 115 or consent of instructor.
– Hands-on laboratory experience in two dimensional computer-aided design (CAD) for engineering design graphics.

ME 117 MECHANICAL ENGINEERING DESIGN GRAPHICS
F, S 1 cr. LEC 1
PREREQUISITE: ME and MET majors only, or consent of instructor.
– Introductory course developing freehand sketching and computer aided modeling techniques for mechanical engineering design graphics. Skills will be developed for sketching and interpreting dimensioned multi-view drawings, tolerancing, specifications, pictorials, and assembled for mechanical designs.

ME 118 MECHANICAL ENGINEERING DESIGN GRAPHICS LABORATORY
F, S 1 cr. LAB 1
PREREQUISITE: ME and MET majors only, or consent of instructor.
COREQUISITE: ME 117, or ME 115 or consent of instructor.
– Hands-on laboratory experience in three-dimensional and parametric constraint-based modeling for mechanical engineering design.

ME 250 MECHANICAL ENGINEERING MATERIALS
On Demand 3 cr. LEC 3
PREREQUISITE: CHEM 121 or CHEM 131.
COREQUISITE: MATH 175 for MET majors only; MATH 181 for ME majors.
– Properties of metallic, ceramic, and polymeric materials as related to their structures. Material selection for engineering applications.
ME 255 MANUFACTURING PROCESSES
F, S 3 cr. LEC 3
PREREQUISITE: ME 250 or CH E 213.
- Basic methods of processing materials to change shapes, dimensions, and finishes; special attention to attendant forces, temperature, and property changes.

ME 324 ENGINEERING THERMODYNAMICS
F, S 3 cr. LEC 3
PREREQUISITE: MATH 176 or MATH 182, PHYS 205 or PHYS 211.
- General treatment of the basic laws of thermodynamics and engineering applications with introduction to heat transfer for curricula not requiring ME 320/ME 521 series.

ME 326 FUNDAMENTALS OF HEAT TRANSFER
F, S 4 cr. LEC 4
PREREQUISITE: EM 335, ME 520.
COREQUISITE: Concurrent enrollment in or prior completion of ME 315.
- Mechanisms of energy transport due to a temperature difference in materials. Conduction, convection, and radiation formulations. Introduction to heat transfer equipment.

ME 341 INTRODUCTION TO MACHINE DESIGN
F, S 4 cr. LEC 5 RCT 1
PREREQUISITE: ENGL 121, COM 110 or CLS 101, ME 102, ME 251, EM 253, MATH 225, MATH 117 or consent of instructor.
COREQUISITE: Concurrent enrollment in or prior completion of ME 257, ME 315 and IAM 350.
- Static yield theories, introduction to fracture mechanics, analysis of fatigue, thick-walled pressure vessels, strain energy, Castigliano's theorem, application to engineering design analysis problems.

ME 342 MECHANICAL COMPONENT DESIGN
F, S 4 cr. LEC 4
PREREQUISITE: ME 341, EM 252.
COREQUISITE: Concurrent enrollment in or prior completion of ME 315.
- Analysis of components used in mechanisms and machines. Topics include kinematics and dynamics of machines; bolts, welds, springs, bearings, gears, belts, chains, motors, and hydraulic elements.

ME 354 MECHANICAL STRUCTURES
On Demand 3 cr. LEC 3
PREREQUISITE: MATH 225, MATH 225, ME 102, ME 117 or equivalent, ME 515, ME 541.
- Numerical analysis of skeletal structures by the stiffness method including strain energy and Castigliano's theorem. Introduction to finite element method.

ME 355 COMPUTER-AIDED MANUFACTURING
On Demand 6 cr. LEC 3 RCT 1
PREREQUISITE: CS 120 or some familiarity with computers and programming.
- Programming, operation, and application of computer-controlled manufacturing and assembly for product/process design including multi-axis CNC, robotics, and integrated manufacturing systems.

ME 360 MEASUREMENT AND INSTRUMENTATION
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: EE 250, ENGL 121, COM 110 or CLS 101; ME 520 and EM 253 for ME majors.
COREQUISITE: Concurrent enrollment in or completion of IAM 350 or consent of instructor.
- Mechanical measurement theory and applications, and laboratory experience emphasizing transducers, data acquisition and communication.

ME 403 MECHANICAL ENGINEERING DESIGN I
F, S 3 cr. LEC 2 RCT 1
PREREQUISITE: ME 320, EM 335.
COREQUISITE: Concurrent enrollment in or prior completion of ME 542.
- Mechanical Engineering design project experience emphasizing use of a formal design process, presentations, and documentation. Includes coverage of industry machining and welding practices.

ME 404R MECHANICAL ENGINEERING DESIGN II
F, S 2 cr. LEC 1 RCT 1
PREREQUISITE: ME 403, ME 560, ME 321, ME 326.
COREQUISITE: Concurrent enrollment in or prior completion of ME 445.
- First semester of senior capstone design experience in Mechanical Engineering. Students, under the guidance of a faculty supervisor, solve real-world design problems.

ME 405R MECHANICAL ENGINEERING DESIGN III
F, S 2 cr. LEC 1 RCT 1
PREREQUISITE: ME 404.
- Second semester of the senior capstone design experience in Mechanical Engineering. Students, under the guidance of a faculty supervisor, implement their ME 404 design projects.

ME 411 ADVANCED ENGINEERING GRAPHICS AND COMPONENT SPECIFICATION
On Demand 5 cr. LEC 1 LAB 2
PREREQUISITE: ME 118; instructor's consent for non-ME/ME techn majors; junior standing.
- Develop the ability to use solid and parametric modeling to design and document machine parts. Geometric dimensioning and tolerancing, auxiliary views, analysis of models, advanced modeling techniques and customization are covered through hands-on experiences.

ME 428 DYNAMICS OF FLUIDS
On Demand 3 cr. LEC 3
PREREQUISITE: MATH 225, EM 335.
- A study of fluid dynamics, including incompressible and compressible inviscid fluids, and viscous flow theory and application.

ME 430 THERMAL SYSTEM DESIGN
F, S 3 cr. LEC 1 RCT 2
PREREQUISITE: ME 321, ME 326, ME 541, ME 403.
- Design and analysis of energy conversion and thermal systems. Energy conversion cycles and applications, heat transfer equipment design.

ME 445 MECHANICAL VIBRATIONS
F, S 3 cr. LEC 3
PREREQUISITE: EM 252, EM 253, ME 315.
- Vibration problems of single and multiple degree of freedom systems. Introduction to vibration of continuous bodies. Analysis of free and forced vibration problems. Effects of damping.

ME 448 DESIGN OF TOOLS
S 3 cr. LEC 3
PREREQUISITE: ME 541 or MET 540 or instructor approval.
- Fundamentals of tool design, including tooling materials, workholding principles, jig design, fixture design, assembly tool design, design of tools for inspection and gaging, and tool fabrication techniques.

ME 450 METALLIC MATERIALS
On Demand 3 cr. LEC 3
PREREQUISITE: ME 250 or equivalent.
- Advanced consideration of the structure and behavior of metals.
ME 451 WELDING, MACHINING, AND FABRICATION PRACTICES
On Demand 3 cr. LEC 2 LAB 1
PREREQUISITE: ME 255, CH E 213 or ME 250; junior standing and instructor consent for non-ME/IMME majors.
- Survey of welding and machine tool practices, including existing fabrication methods and their limitations.

ME 454 REFRIGERATION AND HVAC
F 5 cr. LEC 3
PREREQUISITE: (ME 321, ME 326), or (ME 324, MET 325).
- Refrigeration and heating, ventilating and air-conditioning (HVAC) for comfort and industrial applications. Psychrometric, physiological factors in cooling, HVAC load calculations; modern vapor compression, absorption, low temperature refrigeration cycles; air distribution and fan-duct analysis, design/seletion of HVAC equipment and control systems.

ME 458 AIRCRAFT STRUCTURES
On Demand 4 cr. LEC 3 RCT 1
PREREQUISITE: ME 541 or instructor approval.
- An introduction to the current practices in the design and analysis of aircraft metallic and composite structures. Overview of aircraft design, analysis, testing, and certification with examples. Static and dynamic load condition analysis.

ME 461 ME SENIOR LABORATORY
F, S 3 cr. LAB 3.
PREREQUISITE: ME 521, ME 526, ME 560.
- Execution of engineering experiments.

ME 463 COMPOSITE MATERIALS
F alternate years, to be offered even 3 cr. LEC 3
PREREQUISITE: CH E 213.
- Structure and properties of composite materials and design procedures for composite structures. Cross-listed with CH E 463.

ME 464 MECHANICAL BEHAVIOR OF MATERIALS
F alternate years, to be offered odd 3 cr. LEC 3
PREREQUISITE: CH E 213.
- Theory, analysis, and application of mechanical behavior of materials. Constitutive behavior, plasticity, and fracture mechanics of engineering materials such as metals, polymers, ceramics and composites are analyzed. High temperature behaviors of materials are presented. Toughening mechanisms, fatigue, and damage tolerance design with modern engineering materials are emphasized.

ME 465 INTRODUCTION TO FINITE ELEMENT ANALYSIS
F 4 cr. LEC 3 RCT 1
PREREQUISITE: ME 526 or instructor approval.
- Introduction to the finite element method emphasizing the fundamental principles of FEA. Various finite element formulations for applications to structural analysis, thermal/fluid analysis, and design. Practical computational experience using a commercial finite element computer code.

ME 468 INTRODUCTION TO WAVE PROPAGATION AND ULTRASONICS
S 4 cr. LEC 3 LAB 1
PREREQUISITE: ME 360, or equivalent, and ME 515, or equivalent.
- Analytical and numerical methods of solution. This course is cross-listed with CH E 522.

ME 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

ME 474 MECHANICAL ENGINEERING CONSULTATION
On Demand 1 - 3 cr. IND Maximum 9 cr.
PREREQUISITE: Sophomore standing in ME/MET curriculum and consent of supervising faculty.
- Students enrolled in this class will provide technical support for selected ME/MET courses.

ME 476 INTERNSHIP
On Demand 1 - 12 cr. IND
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

ME 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ME 486R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. May be repeated. Max 4 cr.
COREQUISITE: ME 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ME 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

ME 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting the discussion material.

ME 510 ADVANCED ENGINEERING ANALYSIS I
F 3 cr. LEC 3
PREREQUISITE: ME 315 or consent of instructor.
- Mathematical modeling of engineering systems, physical interpretation of ordinary and partial differential equations and methods of solution. This course is cross-listed with CH E 522.

ME 511 ADVANCED ENGINEERING ANALYSIS II
S 3 cr. LEC 3
PREREQUISITE: ME 315 or consent of instructor.
- Analytical and numerical methods in engineering.

ME 520 ADVANCED THERMODYNAMICS
On Demand 3 cr. LEC 3
PREREQUISITE: ME 521.
- First and second laws of thermodynamics, uniform flow and general open systems, real gases, mixtures, reacting processes, phase and chemical equilibrium.

ME 521 STATISTICAL THERMODYNAMICS
On Demand 3 cr. LEC 3
PREREQUISITE: ME 520.
- Kinetic theory of gases, distribution functions, thermodynamic properties in terms of partition functions, reactions, phase transition.

ME 525 CONDUCTION HEAT TRANSFER
F 3 cr. LEC 3
PREREQUISITE: ME 526.
COREQUISITE: ME 510.
- Advanced topics in conduction heat transfer with emphasis on analytical techniques including separation of variables, Duhamel's theorem, two-phase problems, and numerical techniques.

ME 526 CONVECTION HEAT TRANSFER
On Demand 3 cr. LEC 3
PREREQUISITE: ME 526.
- Advanced topics in convection heat transfer including both internal flows and external flows, introduction to the theory of laminar boundary layer stability, determination of turbulent transition, and analytical models of turbulent flows.

ME 527 RADIATION HEAT TRANSFER
On Demand 3 cr. LEC 3
PREREQUISITE: ME 526.
- Advanced topics in radiation heat transfer including detailed specification of radiative surface properties, development of energy equations for diffuse gray enclosures and nondiffuse nongray enclosures, development of energy equations for combined modes of heat transfer, introduction to Monte Carlo method.

ME 530 ADVANCED FLUID MECHANICS I
S 3 cr. LEC 3
PREREQUISITE: EM 335 or CH E 322.
COREQUISITE: EM 525 or consent of instructor.
- Review of conservation equations, laminar and turbulent internal flows, potential flows, and Stokes flow. This course is cross-listed with CH E 531.

ME 531 ADVANCED FLUID MECHANICS II
F 3 cr. LEC 3
PREREQUISITE: EM 335 or CH E 322.
COREQUISITE: EM 525.
- Laminar boundary layer and free shear flows, internal and external compressible flows.

ME 532 TURBULENCE
On Demand 3 cr. LEC 3
PREREQUISITE: ME 531.
- Modern turbulence theory, turbulence modeling.

ME 533 TRANSPORT PHENOMENA
On Demand LEC 3
PREREQUISITE: ME 531.
- Comprehensive treatment of mass, momentum, and energy transport. This course is cross-listed with CH E 530.
ME 580 GRADUATE CONSULTATION  
F, S, Su 1 - 3 cr. IND.  
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.  
This course may be used only by students who have completed all of their coursework (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

ME 590 MASTER'S THESIS  
F, S, Su 1 - 10 cr. IND. Maximum credits unlimited.  
PREREQUISITE: Master's standing.

ME 690 DOCTORAL THESIS  
F, S, Su 1-10 cr. IND. Maximum credits unlimited.  
PREREQUISITE: Doctoral standing.

MEDS 502 SPANISH  
FOR HEALTHCARE PROFESSIONALS  
F, S 1 cr. LEC 1 LAB 1  
PREREQUISITE: WWAMI medical student or consent of the WWAMI Medical Program and Dean of the College of Graduate Education.  
– Opportunity to gain personal experience with primary care medical practice by observation of selected physicians in the Bozeman area.

MEDS 514 BIOCHEMISTRY AND MOLECULAR BIOLOGY  
F 5 cr. LEC 4 RCT 1  
PREREQUISITE: WWAMI medical student or consent of the Director of the WWAMI Medical Program and Dean of the College of Graduate Education.  
– Patterns of cell and tissue response to injury.  
Cell injury: chemical, physical and biological.  

MEDS 529 MOLECULAR AND CELLULAR BASIS OF DISEASE  
S 4 cr. LEC 2 RCT 1 LAB 1  
PREREQUISITE: WWAMI medical student or consent of the Director of the WWAMI Medical Program and Dean of the College of Graduate Education.  
– Pathogenesis, susceptibility and resistance to infection.  
Microbiology, epidemiology, clinical manifestations and control of representative bacterial, fungal, parasitic and viral infectious diseases. Principles of chemotherapy, sterilization, principles of asepsis, nosocomial and iatrogenic infections and their prevention.

MEDS 510 MICROSCOPIC ANATOMY (HISTOLOGY)  
F 3 cr. LEC 2 LAB 1  
PREREQUISITE: WWAMI medical student or consent of the Director of the WWAMI Medical Program and Dean of the College of Graduate Education.  
– Microscopic study of the structure and function of human cells, tissues and organs as a basis for understanding the alterations in structure and function seen in human disease.
Meds 522 Introduction TO CLINICAL MEDICINE II
S 2 cr. LEC 1 LAB 1
PREREQUISITE: WWAMI medical student.
Continuation of communication skills. The medical history is introduced and instruction in data collection begins. Screening physical examination, further experience and instruction in the medical history, the problem-oriented medical record.

Meds 531 IMMUNOLOGY & HUMAN DISEASE
F 2 cr. LEC 1 LAB 1
PREREQUISITE: WWAMI medical student or consent of the Director of the WWAMI Medical Program and Dean of the College of Graduate Education.
Mechanisms of humor and cell mediated immunity. Immunological mechanisms of cell and tissue injury. Immune mechanisms in human resistance to disease and in immunological diseases.

Meds 532 HEAD & NECK ANATOMY
S 4 cr. LEC 2 LAB 2
PREREQUISITE: WWAMI medical student or consent of the Director of the WWAMI Medical Program and Dean of the College of Graduate Education.
Gross anatomy of head and neck. Relation of head and neck anatomy to disease of the nasal passages, throat, eyes and oral cavity. Relation to physical examination (including skull, pharynx, and larynx).

Meds 533 NERVOUS SYSTEM
S 6 cr. LEC 4 LAB 2
PREREQUISITE: WWAMI medical student or consent of the Director of the WWAMI Medical Program and Dean of the College of Graduate Education.
Integrated approach to the normal structure and function of the human nervous system, basic neuropathological concepts and an introduction to the clinical evaluation of typical neurological lesions. Laboratory includes dissection of human brain and histologic study of brain stem cross sectional anatomy.

Meds 534 SYSTEMS OF HUMAN BEHAVIOR I
F 3 cr. LEC 1
PREREQUISITE: WWAMI medical student or consent of the Director of the WWAMI Medical Program and Dean of the College of Graduate Education.
Overview of conceptual systems and models of behavior, normality and abnormality, environment and social learning, conditioning, learning in the autonomic nervous system, catecholamines and behavior, illness behavior, feelings, emotion and cognition, physician-patient interaction and disease and techniques of behavior change.

Meds 570 INDIVIDUAL PROBLEMS
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of the Director of the WWAMI Medical Program and Dean of Graduate Education.
Directed research and study on an individual basis.

Meds 580 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

Meds 581 EVALUATION OF MEDICAL LITERATURE
S 1 cr. LEC 1
PREREQUISITE: WWAMI medical student or consent of Director of the WWAMI Medical Program and Dean of the College of Graduate Education.
An introduction to methods for retrieving quality, relevant evidence using the internet, and to methods for applying rigorous criteria when reading primary research studies, or reviews of primary studies, that report on the effectiveness of therapeutic or preventive intervention.

MET Mechanical Engineering Technology
Department of Mechanical & Industrial Engineering
(406) 994-2203

MET 101 INTRODUCTION TO MECHANICAL ENGINEERING TECHNOLOGY
F 1 cr. SEM 1
A seminar course surveying the mechanical engineering technology profession. Topics include an overview of career opportunities, problem solving processes, an introduction to basic design process, professionalism, professional registration, and ethics.

MET 201 MECHANICAL ENGINEERING TECHNOLOGY COMPUTER APPLICATIONS
F, S 2 cr. LAB 2
COREQUISITE: MATH 176 - Computer methodology, and use of various computer software packages in mechanical engineering technology applications.

MET 251 MATERIALS SCIENCE LAB
F, S 1 cr. LAB 1
PREREQUISITE: MET majors only.
COREQUISITE: CHBE 213 or equivalent, ME 102 or MET 201. Specific hands-on experience with material properties experiments that parallel the lecture portion of CHBE 213. Students will analyze mechanical and physical properties of various materials. Students will use various testing apparatus and conduct both destructive and non-destructive evaluations (NDE).

MET 256 MANUFACTURING PROCESS LABORATORY
S 1 cr. LAB 1
PREREQUISITE: MET majors only, non-majors require instructor approval.
COREQUISITE: ME 255.
Hands-on application of the fundamentals of basic manufacturing processes.

MET 270 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
Directed research and study on an individual basis.

MET 280 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MET 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
Classroom instruction associated with directed undergraduate research/creative activity projects.

MET 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F S 1-6 cr. IND may be repeated
Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

MET 314 MACHINING TECHNOLOGY AND INDUSTRIAL SAFETY
F 3 cr. LEC 1 LAB 2
PREREQUISITE: ME 118 or equivalent, or TE 230 for non-majors; MET 256 or department head approval.
Introduction to modern machining technology and the key principles of industrial safety, material properties related to machining practices, design, and specifications. Semi-precision and precision lay-out are covered. An introduction to computer numerically controlled (CNC) technology and operations is included. Specific hands-on experiences included in laboratory.

MET 315 WELDING TECHNOLOGY I
S 3 cr. LEC 1 LAB 2
PREREQUISITE: ME 118 or equivalent, or TE 230 for non-majors; MET 256 or department head approval.
Introduction to modern welding technology and metallurgy. An overview of the most common processes in use. Detailed examination of metallurgy and materials properties as related to welding processes. Welding specification and symbology are introduced as well as modern welding code usage. Specific hands-on experiences included in laboratory.

MET 325 HEAT TRANSFER FOR ENGINEERING TECHNOLOGY
S 4 cr. LEC 3 LAB 1
PREREQUISITE: ME 324 or equivalent.
COREQUISITE: EM 351 or equivalent.
Study of the basic mechanisms of heat transfer and its applications. Introduction to equipment that utilizes these mechanisms.

MET 340 MECHANISMS
F 3 cr. LEC 2 LAB 1
PREREQUISITE: MATH 176 or equivalent.
COREQUISITE: EM 215.
Introduction to mechanisms and machine elements used in the design and synthesis of mechanical devices.

MET 401 MECHANICAL ENGINEERING TECHNOLOGY SENIOR SEMINAR
F 1 cr. SEM 1
PREREQUISITE: MET 101 and senior standing.
COREQUISITE: MET 456.
A seminar course focusing on career path development. Students will meet with current industry professionals to discuss specific careers, as well as meet with freshman students to share undergraduate experiences.

MET 417 ADVANCED WELDING AND MACHINE TOOL APPLICATIONS
F 3 cr. LEC 1 LAB 2
PREREQUISITE: MET 314 and MET 315.
Advanced applications of welding and machine tool technology. Computer numerical control, multi-axis machining set-up, gas tungsten arc welding, and gas metal arc welding.
MET 445 MACHINE DESIGN
S 4 cr. LEC 5 LAB 1
PREREQUISITE: MET 540 or equivalent.
- Application of mechanisms fundamentals, strength of materials, material selection, and tolerances and fits to the design of machines and machine systems. Specific hands-on experiences included in laboratory.

MET 455 HEATING, VENTILATION, AND AIR CONDITIONING LAB
F 1 cr. LAB 1
PREREQUISITE: MET majors only; non-majors require instructor approval.
COREQUISITE: ME 360, ME 454.
- Laboratory experiences enforcing topics covered in ME 454.

MET 456 MECHANICAL ENGINEERING TECHNOLOGY CAPSTONE EXPERIENCE I
F 5 cr. RCT 2 LAB 1
PREREQUISITE: BUS 201, I&M 350, MET 201, MET 325, MET 445, for MET majors only.
COREQUISITE: MET 417, I&M 325.
- First course in senior capstone sequence. Students, under the guidance of faculty supervisors, design, plan, and schedule a product for fabrication/manufacturer. Lectures will address fundamental principles of planning, estimating, budgeting, scheduling, and controlling engineering projects, plus review of CAD software.

MET 457R MECHANICAL ENGINEERING TECHNOLOGY CAPSTONE EXPERIENCE II
S 3 cr. RCT 1 LAB 2
PREREQUISITE: MET 456, for MET majors only.
- Second course in senior capstone sequence. Manufacturing, scheduling, and construction of the project initiated.

MET 465 BUILDING SYSTEMS
F 3 cr. LEC 3
PREREQUISITE: PHYS 206 and junior standing.
- A survey of the systems and equipment for water supply, sanitation, fire protection, electrical service, heating and air conditioning of buildings.

MET 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

MET 476 INTERNSHIP
On Demand 1 - 12 cr. IND
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

MET 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MET 499R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: MET 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MET 499R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MGMT Management
College of Business
(406) 994-4423

MGMT 102 INTRODUCTION TO BUSINESS
On Demand 3 cr. LEC 2 RCT 1
- Introduction to functional areas of business and their interrelationships. Exploration of various career paths in business.

MGMT 202 SUPERVISION & LEADERSHIP
On Demand 3 cr. LEC 2 RCT 1
- Management principles as they apply to first-line supervision and to the function of leadership and motivation in any organization. This course may not substitute for any required business course.

MGMT 231S KNOWLEDGE CREATION & INQUIRY IN BUSINESS
On Demand 3 cr. LEC 2 RCT 3
- Introduction to the history and methods of knowledge and knowing regarding business and business organizations. Focused on disciplined inquiry using statistics and quantitative analysis providing the intellectual foundation for further exploration of the business discipline.

MGMT 245D CULTURAL DIMENSIONS OF INTERNATIONAL BUSINESS
S 3 cr. RCT 2
- The course will help students recognize the importance cultural differences play in conducting international business transactions. They will analyze the nature and impact of some common problems resulting from not understanding how to deal appropriately with cultural differences.

MGMT 366 MANAGERIAL ANALYSIS AND ACTION I
S 3 cr. LEC 3
PREREQUISITE: BUS 301.
- Part of an integrated, two-course sequence which will build knowledge and skills appropriate for the challenges faced by managers. This course will deal with such operations/first-line supervision issues as human resources, team building, leadership, ethics, technology, and law.

MGMT 302 LEADERSHIP IN BUSINESS ORGANIZATIONS
F 3 cr. LEC 3
PREREQUISITE: BUS 301 or permission of the instructor.
- Theories, issues, and current topics related to the emergence and effectiveness of leaders, with a focus on leadership behaviors and processes in business organizations. Emphasis placed on examination of how individual and organizational leadership capacity is developed.

MGMT 406 NEGOTIATION AND DISPUTE RESOLUTION
F 3 cr. RCT 3
PREREQUISITE: BUS 301 or consent of instructor.
- Introduction to negotiation theories and skills to help students practice and improve this essential area of business and personal competence. Taught primarily through discussion and in-class exercises that allow students to gain experience and confidence as negotiators.

MGMT 411 COMPUTER APPLICATIONS
On Demand 3 cr. LEC 3
PREREQUISITE: ACCT 395 or BUS 311.
- Business applications for computers. Accounting inventory, planning, and financial analysis are among the topics covered. End-user programming and prototyping will be emphasized.

MGMT 412 SYSTEM ANALYSIS AND DESIGN
S 3 cr. LEC 3
PREREQUISITE: BUS 301.
- Study of methods and tools a system analyst uses in development of information system. Decision-making process of managers used as basis for analysis. Design done on networked microcomputers. Final solutions presented orally, written, and on Web.
MGMT 413 MANAGERIAL SUPPORT SYSTEMS
F 3 cr. LEC 3
PREREQUISITE: BUS 311.
- Theory, application and development of information systems to support managerial decision making in semi-structured and unstructured situations. Database, spreadsheet, expert system, and/or collaborative software application to decision problems. Cases and project assignments.

MGMT 415 MANAGEMENT OF INFORMATION TECHNOLOGY
S 3 cr. LEC 3
PREREQUISITE: MGMT 412, MGMT 413, BUS 301.
- Course integrates content from the courses in the Management of Information Technology minor. The course will unite the technical knowledge and skills acquired by students with behavioral knowledge and skills necessary to effectively manage business applications of information technology.

MGMT 433 MANAGING QUALITY & PRODUCTIVITY
On Demand 3 cr. LEC 3
PREREQUISITE: BUS 331.
- An in-depth study of the theoretical foundations of quality management along with applications of the quantitative and qualitative tools used in improving organizational quality and productivity. Coverage will include the principles promoted by major quality experts and a review of the requirements for corporate quality certification.

MGMT 450 BUSINESS TUTORIAL
F 5 cr. LEC 1 SEM 2
PREREQUISITE: Junior standing and permission of instructor.
- Provides selected upper-division students an opportunity to develop leadership and mentoring skills through the involvement with the BUS 101V Freshman Seminar course. Student Associates work closely with faculty to enhance the academic, cultural, and social experiences of students in the seminar course.

MGMT 461 SMALL BUSINESS MANAGEMENT
S 3 cr. LEC 3
PREREQUISITE: BUS 222, BUS 301, BUS 341, BUS 351, and Senior standing.
- Focus on the process of starting and managing a small business, with an emphasis on businesses owned and operated by one individual or family. Topics covered will include typical funding sources and all phases of small business management from startup to exit.

MGMT 463 MANAGING THE ENTREPRENEURIAL EXPERIENCE
F, S 3 cr. LEC 3
PREREQUISITE: BUS 222, BUS 301, BUS 341, BUS 351 and Senior standing.
- This course is designed to give students real-world experience in projects that will assist actual area entrepreneurs. Students will work with these new ventures to solve their management, marketing, finance and other business problems. The content of the problems will depend on the situation of the client businesses.

MGMT 464 INTERNATIONAL MANAGEMENT
S 3 cr. LEC 3
PREREQUISITE: BUS 301 and Senior standing.
- Description of the challenges which the global context poses to people who manage businesses. Examination of the elements of international environment and illustration of their effects on management practices and how management deals with those forces.

MGMT 465 INTERNATIONAL PRACTICUM
On Demand 1-12 cr. IND
PREREQUISITE: By application.
- Intensive study of culture, customs, politics, history, and business practices of another country. Program culminates with extended visit to location for lectures, and other relevant activities.

MGMT 466 MANAGERIAL ANALYSIS AND ACTION II
F 5 cr. LEC 3
PREREQUISITE: BUS 311, BUS 331, BUS 351, and MGMT 266.
- Part of an integrated, two-course sequence which will build knowledge and skills appropriate for the challenges faced by managers. This course will deal with issues faced by middle managers at the functional level of the organization.

MGMT 468 BUSINESS, ETHICS AND ENVIRONMENT
S 3 cr. LEC 3
PREREQUISITE: Senior standing or permission of the instructor.
- Role of business in solving and causing current problems is examined in the context of our nation and the world. An analytical, problem-solving approach will be used to model operating and ethical issues. Varied perspectives on these issues will be presented.

MGMT 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of Associate Dean.
- Directed research and study on an individual basis.

MGMT 472 LEGAL AND SOCIAL FRAMEWORK OF BUSINESS REGULATION
On Demand 3 cr. LEC 3
PREREQUISITE: BUS 361 or consent of instructor.
- Study of legal and social bases for government regulation of business. Topics include environmental regulation, employment and labor law, securities regulation, antitrust, and international trade. Students research and make class presentation on regulatory issues.

