Courses of Instruction

The following is a listing of all courses of instruction offered by departments at LSU. This listing was up-to-date and as correct as possible at the time of publication of this catalog.

Since this catalog was prepared well in advance of its effective date, some courses may have been added, others may have been dropped, and/or changes in content may have been made.

The following are important notes concerning courses:
- General education courses are designated by stars (*) placed before the course numbers.
- Class minima are specified in PS-37, Minimum Class Size:
  - « Below 4000 ..... ................................ 15
  - « Between 4000-4999 ......... 10
  - « 5000 and above ............... 5
- No credit is given for a course unless the student has been duly registered in that course.
- The amount of credit given for the satisfactory completion of a course is based on the number of lectures each week for one semester:
  - « one credit represents at least one hour of lecture a week for one semester;
  - « two hours of laboratory (in some cases, three) are the equivalent of one hour of lecture.
- When a course consists entirely or partly of laboratory, that fact is stated in the description. When not otherwise specified, the course consists entirely of lectures.
- The number of credit hours that a course carries per semester is listed in parentheses following the course title. If the number listed is variable, i.e. (2-4), the amount of credit that the student is to receive must be stated at the time of registration.
- Indication of variable credit does not mean that a course may be repeated for credit. If a course can be repeated for credit, that information is included in the course description.
- Listing of a course does not necessarily mean that it will be offered every year. Some departments indicate in the course description the semester in which a course is usually offered. (See Key to Course Information on the next page.) If no information is given, students should contact the department to determine when the course is to be offered.
- The phrases also offered as..., see..., or same as..., which appear in some course descriptions, refer to honors courses or to cross-listed courses that are available through more than one department. In each of these instances, only one of the courses may be taken for credit.

COURSE NUMBERING SYSTEM

An explanation of the first digit of the four-digit course numbering system follows. The meaning of the second, third, and fourth digits varies by department. See “Year Classification of Students” in the “Undergraduate Degree Requirements and Regulations” section of this catalog for an explanation of the criteria for classification as a freshman, sophomore, etc.

0001-0999 • Offered by the University to strengthen students’ facility in certain basic skills; not for degree credit.
1000-1999 • For undergraduate students, primarily freshmen; for undergraduate credit only. Ordinarily open to all students; in some instances upper-division students may not take these courses for degree credit.
2000-2999 • For undergraduate students, sophomore level or above; for undergraduate credit only.
3000-3999 • For advanced undergraduate students, junior- and senior-level; for under-graduate credit only. These courses constitute the advanced portion of an undergraduate program leading to the bachelor’s degree. A student with fewer than 60 hours of credit may enroll in 3000-level courses if they meet the enrollment requirements of the college whose departments offer the courses.
4000-4999 • For advanced undergraduate students (who have completed a minimum of 60 semester hours) and students in graduate and professional schools and colleges; for undergraduate or graduate credit. Undergraduates with 30 or more semester hours who are making timely progress toward a degree may be admitted to 4000-level courses. Such students must have a 3.50 gpa or higher, the appropriate prerequisites, consent of the instructor, and permission of the dean of the student’s undergraduate college.
5000-5999 • For students in post-baccalaureate professional programs (architecture, law, and veterinary medicine). A student in the Graduate School may take these courses for credit with approval of the student’s major department.
6000-6999 • Exclusively for teachers at the elementary, secondary, and junior college levels.
7000-7999 • For students in the Graduate School; for graduate credit only except as follows. Undergraduates with 75 or more semester hours who are making timely progress toward a degree may be admitted to 7000-level courses. Such students must have a 3.50 or higher gpa, the appropriate prerequisites, consent of the instructor, and permission of the dean of the student’s undergraduate college. Credit so earned will apply only toward undergraduate degree requirements, except for students enrolled in an accelerated master’s degree program.
8000-8999 • Research courses exclusively for graduate students, primarily for students working toward the master’s degree; for graduate credit only. The number 8000 designates thesis research.
9000-9999 • Research courses exclusively for graduate students, primarily for advanced graduate students working toward the doctoral degree; for graduate credit only. The number 9000 designates dissertation research.
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**KEY TO COURSE INFORMATION**

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<td>Su</td>
<td>Course offered in summer</td>
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<td>Course offered in even-numbered years (calendar years)</td>
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<td>Course offered in odd-numbered years (calendar years)</td>
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<td>V</td>
<td>Course offered irregularly</td>
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<tr>
<td>F.S.Su</td>
<td>Course offered in fall, spring, and summer</td>
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ACCT 3001 Accounting Information Systems (3) Prereq.: ACCT 2001 or equivalent. Principles and methods of accounting primarily concerned with data gathering and presentation for purposes of internal management evaluation and decision making. Credit will not be given for both this course and ACCT 2001. 3001 Intermediate Accounting—Part I (3) Prereq.: grade of "C" or above in ACCT 2001 or equivalent; MATH 1431. Creation and use of accounting information for external reporting purposes; preparation of financial statements; understanding of financial accounting statements; application in measurement and reporting of selected balance-sheet items and related revenue and expense recognition. 3011 Intermediate Accounting—Part II (3) Prereq.: grade of "C" or above in ACCT 3001. Continuation of ACCT 3001. Accounting for liabilities, income taxes, pensions, leases, stockholders' equity, earnings per share, accounting changes and corrections of errors, and income and balance sheet presentations. 3121 Cost Analysis and Control (3) Prereq.: ACCT 3001. Nature, objectives, basic systems, and procedures of cost accounting and control for manufacturing firms; cost-volume-profit relationships; standard costs and variance analysis; direct costing; relevant costs; activity-based costing. 3122 Accounting Information Systems (3) Prereq.: ACCT 3001 and IDS 1310. Majors only or permission of instructor. Analysis and design of standard accounting systems; emphasis on computerized systems and internal control systems. 3201 Fundamental Tax Problems and Tax Planning for Individuals (3) Not open to accounting majors. Not intended to satisfy the requirements to sit for the CPA exam. For students majoring in business, economics, or related majors. 3221 Income Tax Accounting I (3) Prereq.: credit or registration in ACCT 3001. Credit will not be given for both this course and ACCT 3201. Fundamentals of federal income tax with respect to individuals and other entities, income inclusions and exclusions, and statutory deductions in arriving at taxable income. 3222 Auditing (3) Prereq.: ACCT 3011 and 3122. Theoretical and practical development of the independent audit function; generally accepted auditing standards; collection and evaluation of audit evidence; understanding of internal control; risk assessment; transaction cycles; and reporting. 3232 Internal Auditing I (3) Internal auditing standards, ethics, concepts, audit techniques, and reporting practices. 4021 Cases in Accounting Policy (3) Prereq.: accounting major with senior standing. Case approach; integrates financial accounting, systems, auditing, income tax, and management uses of accounting information; emphasis on financial reporting to owners, the financial community, regulatory agencies, and the general public; relationship of accounting to the law. 4022 Advanced Accounting (3) Prereq.: ACCT 3011; M.S. in accounting students or permission of department. Completion of the core financial accounting sequence; business combinations, consolidated financial statements, segment reporting, foreign operations, and Securities and Exchange Commission reporting procedures. 4112 Advanced Cost Analysis (3) Prereq.: ACCT 3121. Measurement, interpretation, planning, and control of manufacturing and distribution costs; budgets and implementation of cost control; comparison of costs of business alternatives. 4221 Income Tax Accounting II (1-3) Prereq.: ACCT 3211; M.S. in accounting students or permission of department. Credit will not be given for both this course and ACCT 3213. Fundamentals of federal income taxation, with respect to partners, partnerships, corporations, and shareholders. 4225 Research in Taxation (3) Prereq.: credit or registration in ACCT 3211. M.S. in accounting students or permission of department. Credit will not be given for both this course and ACCT 7150. Techniques and procedures involved in tax planning and research. 4231 Internship in Accounting (3) Prereq.: permission of instructor and department chair. Grade of "C" or above in ACCT 3221 or 3233 or 7331. Pass-fail grading. At least 20 hours per week (3 credits) of learning experience including an internship with an accounting member and direct supervision of a professional in accounting. Grading based on the faculty member’s evaluation, a written report by the professional supervisor, and a written report by the student. 4232 Advanced Auditing (3) Prereq.: ACCT 3222; M.S. in accounting students or permission of department. Independent study of advanced auditing principles and methods; responsibility for the detection and reporting of fraud; statistical sampling concepts and applications; extensions of the audit function including operational auditing, compliance auditing, and reporting on other types of financial and nonfinancial information. 4233 Case Studies in Auditing (3) Prereq.: ACCT 3233. Case studies in operational, compliance, and financial audits. 4234 Internal Auditing II (3) Prereq.: grade of "C" or above in ACCT 3233. Operation, organization, and quality control of audits; supervisor and sponsor reports. 4235 Fraud Auditing and Forensic Accounting (3) Prereq.: ACCT 3001; M.S. in accounting students or permission of department. Credit will not be given for this course and ACCT 7235. Proactive and reactive fraud auditing including audit committee and liability related issues; investigative decision making for prevention, detection, investigation, and recovery of fraud. 4236 Environmental and Safety Auditing (3) Prereq.: ACCT 3233. Compliance and legal issues relative to environmental and safety regulations; emphasis on current laws and compliance auditing methodology. 4333 Internship in Internal Auditing (3) Prereq.: Permission of instructor and department chair required. Credit will not be given for this course and ACCT 4231 or 7231 or 7331. Pass-fail grading. At least 20 hrs. per week of learning experience in internal auditing under the general supervision of a faculty member and direct supervision of a professional in internal auditing. Grading based on the faculty member’s evaluation, a written report by the professional supervisor, and a written report by the student. 4244 EDP Auditing (3) Prereq.: ACCT 3222 or 3233; M.S. in accounting students or permission of department. Credit will not be given for this course and ACCT 7244. Electronic data processing systems in auditing, control procedures, and generalized audit software systems. 4421 Governmental and Not-for-Profit Accounting (3) Prereq.: ACCT 3001. Credit will not be given for this course and ACCT 7421. Accounting, budgeting, fiscal processes, and financial records of local, state, and federal governmental bodies and of private nonprofit institutions. 4501 Petroleum Accounting (3) Prereq.: ACCT 3021 and 3121; M.S. in accounting students or permission of department. Accounting for oil and gas exploration and production, including oil and gas leases, exploration costs, undeveloped properties, drilling and development operations, production, and oil and gas revenues. 7021 Advanced Theory of Accounts (3) Prereq.: ACCT 3201 and consent of instructor; or ACCT 4022. M.S. in accounting students or permission of instructor. Corporate reporting strategies and practices by managers; preparation of financial statements, on top for both corporate financial reports. 7122 Budgeting, Cost Analysis, and Control (3) Prereq.: ACCT 3121 or 3241. Planning and controlling accounting systems for decision-making and control. 7210 Tax Aspects of Business Entities (3) Prereq.: ACCT 3021 or equivalent. Basic concepts of business entities, including partnerships, corporations, and S corporations; tax consequences of the formation and operation of a business entity, and distributions to the owners. 7212 Income Taxation of Equity Exchanges and Redemptions (3) Prereq.: ACCT 7201. Income tax consequences of the sales and exchanges of equity interests, the redemptions of equity interests, and business divisions and liquidations. 7203 Taxation of Corporations and Shareholders (3) Prereq.: ACCT 3221 or equivalent. Credit will not be given for both this course and ACCT 3121. Tax concepts of corporations, including creation, operation, ownership changes, acquisitions, liquidations, reorganizations, and computed corporate tax returns. 7210 Tax Research, Planning and Business Decision Making (3) Prereq.: ACCT 3221 or equivalent. Credit will not be given for both this course and ACCT 7221. Fundamental tax research methodology based on the Internal Revenue Code, regulations and rulings, judicial interpretations, annotated and topical tax services, computerized tax research methods, and techniques of communicating research results. 7222 Auditing Theory and Standards (3) Prereq.: ACCT 3221 or equivalent. M.S. in accounting students or permission of instructor. A comprehensive analysis of the theory and practice of independent auditing. 7231 Internship in Accounting (3) Prereq.: Permission of instructor and department chair required. Credit will not be given for this course and ACCT 4244. Selected topics in the control and audit of computer systems. 7250 Current Topics in Federal Income Taxation (3) Prereq.: ACCT 3221 or equivalent. May be taken for a max. of 6 hrs. of credit. Tax research and planning in current major interest areas of tax law. 7255 Fundamentals of Federal Income Tax (3) Prereq.: ACCT 3021 or equivalent. Federal taxation, anatomy of tax returns, current applicable laws, state tax law, congressional committee reports, and administrative pronouncements. 7256 Internal Revenue Service Practice and Procedure (3) M.S. in accounting students or permission of department. Practices and procedures of the Internal Revenue Service; client representation. 7270 Statement and Report Presentation and Analysis (3) M.S. in accounting students or permission of department. 7301 Financial Information Systems (3) Prereq.: ACCT 3122 or equivalent. M.S. in accounting students or permission of department. Basic knowledge of computers and databases. Financial information systems, with emphasis on the analysis and design of a system and its use in financial planning, control, and decision making. 7310 Tax Aspects of Personal Financial Planning (3) Prereq.: ACCT 3221. Basic concepts of estate and gift taxation and income taxes as they affect personal tax planning; emphasis on wealth accumulation. 7333 Internship in Internal Auditing (3) Prereq.: Permission of instructor and department chair required. Credit will not be given for this course and ACCT 4231 or 4233 or 7231. Pass-fail grading. At least 20 hrs. per week of learning experience in internal auditing under the general supervision of a faculty member and direct supervision of a professional in internal auditing. Grading based on the faculty member’s evaluation and a written report by the professional supervisor, and a written report by the student.
7421 Public Sector Accounting and Reporting (3) Prereq. : ACC 1001. S.S. in accounting students or permission of department. Credit will not be given for this course and ACC 4421. Public sector management competencies for executive directors, managers, accountants, and consultants for government and nonprofit organizations; topics include financial reporting, regulation, managerial, auditing, taxation, and information systems issues in governmental and nonprofit entities.

7601 International Accounting (3) S.S. in accounting students or permission of department. Accounting principles, auditing environments, managerial objectives, and financial reporting requirements applicable to multinational corporations; causes of international accounting problems.

8900 Preparation Research (1-9) May be repeated for credit. Pass-fail grading. Permission of instructor and department chair required.

9000 Dissertation Research (1-12 per sem.) “S”/“U” grading.

9001 Accounting Research I (3) For doctoral students only. Research methodologies in accounting and a survey of the accounting research literature.

9002 Accounting Research II (3) For doctoral students only. Theory and evidence relating to internal decision making and control, financial accounting, and auditing.

9003 Accounting Research III (3) For doctoral students only. Contraction of ACC 9002. Theory and evidence relating to internal decision making and control, financial accounting, and auditing.

9004 Accounting Research IV (3) For doctoral students only. May be taken for a max. of 6 hrs. of credit. Seminar in current accounting research topics.

AEROSPACE STUDIES • ASST

1001, 1002 The Foundations of the United States Air Force (1,1) S.S. Coreq.: ASST 1011, 1012. Fundamentals of leadership, effective communication, organizational elements, and weapons systems of today’s Air Force.

1011, 1012 Leadership Laboratory I (1,1) S.S. Coreq.: ASST 1001, 1002. 2 hrs. lab. Pass-fail grading. Applied leadership in drill and ceremony, physical fitness, team building, and professional development.


3003, 3004 National Security Affairs/Preparation for Active Duty (3,3) S.S. Prereq.: Permission of instructor. 3 hrs. lecture; 3 hrs. leadership lab. Organization and implementation of national security; evolution of strategy; management of conflict; and civil-military interaction; military profession/officership and the military justice system.

3005 Leadership Lab (0,0) S.S. One hour per week throughout student’s involvement in AFROTC. Experiences designed to develop leadership potential; study of Air Force customs and courtesies; drill and ceremonies; career opportunities; and the life and work of an Air Force junior officer.

AFRICAN AND AFRICAN-AMERICAN STUDIES • AAAS

General education courses are marked with stars (★).

★ 1001 Elementary Swahili Language and Culture I (4) See SWAH 1001.
★ 1002 Elementary Swahili Language and Culture II (4) See SWAH 1002.


★ 3003 or equivalent. Analysis of the agricultural commodity and food marketing system; marketing, management, and economic principles are applied to the formulation and implementation of marketing plans for agricultural commodities and branded food products; futures market trading principles.