MGMT 473 MODERN MANAGEMENT OF WESTERN RESOURCES
F 3 cr. LEC 3
PREREQUISITE: BUS 301 or consent of instructor.
- Study of the decision making process of managers of large tracts of Western land. Real world cases will be used to explore the variables impacting their decision such as: production versus subdivisions, conservation easements, inheritance taxes and wildlife based business plans.

MGMT 475R MANAGEMENT PRACTICUM
F, S 3 cr. RCT 3
PREREQUISITE: Senior standing or permission of instructor.
- Teams do major project such as substantive community service project, research paper, small business experience case, business plan, or strategic analysis. Practical experience with project and/or team management where performance is measured by delivered product. No credit for previous experience.

MGMT 476 INTERNSHIP
On Demand 2 - 12 cr. IND
PREREQUISITE: Junior standing, Formal Admission to the College of Business, and consent of the instructor.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

MGMT 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MGMT 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
On Demand 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: MGMT 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MGMT 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
On Demand 1-6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MGMT 505 THE STRATEGIC MANAGEMENT OF TECHNOLOGICAL INNOVATION
On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing in Business, Engineering or Agriculture or consent of instructor.
- To prepare students to strategically manage the innovation of technology by bringing together students from several disciplines and have them work together to integrate strategy and technology. The students will be given cases and other problems throughout the semester that require them to use and integrate these concepts.
COURSE DESCRIPTIONS: MGMT 570 - MKTG 490R

MGMT 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing consent of instructor, approval of Associate Dean and Dean of Graduate Education.
- Directed research and study on an individual basis.

MGMT 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper-division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MKTG
Marketing
College of Business
(406) 994-4423

MKTG 241 SALES
On Demand cr. LEC 3
- Principles of sales for non-business majors. Focus is on selling in retail and service environment. This course may not substitute for any required business course.

MKTG 242D INTRODUCTION TO GLOBAL MARKETS
F, S 3 cr. RCT 3
- Explores the global range of human differences and how these factors including cultures, nations and political economies interact in an evolving world order brought about by globalization and an interdependent and integrated world economy. Economic systems, international business structures and the dynamic complexities of international relations are introduced in the context of real world issues and the social, political and economic conflicts that result from them.

MKTG 270 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of Associate Dean.
- Directed research and study on an individual basis.

MKTG 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MKTG 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MKTG 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

MKTG 342D MARKETING RESEARCH
F, S 3 cr. RCT 3
PREREQUISITE: STAT 216, STAT 217. COREQUISITE: BUS 541.
- The application of scientific research methods to marketing problems. The emphasis is on survey design and data analysis for market segmentation studies.

MKTG 343 CONSUMER BEHAVIOR
F, S 3 cr. LEC 3
PREREQUISITE: MKTG 342 and Formal Admission to the College.
- Application of behavioral sciences to understanding human behavior in the market place. Emphasis on culture and subculture, social class, reference group, family, attitudes, perception, motivation, personality, and learning theory on consumer and marketing management decisions.

MKTG 345 PROFESSIONAL SELLING
S 3 cr. LEC 3
PREREQUISITE: BUS 541.
- Personal selling techniques applied to outside sales. Sales organization including structure, training, motivation, and compensation. Evaluation of sales goals and individual performance.

MKTG 400 SEMINAR
On Demand 1 cr. SEM 1
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper-division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

MKTG 441 INTERNATIONAL MARKETING
S 3 cr. LEC 3
PREREQUISITE: BUS 541.
- International economic, financial, cultural, political, and legal environment; marketing research, market segmentation and positioning issues analyzed primarily from a global perspective. Global strategies and organizational designs described and analyzed as related to foreign market entry, sourcing, product development, pricing, promotion, logistics and distribution, and export-import management.

MKTG 443 PROMOTION
F 3 cr. LEC 3
PREREQUISITE: Senior standing. BUS 541.
- Explores the use of advertising, sales promotion, Internet, electronic media, and personal selling as methods for promoting goods and services. Taught from the perspective of the marketing manager; with emphasis on the theory, strategy, and tactics of promotion.

MKTG 444 RETAIL MANAGEMENT
F 3 cr. LEC 3
PREREQUISITE: Senior standing. BUS 541.
- The application of marketing theory to retail management problems. Topics include structure of the retail industry and nature of competition; merchandise planning, budgeting and control; and pricing and location theory.

MKTG 446 MARKETING FOR ENTREPRENEURS
F 3 cr. LEC 3
PREREQUISITE: BUS 541.
- This course examines the unique marketing challenges faced by start-up organizations. New firms are often resource constrained. As a result, penetrating markets dominated by larger competitors with new and innovative products and services requires different marketing tactics. Markets are undefined and establishing primary demand for a new product category may be required.

MKTG 447 MARKETING MIX DESIGN
F, S 3 cr. RCT 3
PREREQUISITE: Senior standing, MKTG 342 and approval of instructor.
- Student teams will apply their expertise in marketing to practical business problems encountered by firms in the community and surrounding area. The problems have their basis in any of the marketing mix elements such as identifying market potential, developing a promotional campaign, or development of a new product.

MKTG 449 MARKETING MANAGEMENT
F, S 3 cr. LEC 3
PREREQUISITE: Senior standing, MKTG 342, and MKTG 443.
- The content of previous marketing courses is applied using the case method to solve marketing problems. Emphasis is on marketing strategy and implementation.

MKTG 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of Associate Dean.
- Directed research and study on an individual basis.

MKTG 476 INTERNSHIP
On Demand 2 - 12 cr. IND
PREREQUISITE: Formal Admission to the College of Business and consent of instructor.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

MKTG 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MKTG 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
On Demand 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: MKTG 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MKTG 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
On Demand 1-6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.
MKTG 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr
PREREQUISITE: Graduate standing consent of instructor, approval of Associate Dean and Dean of Graduate Education.
- Directed research and study on an individual basis.

MKTG 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper-division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ML
Modern Languages
Department of
Modern Languages & Literatures
(406) 994-4448

ML 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ML 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT 1 MAY be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

ML 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND MAY be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

ML 344 INSTRUCTIONAL PERSPECTIVES
F, S, Su On Demand 1 cr. RCT 1 Maximum 3 cr.
PREREQUISITE: MLF 351 or MLF 352; MLG 350 or MLG 351; MLS 350 or MLS 351.
- Students learn how various pedagogical approaches are realized through class discussion, observation, and practice under the direction of the faculty mentor.

ML 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

ML 480 SPECIAL TOPICS
On Demand 1 - 3 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ML 499R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 8 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

ML 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

ML 580 SPECIAL TOPICS
On Demand 1 - 3 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

ML 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 3 cr. MAY be repeated; maximum 5 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
- Courses offered on a one-time basis to fulfill professional development needs of in service educators. A specific focus is given to each course which is appropriately subtitled.

MLA
Modern Languages, Arabic
Department of
Modern Languages & Literatures
(406) 994-4448

MLA 101 ELEMENTARY MODERN STANDARD ARABIC
F, S 4 cr. RCT 4
- An elementary level course designed to facilitate students' acquisition of basic proficiency in communication within culturally significant contexts. Students learn Modern Standard Arabic language skills in an environment integrating interactive video and classroom instruction.

MLA 102 ELEMENTARY MODERN STANDARD ARABIC II
F, S 4 cr. RCT 4
PREREQUISITE: MLA 101 or consent of instructor.
- This course builds upon the foundation established in 101. Greater emphasis is placed upon oral and written expression. Cultural issues are explored in an environment integrating interactive video and classroom instruction.

MLA 101 ELEMENTARY MODERN STANDARD ARABIC
F, S, Su alternate years 4 cr. RCT 4
NOTE: Offered on a rotating basis with German and Spanish in Summer.
- An elementary level course designed to help students acquire basic proficiency in communicating within culturally significant contexts. An integrated approach to teaching language skills with emphasis on vocabulary acquisition and basic grammatical structures.

MLA 219D INTERMEDIATE FRENCH
F, S 3 cr. RCT 3
PREREQUISITE: MLA 102 or equivalent, or a minimum three years of high school French or placement interview.
- Intensive, methodical review of grammar and syntax combined with the integrated development of proficiency in the four language skills. Expansion of cultural knowledge and functional vocabulary through intermediate-level readings and discussions. Increased emphasis on written communication.

MLA 220D FRENCH LANGUAGE & CULTURE
S alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: MLA 219 or equivalent, or placement interview.
- Fourth semester French language course designed to provide basis for advanced level study of French language, literature, and culture. Application of language skills in discussions and explications of selected readings in literature and culture.

MLA 301 HISTOIRE CIVILISATION
S alternate years, to be offered 2006 5 cr. RCT 5
PREREQUISITE: MLA 220
- Survey of French culture from the middle ages to modern era; focus on historical, artistic, literary, and social developments. Taught in French.

MLA 302 LA FRANCE AUJOURD'HUI
S alternate years, to be offered 2007 5 cr. RCT 3
PREREQUISITE: MLA 220
- The French personality today in social, cultural, and political settings. Taught in French.

MLA 306H FROM REFLECTION TO REVOLUTION
S alternate years, to be offered 2006 3 cr. RCT 3
- Reading and discussion of selected major works from the eighteenth century. All reading and discussions are in English. Majors may be required to do some work in French.
MLF 351 ADVANCED GRAMMAR & COMPOSITION
F alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: MLF 220.
- Intensive review of French grammar to increase proficiency in various forms of written expression including business correspondence, problems of translation, and short essays.

MLF 352 ADVANCED CONVERSATION & PHONETICS
F alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: MLF 220.
- Intensive conversation coupled with a practical study of French phonetics and contrastive comparison with English for teaching application. Various levels of the spoken language from slang to formal speech.

MLF 491 FRENCH LITERATURE I
F alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: MLF 220.
- Survey of French literature from the Middle Ages through the 18th century. Taught in French.

MLF 492 FRENCH LITERATURE II
F alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: MLF 220.
- Survey of French literature of the 19th and 20th centuries. Taught in French.

MLF 450 SEMINAR: FRENCH LITERATURE AND CULTURE
S 3 cr. SEM 3
PREREQUISITE: MLF 401 or MLF 402.
- Senior capstone course. The study of Francophone literature and culture. Taught in French.

MLF 499R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. RCT 3 May be repeated. Max 4 cr.
COREQUISITE: MLF 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MLF 499R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MLG
Modern Languages, German
Department of Modern Languages & Literatures
(406) 994-4448

MLG 101 ELEMENTARY GERMAN I
F, Su alternate years 4 cr. RCT 4
NOTE: Offered on a rotating basis with French and Spanish in Summer.
- An elementary level course designed to help students acquire basic proficiency in communication within culturally significant contexts. An integrated approach to teaching language skills with emphasis on vocabulary acquisition and basic grammatical structures.

MLG 102D ELEMENTARY GERMAN II
F, S; Su alternate years 4 cr. RCT 4
PREREQUISITE: MLG 101 or equivalent, or two years of high school German. Offered on a rotating basis with French and Spanish in Summer.
- This course builds upon the foundation established in 101. Greater emphasis is placed upon oral and written expression. Reading and discussions are designed to increase comprehension of more linguistically complex texts and more conceptually complex cultural issues.

MLG 219D INTERMEDIATE GERMAN
F, S 3 cr. RCT 3
PREREQUISITE: MLG 102 or equivalent, or a minimum three years of high school German, or placement interview.
- In-depth review of grammar and syntax combined with the integrated development of proficiency in the four language skills. Expansion of cultural knowledge and functional vocabulary through intermediate-level readings and discussions. Increased emphasis on written communication.

MLG 220D GERMAN LANGUAGE & CULTURE
F alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: MLG 220.
- An overview of significant linguistic concepts which contribute to an understanding of Modern German. Also a practical study of German sounds - their pronunciation, combination, and representation by written symbols. Contrastive linguistic study, German-English, for teaching application.

MLG 301 GERMAN CULTURE & CIVILIZATION
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MLG 220.
- A survey of some of the great figures and periods of German art, literature, music, and public life in German-speaking countries which have made significant cultural contributions to world civilization up to 1832.

MLG 301H MODERN GERMAN CULTURE AND SOCIETY
S alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: Consent of instructor.
- A survey of some of the great figures and periods of German art, literature, music, and public life in German-speaking countries which have made significant cultural contributions to world civilization from 1832 to the present. All readings and discussion in English, with additional readings in German for majors and minors.

MLG 315 SURVEY GERMAN LITERATURE
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MLG 220.
- A survey of representative works of German literature from selected literary periods.

MLG 320 CONTEMPORARY GERMAN LITERATURE
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: MLG 220.
- A survey of some of the great figures and periods of German art, literature, music, and public life in German-speaking countries which have made significant cultural contributions to world civilization from 1832 to the present. All readings and discussion in English, with additional readings in German for majors and minors.

MLG 350 ADVANCED GRAMMAR CONVERSATION COMPOSITION I
F alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: MLG 220.
- In-depth review of grammar, syntax, and idiomatic expression; vocabulary building practice in conversation. Short readings in German as a basis for conversation and composition. Emphasis on accuracy in grammar and expression.

MLG 351 ADVANCED GRAMMAR CONVERSATION COMPOSITION II
F alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: MLG 220.
- In-depth review of grammar, syntax, and idiomatic expression; vocabulary building practice in conversation. Short readings in German as a basis for conversation and composition. Emphasis on accuracy in grammar and expression.

MLG 360 THE FAUST MYTH
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: MLG 315 or consent of instructor.
- An examination of the German Faust figure in pursuit of knowledge. This theme is explored through the texts of Luther, Goethe, Mann, Bulgakov, and others. All readings and discussions in English.

MLG 410 LINGUISTICS-PHONETICS
S alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: MLG 351.
- An overview of significant linguistic concepts which contribute to an understanding of Modern German. Also a practical study of German sounds - their pronunciation, combination, and representation by written symbols. Contrastive linguistic study, German-English, for teaching application.

MLG 450 SEMINAR: GERMAN LITERATURE AND CULTURE
S 3 cr. SEM 3
PREREQUISITE: MLG 301, MLG 315, or MLG 320.
- Senior capstone course. Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion materials.

MLG 498R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. RCT 3 May be repeated. Max 4 cr.
COREQUISITE: MLG 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MLG 499R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
S, Su 1-6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/ creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MLJ
Modern Languages, Japanese
Department of Modern Languages & Literatures
(406) 994-4448

MLJ 101 ELEMENTARY JAPANESE I
F 4 cr. RCT 4
- Elementary course designed to help students acquire basic language skills in Japanese: reading, writing, listening, speaking. Introduction to Japanese writing systems (hiragana, katakana, kanji). Emphasis on establishing correct pronunciation and grasp of grammar. Cultural perspectives such as greetings, simple dialogues.

MLJ 102D ELEMENTARY JAPANESE II
S 4 cr. RCT 4
PREREQUISITE: MLJ 101 or equivalent, or placement interview with instructor.
- Continuation of MLJ 101. Expansion of cultural knowledge.
MLJ 219D INTERMEDIATE JAPANESE
F 4 cr. RCT 4
PREREQUISITE: MLJ 102 or equivalent, or placement interview with instructor.
- Review of skills acquired in elementary Japanese, followed by additional study of grammatical patterns and vocabulary acquisition. Emphasis on gaining basic conversational skills and improving reading. Expansion of cultural knowledge.

MLJ 220D INTERMEDIATE JAPANESE II
S 4 cr. RCT 4
PREREQUISITE: MLJ 219 or equivalent, or placement interview with instructor.
- Continuation of MLJ 219. Students who successfully complete this course will have "survival" skills for daily life in Japan, and will be ready for more advanced course work using authentic materials. Expansion of cultural knowledge.

MLJ 301 JAPANESE CULTURE & CIVILIZATION
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: ENGL 121W or consent of instructor
- Survey of Japanese society, literature, art, and religion from earliest times to the modern period. All readings and discussions in English. No knowledge of Japanese necessary.

MLJ 306 JAPANESE PORTRAYALS OF WORLD WAR II
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: ENGL 121W and Junior Standing or consent of instructor.
- A study of fictional and nonfiction literature and film on the Japanese experience of World War II. Emphasis on the motives, ideologies, and memories involved in the war. All reading and discussion is in English.

MLJ 315 INTRODUCTION TO JAPANESE LITERATURE
F alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: ENGL 121W or consent of instructor.
- Survey of masterpieces of poetry, drama, and narrative from earliest times to the 20th century. All readings and discussions in English. No knowledge of Japanese necessary.

MLJ 320 CLASSICAL JAPANESE LITERATURE
S alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: ENGL 121W or consent of instructor.
- Study of poetry, drama, and narrative from earliest times to mid-nineteenth century. All readings and discussions in English. No knowledge of Japanese necessary.

MLJ 321 MODERN JAPANESE LITERATURE
F alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: ENGL 121W or consent of instructor.
- Study of novels, short stories, and poems written by Japanese authors from the mid-nineteenth century onward. Covers Japan's initial encounter with the West and the establishment of individual identity. All readings and discussions in English. No knowledge of Japanese necessary.

MLJ 341 WOMEN IN JAPANESE LITERATURE AND CULTURE
S alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: ENGL 121W or consent of instructor.
- A study of Japanese women writers and images of women in Japanese culture from earliest times to the present. No knowledge of Japanese necessary.

MLJ 350 ADVANCED READING & GRAMMAR
F 3 cr. RCT 3
PREREQUISITE: MLJ 220 or placement interview with instructor.
- Review and further development of grammar and vocabulary skills necessary for improved reading proficiency in Japanese. Topics for study address Japanese culture and society through manga/cartoons, newspapers, magazines, correspondence, and short essays, with some translation and comparison with English.

MLJ 351 ADVANCED COMMUNICATION & COMPOSITION
S 3 cr. RCT 3
PREREQUISITE: MLJ 220 or placement interview with instructor.
- Review and further development of communication skills with an emphasis on both speaking and writing for various occasions. Cultural and social topics are explored through authentic materials to enhance knowledge of Japan and its people.

MLJ 361 TEXT & CINEMA
F alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: ENGL 121W or consent of instructor.
- Study of several fine Japanese films and the literary works upon which they were based. Emphasis is on the translation of written text into image. All readings and discussions in English. No knowledge of Japanese necessary.

MLJ 371 JAPANESE FILM & ANIME
S alternate years, to be offered 2006 3 cr. LEC 2
PREREQUISITE: ENGL 121W or consent of instructor.
- An introduction to the history and art of Japanese cinema, including its possibilities for exploring Japanese culture, the techniques of major film artists, and theoretical approaches to film. All reading and discussion is in English.

MLJ 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: MLJ 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MLJ 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MLS Modern Languages, Spanish
Department of
Modern Languages & Literature
(406) 994-4448

MLS 101 ELEMENTARY SPANISH I
F, Su alternate years 4 cr. RCT 4
NOTE: Offered on a rotating basis with French and German in the summer.
- An elementary level course designed to help students acquire basic proficiency in communicating within culturally significant contexts. An integrated approach to teaching language skills with emphasis on vocabulary acquisition and basic grammatical structures.
MLS 321 CONTEMPORARY LATIN AMERICAN LITERATURE
S alternate years, to be offered 2007 5 cr. LEC 3
PREREQUISITE: MLS 220
- An examination of the major authors, works, and literary movements of the 19th and 20th centuries as Latin American literature has come of age and established its independence from Spanish peninsular influences. Taught in Spanish.

MLS 390H TRAVEL IN LATIN AMERICA LITERATURE & FILM
Su 3 cr. RCT 3
PREREQUISITE: MLS 220 or junior standing.
- The course examines travel in Latin America texts and films as exploration and search for individual and national identity and its disruptive displacements caused by political and economic forces and the problem of adapting to a new environment. In English.

MLS 390 ADVANCED GRAMMAR AND PHONOLOGY
F alternate years, to be offered 2007 5 cr. RCT 3
PREREQUISITE: MLS 220
- In-depth review of problem areas in grammar, complete review of the verb system and a practical study of Spanish sounds. This class is designed to provide prospective teachers and advanced students with an understanding of the function of Spanish grammar. In Spanish.

MLS 515 ADVANCED ORAL AND WRITTEN COMPOSITION
S alternate years, to be offered 2006 5 cr. LEC 3
PREREQUISITE: MLS 350
- Development and refinement of advanced oral and writing skills. Intensive practice in expository and imaginative composition, review of idiomatic expressions, and vocabulary expansion.

MLS 560 HISPANIC TEXTS AND CINEMA
S alternate years, to be offered 2006 5 cr. LEC 3
PREREQUISITE: Junior standing
- This course will focus on different topics of Latin America and/or Spain through the reading and viewing of a variety of Hispanic literature and movies. These classes include history, race, gender, politics, and literary trends in Latin America or Spain. Focus will vary depending on the professor. In Spanish.

MLS 419 SPANISH PHONOLOGY
F alternate years, to be offered 2006 5 cr. RCT 3
PREREQUISITE: MLS 220
- A practical study of Spanish sounds - their production, combination, description, and representation by written symbols. Contrastive linguistic study. Spanish-English, for teaching application.

MLS 420 CULTURE AND REVOLUTION
F alternate years, to be offered 2006 3 cr. RCT 3
PREREQUISITE: MLS 220
- An intensive study of the cultural materials produced as a result of dictatorships and revolutions in Latin America and Spain including movies, documentaries, songs, literature, and art. Will encourage the understanding of the mutual influence between historical events and cultural production in Hispanic countries. Focus will vary depending on the professor. In Spanish.

MLS 450 SEMINAR: MODERN HISPANIC LITERATURE
S 3 cr. SEM 3
PREREQUISITE: MLS 301 or MLS 302 or MLS 520 or MLS 521.
- Senior capstone course. An in-depth examination of the most important Hispanic works and authors of the 19th and 20th, and 21st centuries. In Spanish.

MLS 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: MLS 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MLS 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MSG Military Science - Army ROTC
Department of Military Science
(406) 994-4044

MSG 101 INTRODUCTION TO MILITARY LIFESTYLES F 2 cr. LEC 1 LAB 1
- An introduction to issues and competencies that are central to a commissioned officer's responsibilities. These initial lessons establish a framework for understanding officership, leadership, and Army values. The class also addresses "life skills" including fitness and time management. Laboratory component is required.

MSG 103 PROBLEM SOLVING AND LEADERSHIP MANAGEMENT SKILLS S 2 cr. LEC 1 LAB 1
PREREQUISITE: Recommended MSG 101.
- Building on problem solving, communications and leadership. "Life skills" include problem solving, goal setting, interpersonal communication skills and assertiveness skills. Further information about life in the Army. Laboratory component is required.

MSG 200 LEADERSHIP MANAGEMENT AND LIFE SKILLS F 2 cr. LEC 1 LAB 1
- Leadership studies. An understanding of how to build teams, influence, communicate, decision making, creative problem solving, planning, and organizing. Laboratory component is required which includes physical fitness training, and other outdoor skills.

MSG 201 ADVANCED LEADERSHIP CONCEPTS AND COMMUNICATION SKILLS S 2 cr. LEC 1 LAB 1
- An advanced look at leadership principles and the application and practice of those principles. Laboratory component is required and includes the operation of military radios and telephones, and a continued emphasis on physical fitness training.

MSG 203 AMERICAN MILITARY HISTORY F, S 3 cr. LEC 2 LAB 1
- The study of the evolution of the American Military, with concentration on the evolution of the American military within the context of national historical development, specifically with regard to industrialization, national security, and the United States' evolving international role and policies. Study of significant battles throughout our history with a focus to successful completion of MSG 201 and MSG 202 and the Professor of Military Science's approval.

MSG 204 LEADERS TRAINING COURSE Su 3 cr. LAB 5
PREREQUISITE: Consent of Professor of Military Science. Practical application of basic knowledge required of an army officer. Subject matter parallels 100 and 200 level courses. Satisfaction prerequisites for advanced course in lieu of the basic course.

MSG 270 INDEPENDENT STUDY
On Demand 1-3 cr. Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Directed research and study on an individual basis.

MSG 280 SPECIAL TOPICS
On Demand 1 - 6 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MSG 301 SMALL UNIT TACTICS AND METHODS OF INSTRUCTION F 3 cr. LEC 3 LAB 1
PREREQUISITE: MSG 101, MSG 103, MSG 201, MSG 200, or MSG 204.
- The study, practice and evaluation of adaptive leadership skills. Small unit tactical operations are used to develop self awareness and critical thinking. Preparation for Leader Development and Assessment Course. A lab component including a field training exercise is required.

MSG 302 PREPARATION FOR LEADER DEVELOPMENT AND ASSESSMENT COURSE S 3 cr. LEC 2 LAB 1
PREREQUISITE: MSG 301.
- Situational leadership challenges are used to build awareness and skills in leading small units. Skills in decision-making, persuading and motivating team members are explored, evaluated and developed. Preparation for Leader Development and Assessment Course. A lab component including a field training exercise is required.

MSG 303 MILITARY SCIENCE LEADER DEVELOPMENT AND COURSE
Su 3 cr. LAB 5
PREREQUISITE: MSG 302. Enrollment restricted to successful completion of MSG 301 and MSG 302 and the Professor of Military Science's approval.
- Practical exercise in tactical, technical, and administrative duties, common to all branches of the Army. Development of leadership and the ability to function effectively in small unit operations.

MSG 401 SENIOR SEMINAR I F 3 cr. LEC 2 LAB 1
PREREQUISITE: MSG 302, approval of instructor.
- Develops proficiency in planning, executing and assessing complex operations, function as a member of a staff and providing leadership performance feedback to subordinates. A lab component is required.

MSG 402 SENIOR SEMINAR II S 3 cr. LEC 2 LAB 1
PREREQUISITE: MSG 401, approval of instructor.
- Study of military justice system and international military law. Study of Army organization and administration. Exploration of the economics of leading in complex situations. Preparation for transition from college student to commissioned officer in the Army. A lab component is required.
 COURSE DESCRIPTIONS: MSG 403 - MTA 301

MSG 403 MILITARY CONTRACTS, DISPUTES AND CLAIMS
S 1 cr. LEC 1
PREREQUISITE: Junior standing. Restricted entry and approval of Professor of Military Science.
- Study of military contracts, disputes, and claims.
- Emphasis on understanding contract terms, bids, and estimates. Students will learn procurement procedures for equipment and supplies along with legal responsibilities of contract officers.

MSG 405 TECHNICAL WRITING
S 1 cr. LEC 1
PREREQUISITE: Junior standing. Restricted entry and approval of Professor of Military Science.
- Study of military technical writing and the Army style. Emphasis on preparing military correspondence and operation orders.

MSG 470 INDEPENDENT STUDY
On Demand 1 - 3 cr IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

MSG 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MSG 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: MSG 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MSG 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MTA Media & Theatre Arts
Department of Media & Theatre Arts
(406) 994-2484

MTA 101A FILM IN AMERICA
F, S 1 cr. LEC 1 LAB 2
- Survey of the development of the motion pictures as an art, a craft and a business in the United States during the 20th century.

MTA 102 AESTHETICS OF FILM PRODUCTION
F, S 3 cr. RCT 5
- An understanding of motion pictures, video art and television practice through study of principles of concept and production. Will include assignments to view and critique selected examples and the completion of short exercises.

MTA 103R UNDERSTANDING PHOTOGRAPHY
F, S, Su 3 cr. LEC 2 LAB 1
- An introductory application of basic photographic theory and visual principles, including camera operation, use of B&W darkroom, and photographic assignments.

MTA 104 THEATRE AND MASS MEDIA
S 3 cr. LEC 3
- An exploration of major plays from the history of drama via contemporary film and television equivalents.

MTA 106 INTERMEDIATE PHOTOGRAPHY
S 3 cr. LEC 2 LAB 1
PREREQUISITE: B or better in MTA 103.
- Theory and continued application of image control in B&W photography, through the use of a variety of 35mm films and the introduction of basic zone system principles. Advanced traditional B&W printing techniques in preparation for portfolio review.

MTA 222 LIGHTING TECHNIQUE AND DESIGN
F 3 cr. LEC 1 RCT 2
PREREQUISITE: Sophomore standing in MPVT.
- An introduction to the aesthetics and technical principles of lighting for film and theatre with attention to familiarity with basic instruments and a lighting board. The opportunity for an exercise in lighting design will be provided.

MTA 232 ACTING I
F 3 cr. LEC 1 RCT 2
PREREQUISITE: Sophomore standing in MPVT.
- An introduction to the basic skills of acting through acting exercises and individual projects, including a unit for acting for the camera.

MTA 233 BASIC PRODUCTION OPERATIONS AND TECHNIQUES
F, S, Su 1 - 3 cr. IND Maximum 12 cr. Total for both MTA 233 and MTA 333 combined.
PREREQUISITE: MTA 102 or MTA 103.
- Practical experience associated with production and research projects in motion pictures, television/video, photography, and theatre. May include rehearsal or performance activity. Credit will be offered to students doing basic work on faculty members' productions or on student productions under direct faculty supervision. Credit will be offered to students giving basic technical support to a) faculty teaching courses, b) faculty engaged in creative activities, or c) advanced students' productions (while supervised by an MTA faculty member).

MTA 251 WRITING
S 3 cr. RCT 5
PREREQUISITE: Sophomore standing in MPVT.
- Experience in techniques and concepts of writing for motion picture and video production.

MTA 252 EDITING
F 3 cr. LEC 1 RCT 2
PREREQUISITE: Sophomore standing in MPVT.
- History and techniques of motion picture and video editing. The course will combine lectures with hands-on exercises in editing.

MTA 253 DIRECTING
S 3 cr. RCT 2 LAB 1
PREREQUISITE: MTA sophomore standing in MPVT.
- An examination of the theory and practice of directing and working with actors. Students complete projects for the stage and for filming during the semester.

MTA 254 SOUND
S 3 cr. LEC 1 RCT 2
PREREQUISITE: Sophomore standing in MPVT.
- Theoretical and practical approaches to the motion picture soundtrack. Topics and exercises will include field recording, post-production, sound design, and the musical score.

MTA 255 CINEMATOGRAPHY/VIDEOGRAPHY
F 3 cr. LEC 1 RCT 2
PREREQUISITE: Sophomore standing in MPVT.
- An examination of the aesthetics and practice of cinematography using 16mm film and digital video cameras.

MTA 260 INTRODUCTION TO COLOR PHOTOGRAPHY
F 5 cr. LEC 3 LAB 1 RCT 1
PREREQUISITE: B or better in MTA 104 and sophomore standing.
- Introduction and analysis of color theory, color imagery and color materials. Exploration of image capture via film, scanning and digital cameras. Technical skills are developed in digital systems, applications and printing. Critical exploration of color visual language and aesthetic issues.

MTA 261 PRODUCTION DESIGN
S 3 cr. LEC 2 RCT 1
PREREQUISITE: Sophomore standing in MPVT.
- Introductory course in production design for theatre, film and video.

MTA 263 STAGE MAKEUP AND COSTUME DESIGN THEORY
S alternate years, to be offered 2006 3 cr. RCT 2 LAB 1
PREREQUISITE: MTA 104.
- Theory and practical experience in various aspects of makeup for stage, screen, and studio, integrated with basic costume design theory.

MTA 264 INTERMEDIATE BLACK AND WHITE PHOTOGRAPHY
F 3 cr. RCT 2 STU 2
PREREQUISITE: MTA 106 and MTA 260.
- Introduction to large format black and white theory and practice. Basic studio and lighting techniques will be addressed as well as advanced contrast control through application of the zone system and an eye toward future digital technologies.

MTA 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MTA 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1 cr. RCT may be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MTA 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

MTA 301 INVESTIGATIONS INTO PHOTOGRAPHY
F alternate years, to be offered 2007 3 cr. LEC 3.
PREREQUISITE: B or better in MTA 260 and sophomore standing in Photography option.
COREQUISITE: MTA 260.
- The critical exploration of photography as cultural phenomenon, personal expression and art form. Emphasis on aesthetic, ethical, and political issues raised through application of the medium and consumption of its products.
MTA 303 EARLY HISTORY OF PHOTOGRAPHY
S alternate years, to be offered 2008 5 cr. LEC 3
PREREQUISITE: MTA 103.
- The visual and technical evolution of photography within the cultural context. Personalities, ideas, and style of individual photographers are explored. Prehistoric to 1913.

MTA 304 RECENT HISTORY OF PHOTOGRAPHY
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MTA 103.
- Continued exploration of the visual and technical evolution of photography from 1913 to the present, including study of criticism and the relationship to contemporary culture and art.

MTA 318 WORLD CINEMA
S 3 cr. LEC 1 RCT 2
PREREQUISITE: Junior standing in MPVT Option curriculum (i.e., all freshman and sophomore MTA requirements are prerequisites).
- An advanced introduction to the theories which enable an understanding of the national cinemas practiced in light of, outside of, the influence of Hollywood. Focus on particular national cinemas varies by semester, but may include examinations of major European cinemas, Asian cinema, and/or the cinemas of the developing world.

MTA 319 NON-SILVER PHOTOGRAPHY
S 4 cr. RCT 2 STU 2
- Image creation through the use of historical contact printing processes. A variety of alternative processes will be addressed such as gum printing, cyanotype, and platinum/palladium. Extensive aesthetic exploration will be supported through a blend of the old processes and current digital negative making techniques.

MTA 333 ADVANCED PRODUCTION OPERATIONS AND TECHNIQUES
F, S, Su On Demand 4 cr. RCT 2-4. May be repeatable. Maximum 12 cr.
PREREQUISITE: Junior standing in MPVT.
- Projects pursued under faculty supervision, emphasizing an area of specialization in Theatre, Film or Video relating to professional practices. Details of individual sections and the supervising faculty will be posted by the department prior to pre-registration.

MTA 371 JUNIOR PRODUCTION PROCESS: NONFICTION
F, S 4 cr. LEC 1 RCT 2
PREREQUISITE: Junior standing in MPVT.
- Projects pursued under faculty supervision, emphasizing fiction production using traditional and non-traditional approaches from pre-production to post-production. Details of individual sections and the supervising faculty will be posted by the department prior to pre-registration.

MTA 372 JUNIOR PRODUCTION PROCESS: FICTION
F, S 4 cr. RCT 4
PREREQUISITE: Junior standing in MPVT.
- Projects pursued under faculty supervision, emphasizing fiction productions using traditional and non-traditional approaches from pre-production through post-production. Details of individual sections and the supervising faculty will be posted by the department prior to pre-registration.

MTA 374 JUNIOR PRODUCTION: THEATRE
F 4 cr. RCT 4
PREREQUISITE: Junior standing in MPVT.
- Projects pursued under faculty supervision, emphasizing the theatrical production processes. Specific emphasis may include acting, directing, management, technical theatre and/or theatrical design. Details of individual and the supervising faculty will be posted by the department prior to pre-registration.

MTA 377D WHITENESS AND MASCULINITY IN CINEMA
F alternate years, to be offered 2007 3 cr. LEC 1
PREREQUISITE: MTA 101 or MTA 318 or equivalent, or permission of instructor.
- This course uses the methodologies of whiteness and masculinity studies to interrogate how issues of identity are contested within the representational practices of the cinema.

MTA 378 COMPARATIVE CRITICAL APPROACHES TO FILM AND THEATRE
F alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: MTA 222, MTA 232, MTA 251, MTA 252, MTA 253, MTA 254, MTA 255, MTA 261
- An advanced exploration of critical methods for analyzing the intersections between film and theatre as art forms.

MTA 379 FILM CRITICISM
F 3 cr. LEC 1 RCT 2
- This course models an intelligent encounter with contemporary cinema. By attendance at, and discussion of, films in current release, students will learn to think, talk effectively, and write about the importance of movies in everyday life.

MTA 400 PRODUCTION SEMINAR
S 4 cr. RCT 2-4. Maximum 6 cr.
PREREQUISITE: Senior standing or permission of instructor and as determined for each offering.
- Topics offered at the upper division level that are not covered in regular courses. Students participate in preparing and presenting discussion material.

MTA 401 STUDIES SEMINAR
S to be offered 2007 1 - 4 cr. SEM.
PREREQUISITE: Senior standing or permission of instructor and as determined for each offering.
- Studies topics offered at the upper division level that are not covered in regular courses. Students participate in preparing and presenting discussion material.

MTA 470 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

MTA 472 MOTION PICTURE/TV/VIDEO/ THEATRE SENIOR PRODUCTION
F, S 2 cr. RCT 2 May be repeated Maximum 10 credits
PREREQUISITE: Senior standing in MPVT and facility supervision in small workshop groups.
COREQUISITE: MTA 474.
- Senior capstone course. A final series of television programming, video production projects, a stage production, or the production of a complete motion picture.

MTA 473 PHOTOGRAPHY SENIOR PRODUCTION
F, S 2 cr. RCT 2 May be repeated Maximum 4 credits
PREREQUISITE: Senior standing in the photography option.
COREQUISITE: MTA 475.
- Senior capstone course, Independent production of a significant body of work in photography, extensive production combined with group critique and faculty consultation.
MTA 474 INDEPENDENT MOTION PICTURE/TV/VIDEO/THEATRE SENIOR PRODUCTION
F, S 3 cr. IND 3
COREQUISITE: MTA 472.
- Independent production supporting MTA 472.

MTA 475 INDEPENDENT PHOTOGRAPHY SENIOR PRODUCTION
F, S 3 cr. IND 5 May be repeated. Maximum 6 credits.
COREQUISITE: MTA 473.
- Independent production work supporting MTA 473.

MTA 476 CAREER INTERNSHIP
F, S Su 2-12 cr. IND
PREREQUISITE: Consent of instructor.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

MTA 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Course arranged in a curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MTA 489R UNDERGRADUATE RESEARCH/CREATIVITY ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: MTA 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MTA 490R UNDERGRADUATE RESEARCH/CREATIVITY ACTIVITY
F, S, Su 1-6 cr. IND May be repeated. Max 12 cr.
PREREQUISITE: Senior standing in MINT.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MTA 504 FILM AND DOCUMENTARY THEORY
F 2 cr. LEC 2
- An advanced introduction to film and documentary theory with direct application to science filmmaking.

MTA 505 SURVEY OF SCIENCE AND NATURAL HISTORY FILMMAKING
F 3 cr. LEC 3
- A close analysis and interpretation of the social function and cultural value of science and natural history films, with a particular emphasis for broadcast nationally and internationally.

MTA 550 SCIENCE/NATURAL HISTORY ROTATION
F 1 cr. LAB 1
- On-site learning with scientist(s). This prepares students for area of project proposal.

MTA 551 PRODUCTION TECHNIQUE III
F 2 cr. LEC 2
PREREQUISITE: MTA 510, MTA 511.
- Production Technique III teaches advanced production techniques used by professional science and natural history filmmakers in high definition digital imaging, 16mm cinematography, location and studio sound recording techniques, and advanced post-production procedures.

MTA 552 ADVANCED PRODUCTION I
F 2 cr. LEC 2
COREQUISITE: MTA 510, MTA 551.
- On-site learning with scientist(s). This prepares students for area of project proposal.

MTA 553 ADVANCED PRODUCTION II
F 2 cr. LEC 2
COREQUISITE: MTA 510, MTA 551.
- Production and post-production of the second year agenda-based professional project sponsored by a hosting agency that finds significant usage. Proposals and treatments are to be polished and refined so that dialogue with broadcasters and hosting agencies can be effectively initiated and funded fully secured. With approval of advisor and graduate committee, production sequence may begin.

MTA 555 ADVANCED PRODUCTION II
F 4 cr. LEC 4
COREQUISITE: MTA 510, MTA 511, MTA 515, MTA 516, MTA 517, MTA 552.
- Production and post-production of the second year agenda-based professional project that finds significant usage. Production and/or post production work is to be completed and deliverables presented to the hosting agency. Selects and all cuts are to be screened and critiqued by the hosting agency and the advisor and graduate committee. The post production phase concludes with the completion of the second year project and the presentation of deliverables to the hosting agency and/or broadcast and distribution venues.

MTA 554 PRODUCTION PRACTICUM: POST-PRODUCTION
F 2 cr. IND 2
PREREQUISITE: MTA 550 and MTA 552.
- A committee directed course in which the students begin the post-production phase and concludes with the completion of their second year project.

MTA 555 ADVANCED PRODUCTION PRACTICUM: PRE-PRODUCTION
F 2 cr. IND 2
PREREQUISITE: MTA 551.
- The rotation proposal workshop makes students formalize their second year projects. This course initiates dialogues and proposals with broadcasters and hosting agencies.

MTA 556 PRODUCTION PRACTICUM: POST-PRODUCTION
F 2 cr. IND 2
PREREQUISITE: MTA 551 and MTA 552.
- An introduction to working professionals and faculty that examines successful filmmaking methodologies. May include presentations, seminars or conferences designed to explore specific actual production scenarios on a variety of documentary subjects including producing, directing, cinematography, sound, editing, grant writing, distribution and funding.

MTA 557 PRODUCTION METHODS & STUDIES II
S 2 cr. LEC 2
PREREQUISITE: MTA 510, MTA 511, MTA 512, MTA 515, MTA 516, MTA 517.
- Production Methods & Studies II teaches advanced post-production procedures.

MTA 558 INTRODUCTION TO CINEMATOGRAPHY WORKSHOP
Su 1 cr. LAB 1
PREREQUISITE: MTA 501, MTA 510, MTA 511, MTA 515, MTA 516, MTA 517.
- Instruction and practical application of the use of high-definition camera in order to qualify for use in the MFA program in science and natural history filmmaking.

MTA 559 INTRODUCTION TO CINEMATOGRAPHY WORKSHOP
F 1 cr. IND 1
PREREQUISITE: MTA 551.
- On-site learning with scientist(s). This prepares students for area of project proposal.

MTA 560 ADVANCED PRODUCTION I
F 4 cr. LEC 4
COREQUISITE: MTA 551.
- Production and post-production of the second year agenda-based professional project sponsored by a hosting agency that finds significant usage. Proposals and treatments are to be polished and refined so that dialogue with broadcasters and hosting agencies can be effectively initiated and funded fully secured. With approval of advisor and graduate committee, production sequence may begin.
MTA 558 PRODUCTION PRACTICUM: POST-PRODUCTION
S, 3 cr. IND 3
PREREQUISITE: MTA 550 and 552.
- A committee directed course in which the students begin the post-production phase and concludes with the completion of their second year project.

MTA 570 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 3 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

MTA 572 ADVANCED PRODUCTION
F, S 1 cr. LAB 1
PREREQUISITE: MTA 510, 511, 512, 515, 516, 517.
COREQUISITE: MTA 552 or 553.
- Proposals and treatments are distributed to project advisor and to the graduate committee by the first day of fall semester for workshop review and critique. Pre-production, production, post-production schedule milestones must be determined in consultation with advisor and graduate committee who provide oversight for the entire second year project production sequence. Due to the varying nature and unique demand of each project, those unable to meet the preferred residency requirements may request a regular course number.

MTA 576 INTERNSHIP
F, S, Su 1-12 cr. IND 1-12
PREREQUISITE: MTA 510, 511, 512, 515, 516, 517.
- This course allows the student to spend a semester working in a professional environment under the guidance of mentor.

MTA 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular time need, or given on a triad basis to determine acceptability and demand before requesting a regular course number.

MTA 589 GRADUATE CONSULTATION
F, S, Su 3 cr. IND 3
PREREQUISITE: Master's standing and approval of Dean of Graduate Education.
- This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

MTA 590 MASTER'S THESIS
F, S, Su 1-15 cr. IND 1-15
PREREQUISITE: Master's standing/Restricted Entry.
- Course replaces MTA 591, 592, and 593. Maximum of 8 credits per semester.

MOR
Museum of the Rockies
(406) 994-2251

MOR 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT May be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MOR 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-15 cr. IND may be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

MOR 301 INTRODUCTION TO MUSEUM PRACTICES
F 3 cr. LEC 3
PREREQUISITE: Junior standing or permission of instructor.
- Team taught by Museum of the Rockies staff, the course will introduce students to the museum profession with emphasis on collections and exhibitions. Topics covered include museum missions, object-based learning, collecting theory, curatorial research, managing collections, and developing exhibitions.

MOR 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: MOR 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MOR 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

MUED
Music Education
Department of Music
(406) 994-3562

MUED 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

MUED 504 STUDIES IN HISTORY AND ANALYSIS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MUS 206, MUS 310, MUS 311.
- Review and study of the history of music, with an emphasis on specific works. Review and practice of analytical and theoretical procedures and concepts in a variety of musical genres and styles.

MUED 515 CONTEMPORARY DIRECTIONS IN MUSIC
Su On Demand 2 cr. LEC 2
PREREQUISITE: MUS 311.
- In-depth investigation of musical styles prevalent in western music between 1975-present.

MUED 519 WORLD MUSIC
F, S On Demand 2 cr. LEC 2
PREREQUISITE: MUS 311.
- Approaches to and use of music in world cultures. The influence of world music on Western music.

MUED 520 MONTANA CHAMBER MUSIC WORKSHOP
Su 2 cr. LAB 2
PREREQUISITE: MUS 290, MUS 356 and consent of instructor.
- Students investigate the wealth of chamber music literature that includes their own instrument in various instrumental combinations, through coached playing assignments and in performance forums.

MUED 530 MUSIC, SOCIETY AND EDUCATION
Su alternate years, to be offered 2008 5 cr. LEC 3
PREREQUISITE: EDEL 410, EDSD 410
- Philosophical, historical, psychological and social foundations of music education. Music in public education, music curricula, aesthetics, and music learning theory.

MUED 532 MUSIC EDUCATION: RESEARCH AND PRACTICE
Su alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: EDEL 410, EDSD 410
- Examination and close study of research in music education and its implications for practice.

MUED 535 TEACHING MUSIC LITERACY
Su On Demand 2 cr. LEC 2
PREREQUISITE: EDEL 357.
- Analysis of the foundations of music literacy, contemporary trends in music reading and writing instruction and research related to these issues.

MUED 540 ADVANCED CONDUCTING
Su On Demand 2 cr. LEC 2
PREREQUISITE: MUS 357 or MUS 358.
- Conducting techniques, score study and rehearsal procedures for direction of instrumental and choral groups in the public schools.

MUED 542 GRADUATE VOCAL PEDAGOGY
S alternate years, 2 cr. SEM 2
PREREQUISITE: MUS 442.
COREQUISITE: Must be an active music educator.
- Online/Seminar delivery centers around classroom application of vocal methodologies in the studio and classroom. Course content will include the study of vocal physiology and acoustics.

MUED 560 APPLIED MUSIC
F, S, Su 1 cr. STU 1 May be repeated; Maximum 3 cr.
PREREQUISITE: MUS 460 and consent of instructor.
- Advanced studies of techniques of performance and interpretation to develop musical ability, expression, accuracy and stylistic awareness in student's performance area.

MUED 565 GRADUATE RECITAL
F, S, Su 1 cr. IND 1
PREREQUISITE: MUED 560.
- Formal recital to include works from different eras.
MUED 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of Department Head and Dean of Graduate Education.
— Directed research and study on an individual basis.

MUED 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
— A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

MUED 576 INternship
On Demand 2 - 12 cr. IND Maximum credits unlimited
PREREQUISITE: Graduate standing, consent of instructor and Department Head.
— An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

MUED 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
— Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MUED 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 3 cr. May be repeated; maximum 3 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
— Courses offered on a one-time basis to fulfill professional development needs of in service educators.
A specific focus is given to each course which is appropriately subtitled.

MUS Music
Department of Music
(406) 994-3562

MUS 102RA FUNDAMENTALS OF MUSICAL CREATION
F, S 3 cr. LEC 1 RCT 1 LAB 1
— Open to all students. Study of the elements of music and their combination in musical creation.
Activities include the acquisition of keyboard skills, exploration of traditional harmonic theory and exercises in music reading, analysis, and composition.

MUS 103 AURAL SKILLS I
F 1 cr. LAB 1
PREREQUISITE: Music reading pre-test.
COREQUISITE: MUS 105.
— Studies in ear training and sight-singing to develop aural perception of tonal and temporal relationships. Primarily for students with planned concentration in music. Assumes knowledge of musical notation.

MUS 104 AURAL SKILLS II
S 1 cr. LAB 1
PREREQUISITE: MUS 103.
— Continuation of studies in ear training and sight-singing to develop aural perception of tonal and temporal relationships. Primarily for students with planned concentration in music.

MUS 105 MUSIC THEORY I
F 3 cr. LEC 3
PREREQUISITE: Music fundamentals pre-test.
COREQUISITE: MUS 103.
— Music fundamentals, diatonic harmony and elementary counterpoint. Successful completion of Music Fundamentals Pre-test (administered during the first class meeting and covering scales, rhythm/meter, clefs, and key signatures) required for enrollment in this course.

MUS 106 MUSIC THEORY II
S 3 cr. LEC 3
PREREQUISITE: MUS 105.
— Continuation of study of materials used in the previous semester: diatonic harmony and analysis in the common practice style, musical notation and language, function and interaction of the elements of music.

MUS 120 MARCHING BAND
F 1 cr. LAB 1 May be repeated, Maximum 8 cr.
— Non-auditioned ensemble offering experience in marching techniques and a variety of ensembles for outdoor performances.

MUS 125 UNIVERSITY CHORUS
F, S 1 cr. LAB 1 May be repeated, Maximum 8 cr.
— Non-auditioned choir performing a variety of contemporary repertoire.

MUS 130 TECHNIQUES: FLUTE & CLARINET
F 1 cr. LAB 1
— Teaching techniques, materials and basic playing approaches for flute and clarinet. For music education students.

MUS 131 TECHNIQUES: SAX, OBOE & BASSOON
S 1 cr. LAB 1
— Teaching techniques, materials, and basic playing approaches for saxophone, oboe, and bassoon. For music education students.

MUS 132 TECHNIQUES: TRUMPET & FRENCH HORN
S 1 cr. LAB 1
— Teaching techniques, materials, and basic playing approaches for trumpet and French horn. For music education students.

MUS 133 TECHNIQUES: TROMBONE, EUPHONIUM & Tuba
S 1 cr. LAB 1
— Teaching techniques, materials, and basic playing approaches for trombone, euphonium, and tuba. For music education students.

MUS 134 TECHNIQUES: PERCUSSION
S 1 cr. LAB 1
— Teaching techniques, materials, and basic playing approaches for percussion. For music education students.

MUS 135 TECHNIQUES: STRINGS
F 1 cr. LAB 1
— Teaching techniques, materials, and basic playing approaches for strings. For music education students.

MUS 141 UNIVERSITY BAND
F, S 1 cr. LAB 1 May be repeated, maximum 8 cr.
— Study and performance of traditional and contemporary repertoire for wind and percussion in a large ensemble format. Open to all students with high school instrumental music experience.

MUS 150 KEYBOARD SKILLS I
F 1 cr. LAB 1
PREREQUISITE: Placement audition and music major.
— Study of keyboard theory and technique, creative activities, sight reading, and piano repertoire. For music majors.

MUS 151 KEYBOARD SKILLS II
S 1 cr. LAB 1
PREREQUISITE: MUS 150 or placement audition and music major.
— Continued study of keyboard theory and technique, creative activities, sight reading, and piano repertoire. For music majors.

MUS 153 GUITAR IN CLASS I
F, S 1 cr. LAB 1
PREREQUISITE: Placement audition.
— Basic instruction in techniques of chord and classical guitar, music reading, and performance.

MUS 154 GUITAR IN CLASS II
S 1 cr. LAB 1
PREREQUISITE: MUS 153 or placement audition.
— Continued of MUS 153.

MUS 156 VOCAL IN CLASS
F 1 cr. LAB 1 May be repeated, Maximum 2 cr.
— Basic singing technique: tone production, interpretation; introduction to song literature.

MUS 160 APPLIED MUSIC I
F, S, Su 1 cr. STU 1 May be repeated, Maximum 3 cr.
PREREQUISITE: Successful audition.
— Techniques of performance and interpretation to develop musical ability; expression, accuracy, and stylistic awareness in student’s performance area.

MUS 205 AURAL SKILLS III
F 1 cr. LAB 1
PREREQUISITE: MUS 104.
— Continued development of aural and vocal skills that deal with tonal and temporal relationships.

MUS 204 AURAL SKILLS IV
S 1 cr. LAB 1
PREREQUISITE: MUS 203.
— Continued development of aural and vocal skills that deal with tonal and temporal relationships.

MUS 205 MUSIC THEORY III
F 3 cr. LEC 3
PREREQUISITE: MUS 106.
— Study and use of chromatic harmony and counterpoint in the common practice period. Analysis of small forms.

MUS 206 MUSIC THEORY IV
S 3 cr. LEC 3
PREREQUISITE: MUS 205.
— Analysis and use of homophonic forms and 20th Century techniques.

MUS 210A MASTERWORKS IN MUSIC
F, S 3 cr. LEC 3
— Presentation of examples of great music literature to develop informed, perceptive listening and musical understanding.
MUS 212IA AMERICAN POPULAR MUSIC: REFLECTIONS OF POLITICS & SOCIETY
F, S 3 cr. LEC 3
- A study of the way in which American popular music is a product of the social, political, and historical context in which it developed, and in turn how this context was shaped by this music.

MUS 214IA JAZZ LITERATURE
S 3 cr. LEC 3
- Important literature from American jazz, with an emphasis on a detailed study of styles that have developed new directions in music and shaped America's culture.

MUS 220 INTRODUCTION TO COMPUTER APPLICATIONS AND RECORDING
F, S, So 2 cr. LEC 1 LAB 1
- Introduction to audio recording, including mixing, editing, and microphone placement; instruction in the use of recording and music notation software programs.

MUS 221 RECORDING I
F 3 cr. LEC 2 LAB 1
- Introduction to, and exploration of, technologies and concepts used to create, record, edit, format, manufacture, reinforce, and reproduce audio. Combination of lecture and hands-on learning.

MUS 222 RECORDING II
S 3 cr. LEC 2 LAB 1
- Continuation of the study of the technologies and concepts used to create, record, edit, format, manufacture, reinforce, and reproduce audio. This course builds on the material presented in Recording I, and incorporates both lecture and hands-on learning.

MUS 224 JAZZ ENSEMBLE
F, S 1 cr. LAB 1 May be repeated. Maximum 8 cr.
PREREQUISITE: Successful audition.
- Ensemble experience performing musical styles that include swing, jazz, commercial, and popular music. Open to all students with high school instrumental music experience.

MUS 235 DICTION: ENGLISH-LATIN
S 2 cr. LEC 2
PREREQUISITE: One of the following: MUS 156 or MUS 160 (voice) is recommended.
- Correct pronunciation of English and Latin for singers using the International Phonetic Alphabet.

MUS 240IA MUSIC & SOCIETY
S 3 cr. LEC 3
- An investigation into the relationship between composers, and the cultural, political, and social influences that impacted their creative work. Various composers and significant musical works representing diverse style periods, cultures, and historical backgrounds will be discussed in depth. Students will be required to present a final paper discussing the work of a specific composer of their choice, incorporating the above criteria. Restricted entry. Priority to University Honors students.

MUS 249 ADVANCED KEYBOARD SKILLS: REPertoire
F 1 cr. LAB 1
PREREQUISITE: MUS 151 OR placement audition and music major.
- Continuation of the study of keyboard theory and technique, sight reading, and piano repertoire. For non-keyboard music majors.

MUS 250 ADVANCED KEYBOARD SKILLS: ACCOMPANYING
F 1 cr. LAB 1
PREREQUISITE: MUS 151 or placement audition and music major.
- Continuation of the study of keyboard theory and technique, ensemble playing, sight reading, and piano accompanying. For non-keyboard music majors.

MUS 251 ADVANCED KEYBOARD SKILLS:
OPEN SCORE READING
S 1 cr. LAB 1
PREREQUISITE: MUS 151 or placement audition and music major.
- Continuation of the study of keyboard theory and technique, sight reading, and keyboard realization of choral and instrumental ensemble scores. For music majors.

MUS 252 ADVANCED KEYBOARD SKILLS: JAZZ
S 1 cr. LAB 1
PREREQUISITE: MUS 151 or placement audition and music major.
- Continuation of the study of keyboard theory and technique, creative activities, sight reading, improvisation, and performance of jazz. For music majors.

MUS 253 GUITAR IN CLASS III
F 1 cr. LAB 1
PREREQUISITE: MUS 154.
- Continued instruction in techniques of chord and classical guitar, music reading, and performance.

MUS 254 GUITAR IN CLASS IV
S 1 cr. LAB 1
PREREQUISITE: MUS 253.
- Continued instruction in techniques of chord and classical guitar, music reading, and performance.

MUS 260 APPLIED MUSIC II
F, S, So 1 cr. STU 1 May be repeated, maximum 8 cr.
PREREQUISITE: MUS 160 and successful audition.
- Continued instruction in techniques of performance and interpretation to develop musical ability, expression, accuracy, and stylistic awareness in student's performance area.

MUS 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand.

MUS 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MUS 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

MUS 303 INSTRUMENTATION
F 3 cr. LEC 1 LAB 1
PREREQUISITE: MUS 206.
- Training in scoring principles for instrumental ensembles with emphasis on arranging and adapting music for public school programs.

MUS 310 MUSIC HISTORY:
ANTiquITY THROUGH BAROQUE
F 3 cr. LEC 3
PREREQUISITE: MUS 106.
- Music as it relates to other arts and humanities from an historical and stylistic perspective. From Antiquity through the Baroque era.

MUS 311 MUSIC HISTORY:
CLASSICAL THROUGH 20TH CENTURY
S 3 cr. LEC 3
PREREQUISITE: MUS 106.
- Music as it relates to other arts and humanities from an historical and stylistic perspective. From the Classical era through the 20th Century.

MUS 312IA WORLD MUSIC
F, S 3 cr. LEC 3
PREREQUISITE: Junior standing.
- Approaches to, and use of, music in world cultures. Impact of world music on the western art music tradition.

MUS 322 PERCUSSION ENSEMBLE
F, S 1 cr. LAB 1 May be repeated, maximum 8 cr.
PREREQUISITE: Successful audition.
- Advanced ensemble performance experience focusing primarily on music written for percussion during the 20th Century.

MUS 324 STUDIO JAZZ LAB
F, S 1 cr. LAB 1 May be repeated, maximum 8 cr.
PREREQUISITE: Successful audition.
- Advanced performance training in jazz literature from all style periods, guided improvisational experience.

MUS 325 UNIVERSITY ORCHESTRA
F, S 1 cr. LAB 1 May be repeated, maximum 8 cr.
PREREQUISITE: Successful audition.
- Advanced training in the performance repertoire for orchestra.

MUS 326 CHORALE
F, S 1 cr. LAB 1 May be repeated, maximum 8 cr.
PREREQUISITE: Successful audition.
- Advanced choral performance.

MUS 330 OPERA WORKSHOP
F, S 1 cr. LAB 1
PREREQUISITE: Successful audition.
- Advanced training in the performance repertoire of opera and musical theater repertoire.

MUS 335 DICTION & REPERTOIRE:
ITALIAN & GERMAN
F alternate years, to be offered 2007 2 cr. LEC 2
PREREQUISITE: MUS 235.
- Correct pronunciation of Italian and German for singers using the International Phonetic Alphabet. Study of standard art song and operatic repertoire in Italian and German.

MUS 336 DICTION & REPERTOIRE:
FRENCH
S alternate years, to be offered 2008 2 cr. LEC 2
PREREQUISITE: MUS 235.
- Correct pronunciation of French for singers using the International Phonetic Alphabet. Study of standard art song and operatic repertoire in French.