3002 Farm Management (3) F Prereq.: AGEC 2003 or equivalent. An overview of agricultural and natural resource management concepts applied to the farm business; comprehensive and integrated treatment of management concepts for successful operation of a farm business.

3121 Agribusiness Commodity and Food Products Marketing (3) S Prereq.: AGEC 2003 or equivalent. An overview of the agricultural commodity and food marketing system; marketing, management, and economic principles are applied to the formulation and implementation of marketing plans for agricultural commodities and branded food products; futures market trading principles.

3131 Agribusiness Management Decisions (3) F Prereq.: AGEC 1003. An introduction to principles of management used in agricultural business firms; development of concepts, procedures, and analyses that facilitate planning, organizing, directing, coordinating, and controlling functions within agricultural business firms.

3503 Natural Resource Economics (3) S Prereq.: AGEC 2003 or equivalent. The study of the use and management of natural resources; public administration; public policy; and the economic implications of natural resource usage.

3700 Internship (1-3) Prereq.: AGEC 2003 or equivalent and approval of department head. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Supervised work experience in a business or organization in the food and fiber system.

3800 Agricultural Law (3) F Prereq.: AGEC 2003 or equivalent. An introduction to the legal, ethical, and regulatory environment of agricultural business firms; emphasis on the impact of agricultural law on the business environment; analysis of legal principles and the development of legal strategies that are essential for successful management of agricultural business firms.

4000 Agricultural Finance (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4001 Financial Management (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4003 Agricultural Marketing (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4005 Agricultural Policy (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4006 Agricultural Trade (3) S Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4007 Agricultural Accounting (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4008 Agricultural Economics (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4009 Agricultural Economic Analysis (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4010 Agricultural Policy and Administration (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4011 Agricultural Policy Analysis (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4012 Agricultural Policy and Administration (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4013 Agricultural Policy Analysis (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4014 Agricultural Policy and Administration (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4015 Agricultural Policy Analysis (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.

4016 Agricultural Policy and Administration (3) F Prereq.: AGEC 2003 or equivalent. Analysis of the agricultural production and investment decision process; the economic role of banks, government agencies, and nonbank financial institutions in the agricultural production and investment decision process; the impact of changes in financial institutions on agricultural production and investment; and the role of financial institutions in the agricultural economy.
3013 Summer Crop Production Laboratory (1) S-Prereq: consent of instructor. Laboratory designed to provide an understanding of the growth and practices involved in the production of rice, corn, and sorghum.

3040 Soil Conservation (2) F-Prereq.: AGRO 2051. Also offered as ECOL 1004. Course and effects of erosion and sedimentation; their effects on the quality of the environment; methods of reducing erosion and soil environmental quality.

3090 Agronomic Internship (3) F,S,Su-Prereq.: overall GPA of 2.50 and written consent of instructor. May be taken for a max. of 6 sem. hrs. when topics vary and new and special- ized topics in agricultural economics.

7003 Agricultural Economics Applications (3) S-Prereq.: ECON 1100. Applications of economic theory to issues in agricultural production, consumption of agricultural goods, and natural resource management.

9000 Thesis Research (1-2 per sem.) "S"/"C" grading.

9000 Dissertation Research (1-2 per sem.) "S"/"U" grading.

AGRICULTURE • AGRO

General education courses are marked with stars (★).

1001 Introduction to Agriculture (1) F, S-Enrollment in this course is limited to freshmen in the College of Agriculture or by permission of department. Opportunities and educational requirements in all fields of agriculture, and careers in agriculture.

★ 1005 Science and Society (3)-Principles of biology applied in a sociological context; relationships among scientific inquiry, ethics, social values, and public policies for the beginning science and non-scientist student.

AGRONOMY • AGRO

General education courses are marked with stars (★).

★ 1001 Introduction to Managed Plant Systems in the Modern World (3) S-2 hrs. lecture; 2 hrs. lab. Survey of plant kingdom; anatomy, growth, and development of plants; ecosystem structure, sustainable agriculture and animal/plant systems; plant nutrition, food additives, and food safety; plant growth and health; food and fiber; biotechnology and its role in modern agriculture.

1051 Soils and the Environment (3)-Also offered as ENPS 1051. Complexity and diversity of the earth's land surface, soil management of mismanaged soils, and use of recyclable waste materials as soil amendments.

2051 Soil Science (4)-Prereq.: CHEM 1002 or 1022 or equivalent; 3 hrs. lecture; 2 hrs. lab. Also offered as EMS 2051. Principles of soil science; properties of soils related to plant growth and the environment.

2066 Introduction to Turfgrass Management (3) See MORT 2066.

3000 Principles of Crop Production (3)-Prereq.: BIOL 1402 or equivalent. Crop production practices related to major crops grown in Louisiana and the U.S.; seed bed preparation, planting, weed and pest control; harvest and processing practices related to each major crop group.

3019 Research Problems (3)-F,S,Su-Preq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. Independent research under a faculty member, culminating in an oral and written report.

3011 Fall Crop Production Laboratory (1) F-Prereq.: credit or registration in AGRO 1000. Field and laboratory research designed to provide an understanding of the growth and practices involved in production of soybeans, cotton, and sugarcane.

3012 Spring Crop Production Laboratory (1) S-Prereq.: AGRO 1000. Field laboratory research designed to provide an understanding of the growth and practices involved in production of winter small grains.

4091 Special Topics in Crop Science (1-3)-Prereq.: written consent of instructor. May be repeated for credit; a total of 6 sem. hrs. may be earned in AGRO 4091 and 4902 combined.

4092 Special Topics in Soil Science (1-3)-Prereq.: written consent of instructor. May be repeated for credit; a total of 6 sem. hrs. may be earned in AGRO 4091 and 4902 combined.

7001 Agronomy Seminar (1)-May be repeated for credit. 1 hr. seminar; reports.

7040 Research Methods in Plant Science (3)-S,E-Preq.: AGRO 2051 or equivalent. Research activities and methodology used to conduct field research in plant science and pest management disciplines from initial planning through publication of results; areas of emphasis include: research proposal preparation and protocol development; selection of experimental design and implementation of research; data analysis, interpretation, and presentation; and manuscript preparation.

7051 Advanced Soil Fertility and Plant Nutrition (4)-S,E-Preq.: AGRO 4052 and BIOL 3060 or equivalent. 3 hrs. lecture; 2 hrs. lab. Principles of bioavailability and acquisition of mineral nutrients by crop plants; interactions of plant roots with the soil environment; fertilizer use efficiency.

7054 Plant-Herbicide Physiology (3)-F,E-Preq.: AGRO 4070 or equivalent. 2 hrs. lecture; 3 hrs. lab. Project includes several techniques used in plant-herbicide physiology research. Physiological and physical interactions of herbicides with plants; emphasis on the specific mode of action, entry, movement, metabolism, and selectivity mechanisms of specific herbicides.

7042 Soil-Pestcide Interactions (3)-F,E-Preq.: AGRO 2051 and AGRO 4070 or equivalent. Chemical, physical, and biological characteristics of soil-pesticide interactions; role of soil microbial processes in maintaining environmental quality; fate and behavior of introduced microorganisms; methods of investigation; development of a laboratory consistent with students' interests.

7057 Advanced Soil Physics (4)-F,E-Preq.: 2 hrs. lecture; 2 hrs. lab. Also offered as EMS 7057. Physical properties of the soil matrix, soil-water retention, and processes governing water, gas, and heat movement in the soil column; and nutrient and water management through influence on plant response.

7058 Advanced Pedology (3)-S,O-Theory and current literature on pedogenetic processes responsible for the physical, chemical, and mineralogical, properties found in soil environments.

8060 Agronomic Crop Breeding Techniques (1)-F,Su-2 hrs. lab. May be repeated in the alternate semester for a max. of 4 sem. hrs. of credit. Practical experience in hybridization of agronomic and horticultural crops; objectives, methodologies, and rationale of specific breeding programs; selection procedures, computerized record keeping and data management.

8068 Soil Mineralogy (3)-F,E-Preq.: GEOL 2082 or AGRO 4055 or equivalent. 2 hrs. lecture; 3 hrs. lab. Variety, distribution, and alteration of major minerals in soils; their physico-chemical properties and reactions; their significance to agriculture and the environment.

8070 Advanced Plant Breeding (4)-S,E-Preq.: AGRO 4044 and EST 7014 or equivalent. 3 hrs. lecture; 2 hrs. lab. Also offered as HORT 7070. Advanced methods of plant breeding; emphasis on breeding for insect, pathogen, and abiotic stress resistance; breeding strategies and theory; resource allocation and evaluation of breeding methodologies.

8071 Advanced Plant Genetics (4)-So-See HORT 7071.

7074 Qualitative Genetics in Plant Improvement (3)-F,E-Preq.: HORT 7063 or AGRO 7065 and EST 7022. Also offered as HORT 7074. Genotypic and environmental values, their effects, determination of heritability, quantitative and qualitative characteristics, biokinetics, dominance, overdominance, environmental influences, segregation, linkage, multiple factors, gene interactions, variances, covariances, combining ability, genetic advance, selection indices, molecular markers for quantitative trait loci.
ANIMAL SCIENCE • ANSC

1011 Introduction to Animal Science (3) F, S
Prereq.: ANSC 1011 or equivalent.
Course describes efficiency of growth, reproduction, and nutrition of animals; emphasis on dogs and cats; opportunities in veterinary medicine.

1018 Horse Production (3) F, S
Prereq.: ANSC 1012, 1 hr. lecture; 2 hrs. lab. Graduate students in animal, dairy, and poultry sciences or animal and dairy sciences may not take more than one of the following for graduate credit: ANSC 4081, 4084, 4086, or 4888.

2001 Farm Unit Internship (1) F, S
Prereq.: ANSC 1011 and consent of department head. 3 hrs. work experience. May be taken for a max. of 5 sem. hrs. of credit, one each in beef, horse, sheep, swine, and meat units. Pass-fail grading. Supervised work experience with animal behavior, vocational management skills, and livestock handling.

2060 Companion Animal Management (3) Care, feeding, breeding, health, behavior, and management of companion animals; emphasis on dogs and cats; opportunities in pet-related fields and industries.

2153 Growth and Development of Livestock (3) S
2 hrs. lecture; 2 hrs. lab. Cell, tissue, and body growth, development, and composition; patterns of tissue deposition in livestock; nutrition and utilization of normal and abnormal growth; evaluation and measurement of composition of beef, sheep, swine, and horses.

3033 Elements of Live Animal and Carcass Evaluation (3) F, S
Prereq.: ANSC 1011, 4 hrs. lecture. Basic principles and techniques involved in evaluation of meat animals and their carcasses.

3045 Advanced Live Animal and Carcass Evaluation (3) F
Prereq.: ANSC 1011, 4 hrs. lecture, 3 hrs. lab. Recent developments in animal biotechnology, nutrition, body composition, and techniques related to evaluation of meat animals.

5051 Animal Science Problems (1-6) F, S
Prereq.: consent of department head. Head. May be taken for a max. of 6 sem. hrs. of credit. Directed individual study of a problem in biotechnology, nutrition, body composition, and evaluation of meat animals. Topics include: nutrition and growth, nutrition and health, nutrition and marketing of farm animals.

5053 Meats (3) F, S
Prereq.: consent of department head. 2 hrs. lecture; 2 hrs. lab. Livestock and meat industry relationship; live animal and carcass comparison, slaughtering, processing, identification, and utilization of meat and meat products.

4010 Parasite Effects on Animal Performance (2) F
Prereq.: ANSC 4009 or equivalent. 1 hr. lecture. Endo- and ecto-parasites that affect performance of domestic animals and birds.

4009 Animal Nutrition (3) F, S
Prereq.: ANSC 1011, or equivalent.
1 hr. lecture. Basic principles of nutrition including chemical composition of feedstuffs, digestion, metabolism, and functions and values of nutrients.

4015 Principles of Animal Genetics (4) F, S
Prereq.: ANSC 1011, or equivalent. 4 hrs. lecture; 2 hrs. lab. Concepts of animal breeding and genetics as they relate to farm livestock.

4016 Quality Assurance in the Food Industry (4) S
Prereq.: ANSC 4044. 4 hrs. lecture. Fundamentals of food science including the application of quality assurance practices in the food industry.

4045 Reproductive Physiology of Farm Animals (3) F
Prereq.: ANSC 4045. 3 hrs. lecture. Reproductive physiology of farm animals and its role in animal productivity.

4060 Animal Biotechnology (3) F
Prereq.: at least 8 hrs. of biological sciences. Recent developments in animal biotechnology; development of methods to increase the efficiency of growth, reproduction, and lactation; improvement of resistance to disease and stress.

4060 Contemporary Issues in the Animal Sciences (3) F
Prereq.: ANSC 1011 or equivalent. Discussion and evaluation of contemporary issues and policies related to animal biotechnology; development of reasoning and interpersonal skills; preparation of subject matter for distribution to the public.

4071 Tropical Livestock Husbandry (3) S
Prereq.: ANSC 4071. 3 hrs. lecture. Tropical livestock and their production, nutrition, and diseases.

4081 Swine Production (3) S
Prereq.: credit or registration in ANSC 4009 or DARY 3010 or equivalent. 2 hrs. lecture; 2 hrs. lab. Graduate students in animal, dairy, and poultry sciences or animal and dairy sciences may not take more than one of the following for graduate credit: ANSC 4081, 4084, 4086, or 4888.

4084 Beef Cattle Production (3) S
Prereq.: DARY 3010 or equivalent. 2 hrs. lecture; 2 hrs. lab. Graduate students in animal, dairy, and poultry sciences or animal and dairy sciences may not take more than one of the following for graduate credit: ANSC 4081, 4084, 4086, or 4888.

4094 Meat Technology (3) S
Prereq.: ANSC 3033; and BIOL 2083 or equivalent. 2 hrs. lecture; 2 hrs. lab. Theor y and practice of cutting, grading, and feeding of beef and goats for production under southern conditions.

4095 Reproductive Physiology and Management of Zoo, Laboratory, and Companion Animals (4) F, S
Prereq.: basic course in biology or zoology, and ANSC 4045 or equivalent. 3 hrs. lecture; 2 hrs. lab. Field trips are required. Reproductive physiology of zoo, laboratory, and companion animals, with emphasis on breeding management.

4101 Environmental Control (2) F, S
Prereq.: credit or registration in EES 7014 or equivalent. Scientific methods applied to animal science.

7006 Advanced Animal Genetics (3) F
Prereq.: DARY 7091, 4 hrs. lecture. Application of genetic principles and theory to farm livestock populations.

7030 Energy in Nutrition (3) F
Prereq.: BIOL 1001, 1002, or BIOL 1502. 3 hrs. lecture; 2 hrs. lab. Basic principles of nutrition including chemical composition of feedstuffs, digestion, metabolism, and functions and values of nutrients.

7052 Biotechnology of Gametes and Embryos Physiology and Micromanipulation (4) S
Prereq.: ANSC 4045 or DARY 4045. 4 hrs. lecture; 2 hrs. lab. Procedures for manipulation of mammalian gametes in vitro and general biotechnological techniques; emphasis on application to biological research.

7061 Research in Animal Science (1-6) F, S
Prereq.: consent of department head. 1-6 hrs. lecture; 1-6 hrs. lab. Thesis research in animal science, nutrition, and production; physiology of selection; meat technology.

7075 Advanced Food Preservation (4) F
Prereq.: EES 7075. 4 hrs. lecture; 2 hrs. lab. Evisceration and cutting, grading, and refrigeration; participation in one or more archaeological excavations.

7093 Seminar (1-2 per sem.) F, S
Prereq.: credit or registration in ANSC 4045 or DARY 4045. 1-2 hrs. lecture. Special topics in animal science.

8000 Thesis Research (1-12 per sem.) S/”U” grading.
4023 Latin American Cultures (3) Spanish-American cultures in Latin America, their relationship to current societal changes.

4031 Comparative Religions (3) Also offered as REL 4031. Religious systems in different levels of sociocultural evolution.

4032 Religion, Gender, and Society (3) See REL 4032.

4040 Physical Anthropology (3) Prereq.: ANTH 1001; BIOL 1001, 1002, or BIOL 1201, 1208, 1502. Human evolution, ecological adaptation, and genetic diversity.

4050 Black Music in America (3) Cultural and historical survey of musical genes created and developed by black Americans.

4051 Africa (3) Races and cultures of Negroid Africa.

4053 African-American Cultures (3) Cultures of African-Americans in the western hemisphere; their origins, development, and present distinctiveness.