MUS 337 INSTRUMENTAL
CONDUCTING & REHEARSAL TECHNIQUES
F 2 cr. LEC 1 RCT 1
PREREQUISITE: MUS 204, MUS 206.
- Basic conducting and instrumental rehearsal techniques, instrumental score study, laboratory experiences.
MUS 338 CHORAL CONDUCTING & REHEARSAL TECHNIQUES
S 3 cr. LEC 1 RCT 1
PREREQUISITE: MUS 337.
- Basic conducting and choral rehearsal techniques, choral score study, laboratory experiences.

MUS 340 MARCHING BAND TECHNIQUES
On Demand 2 cr. LEC 2
PREREQUISITE: MUS 206.
COREQUISITE: MUS 120.
- Organization, administration, and creative skills necessary for directing a successful public school marching band.

MUS 351 ACCOMPANYING
F alternate years, to be offered 2008 2 cr. RCT 2
PREREQUISITE: MUS 260.
- Study of repertoire and principles of accompanying in all style periods. Laboratory experiences include accompanying instrumentalists and vocalists.

MUS 352 IMPROVISATION I
F alternate years, to be offered 2007 2 cr. LEC 1 LAB 1
PREREQUISITE: MUS 105 and MUS 260 or successful audition.
- Improvisational basics for experienced instrumentalists and vocalists, improvement of aural perception, techniques of teaching improvisation and utilizing it at various levels of technical proficiency, enhancing other approaches to music education.

MUS 353 IMPROVISATION II
S alternate years, to be offered 2008 2 cr. LEC 1 LAB 1
PREREQUISITE: MUS 352.
- Application of the techniques learned in Improvisation I, continuation of improvisational and creative experiences.

MUS 354 ENSEMBLE
F, S 1 cr. LAB 1 May be repeated; Maximum 8 cr.
PREREQUISITE: Successful audition.
- Selected students perform in small, coached instrumental and vocal ensemble performance.

MUS 356 CHAMBER MUSIC ENSEMBLE
F, S 1 cr. LAB 1 May be repeated; maximum 8 cr.
COREQUISITE: MUS 160, MUS 260, MUS 360, MUS 460, or MUED 560; or successful audition.
- Students perform in small, coached instrumental and vocal chamber music ensembles. Students study and perform chamber music repertoire composed between 1650 and the present.

MUS 358 PARKENING OBSERVATION
Su 1 cr. IND 1 Maximum 4 cr.
PREREQUISITE: MUS 160.
- Guided observation and critique of Parkening Master Class.

MUS 360 APPLIED MUSIC III
F, S 1 cr. STU 1 May be repeated, Maximum 3 cr.
PREREQUISITE: MUS 260 and successful audition.
- Continued study of techniques of performance and interpretation to develop musical ability, expression, accuracy, and stylistic awareness in student’s performance area.

MUS 400 SEMINAR
F, S, Su On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

MUS 405R SENIOR PROJECT
F 3 cr. LEC 2, SEM 1
PREREQUISITE: MUS 206, MUS 310 AND 311
- Senior capstone course. Synthesis of historical, stylistic, and theoretical concepts and performance. Analysis and study of exemplary compositions. Public performance or other presentation and research paper based on an important work.

MUS 406 COMPOSITION
F, S, Su On Demand 1 - 3 cr. TUT 1 IND 1 - 2 May be repeated; maximum 6 cr.
PREREQUISITE: MUS 106.
- Individual study of compositional practices in any musical idiom, compositional processes and techniques, and aesthetic concepts applicable to the idiom of writing or creation of music.

MUS 407 COUNTERPOINT
S alternate years, to be offered 2000 5 cr. LEC 3
PREREQUISITE: MUS 206.
- Study and practice of the techniques of writing two- and three-voice counterpoint. 16th, 18th, and 20th-Century styles.

MUS 408 ANALYSIS
S alternate years, to be offered 2000 5 cr. LEC 3
PREREQUISITE: MUS 206.
- Advanced analysis and in depth study of selected and representative works from specific categories, such as chamber, orchestral, vocal, or choral music.

MUS 420 WIND ENSEMBLE
F, S 1 cr. LAB 1 Maximum 8 cr.
PREREQUISITE: Successful audition.
- Study and performance of advanced, traditional, and contemporary wind band repertoire.

MUS 426 MONTANANS
F, S 1 cr. LAB 1 Maximum 8 cr.
PREREQUISITE: MUS 105 or MUS 312 and consent of instructor.
- Balinese gamelan orchestra rehearsal and performance using authentic instruments. Both traditional music for the angklung gamelan as well as newer directions in music will be addressed. Traditional role learning and musical notation will be used.

MUS 428 GAMBELON
F, S 1 cr. LAB 1
PREREQUISITE: MUS 105 or MUS 312 and consent of instructor.
- Advanced performance in small vocal ensemble using stylistic variety in programming.

MUS 429 GAMBELON
F, S 1 cr. LAB 1
PREREQUISITE: MUS 105 or MUS 312 and consent of instructor.
- Advanced performance in small vocal ensemble using stylistic variety in programming.

MUS 437 INSTRUMENTAL FIELD EXPERIENCE
S 1 cr. LEC 1
COREQUISITE: MUS 446.
- A field experience in secondary (grades 5-12) instrumental music situations prior to student teaching. Observations, interviews, and brief teaching experiences with music ensembles at the secondary level.

MUS 439 CHORAL FIELD EXPERIENCE
F 1 cr. LAB 1
COREQUISITE: MUS 449.
- A field experience in secondary (grades 5-12) choral music situations prior to student teaching. Observations, interviews, and brief teaching experiences with music ensembles at the secondary level.

MUS 440 INSTRUMENTAL PEDAGOGY & LITERATURE
F, S and On Demand 2 cr. LEC 1 IND 1
PREREQUISITE: Junior standing, MUS 260.
- Pedagogical techniques and relevant studies, solo, and ensemble literature in the student’s major applied area. Evaluation of literature and progression of a young player. Required observation of experienced private lesson teachers.

MUS 442 VOCAL PEDAGOGY & LITERATURE
S 2 cr. LEC 1 LAB 1
PREREQUISITE: Junior standing, and one of the following: MUS 156 or MUS 260 and MUS 250.
- Vocal pedagogy, teaching techniques, and literature.

MUS 443 PIANO PEDAGOGY
F alternate years, to be offered 2007 2 cr. LEC 2
PREREQUISITE: Junior standing and MUS 260.
- Study of studio and class piano teaching techniques, beginning piano methods, beginning keyboard literature and materials needed for studio/class piano teaching. Observations and supervised teaching experiences are included.

MUS 444 PIANO LITERATURE
S alternate years, to be offered 2008 2 cr. LEC 1 LAB 1
PREREQUISITE: MUS 443.
- Study of historical keyboard instruments and literature from the 1600s to the present.

MUS 445 EXPERIENCE STUDIO TEACHING
F, S 2 cr. IND 2 May be repeated, Maximum 4 cr.
PREREQUISITE: Senior standing and one of the following: MUS 440, MUS 424, MUS 444.
- Supervised teaching in student’s performance area.

MUS 446 INSTRUMENTAL METHODS & LITERATURE
F 3 cr. LEC 3
PREREQUISITE: MUS 357, MUS 260, MUS 251.
COREQUISITE: MUS 437.
- Rehearsal techniques, materials, literature, strategies for classroom management and the administration of the instrumental program for the middle school band and orchestra teacher.

MUS 449 CHORAL METHODS & LITERATURE
F 3 cr. LEC 3
PREREQUISITE: MUS 358, MUS 260, MUS 251.
COREQUISITE: MUS 439.
- Rehearsal techniques, materials, literature, strategies for classroom management and the administration of the choral program for the middle school and high school choral instructor.

MUS 450 RECITAL
F, S, Su 1 cr. IND 1
COREQUISITE: MUS 360 or MUS 460.
- Selection of appropriate program of works suited to student’s abilities, preparation for performance.

MUS 458 GUITAR MASTER CLASS
Su and On Demand 1 cr. IND 1
PREREQUISITE: MUS 260 (Guitar).
- Pedagogical and performance techniques in classical guitar.

MUS 460 APPLIED MUSIC IV
F, S, Su 1 cr. STU 1 May be repeated; maximum 3 cr.
PREREQUISITE: MUS 360 and successful audition.
- Continued study of techniques of performance and interpretation to develop musical ability, expressivity, accuracy, and stylistic awareness in student’s performance area.
MUS 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

MUS 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

MUS 480R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: MUS 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

MUS 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

Nursing
College of Nursing
(406) 994-3783

N 115 NURSING AS A PROFESSION
F, S, Su 2 cr. LEC 2
- The purpose of this course is to initiate and foster the professional socialization process. Content and activities expose students to issues surrounding the nursing profession, multiple roles of nursing in society and health care, and concepts related to the dimensions of nursing practice: nurse, client, health and environment.

N 200 SEMINAR
F, S 1 - 4 cr. SEM Maximum 12 credits
PREREQUISITE: As determined for each offering.
- Topics offered at the lower division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

N 223 FOUNDATIONS FOR PLANNING AND PROVIDING CLINICAL NURSING CARE
F, S, Su 4 cr. LEC 2 LAB 2
PREREQUISITE: BIOL 207, BIOL 208, HDCF 150, and MB 201.
- Application of nursing principles, concepts and related skills for care of the individual needing assistance. The clinical decision-making process will be utilized in the provision of nursing care in clinical settings.

N 224 PATHOPHYSIOLOGY
F, S, Su 3 cr. LEC 3
PREREQUISITE: BIOL 207 and BIOL 208, BCHM 122 and CHEM 121.
- This course provides an introduction to the abnormal functioning of human cells, tissues, and organ systems, and the physiological adaptations that occur. Commonly encountered age-related variations will be addressed. The influences of environment, genetics, nutrition, and culture will be emphasized. Current research that explains the changes that accompany a particular syndrome or disease will be considered.

N 250 HEALTH ASSESSMENT ACROSS THE LIFE SPAN
F, S, Su 4 cr. LEC 2 LAB 2
PREREQUISITE: BIOL 207, BIOL 208, and N 223.
COREQUISITE: N 223.
- This course is designed to teach the student a health oriented approach to nursing assessment of clients across the life span in a variety of community based settings. The primary focus of the course is on normal health assessment findings, with recognition of abnormal variations. This course emphasizes development of the skills needed to perform a comprehensive health assessment of children, adults, and the elderly. Data collection through comprehensive history taking and physical assessment is emphasized. Utilizations of assessment findings in clinical decision making is discussed throughout the course.

N 270 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Directed research and study on individual basis.

N 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

N 280R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT May be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

N 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND May be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

N 300 CAREER ANALYSIS AND DEVELOPMENT
F, S, Su 1 cr. SEM 1 May repeat; maximum, 2 credits
PREREQUISITE: RN status or graduate of a professional nursing program and holds a temporary work permit from the Montana State Board of Nursing.
- Focus of this course is to assist the RN/BSN student in developing an understanding of baccalaureate nursing education and in establishing professional career goals. The student will create an individualized plan of study based on previous learning and experience.

N 315 CONCEPTUAL FOUNDATIONS FOR BACCALAUREATE NURSING
F, S, Su 4 cr. LEC 1-3 LAB 1 - Variable 2-4; to be determined in consultation with and approval of the RN's academic advisor.
PREREQUISITE: RN status or graduate of a professional nursing program and holds a temporary work permit from the Montana State Board of Nursing.
- Examination/application of theories/concepts relevant to nursing practice and health care delivery. Integrates developmental, cultural, and rural issues. Emphasis on nursing as a profession including communication, nursing process, and teaching learning skills as basis for problem solving/decision making.

N 357 NURSING PHARMACOTHERAPEUTICS
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: CHEM 121, BCHM 122, HDFN 221, N 224 and N 290.
- This course focuses on selected psychosocial concepts and theories basic to nursing practice with clients in a variety of settings. Topics include family therapy, palliative care, crisis theory, anxiety, loss, grief and other human responses; and related psychosocial nursing strategies.

N 342 PSYCHOSOCIAL NURSING CONCEPTS
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: PSY 100, SOC 101, N 115, N 220, N 223, N 224 and N 290.
- This course focuses on selected psychosocial concepts and theories basic to nursing practice with clients in a variety of settings. Topics include family therapy, palliative care, crisis theory, anxiety, loss, grief and other human responses; and related psychosocial nursing strategies.

N 345 CARE MANAGEMENT I
F, S 2 cr. LEC 1 RCT/DIS 1
PREREQUISITE: N 354, N 348 or N 340.
COREQUISITE: N 354, N 348 or N 340.
- This course focuses on care management and application of ethical legal concepts. The student is introduced to the nurse's role in care management. Care management is defined as a service for clients which includes screening, assessment, care planning, arranging for service, monitoring, reassessment, evaluation and discharge planning.

N 348 NURSING CARE OF CHILDBEARING FAMILY
F, S 3 cr. LEC 2 LAB 3
PREREQUISITE: N 342, N 354 and N 377.
- Nursing care of childbearing women, neonates and their families in a variety of settings. Normal pregnancy and childbirth will be addressed, as well as the identification and management of high risk childbirth situations. Selected healthcare of women content is included.
COURSE DESCRIPTIONS: N 349 - N 502

N 349 NURSING CARE OF CHILDREN AND FAMILIES
F, S 5 cr. LEC 2 LAB 3
PREREQUISITE: N 224, N 337 and N 342.
- The focus of this course is health promotion, disease prevention, illness management and nursing care of children within the family context in a variety of settings. This course builds upon and integrates knowledge gained from nursing, sciences and the humanities.

N 354 ACUTE AND CHRONIC ILLNESS
F, S 5 cr. LEC 2 LAB 3
PREREQUISITE: N 223, N 224 and N 299.
COREQUISITE: N 357.
- The focus of this course is application of theoretical and empirical knowledge to nursing care for clients across the adult lifespan with acute and chronic illness in a variety of settings. Health promotion, disease prevention, and symptom management are emphasized. This course builds upon and integrates knowledge gained from nursing, sciences and the humanities.

N 377 INTRODUCTION TO COMMUNITY-BASED NURSING
F, S 2 cr. LEC 2
- The focus of this course is to introduce the student to community-based nursing practice for individuals, families, populations and communities. There is an emphasis on health promotion, disease prevention and health determinants in a variety of settings.

N 388 INTRODUCTION TO RESEARCH IN NURSING AND HEALTH
F, S 2 cr. LEC 2
PREREQUISITE: STAT 216 and junior status or RN status or consent of instructor.
- This course introduces students to the research process. It is designed to assist the student in developing knowledge, skills, and values necessary to be an informed consumer of nursing and health-related research. Critical questions about nursing practice are formulated, and researchable problems are identified. Students are taught to critically examine research studies, and to consider the applicability of findings to clinical practice.

N 400 SEMINAR
F, S 1 - 4 cr. SEM Maximum 12 credits
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper division level which are not covered in regular courses. Students help prepare and present discussion material.

N 415 SUMMER INTERNSHIP
Su 5 cr. LAB 3
PREREQUISITE: Satisfactory completion of all junior level clinical courses. Placement subject to availability.
- This elective course is designed to increase competence and confidence in previously learned clinical skills. The student works with a registered nurse (RN) in a cooperating clinical agency for a period of intensified clinical experience.

N 418 ISSUES IN HEALTH POLICY AND HEALTH CARE ECONOMICS
F, S 2 cr. LEC 1 SEM 1
- Focus is on economics, public policy and political factors which affect the delivery of health and nursing care at the local, state, national and international levels. Students are encouraged to participate in efforts to influence health policy.

N 425 ADVANCED CLINICAL NURSING: CARDIOVASCULAR SYSTEM
F, S 3 cr. LEC 2 LAB 1
PREREQUISITE: RN status
- This course is designed to provide exposure to advanced theoretical and clinical experiences for the registered nurse working with cardiac patients. Content focuses on three distinct areas: diagnosis of cardiac disease, medical and surgical interventions, and recovery.

N 435 SPIRITUALITY IN NURSING
F, S 2 cr. RCT/DIS 2
PREREQUISITE: PSY 100 and N 115 or consent of instructor.
- This course explores aspects of spirituality and the use of spiritually-based therapies in healthcare from various faith traditions. Spiritual assessment and spiritually-based strategies to promote health and wellness are emphasized. Although a multidisciplinary approach to spiritual care is presented, a nursing perspective is highlighted.

N 437 PSYCHIATRIC NURSING
F, S 6 cr. LEC 3 LAB 3
PREREQUISITE: N 342, N 377, N 348, N 349 and N 354.
- The focus of this course is nursing care of clients with acute and chronic psychiatric disorders, including psychopathology associated with major mental illness. Community-based experiences provide opportunity for continued development of therapeutic skills. Social, cultural, spiritual and environmental issues influencing mental health are explored.

N 445 CARE MANAGEMENT II
F, S 2 cr. LEC 1 RCT/DIS 1
PREREQUISITE: N 345.
- This course builds on Care Management I and expands care management skills. It prepares students for care management implementation. Essential competencies will be facilitated using learning activities such as role playing, case study and debate.

N 447 URGENT AND PALLIATIVE CARE
F, S 6 cr. LEC 3 LAB 3
PREREQUISITE: N 354.
- The focus of this course is application of theoretical and empirical knowledge to nursing care for complex clients across the adult lifespan requiring urgent and palliative care in a variety of settings. Clinical decision making, triage and symptom management are emphasized. This course builds upon and integrates knowledge gained from nursing, sciences and the humanities.

N 449 CULTURAL APPLICATIONS IN NURSING: THE SPECIFIC CULTURE EXPERIENCE
F, S 2 cr. LEC 1 LAB 1
PREREQUISITE: Junior standing in nursing or permission of instructor.
- This course is designed as an intense but time-limited immersion into another culture and is focused on health benefits, health care, and nursing applications. The experience may be preceded by analysis of cultural principles applicable to nursing and concluded by analysis of actual clinical participation with specific culture nurses and clients.

N 470 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

N 477 POPULATION-BASED NURSING CARE IN THE COMMUNITY
F, S 6 cr. LEC 3 LAB 3
PREREQUISITE: N 437 and N 454.
- The focus of this course is the health and well-being of the community. Global and national health problems are examined from a public health perspective. Community assessment and epidemiologic methods are used to identify populations at risk and potential areas for intervention.

N 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

N 485 NURSING LEADERSHIP AND MANAGEMENT
F, S 6 cr. LEC 3 LAB 3
PREREQUISITE: N 437, N 445 and N 454.
- The focus of this course is to provide an integration of theoretical and skill development in leadership, management and organizational concepts for the design, coordination and management of health care using the community-based approach.

N 489R UNDERGRADUATE RESEARCH/CREATIVITY ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: N 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

N 490R UNDERGRADUATE RESEARCH/CREATIVITY ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

N 500 SEMINAR
On Demand 1 cr. SEM Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

N 501 TEACHING CONCEPTS FOR NURSING EDUCATORS
F 3 cr. LEC 3 LAB 1
PREREQUISITE: EDCI 504.
- Course considers history and evolution of teaching, learning and curriculum development in nursing. Emphasis on course design and delivery of nursing education to diverse learners in diverse settings. Faculty roles and responsibilities are explored. A supervised teaching practicum is included.

N 502 EFFECTIVE CLINICAL TEACHING
S 3 cr. LEC 1 LAB 2
PREREQUISITE: N 501.
- Focuses on faculty roles and responsibilities in teaching clinical nursing. Designed for students interested in developing clinical teaching skills. Major themes: development of learning activities, student performance evaluation, concepts of student supervision, and agency coordination. Includes a supervised clinical teaching practicum.
N 517 FOUNDATIONS OF PHARMACOTHERAPEUTICS
F 1 cr. LEC 1
COREQUISITE: N 566, graduate standing, or consent of instructor.

- Introduces the student to the essentials of pharmacotherapy for advanced practice nurses. Provides a basis for understanding the pharmacokinetics and actions of selected classes of drugs commonly used in primary care practice. Legal and ethical considerations of prescriptive practice are addressed.

N 518 PHARMACOTHERAPEUTICS FOR INFANTS, CHILDREN, AND ADULTS OF CHILDBEARING AGE
S 1 cr. LEC 1
PREREQUISITE: N 517 or consent of instructor.

- Addresses pharmacological interventions in managing common health care problems of childbearing families. Students will apply knowledge of medication management of commonly encountered pediatric and women's health care concerns.

N 519 PHARMACOTHERAPEUTICS FOR MIDDLE AGE ADULTS
Su 1 cr. LEC 1
PREREQUISITE: N 517 or consent of instructor.

- Addresses the pharmacological intervention in managing common health problems of midlife adults and their families. Students will apply knowledge of pharmacological management of commonly encountered health problems of middle aged adults.

N 520 PHARMACOTHERAPEUTICS FOR OLDER ADULTS
F 1 cr. LEC 1
PREREQUISITE: N 517 or consent of instructor.

- Addresses pharmacological interventions in managing common health problems of elders and their families. Students will apply knowledge of pharmacological management of commonly encountered health problems for the aging population. Regulatory issues regarding prescriptive practice for APRNs are addressed.

N 521 THEORY AND RESEARCH IN NURSING
F 5 cr. LEC 5
PREREQUISITE: N 388 (or equivalent) and STAT 216 (or equivalent).

- Provides an overview of the interrelationships among theory, research, and practice. Students explore patterns and processes for acquiring knowledge and the utilization of knowledge in clinical practice.

N 522 ADVANCED PRACTICE NURSING: ROLES AND ISSUES
S 2 cr. LEC 1 RCT 1
PREREQUISITE: Graduate standing or consent of instructor.

- Introduction to theoretical foundations and competencies of advanced practice nursing and employment settings in which advanced practice nursing may occur. Emphasis on history and development of advanced practice nursing, roles, role transition, spheres of influence, core competencies, and target outcomes.

N 523 RURAL HEALTH NURSING
S 3 cr. LEC 2 LAB 1
PREREQUISITE: N 521.

- This course focuses on the health concerns, issues, and trends facing individuals and populations in rural areas. Rural environments will be assessed and data from a variety of sources will be analyzed through systematic approaches. Students will have the opportunity to build and expand upon rural nursing theory.

N 524 COMMUNICATION IN NURSING LEADERSHIP I
F 2 cr. LEC 1 LAB 1
COREQUISITE: N 521.

- This course, as one of a series, focuses on skill development in scholarly writing, enhancement of critical thinking as the foundation for effective verbal and written interactions, and the elements of strong collaborative communication styles for nursing leaders.

N 525 COMMUNICATION IN NURSING LEADERSHIP II
S 2 cr. LEC 1 LAB 1
PREREQUISITE: N 524.

- One of a series of courses focusing on verbal, written, and computer skills for nursing leaders. The emphasis changes each semester to complement core courses.

N 526 COMMUNICATION IN NURSING LEADERSHIP III
F 2 cr. LEC 1 LAB 1
PREREQUISITE: N 544.

- One of a series of courses focusing on verbal, written, and computer skills for nursing leaders. The emphasis changes each semester to complement core courses.

N 527 COMMUNICATION IN NURSING LEADERSHIP IV
S 2 cr. LEC 1 LAB 1
PREREQUISITE: N 546.

- One of a series of courses focusing on verbal, written, and computer skills for nursing leaders. The emphasis changes each semester to complement core courses.

N 528 COMMUNICATION IN NURSING LEADERSHIP V
F 2 cr. LEC 1 LAB 1
PREREQUISITE: N 540.

- One of a series of courses focusing on verbal, written, and computer skills for nursing leaders. The emphasis changes each semester to complement core courses.

N 529 COMMUNICATION IN NURSING LEADERSHIP VI
S 2 cr. LEC 1 LAB 1
PREREQUISITE: N 548.

- One of a series of courses focusing on verbal, written, and computer skills for nursing leaders. The emphasis changes each semester to complement core courses.

N 530 ADVANCED HEALTH ASSESSMENT
F 5 cr. RCT 1 LAB 2
PREREQUISITE: N 239 (or equivalent).

- This course consists of study modules and videos based on various components of health assessment with emphasis on rural populations. Students will be required to demonstrate assessment competency to faculty.

N 531 ADMINISTRATION AND ORGANIZATION OF HEALTH CARE SYSTEMS
F 2 cr. LEC 2
PREREQUISITE: N 521 and N 565.

- This course focuses on nursing leadership in rural community-focused health care systems. Emphasis is on organizational structure, culture, change, and behavior. Traditional elements of leadership are blended with emerging nursing theory to strategically energize current and developing rural health care systems.

N 532 ADMINISTRATION AND ORGANIZATION OF HEALTH CARE SYSTEMS
F 2 cr. LEC 2
PREREQUISITE: N 521 and N 565.

- This course focuses on the application of fiscal management principles of health care systems. Emphasis is on health care economics, fiscal management and budgeting concepts.

N 533 ADVANCED PHYSIOLOGICAL AND PATHOPHYSIOLOGICAL CONCEPTS IN PRIMARY CARE
F 4 cr. LEC 4
PREREQUISITE: Graduate Standing

- Comprehensive study of the physiological/pathophysiological functioning of all human body systems. Age-related variations in physiology/pathophysiology are emphasized in this course.

N 534 ADVANCED PHYSIOLOGICAL AND PATHOPHYSIOLOGICAL CONCEPTS IN PRIMARY CARE
F 4 cr. LEC 4
PREREQUISITE: N 531 or consent of instructor.

- Focuses on comprehensive assessment, intervention, and preventive care for childbearing and childrearing families in primary health care settings. Advanced nursing practice is based on theoretical perspectives which serve as guides to identification and interventions for the common health needs. Recognizing and valuing the holistic nature of individuals within families, this course will include content on physiological, pathophysiological, psychological, developmental, sociocultural and spiritual primary health care needs of childbearing and childrearing families.

N 535 PRIMARY CARE I FOR CHILDBEARING AND CHILDBEARING FAMILIES
S 6 cr. LEC 3 LAB 3
PREREQUISITE: N 550 and N 521.

- Focuses on comprehensive assessment, intervention, and preventive care for childbearing and childrearing families in primary health care settings. The use of theoretical perspectives for the advanced practice of nursing is continued. Recognizing and valuing the holistic nature of individuals within families, this course will include content on physiological, pathophysiological, psychological, developmental, sociocultural and spiritual primary health care needs of childbearing and childrearing families.

N 536 PRIMARY CARE II FOR MIDLIFE FAMILIES
Su 6 cr. LEC 3 LAB 3
PREREQUISITE: N 561.

- Focuses on comprehensive assessment, intervention, and preventive care for midlife families in primary health care settings. The use of theoretical perspectives for the advanced practice of nursing is continued. Recognizing and valuing the holistic nature of individuals within families, this course will include content on physiological, pathophysiological, psychological, developmental, sociocultural and spiritual primary health care needs of midlife families.
N 563 PRIMARY CARE III
FOR AGING FAMILIES
F 6 cr. LEC 3 LAB 3
PREREQUISITE: N 562.

– Assessment, treatment and preventive care for
growing families in primary health care settings.
Physiological, pathophysiological, psychological,
developmental, sociocultural and spiritual responses
to acute and chronic conditions will be explored.

Advanced nursing practice is developed through
the use of theoretical perspectives which serve as guides to
the identification and treatment of the common health care needs of the aging family. There is added emphasis on the advocacy
role of the nurse practitioner with this population.

N 565 PRINCIPLES
OF POPULATION-BASED HEALTH
F 3 cr. LEC 2 LAB 1
PREREQUISITE: N 531, N 479, N 388, and STAT
216 (or equivalent).
PRE or COREQUISITE: N 550.

– Emphasis is on the public health concepts and
skills essential to community-oriented leadership and
practice in rural communities; concepts of risk, epidemiology, biostatistics, health planning, community empowerment and resource develop-
ment. The values on health promotion and disease prevention are explored. A strong emphasis on the
physical, social, cultural and political environments
of rural populations provides a framework for the above concepts.

N 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
– This practicum allows students to further refine
family nurse practitioner skills. Students participate
in the selection of a practice setting such as family,
health, pediatrics, women’s health or gerontology or
a broad based general practice based on availability.
Theoretical perspectives are applied to enhance
assessment and treatment skills for the selected area 
of practice.

N 571 PRIMARY CARE IV:
CLINICAL PRACTICESHOSORSHIP
S 5 cr. LAB 5
PREREQUISITE: Final semester of course work.

– This practicum allows students to further refine
family nurse practitioner skills. Students participate
in the selection of a practice setting such as family,
health, pediatrics, women’s health or gerontology or
a broad based general practice based on availability.
Theoretical perspectives are applied to enhance
assessment and treatment skills for the selected area of practice.

N 572 HUMAN RESOURCE MANAGEMENT
S 3 cr. LEC 2 LAB 1

– This course examines personnel functions as they
apply to health care systems. Emphasis will be on
job design, staffing, equal opportunity employment,
training and development, performance appraisal,
compensation, and labor-management relations.

N 573 HEALTH POLICY,
REGULATION AND ETHICS
S 3 cr. LEC 2 LAB 1

– Policy development and implementation, the
impact of regulatory and legal issues on organiza-
tional management and ethical problems in nursing prac-
tice is the focus of this course. Legislative processes
and political philosophy are discussed in the context
of health care ethics and reform.

N 575 RESEARCH
OR PROFESSIONAL PAPER/PROJECT
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.

– A research or professional paper or project deal-
ing with a topic in the field. The topic must have
been mutually agreed upon by the student and his
or her major advisor and graduate committee.

N 576 INTERNSHIP
Su 2 - 12 cr. IND Maximum 12 cr.
PREREQUISITE: Graduate standing, consent of
instructor and approval of department head.

– An individualized assignment arranged with an
agency, business or other organization to provide
guided experience in the field.

N 577 PROGRAM PLANNING
AND EVALUATION
FOR POPULATION-FOCUSED HEALTH
F 6 cr. LEC 3 LAB 3
PREREQUISITE: Graduate standing or consent of
instructor.

– Examines the fundamental principles of program
planning and evaluation to determine the efficacy
and efficiency of selected prevention and interven-
tion strategies. Concepts applied to population
based disease prevention program. Emphasis on for-
mative and summative evaluations using quantitative
and qualitative measures.

N 578C ADVANCED COMMUNITY
ASSESSMENT, PLANNING AND EVALUATION
S 6 cr. LAB 3 LEC 3
PREREQUISITE: N 554.

– A research or professional paper or project dealing
with a topic in the field. The topic must have
been mutually agreed upon by the student and his
or her major advisor and graduate committee.

N 579C ADVANCED COMMUNITY
EVALUATION
S 6 cr. LAB 3 LEC 3
PREREQUISITE: N 554.

– A research or professional paper or project dealing
with a topic in the field. The topic must have
been mutually agreed upon by the student and his
or her major advisor and graduate committee.

N 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others
as determined for each offering.

– Courses not required in any curriculum for which
there is a particular one time need, or given on a
trial basis to determine acceptability and demand
before requesting a regular course number.

N 581 CLINICAL NURSE
SPECIALIST PRACTICE I
S 6 cr. LEC 3 LAB 3
PREREQUISITE: N 550, N 560, and N 551
COREQUISITE: N 521, N 522, and N 555.

– This course is the first of three courses designed to
prepare students for advanced practice as a clinical
nurse specialist (CNS) in the care of adults with acute and
chronic health problems. The course builds on previously learned concepts, theories, research, and clinical management strategies
related to the care of diverse populations of both rural
and urban adults with selected complex health problems. Seminars and supervised practica provide opportunities for students to further develop and expand theoretical knowledge and competencies related to CNS practice. In this course, emphasis
is placed on the application of knowledge which pro-
motes the goals of multidisciplinary care.

N 582 CLINICAL NURSE
SPECIALIST PRACTICE II
F 6 cr. LEC 3 LAB 3

– This course is the second of three courses designed to
prepare students for advanced practice as a clinical nurse specialist (CNS) in the care of
adults with acute and chronic health problems. The
course builds on previously learned concepts, theories, research, and clinical management strategies related to the care of diverse populations of both rural
and urban adults with selected complex health problems. Seminars and supervised practica provide opportunities for students to further develop and expand theoretical knowledge and competencies related to CNS practice. In this course, emphasis
is placed on the application of knowledge which pro-
motes the goals of multidisciplinary care.

N 583 CLINICAL NURSE
SPECIALIST PRACTICE III
S 6 cr. SEM 1 LAB 5
PREREQUISITE: N 582.

– This course is the capstone course in a sequence
designed to prepare students for advanced practice
as clinical nurse specialist (CNS) in the care of
adults with acute and chronic health problems.

– This course may be used only by students who
have completed all of their course work (and thesis,
if on a thesis plan) but who need additional faculty
or staff time or help.

N 590 MASTER’S THESIS
F, S, Su 1 - 10 cr. IND May be repeated.
PREREQUISITE: Master’s standing.

N 590 MASTER’S THESIS
F, S, Su 1 - 10 cr. IND May be repeated.
PREREQUISITE: Master’s standing.

N 590 MASTER’S THESIS
F, S, Su 1 - 10 cr. IND May be repeated.
PREREQUISITE: Master’s standing.
NAS

Native American Studies
Department of Native American Studies
(406) 994-3881

NAS 001 SELECTED ISSUES IN PERSONAL DEVELOPMENT
F 2 cr. RCT 2
— For students making an adjustment to university life. Topics include study skills, goal setting, decision making, time management, and personal issues that face college students.

NAS 100D INTRODUCTION TO NATIVE AMERICAN STUDIES
F, S 3 cr. LEC 3
— A survey of traditional and contemporary American Indian cultures, the historical development of the unique relationship between the federal government and Indian nations, and current issues among Indian peoples.

NAS 201D AMERICAN INDIANS IN MONTANA
S 3 cr. LEC 3
— Movements of Indians into Montana. Social structures including kinship, political affiliations; military, warrior societies, and religion. Establishment of Montana's reservations; treaties and agreements with the federal government; vested rights of Indians; sovereignty and self-government; contemporary tribal governments; contemporary Indian societies; socioeconomic problems.

NAS 220 AMERICAN INDIAN ART
F 3 cr. LEC 3
— The aesthetic, cultural, and symbolic meanings of traditional and contemporary American Indian art: Plains, Southwestern, Northwest Coast, and Inuit art and artists.

NAS 240IS NAS THEORIES & METHODS
S 3 cr. SEM 3
PREREQUISITE: NAS 100, INTRODUCTION TO NAS
— This course critically examines the political and academic foundations of Native American Studies. It analyzes the theoretical and methodological underpinnings, emphasizing indigenous paradigms and practices. Students are expected to think analytically, participate in discussion, and do original research.

NAS 242D AMERICAN INDIANS IN CONTEMPORARY SOCIETY
F 3 cr. LEC 3
— Selected contemporary economic, social, political, educational, and cultural issues facing American Indians today, with special emphasis on tribal groups in Montana.

NAS 270 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Max 6
PREREQUISITE: Consent of instructor and approval of department head.
— Directed research and study on an individual basis.

NAS 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
— Course not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

NAS 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT
COREQUISITE: NAS 290.
— Classroom instruction associated with directed undergraduate research and creative activity projects.

NAS 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 8 cr. RCT
PREREQUISITE: Consent of department head.
— Directed undergraduate research/creative activity.

NAS 305 GENRE ISSUES IN NATIVE AMERICAN STUDIES
F alternate years, to be offered 2007 3 cr. LEC 3
— Contrast and compare the social construction of gender in Native American cultures and Euroamericans. Explore role of women, men and "two-spirit" gender of early North American Indigenous societies. Analyze the impact of European colonization on traditional roles and examine contemporary gender issues.

NAS 315 NATIVE AMERICAN INDIES AND THE CINEMA
F alternate years, to be offered 2007 3 cr. LEC 3
— Analysis of images and representations of American Indians in feature, independent, and television based in a cultural studies approach to film and film production. Considerable attention is given to Indigenous aesthetics.

NAS 320 AMERICAN INDIAN RELIGIONS
F, S 3 cr. LEC 3
PREREQUISITE: Junior standing.
— An in-depth analysis of specific contemporary and historic, tribal, and pan-Indian beliefs. Basic elements of Native American religions are defined from the perspective of the practitioner's understanding of their contributions to distinct cosmologies. The legal protection of Native American religions frames the analysis.

NAS 325 NATIVE PEOPLES OF THE AMERICAS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: Junior standing.
— Histories and cultures of representative native peoples of North, Central, and South America: Impact of European discovery, conquest and colonization; political, social, and economic developments from pre-Columbian to present times including contemporary issues facing the indigenous peoples of the Americas.

NAS 330 AMERICAN INDIAN POLICY AND LAW
S 3 cr. LEC 3
PREREQUISITE: NAS 100, and junior standing.
— Survey of institutions, laws, cultures, and political forces which shaped federal Indian policy from colonial times to the present. Examination of primary documents, treaties, case law, and agencies which are the foundations of federal relationships with Indian Tribes.

NAS 340 AMERICAN INDIAN LITERATURE
F, S 3 cr. LEC 3
PREREQUISITE: Junior standing and ENGL 121.
— Traditional and contemporary Native American literature including oral narratives, folktales, poetry, short stories, essays, and the novel. Methods of literary analysis will be explored to assist students in determining the meaning and function of the various genre.

NAS 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
— Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

NAS 415 NATIVE FOOD SYSTEMS
F alternate years, will be offered 2006 3 cr. LEC 1
SEM 2
PREREQUISITE: NAS 100 or NAS 201 and upper division standing.
— This course engages indigenous practices and beliefs, focusing particularly on the food systems of the Native Americans, and using comparative data from across time and place. Of specific interest are dynamic connections between native foods and the health of people and place, both traditionally and in societies affected by colonization and rapid cultural change.

NAS 425 PAN-INDIANISM IN AMERICAN SOCIETY
S alternate years, will be offered 2006 3 cr. LEC 2
RCT 1
PREREQUISITE: NAS 242.
— The course is a broad study of Pan-Indianism as a cultural mechanism that both empowers and victimizes American Indian identity. Lectures and discussion will cover the sources and scope of the social, economic, spiritual and political aspects of Pan-Indianism, drawing from history, literature, political science and anthropology.

NAS 430 AMERICAN INDIAN EDUCATION
S alternate years, will be offered 2006 3 cr. LEC 3
PREREQUISITE: Junior standing, ENGL 121, NAS 201.
— Historical development and contemporary directions in American Indian education, values and assumptions inherent in programs devised at the state and federal levels and their results, the cultural basis of Indian education, and selected materials appropriate to the various educational levels.

NAS 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Max 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
— Directed research and study on an individual basis.

NAS 476 INTERNSHIP
On Demand 2-12 cr. IND
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
— An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

NAS 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisite as determined for each offering.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

NAS 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT
May be repeated. Max 4 cr.
COREQUISITE: NAS 490.
— Classroom instruction associated with directed undergraduate research/creative activity projects.
NAS 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. May be repeated. Max. 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

NAS 500 SEMINAR
On Demand 1-4 cr. SEM
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

NAS 520 FEMINIST AND GENDER THEORIES IN NATIVE AMERICAN STUDIES
On Demand 3 cr. LEC 3
PREREQUISITE: NAS 100 or equivalent and NAS 305 or equivalent.
- This course is intended to explore gender issues in Native American Studies. It will critically explore the problems and points of conflict between Native American women's gender concerns and Euroamerican feminist theories.

NAS 521 TRIBAL GOVERNMENT: YESTERDAY AND TODAY
On Demand 3 cr. LEC 3
PREREQUISITE: NAS 100 or equivalent and NAS 350 or equivalent.
- The course examines the complexities of American Indian governments' organization, their histories, and the unique relationship between the Federal government and American Indian tribes. The course highlights several models of both traditional and contemporary tribal governance systems.

NAS 523 AMERICAN INDIANS AND MINORITIES IN HIGHER EDUCATION
On Demand 3 cr. LEC 3
PREREQUISITE: NAS 100 OR NAS 242.
- The course will develop and build the students' understanding of the historical and current situation of American Indians and other minorities in the U.S. higher education. It will also focus on the unique place of tribal colleges in the U.S. higher education.

NAS 524 CONTEMPORARY ISSUES IN AMERICAN INDIAN STUDIES
S to be offered 2006 3 cr. LEC 3
PREREQUISITE: NAS 920 or NAS 340 or equivalent.
- The course is intended to develop and refine the students' knowledge of the historical background of American Indian issues and how history now affects the contemporary issues facing American Indians.

NAS 525 INDIGENOUS PHILOSOPHIES OF SACRED ECOCOLOGIES
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: NAS 300 or NAS 590 or equivalent.
- This course begins by examining indigenous philosophies of sacred ecologies, contrasting these views with those held by Europeans regarding the natural world. It traces the impact of historical colonialism in the environment up to contemporary conflicts over sacred sites and environmental resources.

NAS 530 FEDERAL LAW AND INDIAN POLICY
S 3 cr. LEC 3
PREREQUISITE: NAS 100 NAS 330 or equivalent.
- Advanced analysis of theories, doctrines, case law, and legislation with a focus on key legal and policy concerns for contemporary Native America including treaties, criminal jurisdiction, land, environmental regulation, water rights, fishing and hunting, child welfare, gaming, taxation, repatriation, and religious freedom.

NAS 540 THEORETICAL POSITIONS IN NATIVE AMERICAN STUDIES
F 3 cr. LEC 3
PREREQUISITE: NAS 100 and NAS 350 or equivalent.
- An introduction to the central conceptualizations of the academic discipline of Native American Studies and several of the theoretical paradigms operative within it. Students will gain an understanding of the contributions of Native American Studies to theoretical understandings within, across, and beyond dominant academic disciplines.

NAS 541 A CRITICAL APPROACH TO NAS METHODOLOGIES
S 3 cr. LEC 3
PREREQUISITE: NAS 540 or equivalent.
- A critical survey of the interdisciplinary approaches used in NAS grounded in a sociopolitical context with emphasis on ethical questions raised by research of Native Americans. Students receive individual attention toward formulating an effective methodology for their master's project.

NAS 560 NATIVE AMERICAN LITERARY TRADITIONS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: NAS 340.
- A survey of prose writing, mainly long fiction, by and about contemporary Native Americans.

NAS 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

NAS 575 PROFESSIONAL PAPER
F, S, Su 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

NAS 576 INTERNSHIP
F, S, Su 1 - 6 cr. IND
PREREQUISITE: Graduate standing, consent of instructor and approval of department head.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

NAS 580 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 6 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

NAS 589 GRADUATE CONSULTATION
F, S, Su 3 cr. TUT 3
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by graduate students who have completed all of their course work and their theses, if on a thesis plan, but who need additional faculty or staff time and assistance.

NAS 590 MASTER'S THESIS
F, S, Su 1-10 cr. May be repeated.
PREREQUISITE: Master's standing.

PHIL

Philosophy
Department of History & Philosophy
(406) 994-4395

PHIL 105H PROBLEMS OF GOOD & EVIL
F, S, Su 3 cr. LEC 3
- An examination from a multi-cultural perspective of traditional conceptions of good and evil and their implications for relativism.

PHIL 120H REASON AND REALITY
F, S 3 cr. LEC 3
- Exploration of the nature of reality and human knowledge. A critical look at the presuppositions of our common sense world view.

PHIL 208D PHILOSOPHY AND CULTURE
S 3 cr. LEC 3
PREREQUISITE: Sophomore standing or consent of instructor.
- Addresses questions of how philosophy and culture interact, as well as exploring the differences and commonalities between philosophical traditions. Themes include social justice, identities, society, and culture.

PHIL 215 SOCIAL AND POLITICAL PHILOSOPHY
On Demand 3 cr. LEC 3
- Philosophical problems about the nature of the state and society and their relationship to the individual.

PHIL 220 PHILOSOPHIES OF ASIA
S 3 cr. LEC 3
- A critical examination of some classical school of Asian philosophy such as Confucianism, Hinduism, or Buddhism.

PHIL 225CS SCIENCE, PSEUDO-SCIENCE AND SUBJECTIVITY
On Demand 3 cr. LEC 3
- Introduces both deductive and inductive aspects of scientific as a foundation for addressing broader questions such as, "Is there demarcation between science and non-science?"; "Is science subjective?"; Is scientific knowledge cumulative?"; and many more.

PHIL 226CS OTHER ANIMALS
On Demand 3 cr. LEC 3
- Explores how animals have been understood over time from scientific, philosophical, and cultural perspectives, in the East as well as in the West. More particularly, the understanding of both morphology and behavior will be examined in terms of classical Darwinian and Japanese approaches. The various methodologies employed, their underlying assumptions and possible limits, will be discussed, as well as the larger, moral issues that they raise.
PHIL 231 INTRODUCTION TO LOGIC
F, S 3 cr. LEC 3
- Modern forms of valid inference with applications.

PHIL 250H MORALITY AND SOCIETY
On Demand 3 cr. LEC 3
PREREQUISITE: Consent of instructor.
- The philosophical study of contemporary moral issues such as capital punishment, euthanasia, racism and terrorism. The term will culminate in a substantial piece of original research on a moral issue chosen by the individual student.

PHIL 280 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

PHIL 289R UNDERGRADUATE RESEARCH/
CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. May be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

PHIL 290R UNDERGRADUATE RESEARCH/
CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

PHIL 305R HISTORY OF WESTERN
PHILOSOPHY: ANCIENT & MEDIEVAL
F 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- Great systems of philosophic thought and their originators during ancient and medieval times.

PHIL 356 HISTORY
OF WESTERN PHILOSOPHY: MODERN
S 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- Foundations of contemporary thought, Descartes to Kant.

PHIL 311 AESTHETICS AND THE ARTS
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- Philosophical examination of the nature and function of the arts and the aesthetic experience.

PHIL 313 PHILOSOPHY AND FILM
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or permission of instructor.
- Philosphic study of the moving image. Examines topics such as ontology of the image, theory of cinematic narrative, problem of realism versus illusion in film, its aesthetic, moral, and cultural value; and what constitutes appropriate interpretative activity in judging film.

PHIL 320 PHILOSOPHY OF RELIGION
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- Analysis of concepts of God, revealed truth, and immortality; the nature of religious emotion and experience, and of religious language; relation of faith to reason; traditional proofs of God's existence; the problem of evil; religious diversity; spirituality.

PHIL 325R STATE, COMMUNITY AND INDIVIDUAL
On Demand 3 cr. LEC 3
PREREQUISITE: One course in Philosophy or consent of instructor.
- The philosophical study of the state and society. Topics include the nature and limits of political legitimacy and the nature of just economic systems.

PHIL 332 ETHICS
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- An examination of general moral theory with applications to moral problems of current interest such as abortion, the legal enforcement of morality, the death penalty, and nuclear war.

PHIL 354 MORAL THEORY
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- An examination of 20th Century moral theory. The focus is on such issues as whether morality is objective or subjective as well as methods of moral reasoning.

PHIL 358 BIO-MEDICAL ETHICS
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- An examination of moral problems in medicine such as abortion, euthanasia, human experimentation, and the distribution of scarce medical resources.

PHIL 360 ENVIRONMENTAL ETHICS
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- This course reviews the major readings, both classical and contemporary, on environmental ethics, and isolates the major issues. It provides the appropriate theoretical background. It applies these readings and this background to the investigation and resolution of several environmental policy questions.

PHIL 362 PHILOSOPHY AND RACE
F alternate years, to be offered 2006, 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- Examines the development of the concept of "race" in philosophy since the 17th century. Traces the effects race has had on concepts such as the "person," "self-respect," "rationality," "knowledge," "state of nature," "science," "social justice," and "ordinary life."

PHIL 364 CONTEMPORARY PHILOSOPHY
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- This course introduces students to recent trends in analytical philosophy. Among the topics the course addresses are philosophy of mind that involves problems concerning the mind/body relationship, the nature of consciousness, artificial intelligence, and others.

PHIL 365 PHILOSOPHY AND FEMINISM
S alternate years, to be offered 2007, 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- Examines a wide variety of texts and ideas from both historical and contemporary perspectives. The focus is on issues such as gender, oppression, machismo, and sexism. 

PHIL 366 LANGUAGE AND THE WORLD
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- A discussion of linguistic meaning, the concept of truth, and the relation between thought and language as viewed by contemporary philosophers.

PHIL 378 PHILOSOPHY OF SCIENCE
F alternate years, to be offered 2006, 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
- An examination of the concepts of explanation, confirmation, and theory and their application to classic works in the history of the natural and social sciences.
PHIL 388 PHILOSOPHY OF TECHNOLOGY
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
— An examination of the scope and limits of consent of instructor.
PHIL 390 REASON AND REVOLUTION
On Demand 3 cr. LEC 3
PREREQUISITE: Previous course in Philosophy or consent of instructor.
— An examination of the scope and limits of reason and their role in revolution as exemplified in Hegel, Marx, and other nineteenth century philosophers.

PHIL 400 SEMINAR
F, S 3 cr. SEM Maximum 9 cr.
PREREQUISITE: Junior standing.
— Senior capstone course. Each semester is given over to the detailed study of a major figure or problem in philosophy. Since the figures and problems studied vary from semester to semester, the course may be repeated for credit. Two semesters of Phil 400 are required for all philosophy majors.

PHIL 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
— Directed research and study on an individual basis.

PHIL 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

PHIL 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: PHIL 490.
— Classroom instruction associated with directed undergraduate research/creative activity projects.

PHIL 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
— Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

PHIL 500 SEMINAR
On Demand 1 cr. SEM Maximum 4 cr
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
— Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

PHIL 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Division of Graduate Education.
— Directed research and study on an individual basis.

PHYS

Physics
Department of Physics
(406) 994-3614

PHYS 101N MYSTERIES OF THE SKY
F, S, Su 3 cr. LEC 3
— An introduction to contemporary astronomy that explores the nature, methods, and limitations of scientific inquiry within the context of our struggle to understand the structure and evolution of the Universe. Topics include the history of astronomy, motions of the night sky, the solar system, stellar evolution, galaxies, and cosmology.

PHYS 101N MYSTERIES OF THE UNIVERSE
Su 4 cr. LEC 3 RCT 1
— An introduction to contemporary astronomy that explores the nature, methods, and limitations of scientific inquiry within the context of our struggle to understand the structure and evolution of the Universe. Topics include the history of astronomy, motions of the night sky, the solar system, stellar evolution, galaxies, and cosmology. In addition to lectures, students spend one full class each week working in teams on a series of lab-like exercises designed to reinforce the learning of key concepts. Students may only count one of PHYS 101 and PHYS 102 toward meeting graduation requirements.

PHYS 103N OUR PHYSICAL WORLD
F, S 4 cr. LEC 3 LAB 1
PREREQUISITE: High School Algebra.
— A conceptual survey of topics in physics for non-science majors. Topics include motion, force, momentum, energy, waves, and sound, and may include heat, the structure of matter, relativity, optics, electricity and magnetism, or modern physics. Students will not receive credit if they have passed PHYS 205, PHYS 211, or PHYS 221.

PHYS 137 FROM QUARKS TO THE COSMOS
F 1 cr. LEC 1
— An introduction to frontier areas of physics, including the "Standard Model" of elementary particle physics, quantum mechanics, and big-bang cosmology. Students explore these topics using order-of-magnitude estimates, dimensional analysis, and simple observations. Intended for physics majors or those considering a major or minor in physics.

PHYS 200 RESEARCH PROGRAMS IN PHYSICS
F 1 cr. LEC 1
— An introduction to some of the exciting ideas, developments, problems, and experiments of modern day physics.

PHYS 201N PHYSICS BY INQUIRY
F, S 3 cr. LAB 3
— An indepth exploration of basic physics principles. Scientific model building and proportional reasoning skills will be developed in the context of properties of matter, observational astronomy, and DC electrical circuits. For pre-service elementary teachers.

PHYS 205 COLLEGE PHYSICS I
F, S, Su 4 cr. LEC 3 LAB 1
PREREQUISITE: High school trigonometry or MATH 160.
— First semester of sequence. Topics include kinematics and dynamics of linear and rotational motion; work and energy; impulse and momentum; and fluids. Students will not receive credit if they have passed PHYS 211 or PHYS 221.

PHYS 206 COLLEGE PHYSICS II
F, S, Su 4 cr. LEC 3 LAB 1
PREREQUISITE: PHYS 205 or PHYS 211.
— Second semester of sequence. Topics include simple harmonic motion; electric forces and fields; dc electric circuits; magnetic forces and fields; and magnetic induction and motors. Students will not receive credit if they have passed PHYS 212 or PHYS 222.

PHYS 211 GENERAL AND MODERN PHYSICS I
F, S 4 cr. LEC 3 LAB 1
PREREQUISITE: MATH 181
— First semester of a three-semester sequence primarily for engineering and physical science students. Covers topics in mechanics (such as motion, Newton's laws, conservation laws, work, energy, systems of particles, and rotational motion) and in mechanical waves (such as oscillations, wave motion, sound, and superposition).

PHYS 212 GENERAL AND MODERN PHYSICS II
F, S 4 cr. LEC 3 LAB 1
PREREQUISITE: PHYS 211 or PHYS 221; MATH 182
— Covers topics in electricity and magnetism (such as Coulomb's law, Gauss' law, electric fields, electric potential, dc circuits, magnetic fields, Faraday's law, ac circuits, and Maxwell's equations) and optics (such as light, geometrical optics, and physical optics).

PHYS 213 GENERAL AND MODERN PHYSICS III
S 4 cr. LEC 3 LAB 1
PREREQUISITE: PHYS 212 or PHYS 222.
— Covers topics in thermodynamics (such as entropy, heat, laws of thermodynamics, and the kinetic theory of gases) and modern physics (such as relativity, models of the atom, quantum mechanics; and atomic, molecular, solid state, nuclear, and particle physics).

PHYS 221 HONORS
GENERAL AND MODERN PHYSICS I
S 4 cr. LEC 3 LAB 1
COREQUISITE: MATH 181
— The honors section of PHYS 211. The concepts are discussed in more depth and the range of applications is greater.

PHYS 222 HONORS
GENERAL AND MODERN PHYSICS II
F 4 cr. LEC 3 LAB 1
PREREQUISITE: PHYS 211 or PHYS 221; COREQUISITE: MATH 182
— The honors section of PHYS 212. The concepts are discussed in more depth and the range of applications is greater.

PHYS 231 INTRODUCTION TO THEORETICAL PHYSICS
S 3 cr. LEC 3
PREREQUISITE: MATH 224.
COREQUISITE: MATH 225, PHYS 213.
— Mathematical methods essential to the practice of theoretical physics, such as matrices, vector calculus, differential equations, and Fourier series, with applications to examples from mechanics and electromagnetism.
PHYS 253 PHYSICS OF PHOTOGRAPHY
F 2 cr. LEC 2
PREREQUISITE: High school algebra.
- Improvement of photographic skills through an understanding of the basic principles of photography. The nature of light and color and the physical principles involved in the operation of a camera will be presented. Unusual effects and recent developments will be discussed. Numerous demonstrations, photographs, and slides will be used to illustrate the principles.

PHYS 281 LABORATORY ELECTRONICS I
F 2 cr. LEC 1 LAB 1
COREQUISITE: PHYS 212 or PHYS 222.
- Laboratory electronic measurements and analysis, and design of basic linear circuits.

PHYS 270 INDEPENDENT STUDY
On Demand 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
- Directed study on an individual basis.

PHYS 290 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

PHYS 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: PHYS 290.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

PHYS 290R UNDERGRADUATE RESEARCH
F, S, Su 1 - 8 cr. RCT
PREREQUISITE: Consent of instructor and approval of department head.
- Directed undergraduate research.

PHYS 301 CLASSICAL MECHANICS
F 4 cr. LEC 4
COREQUISITE: PHYS 219, PHYS 221.
- Principles of Newtonian, Lagrangian, and Hamiltonian mechanics including single particle motion, systems of particles, rigid body motion, moving coordinate systems, and small oscillations.

PHYS 511 SOLAR SYSTEM ASTROPHYSICS
F, S, Su On Demand 4 cr. LEC 3 LAB 1
PREREQUISITE: PHYS 205, PHYS 211, or PHYS 221.
COREQUISITE: PHYS 206, PHYS 212, or PHYS 222.
- Covers the origin and evolution of our solar system, including detailed examinations of the sun, earth, moon, other planets, and satellites. Exciting new discoveries and emerging research results will be integrated into the course. The laboratory operates in a "project mode" and includes experiments with models that can be done indoors as well as with the use of telescopes.

PHYS 312 INTRODUCTION TO ASTRONOMY
S 4 cr. LEC 3 LAB 1
PREREQUISITE: PHYS 205, PHYS 211, or PHYS 221, or the equivalent.
COREQUISITE: PHYS 206, PHYS 212, or PHYS 222, or the equivalent.
- After reviewing basic classical astronomy on the properties, structure and evolution of stars and galaxies, the course will introduce some hot topics in frontiers of astronomy, such as pulsars, quasars, black holes, and fate of the universe.

PHYS 317 ELECTRICITY AND MAGNETISM I
F 3 cr. LEC 3
PREREQUISITE: PHYS 231 or MATH 348.
- Electrostatic fields, dielectric materials, magnetic fields, magnetic materials, and Maxwell's equations.

PHYS 318 ELECTRICITY AND MAGNETISM II
S 3 cr. LEC 3
PREREQUISITE: PHYS 217.
- Propagation of electromagnetic waves, radiation, and general wave phenomena.

PHYS 321 COMPUTATIONAL PHYSICS
F 1 cr. LEC 1
PREREQUISITE: PHYS 231.
- Introduction to the use of computational methods in physics. Emphasis will be placed on common methods of casting problems into forms amenable to numerical solution and for displaying numerical results.

PHYS 341 SPECIAL RELATIVITY
S alternate years, to be offered 2007 1 cr. LEC 1
PREREQUISITE: PHYS 211 or PHYS 221.
- Einstein's theory of special relativity is presented from the modern viewpoint, with emphasis on the geometry of space time.

PHYS 353R THE ART AND SCIENCE OF HOLOGRAPHY
S 3 cr. LEC 2 LAB 1
PREREQUISITE: Junior standing and one core science course. Math 160 or equivalent Math Placement Test.
- Beginner's course on creating holograms. Pictorial and geometric interpretations of lasers, interference, coherence, film, and holography enable students with limited science and math backgrounds to create their own holographic masterpieces. Lab techniques and documenting the creative process are emphasized.

PHYS 361 LABORATORY ELECTRONICS II
S 2 cr. LEC 1 LAB 1
PREREQUISITE: PHYS 261.
- Analysis and design of basic digital circuits and advanced laboratory electronic measurements.

PHYS 400 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Junior standing and as determined for each offering.
- Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

PHYS 401 PHYSICS BY INQUIRY I
Su 3 cr. LAB 3
PREREQUISITE: Teacher Certification.
- An in-depth and hands-on exploration of basic physics principles. Scientific model building and proportional reasoning skills will be developed in the context of dc electronics, one and two dimensional kinematics, and dynamics. For middle school and high school science teachers.

PHYS 402 PHYSICS BY INQUIRY II
Su 3 cr. LAB 3
PREREQUISITE: PHYS 401.
- An in-depth and hands-on exploration of basic physics principles. Scientific model building and proportional reasoning skills will be developed in the context of light, color, geometrical optics, heat, and temperature. For middle school and high school teachers.

PHYS 403 SPECIAL RELATIVITY ONLINE
S alternate years, to be offered 2007 3 cr. RCT 3
PREREQUISITE: PHYS 212, MATH 150, bachelor's degree, and one year teaching experience.
- This online course addresses the question: In what ways does nature behave differently at high relative speeds than at low speeds? Designed for practicing high school physics teachers. Assignments and discussions use electronic computer conferencing and interactive visual software.