4060 Language and Culture (3) Prereq.: ANTH 3060 or ENGL 3010, or COMD 2050 or equivalent. Also offered as LING 4060. Relationships between various aspects of language and culture.

4064 Pilgrim and Creole Languages (3) Prereq.: ANTH 4060 or equivalent. Also offered as FREN 4064 and LING 4064. Linguistic, sociohistorical, and anthropological study of new languages that emerge in contact situations, particularly among peoples of different races and cultures; languages of the slave trade and European commercial expansion through the 18th century.

4074 Place and Culture (3) Also offered as GEOG 4074. Consideration of place and culture as two core concepts in geography and anthropology.

4081 Human Evolution (3) The biological and cultural evolution of the human species.

4082 Social and Cultural Anthropology (3) For graduate students with little or no anthropology background. Culture, social, and language change, primitive and complex societies.

4085 Quaternary Paleoclimatology (3) See GEOG 4085.

4087 History of Anthropological Theory (3) Major theories in all branches of anthropology; emphasis on cultural and social anthropology.

4086 Human-Environment Interactions (3) See GEOG 4086.

4090 Ethnographic Methodology (3) Theories and techniques of ethnography; emphasis on utilization of informants.

4440 Vernacular Architecture and Material Culture (3) Also offered as ARCH 4440. Subject matter and instructor may vary; additional details available from department. World vernacular architecture, including indigenous and folk buildings; other forms of material culture.

4470 Folklore of the African Diaspora (3) African, Caribbean, and African-American cultures from the viewpoint of the diasporic community.

4475 American Folklore (3) See ENGL 4475.

4499 Undergraduate Seminar in Anthropology (3) Prereq.: written consent of instructor. May be taken for a max. of 9 hrs. credit, when topics vary.

4497 Special Topics in Anthropology (3) May be taken for a max. of 6 sem. hrs. when topics vary.

4498 Independent Reading and Research in Anthropology (1-6) Prereq.: written consent of instructor. May be taken for a max. of 6 sem. hrs. When consent of ANTH 4499, also available. Supervised reading or research selected by qualified advanced students.

4499 HONORS: Independent Reading and Research in Anthropology (1-4) Same as ANTH 4499, with special honors emphasis for qualified students.

7005 Historical Linguistics (3) Prereq.: completion of one course in linguistics. Also offered as LING 7005. How and why languages change; basic concepts and methods of historical linguistics.

7006 Phonology: Theory & Methods (3) Prereq.: completion of one course in linguistics. Also offered as LING 7006. Analysis of the sounds of language; phonetic transcription; phonological processes; syllable structure; segmental and suprasegmental features; stress and tone.

7047 Poetics of Place (3) Prereq.: ANTH/GEOG 4074 or permission of instructor. Also offered as GEOG 7047. Combination of the observational method of social science with the literary insights of poetry and fiction; understanding of how humans live out their lives convey a variety of meanings beyond that of the strictly utilitarian.

7105 Seminar in Historical Archaeology (3) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary.

7108 Mesoamerican Archaeology Seminar (3) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary.

7200 Human Fertility (3) Biological, behavioral, and demographic aspects of human reproduction.

7901 Introduction to Graduate Study (1) Same as GEOG 7901. Techniques and methods of the profession for incoming graduate students.

7906 Nature of Culture (3)

7909 Selected Topics in Anthropology (3) May be taken for a max. of 9 hrs. of credit when topics vary. Also offered as LING 7909.

7954 Anthropology of Complex Societies (3) Anthropological assumptions of theory and technique; problems generated by applying these assumptions to contemporary Africa, India, Latin America, and Anglo-America.

7962 Field Methods in Linguistics (3) Prereq.: at least one upper-division or graduate linguistics course. 2 hrs. lecture; 1 hr. individual consultation. Also offered as LING 7962. Recording and analyzing a living non-European language and using a native-speaking informant.

7999 Research in Anthropology (1-6) Prereq.: written consent of instructor. May be repeated for credit up to a maximum of 18 credit hours earned in ANTH 4999 and 7999. On approval for a max. of 9 sem. hrs. Also offered as LING 7999. Individual supervision of advanced research topics.

8000 Thesis Research (1-12 per sem.) "S" or "U" grading.

**ARABIC • ARAB**

Native speakers of Arabic will not receive credit for courses marked with an asterisk (*).

*1101 Beginning Arabic (4) Supplementary work in language laboratory. Introduction to alphabet, vocabulary, and grammar; elementary language study with oral, written, and reading practice.

*1102 Beginning Arabic (4) Prereq.: ARAB 1101 or equivalent. Supplementary work in language laboratory. Continuation of ARAB 1101. Elementary language study with oral, written, and reading practice.

*2101 Intermediate Arabic I (4) Prereq.: ARAB 1101 or equivalent. Supplementary work in language laboratory. Development of writing, reading, and speaking skills.

*2102 Intermediate Arabic II (4) Prereq.: ARAB 2101. Continuation of study of Arabic. Supplementary work in language laboratory. Development of writing, reading, and speaking skills.

**ARCHITECTURE • ARCH**

General education courses are marked with stars (★).

1001 Architectural Design I (6) Prereq.: permission of department. 12 hrs. studio. Emphasis on two-dimensional representation of three-dimensional forms; development of basic skills in architectural design drawing and modeling.


2001 Architectural Design III (6) Prereq.: ARCH 1002; coreq.: ARCH 2003. 12 hrs. studio. Emphasis on abstract and theoretical organizational concepts; space, form, function, and resolution of materials and structural systems.

2002 Architectural Design IV (6) Prereq.: ARCH 2001; coreq.: ARCH 2006. 12 hrs. studio. Required field trip. Students are responsible for paying travel expenses associated with the course. Emphasis on process, materials theory, site inventory, and analysis and impact of design of buildings designed in urban or rural environments.


★2401 Appreciation of Architecture (3) Not open to architecture majors. Architectural concepts and principles.

★2402 Directed Study (3) Prereq.: permission of instructor. May be taken for a max. of 6 sem. hrs. of credit with consent of supervisor. Investigation of areas of interest not covered in other departmental courses.

3001 Architectural Design V (4) Prereq.: approval for advancement to upper division in architecture. 12 hrs. studio. Required field trip. Students are responsible for paying travel expenses associated with the course. Emphasis on programming, site analysis and planning, functional planning, and resolution of structural and architectural systems.

3002 Architectural Design VI (6) Prereq.: ARCH 3001; 3007. 12 hrs. studio. Emphasis on planning buildings while incorporating studies in the technologies of materials, structure, environment, lighting, and acoustics.


3004 Architectural Structures II (3) Prereq.: ARCH 3003. Design and application of timber and steel structures in architecture.

★3005 History of Architecture I (3) The development of architectural and spatial forms as they relate to changing perceptions of self, society, and the natural world. From prehistory to the 13th century.

★3006 History of Architecture II (3) Prereq.: ARCH 3005. The development of architectural and spatial forms as they relate to changing perceptions of self, society, and the natural world from the Italian Renaissance through modern times.

3007 Architectural Systems (3) Prereq.: approval for advancement to upper division in architecture. Detailed treatment of construction materials and systems, with emphasis on large scale application of enclosure systems and structural systems.

3008 Environmental Control Systems (3) Prereq.: approval for advancement to upper division in architecture. Principles and practices of selection and design of mechanical systems, including HVAC, plumbing, lighting, acoustics, ventilation, and fire suppression.

3457 Hands on Materials (3) V Prereq.: ARCH 2154. 6 hrs. studio. Design and physical manipulation, construction, and/or fabrication of devices or components made primarily (but not necessarily) of steel.

4001 Architectural Design VII (6) Prereq.: ARCH 3002. 12 hrs. studio. Emphasis on large, multi-user buildings with particular attention focused on site and context.

4002 Architectural Design VIII (6) Prereq.: ARCH 4001. 12 hrs. studio. Required field trip. Students are responsible for paying travel expenses associated with the course. Emphasis on the design of single or multiple buildings in urban environments.

4003 Intensive Design Studio (6) S Prereq.: admission to the M.Arch. program. 12 hrs. studio. Introduction to design, analysis, and the development of basic architectural skills.


4032 Advanced Architectural Technology (3) Prereq.: ARCH 4002. Seminar course in architectural technologies including, but not limited to building structures and environmental concerns, electronic transfer of information.
4033 Fundamentals of Architectural Technology (2) Prereq.: admission to the M.Arch. program or consent of instructor. A survey of the fundamental theories and techniques of mathematical and physical science related to the application of architectural technology.

4041 Issues in Sustainability (3) Examination of issues in sustainability as they relate to the practice of architecture.

4051 Advanced 20th Century Architectural History (3) Prereq.: ARCH 3905. Topics in 20th century architectural history and theory; writing component.

4052 Advanced Architectural History (3) Prereq.: ARCH 3905. Topics in architectural history and theory.

4062 Urban Design and Planning (3) Fundamentals of urban morphology in relation to historical, social, political, and economic systems.

4090 Restoration Studies (3) Theory and methodology of architectural restoration; topics and techniques of restoration.

4145 Louisiana and Gulf Coastal Architecture (3) History and development of Louisiana and Gulf coastal architecture from the 17th century to the present.

4155 Vernacular Historic Structures (3) Prereq.: permission of department. 1 hr. lecture; 2 hrs. lab. Hands-on field and laboratory experience in current methods of documenting historic buildings, including hand methods, photography, and photogrammetry.

4165 Applied Principles of Conservation (3) Prereq.: permission of department. 1 hr. lecture; 4 hrs. lab. Laboratory work at the ULL Rural Life Museum. Hands on work with traditional construction materials, tools, and methods; masonry, timber, bousillage, and others.

4221 Selected Topics in Architecture (3) V May be taken for a max. of 12 hrs. of credit with school approval. Studies in various subjects related to architecture.

4353 Principles and Practices of Land Development (3) Environmental, physical, and financial aspects of land development.

4440 Vernacular Architecture and Material Culture (3) See ANTH 4440.

4441 Aesthetics of Architecture (3) Prereq.: consent of instructor. Development of aesthetic theory through architectural literature.


4700 Research Methods (3) Major research methods in architecture; hypothesis formulation and testing, data gathering and analysis.

4991 Advanced Computer Applications in Design (3) F,S Prereq.: permission of department. 1 hr. lecture; 2 hrs. lab. Development and application of computer-based architectural design and communication skills.

4993 Advanced Computer Aided Architectural Graphics (3) F,S Prereq.: consent of instructor. The development and application of advanced computer-based architectural design and communication skills.

5001 Comprehensive Architectural Design (6) Prereq.: ARCH 4001, 4090, or equivalent. Emphasis on the comprehensive design of a single building integrating material selection, mechanical, acoustical, structural, lighting, and two- and three-dimensional studies.

5002 Architectural Design Concentration (6) Prereq.: ARCH 5001. 12 hrs. studio. Emphasis on architectural problems developed around faculty expertise and emerging opportunities in the profession.

5003 Advanced Architectural Topics (3) Seminar relating to various topics in architecture; writing component.

5004 Concentration Seminar (3) Various topics relating to architectural problems encountered in ARCH 5002.

5005 Advanced Architectural Techniques (3) 1 hr. lecture; 4 hrs. studio. Preparation and correlation of working drawings, specifications, and project manuals, from design development drawing.

5006 Professional Practice (3) Exploration and analysis of project acquisition, contract negotiations, governmental regulations, personnel, office management, and the architect's societal role.

7001 Graduate Design Studio I (6) F Prereq.: ARCH 4003 or equivalent. 12 hrs. studio. The use of space and form in relation to concept in the exploration of basic architectural elements.

7002 Graduate Design Studio II (6) S Prereq.: ARCH 7001. 12 hrs. studio. Emphasis on the design of buildings in a variety of physical settings.

7003 Graduate Design Studio III (6) V Prereq.: ARCH 7002. 12 hrs. studio. Emphasis on the design of buildings incorporating technologies of materials and various architectural systems.

7004 Graduate Design Studio IV (6) V Prereq.: ARCH 7003. 12 hrs. studio. Emphasis on the design of buildings incorporating technologies of environmental systems.

7005 Graduate Design Studio V (6) V Prereq.: ARCH 7004. 12 hrs. studio. Credit will not be given for both this course and ARCH 8000. Emphasis on the synthesis of all issues addressed in previous studios in the comprehensive design of buildings.

7006 Graduate Design Studio VI (6) V Prereq.: ARCH 7005. 12 hrs. studio. Credit will not be given for both this course and ARCH 8000. Emphasis on the synthesis of all issues addressed in previous studios in the comprehensive design of buildings.

7060 Structural Concepts and Forms (3) Relationship between the schematic properties of prototypical building forms and basic types of total system behavior.

7050 Project Planning/Management (3) Relationship of the construction process and project planning to building projects of various scales and complexities.

7070 Community Design Studies (3) Definition and application of community design processes; relationships between community elements and the design process; case study approach.


7090 Seminar in Architecture (3) May be taken for a max. of 9 hrs. of credit when topics vary. Selected topics in architecture.

7090 Urban Studies/Research (3) Prereq.: written consent of School of Architecture Graduate Committee. May be taken for a max. of 6 sem. hrs. of credit. Selected readings and/or research under the supervision of graduate faculty.

8000 Thesis Research (1-12 per sem.) "S"/"U" grading.

ART • ART

Registration for all multiple-credit courses taken for over three credits in a given semester will require the prior permission of the instructor. Multiple credit courses are designated with an asterisk (*) following the course number.

General education courses are marked with stars (★).

GENERAL COURSES

★ 1001 Introduction to Fine Arts (3) Fundamental problems and concepts of art in the fields of design, sculpture, graphics, painting, and ceramics, as related to home, community, religion, commerce, and industry.

1008 Introduction to Two-Dimensional Composition (3) 6 hrs. studio. Credit will not be given for both this course and ART 1011. An introduction to the principles of design and composition through the use of various media and techniques.

1009 Introduction to Three-Dimensional Art (3) 6 hrs. studio. Credit will not be given for both this course and ART 1012. Introduction to fundamental concepts of three-dimensional art; projects will explore line, plane, spatial organization, surface, and volume using a variety of materials and techniques.

1010 Introduction to Drawing (3) 6 hrs. lab. Credit will not be given for both this course and ART 1847. Drawing from observation and invented images; various drawing materials, methods, and subjects are explored as a means to develop perceptual ability and descriptive drawing skills; drawing concepts including composition, line, perspective, shape, space, and value.

★ 1011 Art Structure (3) 6 hrs. studio. Disciplines in art, with practice in the various media.

1012 Three-Dimensional Design (3) 6 hrs. studio. Fundamentals of three-dimensional design; studio experiences in various materials.

1013 Studio Art Abroad (3) 6 hrs. studio. Studio art fundamentals and experiences in the artistic media of faculty members participating in Academic Programs Abroad.

2050 Digital Art I (3) Prereq.: ART 1008 or 1011. 6 hrs. studio. Introduction to digital applications in art.

2055 Digital Art II (3) Prereq.: ART 2050 or permission of instructor. 6 hrs. studio. Digital studio work in digital animation and multimedia applications.

4020 Special Topics in Studio (3) Prereq.: consent of department. May be taken for a max. of 6 hrs. of credit when topics vary. 6 hrs. studio. Directed studies with a visiting artist.

4044 Gender Aesthetics: Art Theory and Criticism (3) May be taken for a max. of 6 hrs. of credit. Interdisciplinary study of art, writing, and gender; emphasis on the interaction of art and writing about art as it reflects gender.

4050 Digital Art III (3) Prereq.: ART 2053 or equivalent. 6 hrs. studio. Intermediate work in digital animation.

4055 Digital Art IV (3) Prereq.: ART 4050 or equivalent. 6 hrs. studio. Primarily for students majoring in art. Advanced work in digital imaging, video, and animation.

4080 Performance Art (3) Prereq.: completion of studio art fundamental courses and permission of instructor. 6 hrs. studio. Multi-disciplinary “live” art studio programs utilizing a diverse range of media such as drawing and painting, sound and movement, and poetry; lectures and discussions on the history of performance art.

7842 Visiting Artist Seminar (3) May be taken for a max. of 9 hrs. of credit. Seminar with visiting artist: contemporary art, criticism, individual and group projects.

8000 Thesis Research (1-12 per sem.) "S"/"U" grading.

ART HISTORY

★ 1440 Historical Survey of the Arts (3) Prehistoric, Near-Eastern, Greek, Roman, and Medieval.

★ 1441 Historical Survey of the Arts (3) Renaissance to modern art.

★ 2401 Art of the Ancient Near East and Egypt (3) Development of art and architecture in the ancient Near East and Egypt over three millennia; influences of one culture on another and subsequent contributions to Western art.

★ 2411 Survey of Asian Art (3) The arts of China, India, and Japan in relation to religious and philosophical beliefs that affected their production.

2469 Italian Renaissance Art (3) Italian painting, sculpture, and architecture from 1400 to 1500.

★ 2470 Survey of 20th Century Art (3) Modern art.

2480 Introduction to Museum Studies (3) Introduction to art and history museums, their missions and functions; practical aspects and philosophical issues related to museums.

4401 History of Prints (3) History of prints from the 15th century to the present.

4404 The Arts of Rome (3) Development of architecture, sculpture, and painting from Rome's early beginnings (600-200 B.C.) to the end of the 4th century.

4405 Early Christian and Byzantine Art (3) Painting, sculpture, and architecture of the Christian era through the 12th century Byzantine.

4406 Romanesque Art (3) Architecture, sculpture, manuscripts, and paintings from the 9th through the 12th centuries in France, Germany, and England.

4409 Early Greek Art (3) Greek art to the time of the Persian Wars.

4410 Later Greek Art (3) Greek art from the time of Thermistocles to the age of Augustus.

4412 Gothic Art (3) Architecture, sculpture, and painting of Northern Europe from 1150 to 1450.

4413 Early Netherland and German Painting (3) Painting in the Netherlands and Germany in the 15th and 16th centuries.

4420 Studies in Art History (3) May be repeated for credit when topics vary. Advanced work in a predetermined area of specialization.

4421 History of Western Decorative Arts from the Renaissance to 1850 (3) Development of decorative arts design; emphasis on furniture, with investigations of metals, textiles, ceramics, glass; materials, constructional techniques, and socioeconomic conditions giving rise to the objects' fabrication.

4422 History of Modern Design (3) Aesthetic theory and stylistic evolution of decorative arts from mid-19th century to the present; emphasis on crafts, architectural decoration, furniture, interior design, and industrial design. Victorian period, arts and crafts movement, art nouveau, Bauhaus, and international style.
manipulation, digital filtering, and imaging peripherals; emphasis on digital imaging aesthetics, emerging technology, and preparing images for print and multimedia applications.

7500* Graduate Design (3.9,12) 6, 12, 18, 24 hrs. Studio each year. May be taken for a max. of 12 hrs. of credit. Contemporary concepts in painting; approaches to imagery, symbolism, empathy; individual criticism, class discussion.

2881* Advanced Water Media Painting (3) Prereq.: ART 2883. 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Advanced studio work in water-soluble media on paper.

2884* Advanced Painting (3,6) Prereq.: 2883. 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 12 hrs. Research into advanced visual schema through self-initiated studio projects.

2886 Landscape Painting (3) Prereq.: ART 2882. 6, 12, or 18 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. On-location and studio development of the landscape.

2887* Advanced Figure Drawing (3,6) Prereq.: ART 2879 or equivalent. 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Study of the human figure using various media.

2890* Advanced Drawing Workshop (3,9,12) Prereq.: 6 hrs. of drawing. 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Directed studies for advanced students.

2891 Painting Seminar (3) Prereq.: 2881 or consent of instructor. 6 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Discussion of formal and conceptual issues related to the medium.

PHOTOGRAPHY

2995 Basic Photography (3) Prereq.: ART 1008 or 1011. 6 hrs. studio. Basic concepts and techniques of black and white photography; emphasis on photography as a visual art.

2996 Intermediate Photography (3) Prereq.: ART 2995. 6 hrs. studio. Continued investigation of basic photographic principles, utilizing specific subject areas drawn from major themes in visual art.

2997 Advanced Photography (3) Prereq.: ART 2996 and permission of instructor. 6 hrs. studio. Technical investigation of contemporary materials; critical testing of equipment, films, and printing papers; emphasis on process control as an expressive tool.

2995 Introduction to Digital Art (3) Prereq.: ART 2994, 2996, and permission of instructor. 6 hrs. studio. Introduction to digital photographic tools and techniques.

3996 Color Photography (3) Prereq.: ART 2996 and permission of instructor. 6 hrs. studio. Introduction to color theory, color perception, and contemporary color printing materials; emphasis on color print portfolio.

3997 Experimental Photography (3) Prereq.: ART 2994 and 2996, and permission of instructor. 6 hrs. studio. Investigation of experimental camera and darkroom techniques; emphasis on the creative possibilities of photographic manipulations.

4951 Special Studies in Photography (3) Prereq.: ART 3994 and permission of instructor. 6 hrs. studio. Advanced independent research in a predetermined area of specialization.

4952 Direct Photography (3) Prereq.: ART 3994 and permission of instructor. 6 hrs. studio. Fundamentals of the view camera.

4996 Color Photography I (3) Prereq.: ART 2996 and permission of instructor. 6 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Continued investigation of color photography; color negative materials and printing processes.

4977 Nonsilver Photography (3) Prereq.: ART 2994 and permission of instructor. 6 hrs. studio. Exploration of historical photographic processes; emphasis on nonsilver printing techniques.

4998 Senior Project: Photography (3) Prereq.: permission of instructor. 6 hrs. studio. To be taken in the last full semester of the senior year. Course is not offered during the summer term. Proposal for and execution of an independent photography project under the direction of a major professor.

7000 Graduate Photography (3,6) Prereq.: permission of instructor. May be taken for a max. of 12 sem. hrs. or 12 hrs. of studio. Emphasis on personal vision and contemporary issues in photography.

PRINTMAKING

1361 Introduction to Intaglio (3) Prereq.: ART 1008 or 1011 and 1010 or 1047. 6 hrs. studio. Basic intaglio techniques; work in black and white.

1371 Introduction to Lithography (3) Prereq.: ART 1008 or 1011 and 1010 or 1047. 6 hrs. studio. Planographic printing from stones in black and white.

1381 Introduction to Book Arts (3) Prereq.: ART 1361 or consent of instructor. 6 hrs. studio. Basic theory, design, and production in the book arts.

2352 Relief Printmaking (3) Prereq.: ART 1010 or 1047. 6 hrs. studio. May be taken for a max. of 9 hrs. of credit. Investigation of relief printing techniques.

2362* Intermediate Intaglio (3,6) Prereq.: ART 1361. 6 or 12 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Continued investigation of advanced intaglio techniques.

2372* Intermediate Lithography (3,6) Prereq.: ART 1371. 6 or 12 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Planographic printing from stones and plates in black and white color.

2382 Intermediate Book Arts (3) Prereq.: ART 1371. 6 hrs. studio. May be taken for a max. of 9 hrs. of credit. Continued investigation of the book arts; emphasis on personal development in a variety of structures.

2392 Alternative Print Media (3) Prereq.: ART 1361 and 1371. 6 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Exploration of individual imagery in various and combined print media.

4800 Senior Project: Printmaking (3) Prereq.: consent of instructor. 6 or 12 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Individual creative research in a predetermined area of specialization.

4811* Advanced Intaglio (3) Prereq.: ART 2362. 6 or 12 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Advanced intaglio techniques.

4856* Special Studies in Printmaking (3) Prereq.: consent of instructor. 6 or 12 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Advanced planographic printing from stones and plates.

4881 Advanced Book Arts (3 or 6) Prereq.: ART 2382. 6 or 12 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Advanced exploration, design, and production in the book arts; emphasis on self-initiated book art projects.

4891 Alternative Print Media (3) Prereq.: ART 1361 and 1371. 6 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Exploration of individual imagery in experimental and combined print media.

7300 Graduate Printmaking (3,9,12) 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 36 sem. hrs. of credit.

SCULPTURE

1762 Beginning Sculpture (3) Prereq.: ART 1009 or 1012. 6 hrs. studio. Introduction to a variety of materials and techniques used in contemporary sculpture; contemporary and historical concepts and terminology for working in three-dimensional space.

2761* Intermediate Sculpture (3,6) Prereq.: ART 1762. 6 or 12 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Assignments projects on figurative and nonfigurative sculpture, using various materials and methods.

4761* Special Studies in Sculpture (3,6) Prereq.: consent of instructor based on review of student's portfolio. 6 or 12 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Advanced studio work in predetermined area of specialization.

4761* Advanced Sculpture (3,6) Prereq.: consent of instructor based on review of student's portfolio. 6 or 12 hrs. studio. May be taken for a max. of 15 sem. hrs. of credit. Student projects with personal choice of concepts, materials, and methods.
0603 Topics in Environmental Science for Elementary School Teachers (3) Su only. May be taken for a max. of 9 hrs. of credit when topics vary.

7000 Methods of Instruction in College Life Science Laboratories (1) F Pass-fail grading. Philosophy and practice of life science laboratory education at the college level.

BIOTECHNOLOGY LABORATORY

1250 Introduction to Engineering Methods (2) F 6 hrs. lab. Fundamentals of engineering design; presentation of an engineering design; graphical expression of engineering design using computer-aided drafting.

1252 Biology in Engineering (2) S Prereq.: credit or registration in BIOI 1201. 1 hr. lecture; 3 hrs. lab. Effect of variability and constraints in various areas of biological engineering problem solving and design; engineering units; engineering report writing; oral report presentation; laboratory demonstration of biological engineering analysis.

2307 Elements of Landscape Construction (3) F,S Prereq.: MATH 1015 or 1022. 2 hrs. lecture; 3 hrs. lab. Theory and use of turf, level, transit, plane table, and compasses; design principles of mechanical calculations, land slopes, drainage grades, land descriptions, and topographic mapping.

2350 Experimental Methods for Engineers (3) S Prereq.: BE 2352. 2 hrs. lecture; 3 hrs. lab. Introduction to experimental methods, technical report writing, and instrumentation and calibration; measurement of temperature, pressure, flow, strain, and vibration in biological products; microprocessor data loggers and computer data acquisition systems.

2352 Quantitative Biology in Engineering (3) F Prereq.: BE 1252. 2 hrs. lecture; 3 hrs. lab. Characterization of biological phenomena in engineering design; relationships among parameters using linear and nonlinear statistical expressions; case studies of engineering design solutions.

3190 Professionalism for Biological Engineers (1) F Prereq.: senior standing in the College of Engineering. Ethical standards, communication, professional societies, goal setting, safety, and time management.

3249, 3250 Engineering Practice (3, 3-3, 3) Su only. Prereq.: consent of instructor. May be taken for a max. of 3 sem. hrs. of credit. Individual reading and theoretical and/or experimental work on advanced problems.

6101 Astronomy for Teachers (4) Su,V. For teachers and students in the College of Education. Cannot be taken for degree credit by physics majors. General astronomy including the solar system, stellar astronomy, and stellar systems.

6108 Laboratory for Teachers (1-3) Su V For in-service teachers and graduate students in the College of Education. May not be taken for credit by physics majors. May be taken for a max. of 2-6 hrs. of credit. Prereq.: consent of instructor. Visual observation techniques including the use of star charts and globes; visual and photographic observation of celestial objects such as galaxies, stars, and nebulae using small reflectors as well as large telescopes through multimedia technologies.

7741, 7742 Stellar Astrophysics (3, 3) F,S ASTR 7741 is prerequisite for 7742. Also offered as PHYS 7741, 7742. Application of physical principles to study of stars; spectroscopy, stellar atmospheres, stellar structure, and stellar evolution.

7751, 7752 Galactic Astrophysics (3, 3) F,S ASTR 7751 is prerequisite for 7752. Also offered as PHYS 7751, 7752. Application of physical principles to study of galaxies; interstellar medium, galactic structure and stellar motions, galaxies, and cosmology.

7777 Seminar in Astronomy (1-6) V May be taken for a max. of 6 hrs. of credit. Also offered as PHYS 7777.

7783 Topics in Astronomy and Astrophysics (3) V. May be taken for a max. of 9 hrs. of credit when topics vary.

BASIC SCIENCES • BACC

6001 Topics in Physical Science for Elementary School Teachers (3) Su only. May be taken for a max. of 12 hrs. of credit when topics vary.

6002 Topics in Biological Science for Elementary School Teachers (3) Prereq.: 8 hrs. of introductory biology. May be taken for a max. of 9 hrs. of credit when topics vary.

3989 Special Projects in Biological Engineering (1-4) F,S Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when experimental and/or theoretical investigation, and written report in form of engineering report.

4290 Senior Design Engineering and Professionalism (2) F Prereq.: senior standing in College of Engineering. Capstone project selection and approval; project to be completed in BE 4292; completion of project feasibility study and outline of design project; ordering necessary parts; design philosophy, teamwork, and communication; professional societies and ethics; production feasibility and reliability; use of standards and codes; goal setting and time management.

4292 Senior Engineering Design Laboratory (2) S Prereq.: BE 4290. Also offered as ME 4465. Design behavior of the human musculoskeletal system and component tissue when physical work is performed; engineering mechanics applied to the activities; fundamental knowledge of human anatomy and physiology; workplace design.

4332 Biomechanics for Engineers (3) V Prereq.: CE 2450. 2 hrs. lecture; 3 hrs. lab. Also offered as IE 4465. Principles of biomechanics and analysis; design and analysis of systems utilizing biomedical models; applied mechanics and analysis of cardiovascular, muscular, and nervous systems.

4340 Food and Bioprocess Engineering (3) V Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Mathematic modeling of systems; design and analysis of systems; development and analysis of systems; quantitative mathematical methods used in biological engineering research and design.

4380 Water Resource Engineering (3) F Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for water resource projects; material science; design and analysis of processes; design and analysis of systems; quantitative mathematical methods used in biological engineering research and design.

4386 Process Control Engineering (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Numerical methods and analysis of systems; quantitative methods of analysis and design of systems; quantitative mathematical methods used in biological engineering research and design.

4389 Industrial Engineering (3) F Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Industrial and analysis of systems for industrial applications; design and analysis of systems; numerical methods and analysis of systems; quantitative mathematical methods used in biological engineering research and design.

4390 Gas Turbine Engine Design (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for gas turbine engines; quantitative mathematical methods used in biological engineering research and design.

4391 Power Systems Engineering (3) F Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for power systems; quantitative mathematical methods used in biological engineering research and design.

4392 Process Machinery Engineering (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for process machinery; quantitative mathematical methods used in biological engineering research and design.

4393 Process Control Engineering (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for process control systems; quantitative mathematical methods used in biological engineering research and design.

4394 Process Control Engineering (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for process control systems; quantitative mathematical methods used in biological engineering research and design.

4395 Process Control Engineering (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for process control systems; quantitative mathematical methods used in biological engineering research and design.

4396 Process Control Engineering (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for process control systems; quantitative mathematical methods used in biological engineering research and design.

4397 Process Control Engineering (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for process control systems; quantitative mathematical methods used in biological engineering research and design.

4398 Process Control Engineering (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for process control systems; quantitative mathematical methods used in biological engineering research and design.

4399 Process Control Engineering (3) S Prereq.: BE 2352 and credit or registration in CE 2340. 2 hrs. lecture; 3 hrs. lab. Design and analysis of systems for process control systems; quantitative mathematical methods used in biological engineering research and design.
representative of each of the ecological subdivisions of the world's oceans treated with respect to species composition, food web structure, and environmental changes; human impact on the marine environment.

7215 Invertebrate-Microbial Interactions in Aquatic Environments (3) Prerequisites: consent of instructor. 2 hrs. lecture; 3 hrs. lab. Invertebrate-microbial interactions in aquatic food webs; ecological significance of mutualistic, parasitic, and commensal relationships.

7310 Environmental Physiology of Estuarine Animals (4) Prerequisites: consent of instructor. 1 hr. lecture; 3 hrs. lab. Effects of salinity, temperature, and dissolved oxygen on the physiology of estuarine animals.

7148 Microbial Anatomy and Ultrastructure (2 V) Prerequisites: BIOL 4110 or equivalent. Structure of various microbial forms.

7152 Advanced Vertebrate Anatomy (4) Prerequisite: BIOL 3152, 2 hrs. lecture; 6 hrs. lab.

7153 Mutagenesis (3) Prerequisites: BIOL 2153 and consent of instructor. Mechanisms of mutation; methods of detecting mutations; comparisons of effect of mutagenic agents among various test organisms.

7154 Advanced Genetics Laboratory (3) Prerequisites: consent of instructor. 1 hr. lecture; 6 hrs. lab. Experiments with Drosophila melanogaster: study of genetic and cytological variations due to deficiencies, duplications, insertions, rings, translocations, transpositions, compound chromosomes, and Y chromosomes. Classical and modern techniques using cells and electrophoretic mobility of enzymes and other proteins; stocks synthesized to meet specific requirements for mutation and biochemistry.