PHYS 404 PHYSICS BY INQUIRY III
Su 5 cr. LAB 5
PREREQUISITE: Science Teacher Certification.
COREQUISITE: PHYS 401.
- PHYS 404 is a continuation of the PHYS 401 experience, but it may also be taken concurrently with PHYS 401. The course will begin with a careful investigation of geometrical optics, leading to an understanding of pinhole cameras, lenses, and prisms. This will be followed by an exploration of magnetic interactions and magnetic materials.

PHYS 406 CAPSTONE PRESENTATIONS
S 1 cr. SEM 1
PREREQUISITE: Senior standing and completion of a senior project.
- Senior capstone course. Participation in this course requires the completion of a senior capstone project that integrates the student's knowledge and skills acquired during the undergraduate curriculum. Results of the senior project will be presented orally and in writing.

PHYS 411 INTRODUCTORY QUANTUM MECHANICS I
S 4 cr. LEC 4
PREREQUISITE: PHYS 301.
- Historical review, operators, eigenvalue problem, Schroedinger equation, one-dimensional problems, bound and unbound states, harmonic oscillator, and angular momentum.

PHYS 412 INTRODUCTORY QUANTUM MECHANICS II
F 3 cr. LEC 3
PREREQUISITE: PHYS 411.
- Three-dimensional problems, hydrogen atom, matrix mechanics, spin, perturbation theory, and applications to atomic, molecular, nuclear, and particle physics.

PHYS 425 THERMODYNAMICS AND STATISTICAL PHYSICS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: PHYS 231.
- Statistical physics and thermodynamics and their applications to physical phenomena. This course is strongly recommended for students intending to study physics in graduate school.

PHYS 426 MODERN OPTICS
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: PHYS 219 and MATH 225.
- Emphasis is on new developments in optics triggered by the laser. Provides a good foundation in wave optics, nonlinear optics, integrated optics, and spectroscopy.

PHYS 427 LASER APPLICATIONS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: PHYS 212.
- A survey of laser types and properties and applications for scientists and engineers who wish to use lasers in research or technology. Many demonstrations will be used to illustrate the principles.
PHYS 435 ASTROPHYSICS
S alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: PHYS 301 and PHYS 317.
— A survey covering basic problems in modern astrophysics such as stellar structure and evolution, solar physics, compact objects, quasars, and cosmology.

PHYS 441 SOLID STATE PHYSICS
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: PHYS 213.
— A treatment of the classification and electronic structure of solids. Properties of conductors, superconductors, insulators, and semiconductors will be discussed. This course is strongly recommended for students intending to study physics in graduate school.

PHYS 442 NOVEL MATERIALS FOR PHYSICS AND ENGINEERING
S 3 cr. LEC 3
PREREQUISITE: Knowledge of introductory solid state physics; PHYS 441 or consent of instructor.
— Provides basic physical knowledge of advanced natural/artificial materials; ferroelectrics, superconductors, nanotubes, superlattices, photonics materials, materials with giant magnetoresistance and negative susceptibilities, molecular magnets, and biomaterials.

PHYS 451 ELEMENTARY PARTICLE PHYSICS
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: PHYS 231.
— A survey of elementary particle physics, beginning with an historical viewpoint and leading up to today's remarkably successful "Standard Model" of quarks, leptons, and gauge bosons.

PHYS 461 SENIOR LAB
F, S 4 cr. LAB 4 Maximum 8 cr
PREREQUISITE: PHYS 361.
COREQUISITE: PHYS 411.
— Introduction to methods, instrumentation, and data acquisition techniques used in modern physics research. Experiments chosen from laser optics, atomic physics, solid-state physics, superconductivity, and nuclear physics.

PHYS 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
— Directed study on an individual basis.

PHYS 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
— Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

PHYS 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: PHYS 490.
— Classroom instruction associated with directed undergraduate research/creative activity projects.

PHYS 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
— Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

PHYS 500 SEMINAR
On Demand 1 - 4 cr. SEM Maximum 8 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
— Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

PHYS 501 ADVANCED CLASSICAL MECHANICS
F 5 cr. LEC 3
PREREQUISITE: PHYS 301.

PHYS 506 QUANTUM MECHANICS I
S 3 cr. LEC 3
PREREQUISITE: PHYS 412.

PHYS 507 QUANTUM MECHANICS II
F 3 cr. LEC 3
PREREQUISITE: PHYS 506.

PHYS 511 ASTRONOMY FOR TEACHERS
F, S 3 cr. RCT 3
PREREQUISITE: PHYS 206 or PHYS 212, and secondary certification in teaching and two years of teaching experience.
— This online course addresses the key ideas behind the solar system, stars and stellar evolution, galaxies, and Big Bang cosmology.

PHYS 512 GENERAL RELATIVITY ONLINE
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: PHYS 212, MATH 182, PHYS 403 and Bachelor's degree and one year teaching experience.
— Two-level atoms in laser fields and applications to nonlinear optics such as photon echoes, second harmonic generation, and stimulated Raman scattering. Atomic and molecular energy level structure, linear and nonlinear spectroscopy, and applications to gaseous and solid state laser materials.

PHYS 513 QUANTUM MECHANICS ONLINE
F alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: PHYS 212, MATH 182, EDSD 366 and Bachelor's degree and one year teaching experience.
— This online course addresses the key ideas behind quantum mechanical observations and devices, including the fundamental behavior of electrons and photons. Designed for practicing high school physics teachers. Assignments and discussions use electronic computer conferencing and simulation software.

PHYS 515 QUANTUM FIELD THEORY
F alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: PHYS 212, MATH 182, EDSD 366 and Bachelor's degree and one year teaching experience.
— Techniques of canonical and path integral quantization of fields; renormalization theory. Quantum electrodynamics; gauge theories of the fundamental interactions.

PHYS 516 EXPERIMENTAL PHYSICS
F, S 5 cr. LAB 5 Maximum 6 cr.
PREREQUISITE: PHYS 261, PHYS 317, and PHYS 411.
— Experiments chosen from laser optics and atomic, solid-state, and nuclear physics are carried out in depth to introduce the graduate student to methods, instrumentation, and data acquisition techniques useful for experimental thesis projects.

PHYS 519 ELECTROMAGNETIC THEORY I
F 3 cr. LEC 3
PREREQUISITE: PHYS 518.
— Electro- and magnetostatics, conservation laws and covariance of Maxwell's equations, and dynamics of relativistic particles and fields.

PHYS 520 ELECTROMAGNETIC THEORY II
F 3 cr. LEC 3
PREREQUISITE: PHYS 519.
— Radiation by moving charges. Electromagnetic waves in condensed matter and plasma.

PHYS 523 GENERAL RELATIVITY I
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: PHYS 519.
— Tensor calculus, differential geometry, and an introduction to Einstein's theory of gravity. The Schwarzschild solution and black hole physics.

PHYS 524 GENERAL RELATIVITY II
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: PHYS 523.
— Advanced topics in gravitation theory such as singularities, cosmological models, and gravitational waves.

PHYS 531 NONLINEAR OPTICS & LASER SPECTROSCOPY
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: PHYS 507.
— Two-level atoms in laser fields and applications to nonlinear optics such as photon echoes, second harmonic generation, and stimulated Raman scattering. Atomic and molecular energy level structure, linear and nonlinear spectroscopy, and applications to gaseous and solid state laser materials.

PHYS 535 STATISTICAL MECHANICS
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: PHYS 425.
— Basic concepts of equilibrium statistical mechanics, with application to classical and quantum systems, will be presented as well as theories of phase transitions in fluid, magnetic, and other systems.

PHYS 544 CONDENSED MATTER PHYSICS I
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: PHYS 425, PHYS 507.
— Crystal structure and the reciprocal lattice. Quantum theory of electrons and phonons.

PHYS 545 CONDENSED MATTER PHYSICS II
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: PHYS 544.
— Applications to the transport, optical, dielectric, and magnetic properties of metals, semiconductors, and insulators.

PHYS 555 QUANTUM FIELD THEORY
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: PHYS 507.
— Topics in advanced quantum field theory and quantum mechanics, including path integral quantization of fields; renormalization theory. Quantum electrodynamics; gauge theories of the fundamental interactions.
PHYS 560 ASTROPHYSICS
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: PHYS 318, PHYS 412, PHYS 425, and PHYS 426.
– The purpose of this course is to prepare graduate students for thesis-level research in astrophysics, solar physics or related fields. Topics covered include: fluid mechanics, hydrodynamics, plasma physics, radiation processes and stability of equilibrium states.

PHYS 561 MODERN PHYSICS
F alternate years, to be offered 2007 3 cr. LAB 3
PREREQUISITE: Secondary teaching certificate; 2 years teaching experience. PHYS 213, PHYS 401, and PHYS 580 (Advanced Physics by Inquiry.)
– Students in this capstone course will discuss, perform, and analyze several experiments that demonstrate the particle and wave behaviors of light and electrons. Students will develop methods and models for teaching these concepts of modern physics to high school students.

PHYS 566 MATHEMATICAL PHYSICS I
F 3 cr. LEC 3
PREREQUISITE: MATH 349, MATH 449, PHYS 301.
– Mathematical methods which find application in physics. Differential equations, contour integration, special functions, integral transforms, boundary value problems, and Green’s functions.

PHYS 567 MATHEMATICAL PHYSICS II
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: PHYS 566.
– Theory of computational techniques, and applications such as numerical integration, differential equations, Monte Carlo methods, and fast Fourier transforms.

PHYS 570 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
– Directed research and study on an individual basis.

PHYS 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
– Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

PHYS 582 ASTROBIOLOGY FOR TEACHERS
F, S 3 cr. Online Lec 3
PREREQUISITE: PHYS 311, PHYS 511, or equivalent; PHYS 205, PHYS 211, or equivalent; BIOL 301 or equivalent; EDSD 366 or equivalent; and Bachelor’s degree and minimum of one year of full-time teaching experience at the secondary level or above.
– Astrobiology is the study of the origin, evolution, distribution, and destiny of life in the universe. It defines itself as an interdisciplinary science at the intersection of physics, astronomy, biology, geology, and mathematics, to discover where and under what conditions life can arise and exist in the universe. The course topics will cover the discovery of planetary systems around other stars, the nature of habitable zones around distant stars, the existence of life in extreme environments. These concepts will serve as a foundation to study possible extraterrestrial ecosystems on planets and moons like Mars and Europa.

PHYS 583 THE INVISIBLE UNIVERSE ONLINE: THE SEARCH FOR ASTRONOMICAL ORIGINS
F, S 3 cr. Online Lec 3
PREREQUISITE: PHYS 311, PHYS 511, or equivalent; PHYS 205, PHYS 211, or equivalent; EDSD 366 or equivalent; and Bachelor’s degree and minimum of one year of full-time teaching experience at the secondary level or above.
– This course covers the long chain of events from the birth of the universe in the Big Bang, through the formation of galaxies, stars, and planets by focusing on the scientific questions, technological challenges, and space missions pursuing the search for origins in alignment with the goals and emphasis of the National Science Education Standards.

PHYS 589 GRADUATE CONSULTATION
F, S, Su 3 cr. TUT
PREREQUISITE: Master’s standing and approval of the Dean of Graduate Education.
– This course may be used only by students who have completed all of their coursework (and thesis, if on a thesis plan) but who need additional faculty or staff time or help.

PHYS 590 MASTER’S THESIS
F, S 5 cr. IND Maximum credits unlimited.
PREREQUISITE: Master’s standing.

PHYS 689 DOCTORAL READING & RESEARCH
On Demand 5 - 8 cr. IND Maximum 15 cr.
PREREQUISITE: Doctoral standing.
– This course may be used by doctoral students who are reading research publications in the field in preparation for beginning doctoral thesis research.

PHYS 690 DOCTORAL THESIS
F, S, Su 1-10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing.

POL 206 THE GOVERNMENT OF THE UNITED STATES
F, S, Su 3 cr. LEC 3
– Examines the major institutions of national government and politics. Special emphasis on the constitution and other political rules of the game as shapers of public consciousness and government policy.

POL 208 STATE AND LOCAL GOVERNMENT AND POLITICS
S 3 cr. LEC 3
– Examines the changing role of state and local government in the American federal system. Emphasis on the constitutional basis of the distribution of governing powers and upon the problems confronting state and local government in Montana.

POL 214S PRINCIPLES OF POLITICAL SCIENCE
F 3 cr. LEC 3
– Major concepts and values of democracy in the United States including the founding, power, behavioral concepts, and sense of community.

POL 241D INTRODUCTION TO INTERNATIONAL RELATIONS
F 3 cr. LEC 3
– A survey of the major global issues and the means nation-states use to resolve them. The students will explore the concepts of sovereignty, the elements of power, and the global trends of regionalism and internationalism.

POL 251 CONDUCTING POLITICAL INQUIRY
S 3 cr. LEC 3
PREREQUISITE: POLS 206.
– Research design and measurement of political behavior at the level of the individual and the political unit. Techniques of gathering and analyzing attitudinal data, voting records, policy outputs, and other political variables. Use of nonparametric statistics.

POL 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
– Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand for requesting a regular course number.

POL 299R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
– Classroom instruction associated with directed undergraduate research/creative activity projects.

POL 299R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated
– Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

POL 301 PARTIES AND ELECTIONS
F alternate years, to be offered 2005 3 cr. LEC 3
PREREQUISITE: POLS 206, 214, 251.
– Examines the structure and function of political parties, interest groups, and the mass media in the electoral process. Special emphasis on electoral rules and citizen participation from a comparative democratic perspective.

POL 302 MEDIA & POLITICS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: POLS 206, 214, 251.
– Explores role of the media in the political process with special emphasis on various print media, television, film, and cyberspace.

POL 304 THE U.S. PRESIDENCY
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: POLS 206, 214, 251.
– The American presidency as a government institution. Examination of the legal, political, administrative, and policy making roles of the president. Emphasis on recent issues of responsiveness to national needs and public accountability.

POL 306 THE LEGISLATIVE PROCESS
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: POLS 206, 208, 214, 251.
– Examines legislative decision-making in a constitutional, political, and comparative context. Special emphasis on how institutional rules and relationships shape the making of public policy at both the Congressional and state legislative level.
POLS 321 CLASSICAL POLITICAL THOUGHT
F 3 cr. LEC 3
PREREQUISITE: POLS 206, 214, 251.
- Themes and issues in political discourse from Plato through Rousseau with emphasis on contemporary relevance.

POLS 322 MODERN POLITICAL THOUGHT
S 3 cr. LEC 3
PREREQUISITE: POLS 206, 214, 251.
- Significant modern and postmodern thinkers, ideologies, utopias, movements, and discourses. May include variants of liberalism, Marxism, anarchism, feminism, political ecology, Freud, and political dimensions of popular culture and cultural theory.

POLS 324 AMERICAN POLITICAL THOUGHT AND POPULAR CULTURE
F, S, Su 3 cr. LEC 3
PREREQUISITE: POLS 206, 214, 251.
- Political issues in American life revealed in ideas of major thinkers and mass popular culture including film, television, and popular music. Review of social science approaches to analysis of mass culture.

POLS 331 COMPARATIVE DEMOCRACY
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: POLS 206, 214, 251.
- Conceptual and theoretical approaches to democracy as system and process in selected contexts.

POLS 334 POLITICAL MOVEMENTS AND CHANGE
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: POLS 241.
- Theoretical and empirical social science approaches to political movements, resistance cultures, and protest and change in selected contexts, both historical and contemporary. Behavior of individuals in mass and revolutionary movements, in cults, and through acts of terrorism is examined.

POLS 456 ADMINISTRATIVE LAW & REGULATION
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: POLS 241 and junior standing.
- Emphasis on the administrative state and regulatory policy. Emphasis on the constitutional and statutory basis for administrative law and the public policy effects which flow from administrative rulemaking.
POLS 460R SENIOR CAPSTONE SEMINAR
F, S 3 cr. SEM
PREREQUISITE: Senior standing, POLS major.
- Senior capstone course. Required course for graduation. Students examine the major concerns and issues in the discipline of political science in a mentored research project.

POLS 470 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, cumulative GPA of 2.5 or better, consent of instructor, and approval of the department head.
- Directed research and study on an individual basis.

POLS 476 INTERNSHIP
F, S, Su 6 - 12 cr. IND 5-11 RCT 1-2
PREREQUISITE: Junior standing, cumulative GPA of 2.5 or better, consent of instructor, and approval of department head.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

POLS 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

POLS 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: POLS 490 or junior standing.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

POLS 555 HUMAN RESOURCES MANAGEMENT
F alternate years, to be offered 2007-8 cr. LEC 3
PREREQUISITE: POLS 554, graduate standing.
- The development of the concept of "public service" in the United States. Topics include historical development of public personnel, position classification, recruitment and selection, equal opportunity, affirmative action, collective bargaining and flexible employment relationships under more limited and decentralized government.

POLS 557 PUBLIC BUDGETING & FINANCE
S alternate years, to be offered 2008-9 cr. LEC 3
PREREQUISITE: POLS 554, graduate standing.
- Public sector budgeting as a tool for financial management and the implementation of fiscal and programmatic policy. Emphasis on the political context.

POLS 558 PUBLIC ORGANIZATION DYNAMICS
F alternate years, to be offered 2006-7 cr. LEC 3
PREREQUISITE: POLS 554, graduate standing.
- Examines alternative organization structures for public management and the influence of those structures upon organization behavior and performances. Influence of management styles and individual differences are examined as well as issues relating to personal development and organizational mission. Public and non-profit organizations are contrasted.

POLS 559 PROGRAM EVALUATION AND POLICY ANALYSIS
S alternate years, to be offered 2007-8 cr. LEC 3
PREREQUISITE: POLS 554, graduate standing.
- Methods of program evaluation and policy analysis for public programs. Quantitative and qualitative methods of analysis are contrasted. Implementation, utilization, and political context of the analysis and evaluation process are examined. Philosophical and ethical issues underlying alternative methods are examined.

POLS 560 ETHICS AND PUBLIC SERVICE
S alternate years, to be offered 2008-9 cr. LEC 3
PREREQUISITE: POLS 554.
- Explores ethics and selected issues in public service and policy making through theoretical and case study approaches. Emphasis on the relation of continuing issues and problem areas to individual careers in policy making and administrative decision making.

POLS 562 LOCAL GOVERNMENT ADMINISTRATION
F alternate years, to be offered 2006-7 cr. LEC 3
PREREQUISITE: POLS 554, graduate standing.
- Training in the administration of municipal and county governments for graduate students who intend a career in agencies of these governments, or instate and federal agencies whose programs focus on local governments.

POLS 570 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

POLS 574 DIRECTED PROFESSIONAL RESEARCH PROJECT
F, S 3 cr. RCT 3
PREREQUISITE: Graduate standing.
- Write, complete, and present a graduate professional paper under the supervision of a faculty mentor.

POLS 576 INTERNSHIP
F, S, Su 3-12 cr. IND 10-11 RCT 1-2 Maximum 12 cr.
- An individualized preprofessional assignment arranged with an agency, business, or other organization.

POLS 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering, consent of instructor.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand.

POLS 588 PROFESSIONAL DEVELOPMENT
On Demand 1 - 3 cr. May be repeated; maximum 3 cr.
PREREQUISITE: Graduate standing, teaching experience and/or current employment in a school organization, consent of instructor and Dean of Graduate Education.
- Courses offered on a one-time basis to fulfill professional development needs of inservice educators. A specific focus is given to each course which is appropriately subtitled.

POLS 589 GRADUATE CONSULTATION
F, S, Su 1-3 cr. IND
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their course work (and thesis if on a thesis plan) but who need additional faculty or staff time or help.

PSPP Plant Sciences
Department of Plant Sciences and Plant Pathology
(406) 994-4832

PSPP 101CS INTRODUCTION TO BIOTECHNOLOGY
F 3 cr. LEC 3 SEM
- Introduction to an ever-growing industry. Course is designed to demonstrate the significance of biotechnology in today's world. Lecture series presented by research professors, social scientists, and industrial experts. Cross-listed with VTMB 101 and MB 110.

PSPP 102CS PLANT SCIENCE, RESOURCES AND THE ENVIRONMENT
S 3 cr. LEC 3
- Provides an understanding of basic plant science principles and environmental components that impact humankind and develop solutions to problems. Real-life case histories will be emphasized with a career goal emphasis on science, resources, the environment, and the transfer of technologies.

PSPP 131 LANDSCAPE DESIGN HISTORY/THEORY
S 3 cr. LEC 3
- Introduction to the history of landscape design from ancient civilizations to the present. The evolution of design theory as it relates to visual arts, material palettes, climate, ecology, cultural, and social issues. Current trends in landscape industry and the work of major designers will be studied.
PSPP 212 METHODS IN BIOTECHNOLOGY  
F, S cr. LAB 4  
This course will challenge students in the biotech major to learn a series of essential molecular techniques focusing on research and faculty interaction. The techniques learned will be highly applicable to the biotech industry, giving students a post-graduation competitive edge.

PSPP 225 LANDSCAPE GRAPHICS  
F, S cr. LEC 1 LAB 2  
PREREQUISITE: ME 116 or TE 230 or AutoCAD experience.  
Landscape graphic communication including drafting and presentation drawing with computer applications of site analysis, site planning, landscape design, planting design, and irrigation design using LandCADD software.

PSPP 231 WOODY ORNAMENTALS  
F 3 cr. LEC 1 LAB 1  
PREREQUISITE: BIOL 101 (may be used as a corequisite).  
Identification characteristics, adaptations and uses of coniferous trees, deciduous trees, coniferous shrubs, deciduous shrubs, and woody vines commonly used as ornamentals in Montana and some species utilized outside of Montana. Lab includes extensive plant walks.

PSPP 232 HERBACEOUS ORNAMENTALS  
S 3 cr. LEC 2 LAB 1  
PREREQUISITE: BIOL 101.  
Corequisite: BIOL 101.  
Identification characteristics, cultural requirements and ornamental uses of indoor tropical foliage and flowering plants, herbaceous landscape annuals and perennials, flowering bulbs, and water gardening plants.

PSPP 234 HORTICULTURE SCIENCE AND TECHNOLOGY  
S 3 cr. LEC 3  
PREREQUISITE: PSPP 102.  
Anatomy, morphology, phylogeny and physiology of horticultural crops. Provides an in-depth examination of the major fields in horticulture science.

PSPP 242 CROP IDENTIFICATION  
F 1 cr. LAB 1  
Meets first third of semester. Recognition and identification of seed, vegetative parts, and floral structure of the major species of cereals, forage legumes, and grasses.

PSPP 250 IDENTIFICATION OF SEED PLANTS  
S 4 cr. LEC 2 LAB 2  
PREREQUISITE: BIOL 101.  
Identification of coniferous, trees and shrubs, and herbaceous seed plants; determination by use of manuals; vocabulary, classification and nomenclature; preparation and collection of seed plant specimens. Cross-listed with BIOL 290.

PSPP 280 SPECIAL TOPICS  
On Demand 1 - 4 cr. Maximum 12 cr.  
PREREQUISITE: None required, but some may be necessary by each offering department.  
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

PSPP 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION  
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr. Corequisite: PSPP 290.  
Classroom instruction associated with directed undergraduate research/creative activity projects.

PSPP 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY  
F, S 1 - 4 cr. RCT May be repeated  
Corequisite: Freshman or sophomore standing and approval of instructor.  
Undergraduate research which may culminate in a research paper, journal article, or other creative project.

PSPP 305 PRACTICAL GENETICS  
S 3 cr. LEC 5  
Corequisite: BIOL 102 214.  
Examination of the modes of inheritance, gene expression and genetic manipulation of eukaryotic organisms, particularly those of flowering plants and mammals. Population genetics, genetic diversity and quantitative genetics are also discussed.

PSPP 310 TURFGRASS MANAGEMENT  
S 3 cr. LEC 2 LAB 1  
PREREQUISITE: BIOL 101, Quantitative Reasoning Core, and PSPP 254.  
Turfgrass propagation, fertilization, establishment, and maintenance. Recognition and adaptability of Northern and Southern turfgrasses used for landscape and sports use. Includes irrigation principles and basic hydraulics, establishment and fertilizer calculations, and pest management. Lab includes experimentation with establishment techniques, equipment calibration, soil testing, and turfgrass maintenance.

PSPP 318 BIOMETRY  
F 3 cr. LEC 5  
PREREQUISITE: MATH 150 and computer literacy.  
Analysis and interpretation of biological data. Topics include: analysis of frequency data, probability distributions, hypothesis testing, one-way analysis of variance, linear regression, and correlation. Use of computer software in solving problems.

PSPP 331 PLANTING DESIGN  
F 3 cr. LEC 1 STU 2  
Corequisite: PSPP 231 (may be taken as a corequisite).  
Graphic communication skills, landscape trends and styles, landscape design principles, and planting design for engineering, architectural, climate control, and aesthetic uses. Emphasis on residential landscape planning. Specification writing and cost estimating for landscape installation.

PSPP 335 SITE DEVELOPMENT  
S 4 cr. LEC 3 LAB 1  
PREREQUISITE: MATH 150, PSPP 331.  
Site analysis, site survey, structure siting, roadway and parking lot planning, grading and earthwork modifications, site drainage, pedestrian circulation design. Lab includes practical assistance with problem-solving and field measurement for: site analysis, boundary survey, leveling and topographic survey.

PSPP 336 LANDSCAPE CONSTRUCTION  
S 4 cr. LEC 2 LAB 2  
PREREQUISITE: PSPP 331, PSPP 335 (may be taken as a corequisite).  
Understanding of construction materials used to create the built landscape. Design and production of working drawings for walls, patios, steps, ramps, retaining walls, decks, fences, irrigation systems, and other landscape features. Production of landscape construction portfolio which details a complete site development project including cost estimating and bidding for construction.

PSPP 357 VEGETABLE PRODUCTION  
F alternate years, to be offered 2007 3 cr. LEC 3  
PREREQUISITE: PSPP 102 or PSPP 251.  
Modern production practices for all major temperate-zone vegetable crops, including crop management, crop growth and development, storage, and post-harvest physiology. The class will include production of transplants and detailed discussion of several major vegetable crop families, including Solanaceae, Cucurbitaceae, Brassicaceae, Liliaceae, and the Fabaceae.

PSPP 358 FRUIT PRODUCTION  
F alternate years, to be offered 2008 3 cr. LEC 3  
PREREQUISITE: PSPP 102 or PSPP 251.  
Modern production practices for all major temperate-zone tree and small fruit, including crop management, fruit crop growth and development, storage, and post-harvest physiology. The class will include a discussion of rootstocks, grafting, pruning, trellising, and quality control as they impact today's fruit production system.

PSPP 359 FIELD CROP PRODUCTION  
S alternate years, to be offered 2008 3 cr. LEC 3  
PREREQUISITE: PSPP 102.  
Production of field crops using practical and applied crop management principles. Emphasis includes understanding of crop management principles and application of problem solving capabilities to field crop management situations.

PSPP 362 FORAGES  
F 3 cr. LEC 3  
PREREQUISITE: PSPP 102.  
Principles of applied forage crop management including establishment, irrigation, fertilization, pests, harvesting, and forage integration of many legume and grass species.

PSPP 421 CONCEPTS OF PLANT PATHOLOGY  
S 3 cr. LEC 2 LAB 1  
PREREQUISITE: BIOL 101.  
An introductory course in the study of plant diseases. Includes plant pathogens, etiology of disease, and various control strategies.

PSPP 422 PLANT DISEASE CONTROL  
S alternate years, to be offered 2007 3 cr. LEC 3  
PREREQUISITE: PSPP 421 or consent of instructor.  
This course will provide comprehensive coverage of the concepts of integrated management of plant diseases. Concepts covered include regulatory, cultural, chemical, host plant resistance, and biological controls. Students will be introduced to epidemiology and weather-based predictive computer models for use in disease management programs.
PSPP 423 MYCOLOGY
F alternate years, to be offered 2008 3 cr. LEC 2 LAB 1
PREREQUISITE: BIOL 101.
This course surveys the immense diversity of fungi, including all major groups, with emphasis on structures, life cycles, identification, and ecology. It provides a basis of knowledge for the rapidly expanding relevance of fungi in research, medicine, agriculture, biotechnology, and industry.

PSPP 426 PLANT BIOTECHNOLOGY
S 3 cr. LEC 2, LAB 1
PREREQUISITE: BCHM 540 or BIOL 301 or PSPP 350.
Humans have historically altered plants to meet food and fiber needs. Our ability to transfer genes from organisms to organisms is accelerating this process. The principles of plant genetic engineering will be discussed along with hands-on laboratory experience.

PSPP 429 BIOTECHNOLOGY
CAPSTONE SEMINAR
S 2 cr. SEM 2
PREREQUISITE: Junior or Senior standing.
Senior capstone course. Participants in this seminar section will bring closure to the student's required internship. Students will have the opportunity to refine their public speaking and writing skills through synthesis of the goals, progress, and outcome of their industrial or research laboratory experience. Exposure to many different types of internship outcomes will broaden the student's perception of the disciplines which contribute to the field of biotechnology.

PSPP 431 LANDSCAPE MANAGEMENT
F 3 cr. LEC 3
PREREQUISITE: BIOL 101, PSPP 234.
- Maintenance of landscape plants on public grounds, athletic fields, golf courses, and commercial and residential properties. Includes planting, transplanting, pruning, and fertilization techniques for woody plants. This course synthesizes knowledge from other horticulture studies and related science courses through the writing of papers and essay questions and thorough oral discussion.