7155 Energy Transducing Membrane Proteins (3) Prerequisites: BIOL 4110 and 4087, or equivalent. Structure and function of energy transducing membrane proteins including bacteriorhodopsin, ATP synthase, cytochrome oxidase, cytochrome b/c, complexes, the bacterial reaction center, photosystem I and II and antenna pigment protein complex.

7166 Experimental Embryology (4) Prerequisites: BIOL 3156 or equivalent. 2 hrs. lecture; 6 hrs. lab. Field service fee. Classic and contemporary theory, techniques, experiments, and independent investigations concerning vertebrate and invertebrate development.

7157 Molecular Adaptation to the Environment (4) Prerequisites: consent of instructor. 1 hr. lecture; 3 hrs. lab. Molecular and physiological mechanisms adapting organisms to environmental factors; emphasis on adaptations permitting organisms to inhabit a diversity of environments.

7160 Histochimistry and Cytchemistry (4) Prerequisites: 3 hrs. of biochemistry or equivalent. 2 hrs. lecture; 6 hrs. lab.

7161 Higher Bacteria (3) V. Prerequisites: BIOL 4110 or equivalent. Microbial systems and ecology; emphasis on morphology and physiology of the higher bacteria.

7162 Molecular Biology of Microorganisms (3) Prerequisites: BIOL 2246, and either BIOL 4093, 4094, or equivalent. Synthesis, activity, and interactions of various molecular components of microbial cells; macromolecules and their relationship to cellular function and heredity.

7163 Advanced Technology of Molecular Biology I (3) V Prerequisites: consent or registration in BIOL 7400 or BIOL 4094. Virology:理发 and assembly; virus-induced host cell infections; virology as a discipline and as a research tool.

7164 Advanced Technology of Molecular Biology II (3) V Prerequisites: consent or registration in BIOL 7400 or BIOL 4094. Virology:理发 and assembly; virus-induced host cell infections; virology as a discipline and as a research tool.

7165 Prerequisites: consent of instructor. 1 hr. lecture; 6 hrs. lab. Methods in recombinant DNA technology; isolation of DNA from prokaryotic or eukaryotic sources; DNA cloning; restriction mapping and DNA sequencing.

7166 Advanced Technology of Molecular Biology III (3) V Prerequisites: consent or registration in BIOL 7400 or BIOL 4094. Virology:理发 and assembly; virus-induced host cell infections; virology as a discipline and as a research tool.

7171 Physiological Rhythms (3) Prerequisites: consent of instructor. 1 hr. lecture; 3 hrs. lab. Theoretical and empirical aspects of circadian and other rhythms.

7172 Biochemistry and Toxicology of Metals (3) S Prerequisites: BIOL 4093, 4094; CHEM 2262. See ENVS 7220.

2553 Molecular Population Genetics (4) Prerequisites: BIOL 2245 and consent of instructor. 3 hrs. discussion/lab. Molecular genetic variation in natural populations; effects of selection, inbreeding, random drift, migration, and mutation on DNA and protein polymorphisms; emphasis in lab on computer-assisted manipulation and analysis of molecular data.

7259 Organellar Genetics (3) Prerequisites: BIOL 4094 and BIOL 2255; or equivalent. Organellar biogenesis, structure and packaging of organelle genomes, segregation and transmission patterns of organellar genes, mapping, and molecular mechanisms of transmission.

7280 Nuclear Acids (3) V. Prerequisites: BIOL 4094 or equivalent. Chemistry and biochemistry of nucleic acids; structure, expression, and regulation of genes in prokaryotic and eukaryotic organisms.

7284 Proteins (3) V. Prerequisites: CHEM 4491 or BIOL 4094; and BIOL 4093 or equivalent. Conformations of fibrous and globular proteins; their interactions with small and large molecular structures.

7285 Advanced Enzymology (3) V Prerequisites: one semester of physical chemistry and credit or registration in BIOL 4094. Principles involving action of enzymes on a molecular level; includes kinetics, inhibition, PH effects, active site, coenzymes, reaction mechanism, and protein structure of enzymes.

7286 Seminar (1, 2) F. S. May be repeated for a max. of 6 sem. hrs. of credit. Topics on current interest in the biological sciences.

7288 Lipids and Membranes (3) V. Prerequisites: BIOL 4094. Chemistry and biochemistry of lipids and membranes; analytical methods for lipids; biosynthesis of complex lipids; organization and function of biological membranes.

7289 Biochemistry of Viruses (3) V. Prerequisites: BIOL 4094 or equivalent. Also offered as BIOL 5265. Molecular biology of representative bacterial, animal, and plant viruses; virus attachment and penetration of host cell membrane; transcription, translation, and transcription of viral genes; virus morphogenesis and assembly; virus-host cell interactions; structure-function relationships.

7290 Complex Carbohydrates (3) V. Prerequisites: BIOL 4094. Chemistry of carbohydrates including stereochemistry, reactions, derivatization, and analysis; biosynthesis and functions of complex carbohydrates; structure and function of complex carbohydrates including polysaccharides, glyco-proteins, and glycolipids; immunology and receptorology.

7262 Fundamentals of Cardiogenesis (3) S, E. Prerequisites: CBS 7662 or consent of instructor. Same as CBS 7622 and ENVS 7622.

7264 Toxicology II (3) S. See CBS 7614.

7265 Toxicology IV: Genetic Toxicology (3) S. See ENVS 7615.

7268 Museum Field Expedition (6) Prerequisites: consent of instructor. One semester in the field under direction of the Museum of Natural Science staff.

7699 Toxicology Seminar (1) S. See CBS 7699.

7800 Special Topics in Biological Sciences (2-4) Prerequisites: consent of instructor. May be taken for a max. of 12 sem. hrs. when topics vary. Special topics of current interest in the biological sciences.

7901 Departmental Seminar in Biological Sciences (1) May be repeated for a max. of 6 sem. hrs. of credit. Reports on specialized subjects of current interest in the biological sciences.

7902 Departmental Seminar in Biochemistry (1) May be repeated for a max. of 6 sem. hrs. of credit. Reports on specialized subjects of current interest in biochemistry.

7921 Research Presentations in the Biological Sciences (1) May be repeated for credit. Pascha grading. Presentations of individual research projects in the biological sciences.

7946 Seminar: Current Topi cs in Molecular Evolution (1) Prerequisites: course in evolution, genetics, BIOL 4094 or equivalent. Also offered as ENMT 7946. May be taken for a max. of 6 hrs. credit when topics vary.

7978 Tropical Agricultural Ecology (1-8) Intensive eight-week field course in Costa Rica conducted by the Organization for Tropical Studies; includes visits to various research sites to study the application of ecological principles to tropical agriculture.

7979 Tropical Biology: An Ecological Approach (1-8) Eight-week field course at research sites in Costa Rica, conducted by Organization for Tropical Studies; also offered as ENMT 7979. Complexities of tropical plants and animals and their interactions.

7989 Independent Research in Biological Sciences (2-8) Prerequisites: consent of instructor. May be repeated for a max. of 9 sem. hrs. credit. Directed research under the guidance of a graduate faculty member.
commercial paper; security interests, securities regulation, accountants' malpractice, negotiable instruments, and bankruptcy; application of Commercial Code and preparation for the CPA examination.

CHEMICAL ENGINEERING • CHE

2160 Computer Technology for Chemical Engineering Systems (1) F S Prereq.: MATH 1330. Introduction to operating system and industrial mathematics packages and software packages used in the solution of chemical engineering problems.

2171 Chemical Engineering Fundamentals: Material and Energy Balances (3) F S Prereq.: MATH 1350 and CHEM 1202. Emphasis on basic principles and concepts used to make chemical engineering calculations; techniques used in these calculations applied to typical industrial problems.

2176 Mathematical Modeling of Chemical Engineering Systems (3) F S Prereq.: MATH 2090 CHE 2160, and 2171. Basic concepts and techniques in analysis of engineering processes; mathematical description of physical systems and application of modern computers to solution of resulting equations.

3100 Chemical Equilibrium and Kinetics of Environmental Processes (3) Prereq.: CHE 3172 or M 3333 or equivalent. Not open to chemical engineering majors. Credit will not be given toward CHE and CHE 4190. Introductory chemical thermodynamic concepts extended to heterogeneous equilibrium, dilute solutions, surfaces and colloids of environmental engineering processes; chemical reaction kinetics concepts applied to the environment; applications to waste treatment process design, property estimations for elucidating the fate and transport of chemicals in the environment.

3101 Transport Sciences: Momentum Transfer (3) F Prereq.: CHE 2171, MATH 2090, and credit or registration in CE 2450. Fundamentals of transport, continuum transport, application to the fluid problems of engineering.

3102 Transport Sciences: Heat and Mass Transfer (4) S Prereq.: CHE 3101 or CE 2200, and MATH 2065 or 2090. Fundamentals of heat and mass transfer; similarities of heat, mass, and momentum transfer and their interrelation; engineering applications.

3104 Engineering Thermodynamics Laboratory (3) F S Prereq.: CHE 2176 and credit or registration in CHE 3102. 2 hrs. lecture; 3 hrs. laboratory. Work to accompany CHE 3101.

3171 Process Economics and Optimization (3) Prereq.: CHE 2176 and credit or registration in CHE 3102 and 3173. Application of optimization principles to the economic design of chemical engineering unit operations.

3172 Chemical Engineering Thermodynamics (3) F Prereq.: CHE 2171 and credit or registration in CHEM 3491. Basic concepts and chemical engineering applications of thermodynamics; emphasis on flow processes and real gas thermodynamics.

3173 Heterogeneous Equilibrium (3) S Prereq.: CHE 3172. Theory of solid, liquid, and solid-liquid equilibrium, including the effects of chemical reactions; application of thermodynamic theory to the correlation of equilibrium data and the prediction of equilibrium compositions.

3249, 3250 Engineering Practice (1-3, 1-3) Su only Prereq.: consent of instructor. Pass-fail grading. Experimental and theoretical investigations including library research.

4151 Unit Operations Design (4) F Prereq.: CHE 3102, 3171, and 3173. 5 hrs. lecture; 3 hrs. lab. Unit operations analyzed as applications of chemical engineering fundamentals and transport sciences; use of these principles in design calculations.

4162 Unit Operations Laboratory (3) F S Prereq.: CHE 3104 and credit or registration in CHE 4151. 1 hr. lecture; 6 hrs. lab. Obtaining and interpreting data needed to solve typical problems in the design or operation of chemical engineering equipment.

4172 Process Design (4) S Prereq.: CHE 4151 and 4190. 3 hrs. lecture; 3 hrs. lab. Chemical plant design from initial concept through preliminary estimate; flow diagrams, equipment cost estimation, economic analysis, safety, and environmental issues; computer-aided process design.

4190 Chemical Reaction Engineering (3) F Prereq.: CHE 3102 and 3173; or equivalent. Basic principles of reactor design and unit operations flow scheme selection; comparison of design alternatives; achievement of optimum reactor operation.

4198 Process Dynamics (3) S Prereq.: CHE 3171 and credit or registration in CHE 3102 or 3173. Principles and applications of process dynamics and control; mathematical modeling of process dynamics, feedback control, and feed forward control.

2404 Technology of Petroleum Refining (3) F Prereq.: Credit or registration in CHE 4151. Catalytic and thermal processes used in petroleum refining; application of scientific and engineering principles to the processes such as catalytic cracking, reforming, coking, alkylation, isomerization, and hydroprocessing; emphasis on applied catalysis and its imporance on engineering.

4205 Technology of Petrochemical Industry (3) Prereq.: CHE 4151. Processes used in the manufacture of petroleum-based chemicals; application of scientific and engineering principles involved in the production of hydrogen, alcohols, olefins, aromatics, aldehydes, ketones, acids, rubber, and other polymers; emphasis on catalysis by transition metal catalysts.

4210 Industrial Catalysis (3) Prereq.: credit or registration in CHE 4190. Principles of the industrial utilization of heterogeneous catalytic systems; application of thermodynamic phenomena, methodology in catalyst preparation, characterization and evaluation of catalysts, diffusion and reaction in porous catalysts, and a survey of major industrial processes involving catalysis.

4221, 4222 Senior Research (1, 2) Prereq.: CHE 3102, 3104, and 3173; GPA of at least 2.6 in CHE and consent of instructor. CHE 4222. Project chosen in consultation with instructor. Formal proposal and final presentation required. Not open to graduate students.

4253 Introduction to Industrial Pollution Control (3) S Prereq.: CHE 3104 or equivalent introductory course in transport science. Quantitative application of chemical engineering principles to removal of objectionable components from effluents, with emphasis on industrial processing effluents; currently available techniques for controlling air and water pollution and solid wastes; concept of pollution control through basic process alterations developed by specific examples.

4260 Biochemical Engineering (3) Prereq.: credit or registration in CHE 4190 or equivalent. Application of chemical engineering fundamentals to microbiology and biochemical systems; problems peculiar to industrial operations involving microbial processes; growth conditions and requirements, metabolites, product separations, enzyme catalysis, sterilization, and aseptic operations.

4261 Environmental Chemodynamics (3) Prereq.: CHE 3101 or 3173. Principles of environmental and geochemical science. Environmental chemodynamics: interphase equilibrium, reactions, transport processes and related models for anthropogenic substances, subsurface and surface interfaces (air-water, sediment-soil) and associated boundary region.

4270 Processing of Advanced Materials (3) Prereq.: CHE 3102 or equivalent transport course. Treatment of coupled chemical reaction and mass, energy, and momentum transport in the manufacturing and processing of semiconductors and advanced ceramic materials; engineering models for chemical and physical vapor deposition methods and condensed phase processes.

4275 Electrochemical Engineering (3) Prereq.: CHE 3102 or equivalent introductory course in transport science. Principles of chemical and electrochemical engineering problems; potential distribution theory, kinetics, mass transport, and thermodynamic principles; quantification of coupling factors, microstructure, corrosion, battery design, and electrochemical synthesis.

4285 Principles of High Polymers (3) Prereq.: CHE 3172 and CHEM 3491. Solution and solid-state properties of high polymers; microstructure of different polymer chains and effect of macromolecular physical properties of the final plastics.

4296 Development of Mathematical Models (3) Prereq.: CHE 3176 and 3102; or equivalent. Mathematical descriptions of systems encountered in chemical engineering developed from basic principles; lumped parameter systems, distributed parameter systems, formulation of boundary and partial differential equations, continuous and discrete analogs, and matrix formulations; models developed for systems ranging from simple elements to plant-scale.

4410 Special Topics in Chemical Engineering Design (3) May be taken for a max. of 6 sem. hrs. when topics vary. One or more sections may be offered each term.

4429 Special Topics in Chemical Engineering Science (3) May be taken for a max. of 6 sem. hrs. when topics vary. One or more sections may be offered each term.

7110 Mathematical Methods in Chemical Engineering (3) F Review of physical-chemical problem formulation; analytical and approximate techniques for the solution of linear and nonlinear differential equation models in chemical engineering systems.

7120 Chemical Engineering Thermodynamics (3) F Thermodynamic properties, first and second laws of thermodynamics; entropy; Maxwell relations; the relationship of thermodynamic properties to intermolecular forces; physical equilibrium with emphasis on partial free energy, fugacity, Raoult's law, K-values, equations of state, and activity coefficients; chemical equilibrium and free energies; fundamentals of statistical mechanics.

7130 Fundamentals of Transport Phenomena (3) S Foundations of heat, mass, and momentum transfer in continuum; laminar flow; boundary layer theory; turbulence; buoyancy-induced flow; heat and mass transfer by diffusion, convection, and turbulence.

7140 Chemical Reactor Design Methods (3) S Basic principles of chemical kinetics, fluid flow, heat transfer, and mass transfer used in design of chemical reactors; chemical equilibria, chemical kinetics, design of isothermal reactors, effects of nonideal flow, nonisothermal reactors, and solutions techniques.

7314 Optimization (3) Techniques of optimization including analytical methods, linear and nonlinear programming, geometric and dynamic programming, and variational methods with application to systems of interest to chemical engineers.

7352 Distillation and Other Separation Processes (3) Mathematical models, problem formulation, and solution procedures related to design and behavior of distillation columns, absorbers, extractor-settlers, etc.; emphasis on computer analysis.

7512 Advanced Chemical Engineering Analysis (3) Prereq.: CHE 7110 or equivalent. May be taken for a max. of 6 hrs. of credit with consent of department. Topics in current chemical engineering analysis, such as perturbation methods, matched asymptotic expansions, vector and tensor calculus, and numerical techniques.

7522 Advanced Chemical Engineering Thermodynamics (3) Prereq.: CHE 7120 or equivalent. May be taken for a max. of 6 hrs. of credit with consent of department. Thermodynamic properties of chemical engineering processes, such as nonequilibrium thermodynamic properties.

7532 Advanced Chemical Engineering Fluid Mechanics (3) Prereq.: CHE 7130 or equivalent. May be taken for a max. of 6 hrs. of credit with consent of department. Chemical engineering fluid mechanics processes, fluid dynamics, boundary layer theory, hydrodynamic stability, compressible flow, multiphase flow, chemically reacting flows, and non-Newtonian and viscous fluids.

7534 Advanced Chemical Engineering Heat Transfer (3) Prereq.: CHE 7130 or equivalent. May be taken for a max. of 6 hrs. of credit with consent of department. Chemical process heat transfer; phase change and moving boundary problems; heat transfer mechanisms, natural and forced convection, radiation, and combined heat and mass transfer.

7536 Advanced Chemical Engineering Mass Transfer (3) Prereq.: CHE 7130 or equivalent. May be taken for a max. of 6 hrs. of credit with consent of department. Transport of mass in chemical engineering processes, such as diffusional operations, models for mass transfer in multicomponent, multiphase, stationary, flowing, and reacting systems.

7542 Catalysis (3) Prereq.: CHE 7410 or equivalent. Metal catalysis including physicochemical properties of metals, solid state spectroscopy, and reaction mechanisms as applicable to fundamental and industrially significant processes.

7544 Chemical Kinetics and Reaction Mechanisms (3) Prereq.: CHE 7410 or equivalent. Gas-phase reactions and modern approach to reaction mechanism; collision, transition state, RRK, and RRKM theories, bond energy correlations, kinetics of complex reaction system, fast reactions, computer modeling, and multiscale analysis.

7572 Advanced Automatic Process Control (3) Prereq.: CHE 4190 or equivalent. Recent developments in control theory applied to control schemes in industrial processes; techniques of state space analysis, nonlinear and stability criteria, multivariable control, and system identification.
7574 Digital Control of Processes (3) Prereq.: CHE 4159 or equivalent.
Theory and use of digital computers for process control, relationships between computer and process control schemes, control algorithms, valve dynamics, modeling techniques.
7582 Spectroscopy and Polymetal Coordination (4) Prereq.: CHEM 4160 or 4562 or CHE 4285 or equivalent. 3 hrs. lecture; 3 hrs. demonstration/lab. Also offered as CHEM 7261. Preparation and characterization of high polymers; typical commercial procedures for plastics production.
7592 Design Problems in Chemical Engineering (3) Prior to registration students should discuss a prospective design problem with instructor under whom they plan to study and obtain departmental approval. Design problem cannot be directly related to student's research. Integration of technology into design of systems or plants for accomplishing specific objectives; emphasis on producing a design package considering technical, economic, manning, and scheduling aspects of the project.
7594 Advanced Computer-Aided Process Design (3) Prereq.: CHE 4173 or equivalent. May be taken for a max. of 6 hrs. of credit with consent of department. Computer-aided process design and simulation of chemical processes industries, such as sequential modular flow sheeting, simultaneous solution schemes, decomposition strategies, and various simulation languages.
7700 Advanced Topics in Chemical Engineering (3) May be taken for a max. of 9 hrs. of credit with consent of instructor. One or more phases of advanced chemical engineering practice.
8000 Thesis Research (1-2 per sem.) "S/U" grading.
9000 Dissertation Research (1-12 per sem.) "S/U" grading.

CHEMISTRY • CHEMISTRY

Laboratory Expenses • Students registering for laboratory courses in chemistry are charged a laboratory usage deposit on their fee bill. Laboratory usage deposit will not be given for both this course and CHEM 2002. Primarily for chemistry majors. Laboratory usage deposit. Experiments in modern methods of analysis.

2003 Honors: Analytical Chemistry Laboratory (2) Prereq.: CHEM 2001, 1212, or 1431. 6 hrs. lab. Credit will not be given for both this course and CHEM 2001. Primarily for chemistry majors. Laboratory usage deposit. Experiments in modern methods of analysis.

2060 Organic Chemistry (3) Prereq.: CHEM 1202. Credit will not be given for this course and CHEM 2001. Aliphatic and aromatic compounds; biological aspects of organic chemistry.

2261 Organic Chemistry (3) Prereq.: CHEM 1202 or 1422. Credit will not be given for both this course and CHEM 2001. Fundamental laboratory operations of organic chemistry.

2460 HONORS: Organic Chemistry I (3) Prereq.: a grade of "A" or "B" in CHEM 1202 or CHEM 1422. Chemistry majors who qualify should take this course. Credit will not be given for both this course and CHEM 2261. Studies of structure, mechanism, and synthesis in organic chemistry.

2462 HONORS: Organic Chemistry II (3) S Prereq.: CHEM 2461 or a grade of "A" in CHEM 2261. Chemistry majors who qualify should take this course. For well-prepared students with a special interest in chemistry. Credit will not be given for both this course and CHEM 2262. Continuation of CHEM 2461.

2364 Organic Chemistry Laboratory (2) Prereq.: CHEM 2125, and CHEM 2060 or credit or registration in CHEM 2262 or 2462. 6 hrs. lab. Same as CHEM 2463. Laboratory usage deposit. Fundamental laboratory operations of organic chemistry.

2463 HONORS: Organic Chemistry Laboratory (2) S Same as CHEM 2364; primarily for chemistry majors. Laboratory usage deposit.

2900 Research Internship (1-2) Prereq.: CHEM 1201 or 1431 or 1432, or by be taken 8 times for credit: no more than 8 sem. hrs. of credit may be earned in CHEM 2900 and 2990. May be selected on recommendation of professor directing the work. Pass/Fail grading. Introduction to chemical research by association with departmental research groups.

3001 Science Teaching in Secondary School I: The Learner (1) See BIOL 3001

3002 Science Teaching in Secondary School II: Technology in Science Education (1) See BIOL 3002

3491, 3492 Physical Chemistry (3,3) Prereq.: MATH 1552; PHYS 1202 or 2102; and CHEM 1202, 1422, or equivalent; all physics, physical chemistry ("C" or "B" or better. CHEM 3491 is prerequisite for CHEM 3492. Principles of theoretical chemistry.

3493 Physical Chemistry Laboratory (3) S Prereq.: PHYS 2099 or 2109 and CHEM 1212 or 1431; and credit or registration in CHEM 3492. 1 hr. lecture; 5 hrs. lab. Laboratory usage deposit. Selected experiments to accompany physical chemistry.

3900 Chemical Problems (1-3) Coreq.: CHEM 3492. May be taken for a max. of 6 sem. hrs. of credit; no more than 8 sem. hrs. of credit may be earned in CHEM 2900 and 3900. May be selected on recommendation of professor directing the work and consent of the dean of the college. Written report of 1500 word maximum research problem is required. Introduction to chemical research methods.


101 Macromolecular Systems (4) Prereq.: CHEM 2262 and 3491 or equivalent. 5 hrs. lecture; 2 hrs. lab. Principles of structural and molecular analysis of large macromolecules and biological polymers; emphasizing theory and practice of modern and classical methods for molecular characterization.

1450 Environmental Chemistry (3) F Prereq.: CHEM 2001 and 2261 or 2462 or 2060. Also offered as ENV 4101. Chemical principles applied to the study of the distribution, transport, reactivity, and toxicity of chemical species in the environment.

1460 Industrial Organic Chemistry (3) S Prereq.: CHEM 2262 or 2462. Review of major industrial processes with special emphasis on polymer synthesis and applications.

4552 Instrumental Characterization of Organic Compounds (2) Prereq.: CHEM 2001, 2002, or 2003 and credit or registration in CHEM 3492. Molecular analysis, NMR, IR, and UV spectroscopy, mass spectroscopy, chromatography, thermal analysis, and combination of techniques.


4561 Intermediate Physical-Organic Chemistry (3) F Prereq.: CHEM 2262 or 2462 and 3492. Selected topics in kinetics, reaction mechanisms, applications of quantum mechanics to organic chemistry, and related topics in physical-organic chemistry.

4562 Intermediate Organic Chemistry (3) F Prereq.: CHEM 2262 or 2462. Selected topics in synthesis, natural products chemistry, stereochemistry, reaction mechanisms, and related topics in structural and synthetic organic chemistry.

4563 Problems in Organic Structure Elucidation (3) Prereq.: CHEM 2262 or 2462 and 3492. Focus on interpretation of multiple types of NMR spectra, mass spectra or other spectra relevant to structure elucidation; extensive utilization of actual spectra in problem solving sessions.

4564 Advanced Organic and Inorganic Laboratory (3) Prereq.: CHEM 2364 or equivalent. 1 hr. lecture; 6 hrs. lab. Laboratory usage deposit. Organic and inorganic preparations emphasizing modern synthetic methods and modern characterization techniques.

4570 Advanced General Inorganic Chemistry (3) Prereq.: credit or registration in CHEM 2060 or credit or registration in CHEM 3492. Chemistry and principles of metal bonds with metal to carbon sigma and pi bonds; bonding concepts, electronic structure, periodic trends and fundamental reaction mechanisms; applications to homogeneous catalysis.

4572 Foundations of Bioinorganic Chemistry (3) S Prereq.: CHEM 1492 or BIOL 4001. Concepts of coordination chemistry, biochemistry, and physical methods used in bioinorganic chemistry.

4581 Introduction to Mathematical Chemistry (3) V Prereq.: MATH 3057 and credit or registration in CHEM 3491. Mathematical methods of chemistry, with application to selected chemical problems.

4591 Introduction to Quantum Chemistry (3) V Prereq.: CHEM 3492 and MATH 3057. Basic ideas of quantum mechanics; application to atomic and molecular structure.

4596 Chemical Thermodynamics (3) V Prereq.: CHEM 2262 or 2462 and 3492. Molecular thermodynamics and application to systems of chemical relevance.

4597 Introduction to Statistical Thermodynamics (3) V Prereq.: CHEM 2262 or 2462 and 3492. Introduce quantum and classical statistical thermodynamics of some simple systems of chemical relevance.

4601 Chemistry Instruction Through Demonstration and Experiments (3) Prereq.: one year of college chemistry. 2 hrs. lecture; 3 hrs. lab. Demonstration techniques for junior and senior high school instruction; hands-on experience.
6092 Chemical Principles for Teachers (3) Su
For elementary and middle school teachers. A basic chemistry course with emphasis upon the principles relevant to effective use of educational materials developed by professional societies and national curriculum development projects.
6083 Laboratory Methods for Teachers (3) Su-V
6 hrs. lecture; 6 hrs. lab. For elementary and middle school teachers. Analysis of laboratory experiments in current elementary and middle school curricula; selected experiments in modern chemistry.
6091 Seminar in Current Developments in Chemistry (1-3) Su Only, V PreReq.: CHEM 1202 or 1422 or equiva-

lent. For high school chemistry teacher college teachers; part of the M. N. S. degree program. May be taken for a max. of 6 sem. hrs. of credit when topics vary.
7101 Macromolecular Systems III (3) F PreReq.: CHEM 4091. Introduction to representative classes of macromolecules; emphasis on polymerization mechanisms and kinetics; advanced polymer synthesis techniques, including synthesis of inorganic polymers, biopolymers, and conjugated polymers.
7111 Macromolecular Systems IV (3) S PreReq.: CHEM 7221. Inorganic Dynamical and Kinetic Studies (3) PreReq.: CHEM 3491 and 3492. Theories of chemical reaction rates in the gas phase and in solution; chemical dynamics; gas phase and solution kinetics and mechanism; advanced chemical dynamics to mechanistic studies; modern experimental techniques.
7212 Chemical Dynamics and Kinetics (3) PreReq.: CHEM 3491 and 3492. Theories of chemical reaction rates in the gas phase and in solution; chemical dynamics; gas phase and solution kinetics and mechanism; advanced chemical dynamics to mechanistic studies; modern experimental techniques.
7251 Analysis of (2) V Modern analytical methods for elements of analysis, including atomic absorption; spectrophotometry; emission, including plasma; X-ray; electron spectroscopy; ESCA-Auger; neutron activation analysis.
7252 Molecular Analysis (2) V Modern analytical methods for molecular characterization including infra-red, Fourier transform infrared, ultraviolet, nuclear magnetic resonance, mass spectroscopy, chromatography, gas chromatography, and mass spectrometry, thermal analysis, and X-ray diffraction.
7261 Polymerization and Polymerization Processes (4) V CHEM 7261.
7272 Inorganic Chemistry of Transitional Elements (2) V PreReq.: CHEM 4370 or equivalent. Chemistry of transition elements including structural chemistry, coordination chemistry, organometallic chemistry; theories of the coordinate bond and their application to spectra, magnetism, and kinetics and mechanisms of complexes.
7290 Statistical Mechanics and Thermodynamics (3) PreReq.: Statistical mechanics of independent and interacting particles including ideal gases, real gases, crystals, other solids, liquids, solutions, and chemical equilibria; advanced topics and areas of current research.
7291 Quantum Chemistry (3) V Methods of quantum mechanics applied to molecular spectra, chemical bonding, and other chemical properties; oscillators, rotators, hydrogen-like wave functions, perturbation and variation theories, configuration interaction, photo-electron systems, spin, and empirical methods.
7292 Special Topics in Chemical Physics (2-3) May be taken 4 times for credit. Specialized areas of physical chemistry.
7769 Toxicology Seminar (1) See C57 5769.
7770 Special Topics in Analytical Chemistry (2-3) May be taken 4 times for credit. Modern methods and techniques of analytical chemistry.
7775 Special Topics in Organic Chemistry (2-3) May be taken 4 times for credit. Specialized areas of current inorganic chemistry.
7776 Special Topics in Inorganic Chemistry (2-3) May be taken 4 times for credit. Advanced treatment of areas of current interest in inorganic chemistry.
7778 Special Topics in Macromolecular Chemistry (2-3) May be taken 4 times for credit. Advanced treatment of specialized subjects of importance to current macromolecular research.
7800 Seminar (1) May be taken 6 times for credit. Pass-fail grading. All graduate students are expected to participate in report and discussion groups in field of chemistry of their particular interest.
8000 Thesis Research (1-12 per sem.) Students who receive 6 hrs. of credit for this course cannot obtain more than 9 hrs. of credit for CHEM 8900. "S"/"U" grading.
8000 Dissertation Research (1-12 per sem.) PreReq.: 6 hrs. of credit in CHEM 8000 or 8900. "S"/"U" grading.

CHINESE • CHIN

Native speakers of Chinese will not receive credit for courses marked with an asterisk (*).

General education courses are marked with stars (★).

★ 1101 Beginning Mandarin Chinese (4) Persons with prior knowledge of Mandarin may not take this course for credit. Basic lexicon and structure of Chinese; development of speaking and listening skills.
★ 1102 Beginning Mandarin Chinese (4) Basic lexicon and structure; emphasis on communicative language use.
★ 2001 Intermediate Mandarin Chinese (4) PreReq.: CHIN 1102. Continuation of the study of basic lexicon and structures of Chinese; emphasis on further development of speaking, writing, and reading skills.
★ 2002 Intermediate Mandarin Chinese (4) PreReq.: CHIN 1102. Continuation of the study of basic lexicon and structures of Chinese; emphasis on further development of speaking, writing, and reading skills.
3101 Advanced Chinese (3) PreReq.: CHIN 2002 or equivalent. Introduction to authentic materials of increasing complexity on a variety of topics; emphasis on the use of relatively sophisticated structures vocabulary in complex communication.
3102 Advanced Chinese (3) PreReq.: CHIN 3001 or equivalent. Introduction of authentic materials of increasing complexity on a variety of topics; emphasis on the use of relatively sophisticated structures vocabulary in complex communication.
3801 Traditional East Asian Literature (3) Taught in English; knowledge of East Asian languages not required. Also offered as JAPN 3801. Introduction to the genres, themes, and representative works of traditional Chinese and Japanese literature; emphasis on critical reading.
3802 Modern East Asian Literature (3) Taught in English; knowledge of East Asian languages not required. Also offered as JAPN 3802. Introduction to the genres, themes, and representative works of modern Chinese and Japanese literature; emphasis on critical reading.
4915 Independent Work (1-3) May be taken for a max. of 6 sem. hrs. of credit. Permission of department required. Directed readings in classical Chinese or Chinese literature.