PSPP 432 ADVANCED LANDSCAPE DESIGN
F 4 cr. LEC 1, STU 3
PREREQUISITE: PSPP 351, PSPP 355, PSPP 356.
- Advanced graphic communication skills, environmental land use planning, master plan design, site specific design, and construction detailing. Individual and group problem-solving skills are stressed through graphic, verbal, and written landscape design solutions.

PSPP 433R PLANT PROPAGATION
S 3 cr. LEC 2, LAB 1
PREREQUISITE: CHEM 121 or 131, PSPP 234.
- Sexual and asexual reproduction of plants including seed germination, micropropagation, stem and leaf cuttings, grafting, and layering. Includes discussion of the biology and physiology of propagation methods. Lab includes experimentation with the various propagation methods.

PSPP 434 GREENHOUSE MANAGEMENT
S 3 cr. LEC 2 LAB 1
PREREQUISITE: CHEM 121 or 131, PSPP 234.
- Focus is on greenhouse design and operation, including environmental control systems, growing media, irrigation, and fertilization systems. Emphasis on retail and wholesale management strategies and the marketing of greenhouse crops. Insect and disease identification and integrated pest management strategies explored. Lab will investigate herbaceous ornamentals and vegetable production techniques.

PSPP 435 NURSERY MANAGEMENT
F alternate years, to be offered 2006 3 cr. LEC 2 LAB 1
PREREQUISITE: Junior standing and CHEM 121 or 131, PSPP 234.
- Addresses all aspects of production of field and container grown ornamental crops including nursery design, environmental concerns, marketing, and current issues. A 5-day field trip is mandatory.

PSPP 438 MARKET GARDENING
Su, 3 cr. LEC 1, LAB 3
PREREQUISITE: PSPP 102, LRES 201, and Junior standing.
- Focus is on the production of quality vegetable, herb, and flower products for sale through local, regional, or non-traditional marketing avenues. Special attention is made to present and analyze sustainable food crop production systems.

PSPP 439 HORTICULTURAL WEEDS
F alternate years, to be offered 2007 4 cr. LEC 3 LAB 1
PREREQUISITE: PSPP 234 and PSPP 250 and BCHM 122.
- Integrated management of landscape weedy species focusing on weed identification, weed biology and ecology, and biological, cultural and chemical weed control strategies. Includes herbicide families, mode of action and injury symptoms and calculations of rates and calibration of application equipment.

PSPP 441 CROP BREEDING
S alternate years, to be offered 2007 3 cr. LEC 3 LAB 1
PREREQUISITE: PSPP 254 and PSPP 250 and BCHM 122.
- Application of genetic principles in improving important agronomic and horticultural plant species. Traditional methods of hybridization as well as methods of non-sexual gene transfer are included.

PSPP 450 PLANT PHYSIOLOGY
S 3 cr. LEC 3
PREREQUISITE: Junior standing, BIOL 101, and one of the following: CHEM 215, CHEM 311, or BCHM 122.
- Physiological process of higher plants, including photosynthesis, water relations, mineral nutrition, development, stress physiology, and biotechnology. Cross-listed with BIOL 450.

PSPP 454 AGROSTOLOGY
F alternate years, to be offered 2007 3 cr. LEC 1 LAB 2
PREREQUISITE: BIOL 230.
- Determination, classification, evolution, and nomenclature of grasses and grass-like plants; morphological and ecological features; preparation of reference specimens. Cross-listed with BIOL 454.

PSPP 456 PLANT SYSTEMATICS
F alternate years, to be offered 2008 3 cr. LEC 1 LAB 2
PREREQUISITE: BIOL 101, BIOL 230.
- Introduction to the local vascular plant flora emphasizing characteristics of the common families and genera. Lab concentrates on plant identification of common angiosperm plant families in Montana; preparation of about 120 reference specimens taken from the local flora. Cross-listed with BIOL 436.

PSPP 457 PLANT DEVELOPMENT
F alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: BIOL 301.
- Cellular and molecular mechanisms of the development of plants. Topics include developmental differences between plants and animals, regulation of gene expression, environmental effects on plant development, and computer modeling of development. Cross-listed with BIOL 487.

PSPP 458 PLANT CELL PHYSIOLOGY
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: BIOL 501, BCHM 540.
- The features of plant cells that differentiate them from animal cells are the chief topics covered. These include cell walls, plastos and vacuoles. Other cellular organelles will also be briefly covered, including intra- and inter-cellular communication mechanisms.

PSPP 460 PLANT METABOLISM
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: BIOL 230, BCHM 540.
- In-depth overview of plant metabolism: photosynthesis including C4 and CAM metabolism; intermediary metabolism; lipid; nitrogen and sulfur assimilation and metabolism; amino acid biosynthesis; secondary metabolism (terpenoids, alkaloids, phenylpropanoids, flavonoids); metabolic changes during plant development.

PSPP 470 INDEPENDENT STUDY
On Demand 1-5 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- Directed research and study on an individual basis.

PSPP 476 INTERNSHIP
On Demand 2-4 cr. IND Maximum 12 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of department head.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

PSPP 480 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand.

PSPP 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. RCT May be repeated.
Maximum 4 cr.
COREQUISITE: PSPP 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.
PSPP 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1 - 4 cr. IND
PREREQUISITE: Junior or Senior standing and approval of instructor.
- Undergraduate research which may culminate in a research paper, journal article, or undergraduate thesis.

PSPP 500 SEMINAR
F, S 1 cr. SEM Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Students prepare, present, and critique scientific presentations.

PSPP 516 RESEARCH DESIGN AND ANALYSIS
F 3 cr. LEC 3
PREREQUISITE: STAT 401.
- Data analysis and interpretation of problems unique to agricultural and biological research.

PSPP 518 PLANT VIRUS DISEASES
F alternate years, to be offered 2006 3 cr. LEC 3
- An in-depth study of viruses with emphasis on plant viruses.

PSPP 519 PLANT VIRUS DISEASES LAB
F alternate years, to be offered 2006 1 cr. LAB 1
COREQUISITE: PSPP 518.
- Laboratory exercises related to plant virology.

PSPP 524 ADVANCED PLANT PATHOLOGY
F alternate years, to be offered 2007 3 cr. LEC 3
This course is designed to give graduate students in the Department of Plant Sciences & Plant Pathology or other departments a broad survey of plant pathology subject matter at the graduate level and to give all graduate students in PSPP a common experience and introduction to PSPP graduate faculty. This course will serve as a companion to ‘Genetic Plant Improvement (PS 542) taught in spring 2008 and alternate years by our plant breeding faculty.

PSPP 525 PLANT BACTERIAL DISEASES
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: PS 421.
- An in-depth study of bacteria and their etiology in causing plant disease.

PSPP 527 PLANT BACTERIAL DISEASES LAB
F alternate years, to be offered 2007 1 cr. LAB 1
PREREQUISITE: PS 421.
COREQUISITE: PSPP 525.
- Laboratory exercises related to the study of plant bacterial diseases.

PSPP 531 PHYSIOLOGY OF HOST-PARASITE INTERACTIONS
S alternate years, to be offered 2008 1 cr. LAB 1
PREREQUISITE: PS 424.
- Advanced study of the physiological and biochemical aspects of host-parasite interactions.

PSPP 541 ADVANCED PLANT GENETICS
F alternate years, to be offered 2007 4 cr. LEC 5
LAB 1
PREREQUISITE: PSPP 441.
- Theory and practice of genetic analysis and genome modification in higher plants. Development of familiarity with current and classical literature is stressed as is sound hypothesis formulation and research project planning.

PSPP 542 GENETIC PLANT IMPROVEMENT
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: PSPP 441, STAT 401.
- The past, present and future of plant improvement. Emphasis on genetic principles underlying classical plant breeding, and on molecular biological principles underlying plant genetic engineering.

PSPP 546 HERBICIDE PHYSIOLOGY
F 3 cr. LEC 3
PREREQUISITE: BCHM 540 and PSPP 450 or equivalents.
- A team-taught, distance delivery course on the biochemistry and physiology of herbicide action in plants. Herbicide discovery, classification, and mechanisms of action and resistance are explored.

PSPP 548 FLOWERING PLANTS OF THE NORTHERN ROCKY MOUNTAINS
Su alternate years, to be offered 2008 2 cr. LEC 2.
- A field oriented study of the flowering plants of Montana with an emphasis on plant keying skills. Objectives are: 1) to identify the parts of flowering plants and become familiar with botanical terms; 2) to learn morphological characteristics of common plant families; 3) to learn how to use a plant key to successfully identify flowering plants; application of these skills and botanical texts to the classroom.

PSPP 552 ADVANCED SOIL AND ENVIRONMENTAL MICROBIOLOGY
S alternate years, to be offered 2006, 2008 3 cr. LEC 3
PREREQUISITE: Graduate standing and instructor's permission.
- Advanced laboratory course. Microorganisms are targeted for isolation and characterization, emphasizing those not normally encountered in general microbiology laboratory. Biogeochemical cycling, contaminant biodegradation, extremophiles, and plant-microbe interactions are typical topics investigated. Students employ classic and novel cultivation approaches, identifying microbes based on morphology, physiology, and phylogeny. Cross-listed with LRES 552.

PSPP 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor, approval of Department Head and Dean of Graduate Education.
- Directed research and study on an individual basis.

PSPP 575 PROFESSIONAL PAPER
F, S, Su 1-10 cr. IND 1-10 cr.
PREREQUISITE: Graduate standing.
- A research or professional paper or project dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

PSPP 576 INTERNSHIP
On Demand 2 - 4 cr. IND Maximum 12 cr.
PREREQUISITE: Graduate standing, consent of instructor and approval of Department Head, and Dean of Graduate Education.
- An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

PSPP 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand.

PSPP 588 GRADUATE CONSULTATION
F, S, Su 5 cr. IND
PREREQUISITE: Master’s standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their coursework (and thesis, if on a thesis plan), but who needs additional faculty or staff time help.

PSPP 600 DOCTORAL THESIS
F, S, Su 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing.

PSY Psychology
Department of Psychology
(406) 994-3801

PSY 100S INTRODUCTORY PSYCHOLOGY
F, S 3 cr. LEC 2 RCT 1
- Introduction to methods and approaches to psychology including exploration of problems in physiological psychology, learning, memory and information processing, abnormal behavior, and social psychology, with selected individual study of other areas related to the student's interests.

PSY 201D CONTEMPORARY ISSUES IN HUMAN SEXUALITY
On Demand 5 cr. LEC 3
- Issues of diversity and difference in human sexuality will be examined. The development and expression of sexual behavior as a complex sociocultural, biological, psychological, and historic phenomenon will be discussed. Course will examine sexual behavior and identity in both the majority culture and other cultures in the U.S. and world.

PSY 221 RESEARCH DESIGN AND ANALYSIS I
F, S 4 cr. LEC 5 LAB 1
PREREQUISITE: PSY 100.
- Introduction to the design and analysis of psychological research. Topics include logic and philosophy of psychological research, conceptualizing research questions, hypothesis testing, data collection and analysis strategies used by researchers in psychology, and introduction to using statistical software for data analysis.
PSY 453 INDUSTRIAL & ORGANIZATIONAL PSYCHOLOGY
On Demand 3 cr. LEC 3
PREREQUISITE: PSY 231.
Basic concepts and theoretical frameworks for the fundamental areas of industrial and organizational psychology. Topics include history of I/O psychology, personnel selection, psychological testing, personnel training, performance appraisal, managerial decision making, job satisfaction, work motivation, leadership, job stress, organizational conflict, job design, and organizational development.

PSY 462 PSYCHOLINGUISTICS
On Demand 3 cr. LEC 3
PREREQUISITE: PSY 100 and either PSY 361 or ENGL 236.
Examines the psychological processes that make it possible for humans to learn and acquire language. Emphasizes on how spoken and written language is understood, how speech is produced, and how language is acquired.

PSY 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor.
Directed research and study on an individual basis.

PSY 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

PSY 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT
PREREQUISITE: Junior or Senior standing, PSY 231 and consent of instructor.
Course prerequisites as determined for each offering.
Classroom instruction associated with directed undergraduate research/creative activity projects.

PSY 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
PREREQUISITE: Junior or Senior standing, PSY 231 and consent of instructor.
Course prerequisite: PSY 489.
Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

PSY 491 FIELD PRACTICUM
IN APPLIED PSYCHOLOGY
F, S, Su 3 - 12 cr. IND May be repeated. Max 12 cr.
PREREQUISITE: Junior or Senior standing, PSY 231 and consent of instructor.
Exposure to the various roles and demands of a field setting, including specialization in one of the following areas: applied research, behavior modification, psychological assessment, industrial/organizational behavior, or others (to be arranged).

PSY 493R SENIOR THESIS CAPSTONE
F, S 3 cr. SEM 3
PREREQUISITE: PSY 489 and 490 (minimum 3 cr.) or PSY 491.
Senior capstone course. Written and oral presentation of senior thesis work.

PSY 500 SEMINAR
On Demand 1 cr. SEM Maximum 4 cr.
PREREQUISITE: Graduate standing or consent of instructor.
Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

PSY 501 ADVANCED RESEARCH DESIGN AND ANALYSIS
F 8 cr. LEC 1 LAB 2
PREREQUISITE: PSY 231 or graduate standing.
Advanced topics in the design and analysis of psychological research.

PSY 539 PHYSIOLOGICAL PROCESSES
S 3 cr. LEC 3
PREREQUISITE: Graduate standing or consent of instructor.
Overview of research methods and relevant aspects of neurophysiology, neuroanatomy and neuropharmacology. Applications of prior work to the problem of discovery in biopsychology.

PSY 540 SENSORPERCEPTUAL PROCESSES
On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing or consent of instructor.
Overview of theories and methods of psychophysics and selected content areas within perception. Application of research design skills to specific problem areas in perception.

PSY 541 COGNITIVE PROCESSES
S 3 cr. LEC 3
PREREQUISITE: Graduate standing or consent of instructor.
Theories, methods, findings, and applications concerning memory and cognitive processes.

PSY 542 LEARNING
S 3 cr. LEC 3
PREREQUISITE: Graduate standing or consent of instructor.
Principles and theories of learning and motivation. Topics include conditioning, learning, incentive motivation, reward and punishment. Application to organizational and human resource management problems.

PSY 544 SOCIAL PSYCHOLOGY
F 3 cr. LEC 3
Graduate standing or consent of instructor.
Advanced experimental research and theoretical viewpoints in social psychology. Topics include social cognition, interpersonal attraction, aggression, attitudes and attitude change, the self, group dynamics, stereotypes and prejudice, and social influence.

PSY 545 ORGANIZATIONAL PSYCHOLOGY
On Demand 3 cr. LEC 3
PREREQUISITE: Graduate standing or consent of instructor.
Introduction to major concepts and theories in organizational psychology through examination of research, theory and application in organizational psychology topics such as organizational entry and socialization, leadership, motivation, group processes, conflict, job design, and personality.

PSY 550 SOCIAL COGNITION
S 3 cr. LEC 3
PREREQUISITE: Graduate standing.
This course examines decision making, judgment, cognition, and affect from a social-cognitive perspective. Topics may include theory development, stereotypes, prejudice and discrimination, group behavior, attitudes, and attitude change, mood and affect, heuristics and biases, memory, the self, and decision making. The primary goal is to understand theory and research in social cognition.

PSY 570 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Graduate standing, consent of instructor.
Directed research and study on an individual basis.

PSY 575 RESEARCH OR PROFESSIONAL PAPER/PROJECT
F, S 1 - 6 cr. IND. Maximum 6 cr.
PREREQUISITE: Graduate standing.
A research or professional paper dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee.

PSY 580 SPECIAL TOPICS
On Demand 1 - 4 cr.
PREREQUISITE: Graduate standing and consent of instructor.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

PSY 589 GRADUATE CONSULTATION
F, S 1 - 4 cr. RCT
PREREQUISITE: Graduate standing and approval of Dean of Graduate Education.
This course may be used only by students who have completed all of their course work (and thesis, if on a thesis option) for a master's degree but who need additional faculty help or time.

PSY 590 MASTER'S THESIS
F, S 1 - 10 cr. IND. Maximum 15 cr.
PREREQUISITE: Graduate standing.

RELS
Religious Studies
Department of History & Philosophy
(406) 994-4395

RELS 105D INTRODUCTION TO THE STUDY OF RELIGION
On Demand 3 cr. LEC 3
The great themes of the world's religions and the methodological approaches to the academic study of religion and culture.

RELS 110D RELIGION, CONFLICT AND POLITICS
F 4 cr. LEC 3 RCT 1
This course will focus on issues in which political events and conflict have had their roots in religion or in specific interpretations of different aspects of religion.
COURSE DESCRIPTIONS: RELS 202D - RELS 490R

RELS 202D ASIAN RELIGIONS - HINDUISM AND BUDDHISM
On Demand 3 cr. LEC 3
The sacred texts and the historical forms of religious thought and practice in the traditions of India.

RELS 203D ASIAN RELIGIONS - FROM TAOISM TO ZEN
On Demand 3 cr. LEC 3
The sacred texts and images of the religious thought and practice in the traditions of China, Korea, and Japan.

RELS 204H INTRODUCTION TO HEBREW BIBLE
On Demand 3 cr. LEC 3
The Hebrew Bible (Old Testament) and its interpreters will be studied from literary, historical, archaeological, anthropological, and cultural perspectives.

RELS 205H INTRODUCTION TO THE NEW TESTAMENT
On Demand 5 cr. LEC 1 RCT 2
The New Testament and its interpreters will be studied from literary, historical, archaeological, anthropological, and cultural perspectives.

RELS 206H ORIGINS OF GOD
On Demand 3 cr. LEC 3
The history and roots of varieties of concepts of the divine in Judaism, Christianity, and Islam.

RELS 207H IMAGES OF JESUS
On Demand 3 cr. LEC 3
Images of Jesus in the Bible, Apocryphal and Gnostic literature and contemporary novels, plays, films, and visual arts, as well as contemporary biblical scholarship.

RELS 217H RELIGION AND SCIENCE
On Demand 3 cr. LEC 3
The histories of religious world-views and their responses to scientific thought.

RELS 220H INTERPRETATION OF AMERICAN RELIGION
On Demand 3 cr. LEC 3
Religion in America and America as religion: an examination of figure, texts, and material culture in religious traditions that create twenty-first century America. This includes issues in the history of American religious traditions, myth, cultural imagery, thought, trends, and practices.

RELS 223 NATURE AND CULTURE
S alternate years, to be offered 2008 3 cr. LEC 2 RCT 1
The roots of the western world views of nature: the development of western scientific theories and technologies: gender, ethnicity, and class influences on descriptions of nature; and a survey of nonwestern views of nature and society.

RELS 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
-Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

RELS 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
Classroom instruction associated with directed undergraduate research/creative activity projects.

RELS 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-5 cr. IND may be repeated
Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

RELS 320 PHILOSOPHY OF RELIGION
On Demand 3 cr. LEC 3
PREREQUISITE: One of the following: PHIL 105, PHIL 120, RELS 206, RELS 207, PHIL 220, PHIL 231, or PHIL 290.
-Analysis of concepts of God, revealed truth, and immortality; the nature of religious emotion and experience, and of religious language; relation of faith to reason; traditional proofs of God's existence; the problem of evil.

RELS 351 GENDER AND RELIGION
On Demand 3 cr. LEC 2 RCT 1
PREREQUISITE: One of the following: HUM 204, RELS 105, RELS 110, RELS 202, RELS 203, RELS 204, RELS 205 or RELS 220.
-Investigation of metaphors and myths of gender and world cultures.

RELS 352 LITERATURE AND RELIGION
On Demand 3 cr. SEM 3.
PREREQUISITE: At least two 200 level courses in any one or combination of Religious Studies, English, Humanities, Modern Languages; or permission of the instructor.
-Exploration of the relationship between the sacred and the aesthetic in a variety of ancient, modern, and postmodern texts.

RELS 356 MYSTICS, FOUNDERS, REFORMERS
On Demand 3 cr. SEM 3.
PREREQUISITE: One of the following: RELS 105, RELS 202, RELS 203, RELS 204, RELS 205, RELS 206, RELS 207, or permission of the instructor.
-The varieties of religious experience and the varieties of theories describing and analyzing those texts considered mystical. Questions of foundation and reformation periods considered in light of mystical experience.

RELS 358 RELIGION AND SOCIETY IN ANCIENT EGYPT
On Demand 3 cr. LEC 3
PREREQUISITE: RELS 105, RELS 110, RELS 204, RELS 205, RELS 206, or RELS 207.
-Survey Egyptian culture, religion, and society from the beginning of the history of a unified Kingdom of Ancient Egypt in the middle of the third millennium BCE through the Hellenistic conquest of Egypt by Alexander the Great in 322 BCE.

RELS 359 ISMS - THE RELIGIOUS BACKGROUND OF SOCIAL & POLITICAL CATEGORIES
S alternate years, 2008 3 cr. LEC 3
PREREQUISITE: RELS 105 or RELS 110 or consent of instructor.
-This course will examine the religious roots of various social and political categories in today's world, which might include, among other, nationalism, fundamentalism, and sexism, and examine the means by which these religiously-influenced categories have affected contemporary society and events.

RELS 402 THE NATURAL, THE UNNATURAL, AND THE SUPERNATURAL
On Demand 4 cr. SEM 4
PREREQUISITE: One of the following: HUM 205, RELS 202, RELS 205, RELS 204, RELS 206, RELS 220 or permission of the instructor.
-Investigating biblical, medieval, American, Taoist, and Buddhist views of nature, ways of categorizing nature and the sacred, and implications of traditional images for contemporary thought.

RELS 405 TEXT AND IMAGE
On Demand 4 cr. LEC 3 RCT 1
PREREQUISITE: One of the following: RELS 105, RELS 110, RELS 204, RELS 205, RELS 206, HUM 201 or HUM 205.
-If western religions are grounded in an icomoclastic imagination, what are the theories of reading and of seeing? This course examines the histories of literacy and of visual representation as keys to the foundations of western culture and religion.

RELS 410 PSYCHE AND THE SACRED
On Demand 3 cr. LEC 3
PREREQUISITE: One of the following: RELS 105, RELS 202, RELS 203, RELS 204, RELS 205, HUM 201, or permission of the instructor.
-This course is a cross cultural investigation of the idea of personhood, including theories of the individual, the social, the body, and the transpersonal and trans-temporal.

RELS 450 INDEPENDENT STUDY
On Demand 1 - 4 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

RELS 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
-Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

RELS 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
COREQUISITE: RELS 490.
-Classroom instruction associated with directed undergraduate research/creative activity projects.

RELS 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
PREREQUISITE: Junior standing and consent of department head.
- Directed undergraduate research.
SOC
Sociology
Department of
Sociology and Anthropology
(406) 994-4201

SOC 101S SOCIOLOGICAL INQUIRY
F, S 3 cr. LEC 3
- Theoretical and methodological underpinnings of sociology. How theory guides investigation of social life and results in creation of factual knowledge. How sociological questions are studied and results are interpreted.

SOC 150D SOCIAL DIFFERENCE
F, S 3 cr. LEC 3
- Examination of social differences by focusing on the construction and consequences of a limited set of ascribed social characteristics: race, ethnicity, gender, sexual orientation and class. Focus on how these ascribed statuses are central to the sociological study of inequality.

SOC 201 INTRODUCTION TO JUSTICE IN THEORY AND PRACTICE
F 3 cr. LEC 3
- This course is an overview of the institutions that comprise our justice system. The emphasis is on criminal justice and the sources of crime but topics relevant to the broader study of the law and justice are included.

SOC 202 INTRODUCTION TO THEORY AND ANALYSIS
On Demand 3 cr. LEC 3
PREREQUISITE: SOC 101.
- How sociologists look at social phenomena from different theoretical and methodological perspectives. Selected social issues relevant to contemporary society are analyzed.

SOC 212 SOCIAL PROBLEMS
On Demand 3 cr. LEC 3
- Major social problems such as human deviance, discrimination, crime, mental illness, and economic inequality. These problems will be considered primarily as consequences of cultural premises and values in American society. Competing theoretical explanations.

SOC 218 QUANTITATIVE TECHNIQUES
F, S 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course; Quantitative core course.
- Topics covered include: Levels of measurement; measures of central tendency; dispersion and association; normal curve, statistical inference; logic of quantitative comparison and decision making utilized by social scientists; introduction to data collection techniques.

SOC 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. labs 1-3 may be repeated
- Classroom instruction associated with directed undergraduate research/creative activity projects.

SOC 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 14 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

SOC 301 INTRODUCTION TO SOCIAL THEORY
F, S 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Introduction to major sociological theories with focus on the implications for the development of empirical research. Theory as a set of tools to guide research. The explanations provided by theorists are compared and their contributions to the study of selected social phenomena are discussed.

SOC 303 SOCIAL PSYCHOLOGY
S 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Social behavior of the individual in the group, linguistic behavior, social perception, motivation and learning, and self-focus on symbolic interaction.

SOC 304 SOCIAL STRATIFICATION
Varies, to be offered F 2006, F 2007, S 2008 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, STAT 216 or SOC 218.

SOC 305 SOCIOLOGY OF SPORT
On Demand 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Designed to mesh personal experience and knowledge of sport phenomena with empirical evidence and sociological theory related to competitive physical activity or sport. Sociological concepts such as race, class, gender, political economy and socialization will be applied and illustrated.

SOC 307 SOCIOLOGY OF CHILDHOOD AND ADOLESCENCE
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Examination of cultural and societal forces influencing development among children and adolescents from a sociological perspective.

SOC 309 POPULATION AND SOCIETY
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Distribution, growth trends, and future prospects of human population numbers in local, national, and world communities including analysis of birth, death, and migration changes. Elementary methods and theories of demographic analysis.

SOC 310 SOCIOLOGY OF DEVIANCE
S 3 cr. LEC 3
PREREQUISITE: Junior standing, SOC 101, Quantitative core.
- Varieties of social deviance including legal, mental, sexual, and religious. Theories of general deviance, the social setting in which types of deviance take place, and the relationship between forms of deviance and social organization.

SOC 311 CRIMINOLOGY
Varies, to be offered F 2006, F 2007, S 2007 3 cr. LEC 3
PREREQUISITE: SOC 101, Quantitative core.
- Discussion of major theories of crime and delinquency with special attention to systems of adult and juvenile deterrence.

SOC 313 PRINCIPLES OF LAW AND PROCEDURES
F, S 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- This course introduces the student to fundamental American legal principles as developed in both the civil and criminal law. In addition, the student will gain a basic understanding of key issues in the application and development of contemporary legal procedures.

SOC 314 FAMILY AND SOCIETY
On Demand 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- The family as a structural and functional unit in social life and organization, as a unit of social control; its status, change, and associated problems.

SOC 319R RESEARCH METHODS
F, S 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Introduction to research methods in sociology with emphasis given to defining variables, hypothesis formation, and development of strategies used to test hypotheses. Student research project.

SOC 325 SOCIOLOGY OF RACE AND ETHNICITY
Varies, offered Fall 2006, Spring 2007, Fall 2007 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Historical, comparative, and social psychological study of race and ethnic relations in the U.S. and elsewhere. Power, prejudice, and discrimination relating to minority status are emphasized.

SOC 326 SOCIOLOGY OF GENDER
Varies, offered Fall 2006, Fall 2007, Spring 2008 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Examines the social and biological bases of gender; how gender is constructed through socialization, social interaction and institutional processes, and the social, cultural and economic consequences of gender differences for men and women.

SOC 329 ENVIRONMENTAL SOCIOLOGY
On Demand 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
SOC 333 SOCIOLOGY OF EDUCATION
On Demand 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- This course will focus on the relationship between education and society including the role of education in structuring socialization; racial, ethnic, gender, and class stratification; human capital development; economic, political, and labor market opportunities; and the political system.

SOC 351 SOCIOLOGY OF SCIENCE AND TECHNOLOGY
On Demand 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- It has been said that the "fresh power" in society comes from science. This course explores that statement as well as the social forces that shape science and technology and the roles of technologies in our daily lives.

SOC 352 SOCIETY AND CONSUMPTION
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: SOC 101 and Quantitative core.
- This course analyzes long-standing questions within consumer society through the lens of race-class-gender. The focus is on: the historical evolution of consumer society; the relationship between consumption and identity; the impacts of consumption on the environment; and consumption's global dimensions.

SOC 355 LAW & INEQUALITY
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Analysis of law, legal processes, and legal and quasi-legal institutions from sociological and philosophical perspectives. Some issues that are addressed include the functions of the law in modern society, the issue of the law's power (or impotence) in the everyday, and the law's violence.

SOC 357 OCCUPATIONAL AND CORPORATE CRIME
F alternate years, to be offered 2006 3 cr. LEC 5
PREREQUISITE: SOC 101 and Quantitative core.
- A sociological analysis of crimes committed by individuals within the work place and by corporations. Addressed are the extent of the problems, social costs, legal responses, and theoretical perspectives assessing the etiology of such crimes.

SOC 363 POLITICAL SOCIOLOGY
On Demand 3 cr. LEC 3
PREREQUISITE: SOC 101, Quantitative core.
- Power. Who has it, who doesn't, and why. Political Sociology explores the omnipresence of power in society from political power in government to power relationships in our day-to-day lives. Political economy will also be examined.

SOC 365 SOCIOLOGY OF GLOBALIZATION
S 3 cr. LEC 3
PREREQUISITE: SOC 101 or equivalent course, Quantitative core.
- Examining the global interconnectedness of economic, political and cultural processes. Topics covered include theories and historical analysis of globalization, global culture and consumerism. The human struggles that accompany these changes including gender, family, and immigration.

SOC 367 SOCIETY AND CONSUMPTION
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: SOC 101 and Quantitative core.
- The historical development of law enforcement practices, contemporary police issues and the role of police in democratic society.

SOC 400 SEMINAR
F, S, Su 1 - 12 cr. IND
PREREQUISITE: Senior standing, SOC 391, and at least one additional upper division sociology course.
- Senior capstone course. The application of theory and methods in the development of an integrated framework for understanding and explaining issues of current concern. Verbal and written presentation of research paper.