CIVIL ENGINEERING • CE

In the Department of Civil Engineering, the second digit of the course number denotes the subject area of the course, as follows: 0 (construction, excluding 8000, 9000); 1 (environmental); 2 (water resources); 3 (geotechnical); 4 (structures); 5 (surveying); 6 (transportation); 7 (general).
2200 Fluid Mechanics (3) PreReq.: grade of "C" or better in CHEM 1550 and PHYS 2102. Fluids and gases; control volume laws; conservation of mass, momentum, and energy; dimensional analysis and similarity; applications to pipe flows.
2250 Fluid Fluid Mechanics Laboratory (1) PreReq.: CE 2200 and 2270. 3 hrs. lab. Measurement and calibration of hydraulic machinery; pump and turbine efficiency; flow in pipelines; viscosity; discharge coefficients.
2400 Statics (3) PreReq.: grade of "C" or better in MATH 1550, 1552 and PHYS 2102. Vectorial treatment of resultants and equilibrium of systems, centroids and centers of gravity, fluid statics, friction.
2400 Dynamics and Vibrations (3) PreReq.: grade of "C" or better in CE 2400 and credit or registration in MATH 2081 and CHEM 1131. Treatment of kinematics and kinetics of particles and rigid bodies; force, movement, velocity, acceleration; impulse and momentum; work and energy; dynamics and vibration; computational application to structural and machine components.
2700 Introduction to Civil Engineering Practice (1) Designed for civil engineering majors; open to nonmajors by consent of department. 3 hrs. lab. Credit will not be given for this course and EPEG 2000. Students will conduct three individual projects including civil engineering construction descriptions. Basic technical and professional aspects of civil engineering education and practice.
2720 Computational Methods in Civil and Environmental Engineering I (3) PreReq.: MATH 3350. Fundamental computational numerical and statistical techniques; solution of partial differential equations; descriptive statistics; correlation and regression analysis; numerical interpolation; root finding; and numerical integration and differentiation techniques for civil and environmental engineering systems.
2730 Computational Methods in Civil Engineering II (3) PreReq.: CE 2720. Advanced numerical, probabilistic, and statistical techniques for solving civil engineering problems; linear algebraic equations; numerical solution of differential equations; probability distributions; hypothesis testing; confidence intervals; and multivariate regression analysis in civil engineering systems.
3200 Hydraulics (3) PreReq.: CE 2200 and 2270. Fundamentals of fluid mechanics applied to problems in the field of water; steady and unsteady flow in closed conduits, flow in open channels, measurement of flowing water, and turbo machinery. Emphasis on computational methods.
3300 Geotechnical Engineering I (3) PreReq.: GEOL 1001, 2200, CHEM 1202, and credit or registration in CE 3350. Introduction to properties and engineering behavior of soil as a natural earth material, and an environment medium subject to flux and transport of liquids, gases, and contaminants; understanding of elementary physical, chemical, and biological phenomena as such phenomena influence the engineering behavior of soils.
3350 Geotechnical Engineering Laboratory I (1) PreReq.: EXST 2201, and CE 2720 and credit or registration in CE 3310. 3 hrs. lab. Laboratory measurement of properties, indices, and behavior of soil as an engineering material and environmental medium; testing methods to determine gradation, specific yield strength, unconfined compression, one-dimensional consolidation, hydraulic conductivity, specific surface area, surface change, x-ray diffraction, pH-redox, and conductivity measurements.
3400 Mechanics of Materials (3) PreReq.: CE 2450 and credit or registration in CE 2720 or equivalent. Stress and strain, tension, bending, deflections of beams, columns, statically indeterminate problems, combined stress.
3410 Mechanics of Materials Laboratory (1) PreReq.: EXST 2201 and CE 3400. 3 hrs. lab. Mechanical properties and strength of engineering materials and structural and machine elements.
3415 Structural Analysis I (3) PreReq.: CE 3400 and MATH 2063. Analysis of statically determinate structures including beams, frames, trusses, and arches for the effects of dead, live, moving, and windloads.
3500 Plane Surveying and Measurements (3) PreReq.: Eligibility for MATH 2057 and CE 2720. 2 hrs. lecture; 3 hrs. lab. Plane surveying theory of measurements; use of surveying equipment; field and office work for boundary surveys and topographic mapping.
3600 Principles of Highway and Traffic Engineering (3) PreReq.: EXST 2201 and CE 3500 or equivalent. Basic traffic characteristics; highway capacity analysis; geometric design of highways; route location; traffic operations, and signalized intersection design.
3700 Engineering Materials Laboratory I (1) PreReq.: credit or registration in CM 3302 or CE 3400 or equivalent. 3 hrs. lab. Descriptive and experimental testing of common construction materials.
3704 Independent Studies in Civil Engineering (3) PreReq.: senior standing, English proficiency, and ENGL 3802 (unless RRTC is elected); gpa of at least 2.5; 15 overall and major area, and consent of department chair. Project chosen in consultation with department chair. Formal proposal and final presentation required. Comprehensive design and/or development of a component, system, process, or software package.
4200 Hydrology (3) PreReq.: CE 2200 or consent of instructor. Water movement in soils, groundwaters, and surficial waters until it reaches the sea overland; concept of frequency, maximum probable runoff of rainfall, mass curves, and other statistical methods of hydrologic engineering.
4250 Ground Water (3) PreReq.: CE 2200 or consent of instructor. Occurrence of ground water; properties and classification of water-bearing formations; origin, discharge,
and methods of evaluating direction and rate of ground water movement; Darcy's Law, Theis Equation, analysis of aquifer tests and other field data; methods and designs for water resources projects; minimization of benefits; analysis, techniques, and design parameters.

4380 Geotechnical Engineering II: Shallow Foundations (3) Prereq.: CE 3200, 4200 or equivalent. Fundamentals of geotechnics applied to design and analysis of shallow foundations, excavations, retaining structures, and slopes; selected topics on soil improvement and vibration; emphasis on computer utilization.

4310 Geotechnical Engineering III: Deep Foundations (3) Prereq.: CE 3300 and 3530. Fundamentals of geotechnics applied to design and analysis of deep soil-structure systems; single piles and pile groups under axial load; caissons and piers; effects of lateral loads; computer utilization.

4320 Coastal Engineering (3) Prereq.: CE 3300 or equivalent. Engineering problems of the coastal zone; coastal processes, wave action, currents, sediment movement; coastal structures due to waves, tides, and winds; offshore soil geotechnical properties, vertical and lateral pile capacity; design principles for submarine pipelines and offshore platforms; engineering case studies.

4400 Principles of Steel Design (3) Prereq.: CE 3415. Analysis and design of elements of steel structures, elastic and plastic design, critical comparison of specifications with those of AISC.

4410 Principles of Reinforced Concrete (3) Prereq.: CE 3415. Working stress and ultimate strength theories as applied to concrete beams (reinforced and prestressed), columns, slabs, and footings; experimental data and current design specifications.

4420 Principles of Prestressed Concrete (3) Prereq.: CE 4410. Analysis and design of stressed concrete or structural elements; full and partial prestressing; serviceability and strength requirements; codes criteria for bridges, buildings, and other structures.

4425 Principles of Wood Mechanics and Timber Design (3) Prereq.: CE 3415 or equivalent. Basic principles of mechanics, elasticity, rheology, and failure as applied to woods and wood structures and specifications governing the design of sawn lumber, plywood, and glulam timber structures and structural components.

4430 Structural Engineering (3) Prereq.: CE 4750, 4400 and 4410, or equivalent. Analysis, planning, and design of structures; introduction to computer-aided design approach to solving structural engineering problems using mainframe and microcomputer software.

4450 Indeterminate Structural Analysis (3) Prereq.: CE 3415. Analysis of statically indeterminate structures; methods of analysis; stresses, strain, and deflections; slope deflection; moment distribution, and matrix formulation.

4440 Advanced Mechanics of Materials (3) Prereq.: CE 3400 and MAT 2065. Mechanics of materials; emphasis on needs of students interested in structural and machine design.

4450 Hurricane Engineering (3) Prereq.: CE 3415 and credit or registration in CE 3200 or equivalent. Analysis and design of structures to resist hurricanes and other natural hazards; wind engineering; flood engineering; hazard phenomena and probabilities of occurrence; estimation of loads, loading provisions of major building codes and standards; damage mechanisms; design strategies for life safety and damage mitigation.

4450 Finite Element Methods (3) Prereq.: CE 3400; and either MAT 2065 or 2090 or 2070. Basic theory of finite element methods with applications in a wide class of physical problems; matrix representation of stress, strain, and material relations; principle of virtual work, discrete finite element models of continuous systems, construction of basic finite element matrices, and solutions of physical problems by using existing finite element computer programs.

4460 Design of Bridges (3) Prereq.: CE 4410, 4420. 2 hrs. lecture and 1 hrs. lab. Design of concrete and steel bridges in accordance with the latest AASHO specifications; understanding of theoretical background behind the codes such as traffic and velocity concepts; load rating of bridges, and hands-on bridge design using computer software and hand calculations.

4500 Geodetic and Photogrammetric Surveying (3) Prereq.: CE 3550 or equivalent; 2 hrs. lecture; 3 hrs. lab. Overview of geodetic and geomatics; photogrammetry and photointerpretation; calculation and field procedures used in ground control surveys and photogrammetry.

4520 Advance Surveying (2) Prereq.: CE 3550 or equivalent; 2 hrs. lecture; 3 hrs. lab. Electronic surveying, simultaneous conveyances, subdivision surveys, flood plain management, surveying of utilities, dams, levees, highways, horizontal and vertical curves, and earthwork.

4530 Control Surveying with GPS (3) Prereq.: CE 3550 or equivalent surveying course; 2 hrs. lecture; 3 hrs. lab. Understanding of spatial positioning capabilities available using satellite positioning system (GPS) receivers to calculate positions and to evaluate results; topics include classical geodesy, global positioning systems (GPS) receivers, static and kinematic GPS surveys, GPS computations, GPS mapping, vertical GPS, and geodetic applications. Lab includes demonstration and hands-on use of GPS equipment and software.

4550 Boundary Surveying (3) Prereq.: CE 3550 or equivalent; 2 hrs. lecture; 3 hrs. lab. Designed to prepare engineers to work in Louisiana Procedures and laws governing surveying of boundaries; emphasis on U.S. Land Survey System and Louisiana Subdivision Law.

4560 Engineering Applications of Remote Sensing (3) Prereq.: consent of instructor; 2 hrs. lecture; 3 hrs. lab. Photographic and remote sensing techniques, interpretation, principles, methods, and techniques; engineering applications in materials, land use, energy, hydrology, transportation, geology, geomorphology, and water resources.

4600 Geometric Design of Highways and Airports (3) Prereq.: CE 3650 or equivalent; 2 hrs. lecture; 3 hrs. lab. Principles of geometric design for rural and urban highway facilities and airport installations; design criteria and controls, capacity analysis, cross-section selection, design of horizontal and vertical alignment, intersections, interchanges, and computer applications to design problems.

4620 Transportation Engineering (3) Prereq.: CE 3650 or equivalent. History, economics, and traffic characteristics of transportation systems; traffic fundamentals, control and signalization, railroads, maintenance, and operation of air, highway, pipeline, rail, and water transportation facilities-vehicles, guideways, and terminals.

4650 Introduction to Asphalt Mixture Design (3) Prereq.: CE 3450 and 3700 or equivalent. Principles of design and practice of hot mix asphalt mixture design; fundamental principles and analysis of binder rheology, aggregates, and mixture design.

4650 Concrete Materials and Mixtures (3) F.R. Prereq.: CE 3450, 3460, or equivalent. Composition and properties of different concrete, including types and basic constituents of cements; structure and hydration reactions of cement pastes; selection and properties of aggregates; properties of fresh concrete; proportioning; manufacturing, placing and curing of concrete mixes; strength; durability; and quality control.

4670 Fundamentals of Pavement Design (3) F Prereq.: CE 3450 or equivalent. Analysis and pavement design procedures, subgrade, base, and surfacing characteristics; loads, stresses in pavement systems; material characterization; pavement performance models; pavement performance models, structural design effects; effects of natural forces; and construction practices.

4730 Risk and Reliability Analysis in Civil and Environmental Engineering (3) Prereq.: CE 2720 and 2730. Decision making under certainty; probability distributions and their characteristics relevant to civil and environmental engineering systems; data gathering and analysis; extraction of information; entropy theory; estimation of distribution parameters; error and uncertainty analysis; natural hazards on the built environment; effects on hazards and building infrastructure systems; damage mechanisms; principles of wind, flood, and seismic resistance design; hurricane evacuation and sheltering; engineering preparedness, response and recovery issues; design strategies for life safety and damage mitigation; building codes, land use zoning, design guidelines, and insurance as mitigation tools.

4750 Professional Issues and Concept Design in Civil Engineering (3) Prereq.: CE 2720. Professional and ethical issues in civil engineering practice; decision-making, management, and insurance as mitigation tools.

4780 Special Topics in Civil Engineering Science (3) Prereq.: senior standing and departmental approval. May be taken for a maximum of 6 hrs. of credit. More than one section of this course may be taken for credit concurrently when topics differ. Special topics in civil engineering design.

7100 Theory and Operation of Wastewater Treatment Facilities (3) Prereq.: consent of instructor. Preparation for undergraduate graduate preparation, or consent of instructor. Theoretical principles, design criteria, and analysis of treatment systems for domestic and industrial wastewaters and sludges, including models of ideal biochemical reactors and design criteria for suspended-growth and biofilm processes applied to new design, construction, operation, and maintenance of wastewater treatment facilities.


7115 Water Quality Management (3) Current environmental engineering topics, with emphasis on water quality; governmental agencies, regulations, and technological limits affecting water and wastewater treatment, solid wastes, hazardous wastes, and air pollution.

7120 Sanitary Engineering Operations and Processes Lab (3) Prereq.: CE 4130 or equivalent registration in CE 7110. 1 hr. lecture; 6 hrs. lab. Laboratory and pilot plant studies of water and wastewater treatment processes.

7135 Advanced Topics in Biogeochemistry (3) Biological waste treatment applications in civil and environmental engineering, including current and emerging techniques for characterization, analysis, control, and mathematical modeling of biological processes in municipal and industrial waste treatment systems.

7145 Biological Treatment of Recirculating Systems in Aquaculture (3) Theory, design, and management of fixed film biofiltration processes used to recondition water in recirculating aquaculture systems and to provide tertiary treatment of domestic and industrial wastes characterized by low substrate regimes.

7180 Water Quality Simulations (3) Prereq.: CE 4130. Water quality modeling from a perspective of practicality and opportunities: emphasis on model calibration and verification procedures and methodologies for quantifying uncertainties associated with model predictions.

7200 Free Surface Flow (3) Prereq.: CE 2280. Natural and artificial open channels, steady and unsteady flow, water surface profiles, channel transitions, hydraulic jump, secondary flow, and application of energy and momentum principles.

7255 Advanced Hydraulics (3) Prereq.: CE 2280. Transport of sediment, mixing current, and other phenomena.

7260 Advanced Hydrology (3) Prereq.: CE 4220 or 4230 or equivalent. Hydrologic design and management of water systems and water quality.
new problems caused by waste-resource development; factual and conceptual hydrological evaluation of present practices in the management and development of water resources.

7265 Advanced Subsurface Hydrology and Hydraulics (3) Prereq.: CE 4250. Properties of porous media and fluid mixtures; dynamics of wetting and drying; single phase and multiphase flow in porous media; miscible and immiscible flow; basic concepts in saturated and unsaturated flow; solution procedures and applications in engineering design, physics and mathematics of transport processes in ground water; governing equations, solution procedures, and applications; waste management and pollution problems.

7270 Hydrologic Systems (3) Prereq.: CE 4200. Techniques of systems analysis and synthesis; application to hydraulic processes including runoff, stream flow routing, infiltration, evapotranspiration, and yield; development of watershed models using these techniques and their application to engineering design.

7275 Modeling for Management of Groundwater (3) Prereq.: CE 4200. Technical aspects of groundwater models and application models and computer codes for simulation and optimization management of surface and groundwater systems.

7280 Modeling in Physical Hydrology (3) Prereq.: GE 4200. Principles of mathematical physics applied to hydrologic processes; methods of solution and model building; control and representation of data; mathematical analysis of models; computer programs for data analysis; applications to natural and engineering systems.