SOC 401 CORRECTIONAL INSTITUTIONS
F 3 cr. LEC 3
PREREQUISITE: SOC 301, SOC 318.
- Examination of philosophical and sociological theories of punishment. Critical analysis of the distribution of punishment across different socioeconomic groups in the U.S.; historical and contemporary prison issues are explored.

SOC 403 POLICE AND SOCIETY
On Demand 3 cr. LEC 3
PREREQUISITE: Consent of instructor and approval of department head.
- The practical application of research skills through the development of an original project, work on a project already underway, or work on an appropriate project with an outside agency. Students are supervised by a faculty member and are expected to demonstrate competency in the application of research skills.

SOC 410 RESEARCH PRACTICUM
F, S, Su 1 - 3 cr. IND
PREREQUISITE: SOC 318 and approval of department head.
- An individualized assignment arranged with an instructor, approval of department head, and at least one additional upper division sociology course.
- Directed research and study on an individual basis.

SOC 415 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

SOC 421 INTERNSHIP
On Demand 3 cr. LEC 3
PREREQUISITE: Consent of instructor, approval of department head, and at least one additional upper division sociology course.
- An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field. See departmental qualification standards for internships.
SOC 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

SOC 489R UNDERGRADUATE RESEARCH/CREATIVe ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: SOC 518
COREQUISITE: SOC 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

SOC 500 UNDERGRADUATE RESEARCH/CREATIVe ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

SOC 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

SOC 570 INDEPENDENT STUDY
On Demand 1 - 5 cr. IND
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.
- Directed research and study on an individual basis.

SOC 600 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular need, or given on a trial basis to determine acceptability and demand.

STAT
Statistics
Department of Mathematical Sciences
(406) 994-5601

The Department of Mathematical Sciences enforces prerequisites. By University policy, in order for any course to serve as the prerequisite you must earn a "C" or better. In addition to the specific prerequisite courses listed, students in 100 level math courses and STAT 216 may also meet the prerequisite with the appropriate Math ACT, Math SAT, or Math Placement Exam score. Specific levels and scores for these courses can be found at: www.math.montana.edu/undergrad/prereq_flow.html

STAT 216Q ELEMENTARY STATISTICS
F, S, Su 3 cr. LEC 3
PREREQUISITE: C or better in any 100 level or above MATH course, or Math Placement Test within the past 12 months.
- Conventional notation and equations are used to explain traditional and robust estimates of location and variability, fundamentals of probability theory, confidence intervals, and tests of hypothesis for normal distributions.

STAT 217 INTERMEDIATE STATISTICAL CONCEPTS
F, S, Su 3 cr. LEC 3
PREREQUISITE: STAT 216.
- One- and two-sample tests and associated confidence intervals for means and proportions; one-way analysis of variance; F-tests, correlation, regression, contingency tables. Statistical analysis using the computer.

STAT 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

STAT 289R UNDERGRADUATE RESEARCH/CREATIVe ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT may be repeated.
PREREQUISITE:STAT 299.
- Classroom instruction associated with directed undergraduate research and creative activity projects.

STAT 332 STATISTICS
SOC 318, or STAT 401.
PREREQUISITE: STAT 217, or STAT 332, or STAT 401.
F, S 3 cr. LEC 3
- Contingency, table analysis, Poisson regression, logistic regression, log linear models, multicategory classification and multiple comparisons, simple and multiple linear regression.

STAT 332 STATISTICS
FOR SCIENTISTS & ENGINEERS
F, S 3 cr. LEC 3
PREREQUISITE: STAT 217, or STAT 332, or STAT 401.
- Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting material.

STAT 401 APPLIED METHODS IN STATISTICS
F, S 3 cr. LEC 3
PREREQUISITE: Graduate standing and STAT 216.
This course is intended for graduate students not majoring in a mathematical science.
- Graphical techniques, data collection plans, populations, samples, and sampling distributions, inference on means and proportions of one and two populations, analysis of variance for one-way classifications and multiple comparisons, simple linear regression.

STAT 410 APPLIED MULTIPLE REGRESSION
F, S 3 cr. LEC 3
PREREQUISITE: One of the following: STAT 217, STAT 332, or STAT 401.
- Linear regression analysis with one response variable and one or more predictor variables. Statistical inference, diagnostics, and remedial measures, and model building methods are discussed.

STAT 412 ANALYSIS OF VARIANCE & DESIGN OF EXPERIMENTS
F, S 3 cr. LEC 3
PREREQUISITE: One of the following: STAT 217, STAT 332, or STAT 401.
- One way, two-way and higher-way layouts ANOVA; interaction, fixed, random and mixed effects; completely randomized design, randomized complete block design, Latin square design and nested designs.

STAT 420 PROBABILITY
F 3 cr. LEC 3
PREREQUISITE: MATH 224.
- Fundamentals of probability; discrete and continuous random variables; expected value; variance; joint, marginal, and conditional distributions; conditional expectations; applications; simulation; central limit theorem, order statistics. Also, listed as MATH 450.

STAT 424 MATHEMATICAL STATISTICS
S 3 cr. LEC 3
PREREQUISITE: STAT 420 or MATH 430.
- Senior capstone course. Introduction to the theory of point estimation, interval estimation, and hypothesis testing. Also, listed as MATH 454.

STAT 431 NONPARAMETRIC STATISTICS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: One of the following: STAT 217, STAT 332, or STAT 401.
- The goal of the course is to train students to use and understand nonparametric statistical methods including, but not limited to, the sign test, permutation tests, Wilcoxon and Mann-Whitney tests, the Kruskal Wallis test, Spearman and Kendall's measures of association, bootstrap techniques, and smoothing methods for model fitting. The emphasis will be on methods and their interpretation rather than theory.

STAT 437 INTRODUCTION TO APPLIED MULTIVARIATE ANALYSIS
S 3 cr. LEC 3
PREREQUISITE: STAT 410.
- Classic multivariate methods, including but not limited to principal components analysis, canonical correlation analysis, factor analysis, discrimination and classification methods, and cluster analysis.

STAT 438 STATISTICAL COMPUTING AND GRAPHICAL ANALYSIS
S 3 cr. LEC 3
PREREQUISITE: One of the following: STAT 217, STAT 332, or STAT 401.
- Introduction to statistical packages SAS and S, including data importation, graphing, and basic analysis. Emphasis on use of graphical displays to explore, understand and present data.

STAT 439 INTRODUCTION TO CATEGORICAL DATA ANALYSIS
S 3 cr. LEC 3
PREREQUISITE: STAT 410.
- Contingency table analysis, Poisson regression, logistic regression, log-linear models, multicategory logit models

STAT 445 SAMPLING
F 3 cr. LEC 3
PREREQUISITE: One of the following: STAT 217, STAT 332, or STAT 401.
- Probability sampling; sources of bias and uncertainty, survey design, methods for the natural sciences and business, simple random sampling, stratified random sampling, systematic sampling, cluster sampling.
STAT 448 MIXED EFFECTS MODELS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: STAT 410 or 412.
- In depth analysis of random, fixed and mixed effects models including use of stat software and interpretation of results. Emphasis on observations correlated in time (repeated measures) and space, and on random coefficients models (e.g., growth curves).

STAT 470 INDEPENDENT STUDY
F, S, Su 1-3 cr. IND Maximum 6 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- Directed research and study on an individual basis.

STAT 476 INTERNSHIP
F, S, Su 2-12 cr. IND
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.
- An individualized assignment arranged with an agency business, or other organization to provide guided experience in the field.

STAT 480 SPECIAL TOPICS
On Demand 1-4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Course not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

STAT 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1-2 cr. RCT
PREREQUISITE: Graduate standing, consent of instructor, and approval of department head.
- An individualized assignment arranged with an agency business, or other organization to provide guided experience in the field.

STAT 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1-6 cr. IND
PREREQUISITE: Junior standing in statistics and consent of department head.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

STAT 500 SEMINAR
F, S, Su 1 cr. SEM 1 Maximum 6 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

STAT 501 INTERMEDIATE PROBABILITY & STATISTICS
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: STAT 484.
- Families of distributions, distributions of functions of random variables, limiting distributions, order statistics.

STAT 502 INTERMEDIATE MATHEMATICAL STATISTICS
S alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: STAT 501.
- Estimation, likelihood inference, statistical hypothesis tests, sufficient statistics, exponential families, Bayesian statistics.

STAT 505 LINEAR MODELS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: MATH 335 or MATH 441, STAT 424 and either STAT 410 or STAT 412.
- Special matrix theory for statistics, multivariate normal distribution, distributions of quadratic forms, estimation and testing for the general linear model, one-way and two-way classification models, contrasts (main effect, simple effect and interaction), multiple comparison techniques.

STAT 506 ADVANCED REGRESSION ANALYSIS
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: STAT 505.
- Applications of linear models using statistical packages S and SAS; detecting and dealing with violations of assumptions including nonconstant variance, nonnormality, and collinearity; influence in the general linear model.

STAT 510 STATISTICAL CONSULTING SEMINAR
F, S 1 cr. SEM 1 Maximum 6 cr.
PREREQUISITE: Graduate standing in statistics.
- Seminar discussions of issues and cases in statistical consulting. Supervised practice in consulting with researchers from various disciplines.

STAT 520 TOPICS IN APPLIED STATISTICS
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: STAT 424 and consent of instructor.
- Current topics selected from computational statistics, time series and spatial statistics, decision theory, sampling, linear and mixed models, and multivariate statistics.

STAT 522 STOCHASTIC PROCESSES
S alternate years, to be offered 2008 3 cr. LEC 3
PREREQUISITE: STAT 420 or an equivalent transfer course in probability theory.
- Conditional probability theory, discrete and continuous time markov chains including birth and death processes and long run behavior; Poisson processes; queueing systems; system reliability.

STAT 524 BIOSTATISTICS
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: STAT 410 or STAT 412.
- Statistical methodology applicable to vital statistics, life tables and survival curves, clinical trials, epidemiologic investigations, and cause-effect studies.

STAT 526 EXPERIMENTAL DESIGN
F alternate years, to be offered 2006 3 cr. LEC 3
PREREQUISITE: STAT 410 or STAT 412.
- Randomization, multiple comparisons and contrasts, balanced complete and incomplete blocking designs, Latin square designs, factorial designs, nested designs, split-plot designs, random and fixed effects.

STAT 528 STATISTICAL QUALITY CONTROL
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: STAT 420 or an equivalent transfer course in probability theory.
- Modeling process quality, traditional SQC tools, control charts, variables and attribute data, CUSUM and UWMA charts, process capability analysis, reliability statistics, accelerated testing.

STAT 532 BAYESIAN DATA ANALYSIS
F alternate years, to be offered 2007 3 cr. LEC 3
PREREQUISITE: STAT 424 and STAT 502.
- Decision theory including loss functions, minimax criteria, shrinkage estimators, Bayesian data analysis and applications including posterior simulation via markov chain monte carlo.
COURSE DESCRIPTIONS: STAT 580 - TE 500

STAT 580 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Upper division courses and others as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

STAT 880 GRADUATE CONSULTATION
F, S, Su 3 cr. TUT
PREREQUISITE: Master's standing and approval of the Dean of Graduate Education.
- This course may be used only by students who have completed all of their coursework (and thesis, if on a thesis plan) but who need additional faculty or staff time.

STAT 900 MASTER'S THESIS
F, S, S 1 - 10 cr. IND Maximum credits unlimited.
PREREQUISITE: Master's standing.

STAT 689 DOCTORAL READING & RESEARCH
F, S, Su 3 - 5 cr. IND Maximum 15 cr.
PREREQUISITE: Doctoral standing.
- This course may be used by doctoral students who are reading research publications in the field in preparation for doctoral thesis research.

STAT 690 DOCTORAL THESIS
F, S, Su 1-10 cr. IND Maximum credits unlimited.
PREREQUISITE: Doctoral standing.

TE Technology Education
Department of Education (406) 994-3120

TE 101 INTRODUCTION TO TECHNOLOGY EDUCATION
F 1 cr. LEC 1
- Introduction to the rationale, principles, concepts, and philosophy of technology education. An overview of the TE Program options is provided through a variety of class activities.

TE 113 BASIC ELECTRONICS/COMPUTER NETWORKS
S 2 cr. LEC 1 LAB 1
- Provides basic understanding of electricity/electronics as it can be used to control devices. Basic principles and theory behind computer networking are also reviewed.

TE 200 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
- Topics offered at the lower division level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

TE 207 MATERIALS AND PROCESSES
F 4 cr. LEC 2 LAB 2
- Exploration of technical competencies using tools and equipment common to wood, metal, composite materials.

TE 214 MATERIALS MACHINING AND SAFETY
S alternate years, to be offered 2008 3 cr. LEC 1 LAB 2
PREREQUISITE: TE 207
- Materials processing information and laboratory practice with emphasis on laboratory/machine facility safety. Machine tool technology practices emphasized.

TE 230 2-D COMPUTER-AIDED DRAFTING
F, S 5 cr. LEC 1 LAB 2
- Provides the learner with an understanding of two-dimensional computer-aided drafting. Study includes instruction to the use of a complete computer-aided drafting system. Course content is structured in a manner which does not require prior knowledge of computer systems.

TE 250S TECHNOLOGY & SOCIETY
F, S 3 cr. LEC 3
- The major technological periods, inventions, and innovations that have altered the course of humanity. Analysis of the organization of the civilization process, leading to a perspective on technological literacy. An examination of current technology related media.

TE 290 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

TE 299R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

TE 299R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 14 cr. IND may be repeated
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

TE 530 TRANSPORTATION TECHNOLOGY
S alternate years, to be offered 2007 3 cr. LEC 1 LAB 2
PREREQUISITE: TE 104 and TE 207
- Systems analysis of transportation technologies. Study of transportation systems of land, sea, and air, and the dependence on energy forms to operate transportation systems. Development of technological literacy pertinent to transportation and energy systems through problem solving activities.

TE 331 ELECTRONIC AND VIDEO COMMUNICATION TECHNOLOGY
S 4 cr. LEC 2 LAB 2
- Electronic communication systems which have been developed to encode, transmit, receive, decode, store, and retrieve information. Telecommunication systems which include voice, data, and video. Students explore the technical and technological concepts of these systems and sub-systems.

TE 350 TECHNOLOGY PRACTICUM
F, S 3 cr. LAB 3
PREREQUISITE: Consent of Instructor.
- Self-selected, self-directed interdisciplinary field experience arranged with and supervised by an academic advisor. This practicum will pertain to the transfer of technological literacy in a variety of settings.

TE 409R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

TE 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S, Su 1 - 6 cr. IND May be repeated. Max 12 cr.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.

TE 500 SEMINAR
On Demand 1 cr. SEM 1 Maximum 4 cr.
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering.
- Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.
TE 501 HISTORY & PHILOSOPHY OF TECHNOLOGY EDUCATION
On Demand 3 cr. LEC 3
PREREQUISITE: EDSD 452
- A study of educational trends related to industry. Also, national trends and issues in technology education and their implications for program development at the local and state level.

UH University Honors
University Honors Program
(406) 994-4110

UH 150S THE ECONOMICS OF LIFE
F 3 cr. LEC 3
PREREQUISITE: Member of University Honors Program.
- This class applies the concepts and methods of economics to the choices people make during their life cycles. Students will explore economic analysis of issues such as marital choices, child bearing, voting, explanations for the rise in obesity, the effect of legalized abortion, and the advantages and disadvantages of estate taxes. The course encourages students to apply economic concepts to diverse topics, to assess the difficulty of empirically testing the predictions of an economic model, and to debate the current research in economics.

UH 201US TEXTS AND CRITICS: KNOWLEDGE
F 4 cr. SEM 4
PREREQUISITE: Restricted entrance; admission to the University Honors Program.
- University Seminar in critical reading/analysis of fundamental texts in the humanities, arts, communication, social studies, science, and history of ideas. Socratic teaching methodology. Particular emphasis on development of analysis and criticism through argument, writing, and oral communication. Academic writing and oral argumentation presentations.

UH 202 TEXTS AND CRITICS: IMAGINATION
S 4 cr. SEM 4
PREREQUISITE: Restricted entrance; admission to the University Honors Program.
- Critical reading/analysis of fundamental texts in the humanities, arts, communication, social studies, science, and history of ideas. Socratic teaching methodology. Particular emphasis on development of analysis and criticism through argument, writing, and oral communication. Academic writing and oral argumentation presentations. Honors students completing this course are exempt from the IH requirements in the core.

UH 204 GREAT EXPEDITIONS
On Demand 2 cr. SEM 2 Maximum credits unlimited.
PREREQUISITE: Consent of instructor.
- Preparation and execution of an expedition paralleling a portion of a historically and/or culturally significant expedition. Students study the original expedition journals, history, social, scientific, artistic, and environmental context as well as plan their own expedition. The expedition occurs over a vacation break and students are required to make a public presentation on the expedition and their specific research project during the subsequent semester.

UH 210 MENTORING GIFTED CHILDREN
F, S 2 cr. SEM 2 Maximum 4 cr.
PREREQUISITE: Admission to the University Honors Program.
- University Honors Program students mentor gifted children from the Bozeman Public Schools. Students meet together in seminar discussion, plan and implement projects, and evaluate their projects.

UH 270 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of Director.
- Directed research and study on an individual basis.

UH 280 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: None required but some may be determined necessary by each offering department.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

UH 280R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S 1-3 cr. RCT 1 May be repeated.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

UH 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
F, S 1-6 cr. IND may be repeated.
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

UH 400 HONORS SEMINAR
On Demand 2 - 4 cr. SEM Maximum credits unlimited.
PREREQUISITE: UH 201 and UH 202.
- Advanced Honors seminars are interdisciplinary courses which emphasize class discussion, development of analytic thinking and writing skills, and encourage independent creativity/research.

UH 401A HONORS RESEARCH SEMINAR IN THE ARTS
On Demand 2 - 4 cr. SEM Maximum credits unlimited.
PREREQUISITE: UH 201 and UH 202.
- Advanced Honors seminars are interdisciplinary courses which emphasize class discussion, development of analytic thinking and writing skills, and require independent creativity/research.

UH 402R HONORS RESEARCH SEMINAR IN THE HUMANITIES
On Demand 2 - 4 cr. SEM Maximum credits unlimited.
PREREQUISITE: UH 201 and UH 202.
- Advanced Honors seminars are interdisciplinary courses which emphasize class discussion, development of analytic thinking and writing skills, and require independent creativity/research.

UH 403R HONORS RESEARCH SEMINAR IN THE SOCIAL SCIENCES
On Demand 2 - 4 cr. SEM Maximum credits unlimited.
PREREQUISITE: UH 201 and UH 202.
- Advanced Honors seminars are interdisciplinary courses which emphasize class discussion, development of analytic thinking and writing skills, and require independent creativity/research.

UH 404RN HONORS RESEARCH SEMINAR IN THE NATURAL SCIENCES
On Demand 2 - 4 cr. SEM Maximum credits unlimited.
PREREQUISITE: UH 201 and UH 202.
- Advanced Honors seminars are interdisciplinary courses which emphasize class discussion, development of analytic thinking and writing skills, and require independent creativity/research.

UH 450 ADVANCED HONORS TUTORIAL
F, S 4-6 cr. RCT 4 TUT 2 May be repeated; maximum 12 cr.
PREREQUISITE: UH 201 and UH 202.
- Weekly seminar and tutorial supervision with extensive interdisciplinary reading, analytic writing, and oral argument, leading to comprehensive examinations.

UH 451 ADVANCED HONORS TUTORIAL
F, S 4 - 6 cr. RCT 4 TUT 2 May be repeated; maximum 12 cr.
PREREQUISITE: UH 450, admission to the University Honors Program, and approval of Director.
- Weekly seminar and tutorial supervision with extensive interdisciplinary reading, analytic writing, and oral argument, leading to comprehensive examinations.

UH 470 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 12 cr.
PREREQUISITE: Junior standing, consent of instructor and approval of Director.
- Directed research and study on an individual basis.

UH 480 SPECIAL TOPICS
On Demand 1 - 4 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

UH 480R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 3 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: UH 490.
- Classroom instruction associated with directed undergraduate research/creative activity projects.

UH 490R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY/THESIS
F, S, Su 1 - 6 cr IND May be repeated. Max 12 cr.
PREREQUISITE: Admission to the University Honors Program, and approval of Director.
- Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis.
UNIV

University Courses
Department of Letters and Science
(406) 994-3120

UNIV 125CS MICROBES IN THE ENVIRONMENT
F 3 cr. LEC 3
During the semester, students will explore contemporary issues related to microorganisms in the environment through a series of lectures and hands-on activities. Topics will include microbes in the environmental, industrial, and medical settings. Examples include the beneficial role microbes play in treating wastewater, making beer, wine, cheese and other food products as well as problems caused by microbes in medical infections, hot tubs, drinking water, and other industrial systems. Completing this course will advance a student's awareness and appreciation of scientific thought, critical thinking and improve communication skills.

US

University Studies
(406) 994-3532

US 101US FIRST YEAR SEMINAR
F, S 3 cr. SEM
PREREQUISITE: First year University Studies students only.
This multi-disciplinary course, presented in seminar format, draws from the disciplines of psychology, sociology, history, and philosophy, and encourages students to explore issues critical to their academic goals and objectives. The course emphasizes verbal communication, critical thinking, intellectual development, and academic choices. Fulfills university seminar requirement of the core curriculum. This course may not be repeated.

US 102 CAREER CONNECTIONS
S 1 cr. SEM 1
Course is designed to assist students in the selection of a major in accordance with their interests and abilities.

US 270 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of the Director of University Studies.
Directed study on an individual basis.

US 280 SPECIAL TOPICS
On Demand 1 - 3 cr.
PREREQUISITE: Course prerequisites as determined for each offering.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand.

US 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: Junior standing, consent of instructor, and approval of the Director of University Studies.
The course emphasizes verbal communication, critical thinking, intellectual development, and academic choices. Fulfills university seminar requirement of the core curriculum. This course may not be repeated.

USP

Undergraduate Scholars Program
(406) 994-6833

USP 280R UNDERGRADUATE SCHOLARS PROGRAM
On Demand 1 - 4 cr. IND
PREREQUISITE: Consent of instructor and approval of the Director of University Studies.
Directed undergraduate research and/or study on an individual basis.

USP 489R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: Junior standing, consent of collaborating faculty member.
First and second year students in this course will conduct research in collaboration with a faculty member which may culminate in a research paper, journal article, or undergraduate thesis.

VTMB

Veterinary Molecular Biology
Department of Veterinary Molecular Biology
(406) 994-4705

VTMB 101CS INTRODUCTION TO BIOTECHNOLOGY
F 3 cr. LEC 2 SEM 1
Introduction to an ever-growing industry. Course is designed to demonstrate the significance of biotechnology in today's world. Lecture series presented by research scientists, covering four areas (scientific basis of biotechnology, experimental techniques, applications and societal issues). History of 20th-century biotechnology will be followed in a student seminar. Cross-listed with PS 101 and MB 110.

VTMB 270 INDEPENDENT STUDY
On Demand 1 - 3 cr. IND Maximum 6 cr.
PREREQUISITE: Consent of instructor and approval of department head.
Directed research and/or study on an individual basis.

VTMB 271 FUNCTIONAL ANATOMY OF DOMESTIC ANIMALS
F, S, Su 1-2 cr. IND Maximum 6 cr.
PREREQUISITE: BIOL 102, Sophomore standing.
Location, structure and function of various tissues, organs, and systems of domestic animals. Lab utilizes ruminants and monogastric species.

VTMB 280 SPECIAL TOPICS
On Demand 1 - 3 cr. Maximum 12 cr.
PREREQUISITE: Course prerequisites as determined by each offering.
Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

VTMB 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION
F, S, Su 1 - 2 cr. RCT May be repeated. Max 4 cr.
PREREQUISITE: BIOL 102, Sophomore standing.
Classroom instruction associated with directed undergraduate research projects.

VTMB 290R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY
On Demand 1 - 4 cr. IND
PREREQUISITE: Sophomore standing.
Directed undergraduate research.

VTMB 406 INFECTIOUS DISEASES
S 3 cr. LEC 2 RCT 1 (Changed from 4 cr)
PREREQUISITE: MB 301; Recommended MB 401.
Selected viral, bacterial and protozoan infections of man and domestic animals will be covered with an emphasis on disease process and immune responses.

VTMB 411 HYBRIDOMAS
F, S, Su 1-2 cr. IND
PREREQUISITE: MB 301 or consent of instructor.
This course will provide students with a thorough theoretical and practical appreciation and understanding of the uses and methods involved in the production of monoclonal antibodies.
VTMB 412 ADVANCED IMMUNOLOGY  
F 1 cr. LAB 1  
PREREQUISITE: MB 301, BIOL 501, or consent of instructor.  
- This course provides hands-on experience on assays commonly used in immunology for the detection of an immune response.

VTMB 413 FLOW CYTOMETRY  
F 1 cr. LAB 1  
PREREQUISITE: MB 301, BIOL 501, or consent of instructor.  
- Theory and practice of flow cytometry with an emphasis on the analysis of mammalian cells.

VTMB 414 ADVANCED MICROSCOPY  
F 1 cr. LAB 1  
PREREQUISITE: MB 301, BIOL 501, or consent of instructor.  
- Introduction to instrument design, operation and applications, and to modern techniques in preparing specimens for microscopic analyses, including computer-assisted microscopic imaging technology and microinjection.

VTMB 421 GENOME SCIENCE  
S, 5 cr. LEC 1 LAB 2  
PREREQUISITE: BCHM 340 or consent of instructor.  
- Course will train students in modern practice of genomics and functional gene expression using DNA cloning, automated DNA sequencing, and comprehensive sequence analysis.

VTMB 422 FUNCTIONAL GENE EXPRESSION  
S, 2 cr. LEC 1 DAB 1  
PREREQUISITE: BCHM 340 or consent of instructor.  

VTMB 426 ETHICAL PRACTICE OF SCIENCE  
F 8 cr. Sem 5  
PREREQUISITE: PHIL 338, PHIL 338, or at least one three-hour level series of any science course.  
- Examines the evolution, of the scientific process with specific focus on the ethical responsibilities of scientists and to examine policies and procedures developed by the scientific community to ensure integrity in the research process.

VTMB 451 VIROLOGY  
On Demand 1 cr.  
PREREQUISITE: VTMB 410 series or consent of instructor.  
- Course covers basic theories of virus replication in cells and provides practical experience in methods for virus culture, quantification, and identification.

VTMB 478 BIOENGINEERING INTERNSHIP  
F 5 cr.  
PREREQUISITE: Junior standing, consent of instructor, and approval of department head.  
- Direct supervision and study on an individual basis.

VTMB 479 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION  
S, F, Su 1-3 cr. LEC 1  
PREREQUISITE: Consent of departmental head.  
- Directed undergraduate research and creative activity may be conducted only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty and staff time or help.

VTMB 501 EXPERIMENTAL IMMUNOLOGY/PATHOLOGY  
S alternate years, to be offered 2008 3 cr. LEC 3  
PREREQUISITE: MB 401.  
- Recent advances in and history of immunocchemistry, immunogenetics, immunopathology, molecular and cellular immunology. Cross-listed with Microbiology 525.

VTMB 505 EUKARYOTIC GENE REGULATION  
S alternate years, to be offered 2007 3 cr. LEC 3  
PREREQUISITE: CHEM 442 and graduate standing.  
- Students in this course study the fundamental mechanisms of eukaryotic gene expression and this knowledge is placed within the context of modern genomics approaches. The course is divided between traditional lectures and a review of current literature in genome science, functional genomics (inRNA expression), and proteomics. Students learn basic informatics skills through a hands-on analysis of genome data with an emphasis on what can, and cannot, be learned from genome data.

VTMB 570 INDEPENDENT STUDY  
On Demand 1 - 3 cr. IND Maximum 6 cr.  
PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Education.  
- Directed research and study on an individual basis.

VTMB 580 SPECIAL TOPICS  
On Demand 1 - 4 cr. Maximum 12 cr.  
PREREQUISITE: Upper division courses and others as determined for each offering.  
- Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

VTMB 585 GRADUATE CONSULTATION  
F, S, Su 5 cr. TUT 5 Maximum credits unlimited.  
PREREQUISITE: Master’s standing and approval of the Dean of Graduate Education.  
- This course may be used only by students who have completed all of their course work (and thesis, if on a thesis plan) but who need additional faculty and staff time or help.

VTMB 589 MASTERS THESIS  
F, S, Su 1-10 cr. IND Maximum credits unlimited.  
PREREQUISITE: Master’s standing.

VTMB 699 DOCTORAL THESIS  
F, S, Su 1-10 cr. IND Maximum credits unlimited.  
PREREQUISITE: Doctoral standing.

WS  
Women’s Studies  
College of Letters and Science  
(406) 994-4288

WS 201H INTRODUCTION TO FEMINIST THEORIES AND METHODOLOGIES  
F, S 1 cr. LEC 3  
- Major directions in feminist scholarship. Examination of the various schools of thought which have addressed gender inequities, and review of the strategies of cultural criticism which incorporate gender.

WS 289R UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY INSTRUCTION  
F, S 1-3 cr. LEC 1  
- Classroom instruction associated with directed undergraduate research/creative activity projects.

WS 290 UNDERGRADUATE RESEARCH/CREATIVE ACTIVITY  
F, S 1-4 cr. IND may be repeated  
- Directed undergraduate research/creative activity which may culminate in a written work or other creative project.

WS 301RH INTEGRATIVE SEMINAR IN WOMEN’S STUDIES  
S 3 cr. SEM 3 Maximum 9 cr.  
- The seminar builds on the theoretical issues in women’s studies and addresses special topics each year from a variety of disciplines.