7300 Advanced Geotechnical Engineering I: Stress Distribution, Seepage, Compressibility (3) Prereq.: CE 3300 and 3350. Advanced theories of soil mechanics including stress-strain relationships, consolidation, and settlement analysis; their applications in foundation engineering.


7310 Advanced Geo-Engineering I: Shear Strength, Bearing Capacity, Slope Stability (3) Prereq.: CE 7300. Shear strength of cohesive and cohesionless soils; stability problems including bearing capacity, slope stability, and earth pressure distribution.

7315 Principles of Soil Behavior (3) Prereq.: CE 3300, 3350. Analysis of the effect of compositional and environmental factors on conduction phenomena; volume change behavior, deformation, stress-strain-time behavior in soils; soil composition, mineralogy, soil-water electrolyte systems in soil-water-vegetation variables.

7320 Advanced Design and Analysis of Foundations (3) Soils as an engineering material; geotechnics applied to advanced foundation design; design and analysis of various types of foundations (i.e., footings, walls, bridge abutments, cofferdams, earth dams, and other pertinent soil structures).

7330 Marine Geotechnics (3) Prereq.: CE 7310 or equivalent. Sea floor soil geotechnical properties; in situ stress environment; analysis of 3-D stress.

7350 Soil Improvement and Stabilization (3) Prereq.: CE 4300. Methodology and analysis of soil placement and improvement techniques; properties of mineral and organic soils, principles of soil compaction; methods of soil placement, improvement and treatment, chemical stabilization of soils, lime columns, stone columns, ultimate strength and bearing capacity of columns, compression by surcharging and drains, dynamic consolidation, vibro stabilization, thermal properties of soils, thermal stress.

7340 Theory and Practice of Geotechnical Laboratory Experiments (3) Prereq.: CE 3300, 3350, and 4350; or equivalent. 2 hrs. lecture; 3 hrs. lab. Theory and practice of laboratory experimental techniques used in geotechnical design and analysis.

7345 In-Situ Soil Testing and Evaluation (3) Prereq.: CE 7340. Theory of practice and new advanced geotechnical in-situ testing methods (i.e., piezo-cone penetrometer, self-boring pressure meter, dilatometer, etc.)

7350 Soil Dynamics and Introduction to Earthquake Engineering (3) Prereq.: CE 7310. Theory and practice related to soil-structure systems subject to time dependent loadings; wave propagation in various media, steady state and transient vibration of foundations; measurement of dynamic soil parameters, analysis and design procedures; influence of soils on ground motion characteristics; causes of soil failure during earthquakes; liquefaction.

7355 Environmental Geotechnics (3) Prereq.: CE 3300, 3350. Geotechnical aspects of waste management; solute transport in saturated media, flow in partially saturated media, diffusion in soil, sorption, hydraulic conductivity, soil-pore fluid interactions, compaction, clay and flexible membrane stability/settlement considerations, remediation techniques.

7360 Soil Reinforcement (3) Prereq.: CE 7310. Selection, design, and construction of soil reinforcement systems for retaining structures, highway embankments, excavations, slope stabilization, bearing capacity, and settlement reduction.

7400 Statistically Indeterminate Structures (3) Prereq.: CE 4410. Application of statically indeterminate structures by modern methods.

7404 Advanced Concrete Theory (3) Analysis and design of reinforced concrete structures; statics; prestressed concrete structures; strength, shrinkage, and creep.

7402 Limit Analysis and Design (3) Prereq.: credit or registration in CE 4410. Analysis of statically indeterminate structures by modern methods.

7410 Structural Design for Dynamic Loads (3) Sources, intensities, and methods of transmission of dynamic loads; response of structural systems to dynamic loading; modern computation techniques.

7410 Applied Elasticity (3) Prereq.: MATH 4101 or ME 4163, and CE 4503. The Euler-Bernoulli beam taken for a max. of 6 hrs. of credit. Plane stress and plane strain; two-dimensional problems in rectangular and polar coordinates; strain energy methods; stress, strain, and general theorems in three dimensions.

7430 Energy Principles in Engineering Mechanics (3) Prereq.: CE 4400 and registration in PHYS 4156 or ME 4563. Principle of virtual work; principle of complementary energy; Castigliano's theorems, Lagrange's equations, and Stanitz's principle; applications to stress and deflection analysis of beams, trusses, frames, plates, and rings; problems in elastic stability and vibrations.

7435 Finite Element Method in Engineering (3) Prereq.: CE 4410. Finite element method as a tool for applications to geotechnical, fluid dynamics, elasticity, plasticity, stability and vibrations of elastic systems.

7440 Theory of Plates (3) Prereq.: credit or registration in CE 4410. Laterally loaded plates with various boundary conditions; approximate methods of plate analysis; large deflections of plates; elastic stability of plates.

7445 Design of Plate and Shear Structures (3) Theory of folded plate and thin shell behavior; structural design of plate and shell elements.

7440 Theory of Elastic and Plastic Stability (3) Prereq.: CE 4440 and credit or registration in MATH 4101 or ME 4563. Mathematical approach to statics and dynamics of deformable solids; tensors in curvilinear coordinates and variational calculus used to formulate elasticity and viscoelasticity theory; energy theorems and conservation laws.

7400 Plasticity and Viscoelasticity: Theory and Application (3) Prereq.: CE 4440. Elements of the theory of plasticity; yield criteria and stress-strain relations for perfectly plastic and strain hardening materials; boundary value problems of plasticity; the slip-line theory and applications; constitutive equations of viscoelastic bodies and methods of solution of boundary value problems of viscoelasticity.

7450 Mechanics of Composite Materials (3) Prereq.: CE 4300. Modeling of the mechanical behavior of fibrous composites for application to structural components; emphasis is placed on interlaminar failure, thermal effects, nonlinear stress-strain response, test methods, and micromechanics.

7450 Damage Mechanics in Metals and Matrix Composites (3) Prereq.: CE 4300. Theoretical formulation and application of the different constitutive models to metals and metal matrix composites, but with consideration of other materials; analysis of isotropic and anisotropic damage in materials.

7500 Remote Sensed Sensing in Engineering Research (3) Prereq.: CE 4560. Physical measurements, characteristics of present and future remote and field instrumentation; computer analysis of space data to include classification algorithms, enhancement, calibration, geo-referencing, overlay, and data base development; image processing, environmental and transportation engineering.

7500 Expert Systems in Civil Engineering (3) Prereq.: ID 4470 or equivalent. Artificial intelligence and knowledge-base systems; system components and structural, water resources, environmental, and transportation engineering.

7600 Transportation Engineering Data Collection Methods (3) Prereq.: CE 4150 or equivalent. Applications of sampling theory to data collections for transportation studies; determination of sample sizes; calculation of sampling error; survey data; survey methodology, including interviews, counting programs, moving observer surveys, self-administered surveys. Simple random sampling; stratified sampling; and cluster sampling; determination of necessary sample size; conducting surveys; data collection; data reduction techniques.

7610 Transportation and Environment (3) Prereq.: CE 4600 or equivalent. Theories relating to environmental impact of transportation actions and preparation of environmental documents on energy consumption and traffic impact mitigation; methods of estimating impacts of transportation projects.

7610 Traffic Engineering Operations and Control (3) F-O Prereq.: CE 4600 or equivalent. Analysis, design, and engineering and transportation problems, and organization theory and implementation of operations and control centers; traffic flow and traffic control devices; development and application of operational models; traffic control strategies.

7615 Advanced Highway Design and Traffic Safety (3) S-E Prereq.: CE 4600 or consent of instructor. Theoretical development and application of highway design principles, particularly as they relate to safety; analysis of accident statistics, diagnosis of high-hazard locations, risk management, tort liability, and design treatments to address high accident locations; design principles of traffic calming, highway-railroad grade crossings, highway work zones, and roadway crossings.

7621 Mass Transit Systems (3) Prereq.: CE 3360 or equivalent. Historical development, role in society, federal participation, and institutional and legislative development of mass transit; description of conventional and innovative forms, and characteristics of users; planning, vehicle scheduling, environmental impact assessment, capital costs, pricing and financing; future systems and policies.

7635 Transportation Demand Analysis (3) S-O Prereq.: ECON 5600, EXST 7003, CE 7700, or equivalent. Theoretical and behavioral methodology of transportation demand analysis; exploration of travel or shipping behavior within the paradigm of microeconomic demand and supply theory; geographical context divided into urban and interurban settings; emphasis on interurban analysis.

7636 Systems Analysis in Transportation (3) S-E Prereq.: EXST 7003 and CE 7700, or equivalent. Systems approach to transportation problem solving, econometric modeling, large-scale mathematical programming and simulation; decision analysis and multiobjective evaluation.

7670 Air Transportation Economics (3) ECON 4710, 7003, or equivalent. The role of air transportation in the economy; comprehensive economic analysis of airline systems, basic operation models, and neoclassical models; market supply and demand; pricing theory; regulated and unregulated domestic and international markets.

7680 Urban Transportation Planning and Policy (3) Prereq.: CE 3360 or equivalent. Introduction to and definition of transportation planning; transportation planning concepts and methods; local and regional transportation planning and decision-making and models of decision makers; systems analytic approaches to transportation planning; inventory, data management, and spatial aspects of travel; land use and transportation; inputs to travel forecasting.

7680 Urban Transportation Planning and Policy (3) S-E Prereq.: CE 7640, ECON 5600, EXST 7003, or equivalent. 3 hrs. lecture; 2 hrs. lab. Theory, descriptive and modeling;
conventional four-step modeling procedures; network development for highways, transit, high-occupancy vehicles; development of trip generation, distribution, and mode-choice models; highway and transit assignment procedures; use of current software for microcomputers.

**2764 Transportation Systems Analysis (3) V Prereq. CE 7640 or equivalent. Quantitative methods for analysis of transportation systems; basic network algorithms; macroscopic traffic simulation models; dynamic traffic assignment approaches; network design problems with travel demand uncertainty; optimization concepts; transportation network modeling.

**2765 Bituminous Materials and Mixtures (3) S-T Prereq. CE 3780 or equivalent. 2 hrs. lecture; 3 hrs. lab. Properties of asphalts and tars used in bituminous materials; historical developments; properties and design of bituminous Mixtures; theory and practice of asphalt concrete mix design for pavements and bases including specification and construction methods for hot-mixes and surface treatments.

**2762 Transportation Engineering - Materials (3) Prereq.: CE 4670 or equivalent. Earthen materials—fills and subgrades; aggregates—types, properties, and performance; introduction to asphalt and asphaltic concrete; introduction to cement and cement concrete; variability, OC Curves; stabilization principles and practices; unsalted roads.

**2766 Pavement Materials Characterization (4) F-I Prereq.: CE 3780 or equivalent. 3 hrs. lecture; 3 hrs. lab. Laboratory and field test methods for determining engineering properties of pavement materials; interpretation of test data for selecting property values; use of fundamental engineering properties in design and analysis of pavement response to environmental and vehicular loads.

**2767 Pavement Structural Design (3) S-T Prereq.: CE 3600 or equivalent. Concepts of pavement, evaluation of pavement performance, serviceability concepts, structural evaluation, safety, maintenance and rehabilitation, economic considerations, selection of alternatives, and life cycle cost analysis.

**2763 Pavement Maintenance and Rehabilitation (3) E-I Prereq.: CE 3700 or equivalent. Pavement maintenance and rehabilitation; pavement evaluation techniques; maintenance versus rehabilitation versus replacement alternatives.

**7706, 7701 Special Topics in Civil Engineering (2-3) Prereq.: permission of department. Each course may be taken for a max. of 3 hrs. of credit. Specialized civil engineering areas.

**7720 Numerical and Matrix Methods in Civil Engineering (3) Application of numerical and matrix methods to structures, soil mechanics, transportation, water resources, and other civil engineering areas; matrix analysis of differential equations; eigen values, eigenvectors, and canonical forms; use of finite differences; high-speed computational techniques.

**7740 Master's Report (3) Comprehensive report with oral defense on subject approved by the major professor.

**7759 Seminar (1-2 per sem.) “S”/“U” grading. 5000 Thesis Research (1-2 per sem.) “S”/“U” grading.

**9000 Dissertation Research (1-2 per sem.) “S”/“U” grading.

**CLASSICAL STUDIES • CLST

General education courses are marked with stars (★).

**2070 Ancient World in the Cinema (3) An examination of how the cinema has interpreted the history and myths of Greece and Rome.

2090 Women in Antiquity (3) Knowledge of Greek or Latin not required. The role of women in Greek and Roman society; readings from historical, legal, medical, and religious documents.

**2099 Greek and Roman Mythology (3) Taught in English; knowledge of the Greek and Latin languages not required. Survey of the principal myths of the Greeks and Romans.

**2092 Greek and Latin Word Study (3) No previous knowledge of Greek or Latin required; credit not applicable toward a major in foreign languages. Etymology of common and scientific words derived from Greek and Latin; emphasis on medical terminology.

**2101 Ancient Greek Civilization (3) Knowledge of Greek and Latin languages not required. Credit will not be given for both this course and a 4000 or 5000 level Survey of literature, philosophy, art, and culture of ancient Greece from its beginnings to the death of Alexander the Great.

**2102 Ancient Roman Civilization (3) Knowledge of Greek and Latin languages not required. A survey of the literature, philosophy, art, and culture of ancient Rome from its beginnings to the death of Marcus Aurelius.

**2015 The Archaeology of Ancient Greece (3) Also offered as ANTH 3015. Material culture of the great civilization of ancient Greece; includes Neolithic Age, Bronze Age (Mycenaeans/Mycenaean), Classical Age, and the Age of Alexander the Great.

**2032 Greek and Roman Tragedy in English Translation (3) Taught in English; knowledge of Greek and Latin languages not required. Drama of Greece and Rome; origins, major examples, and relevance; plays of Aeschylus, Sophocles, Euripides, and Seneca.

**2040 Greek and Roman Comedy in English Translation (3) Knowledge of Greek and Latin languages not required. May be repeated for a max. of 6 sem. hrs. of credit when topics vary.

**2090 Comparative Mythology (3) Prereq.: CLST 2090 or permission of instructor. Also offered as REL 3090. Introduction to myths from around the world with comparisons to Greek and Roman mythology.

**COMMUNICATION DISORDERS • COMD

General education courses are marked with stars (★).

**1051 Spoken American English (3) Prereq.: consent of instructor or international student counselor. Weekly individual work in the Speech Laboratory. Undergraduates only. Theoretical and practical treatment of pronunciation of American English for students of other languages; phonology, stress, intonation, and rhythm through drills, exercises, and speech samples.

**1080 Survey of Communication Science and Disorders (3) For students interested in the study/teaching of language. Anatomical, physiological, and psychological bases of normal and disordered verbal communication.

**2050 Introduction to Language (3) Linguistic study of the principal interrelated levels of language structure: phonetics, phonology, morphology, syntax, and semantics; related topics such as writing systems and dialects.

**2051 Introduction to Manual Communication (4) 3 hrs. lecture; 2 hrs. lab. Basic linguistic structure, educational and cultural aspects, and reading and transmitting messages in manual communication systems; American Sign Language as well as English-based systems.

2081 Introduction to Communication Disorders (3) Required initial course for undergraduates concentrating in speech pathology and audiology. Observations in Speech and Hearing Clinic required. Processes involved in speech production; definition, description, and incidence of speech and hearing disorders; overview of the profession, including agencies, related professionals, job opportunities, publications, professional associations, and certification.

**4150 Phonetics (4) Prereq.: COMD 2050. 3 hrs. lecture; 1 hr. lab. Also offered as LING 4150. Principles of phonemics; articulatory anatomy; acoustic analysis of phonetic articulation; phonetic sounds; transcription at different levels of detail; production and perception.

**4153 Acoustics of Speech and Hearing (3) Prereq.: COMD 2081 or equivalent. Also offered as LING 4153. Production, transmission, and perception of speech acoustics in communication; acoustic phonetics and psycho-acoustics.

**4190 Introduction to Audiology (3) Prereq.: COMD 2081, 4153. Interaction of hearing and speech, effects of hearing loss on speech and language development; types of hearing loss and evaluation processes.

2450 Anatomy and Physiology of Speech and Hearing (3) Prereq.: BIOL 2140; COMD 2050. Functional anatomy of structures associated with speech production, hearing, and reception.

2480 Speech and Language Development (4) Also offered as LING 4380. 3 hrs. lecture; 1 hr. lab. Language acquisition and development; auditory, language and cognitive development, behavioral learning, and structural properties of speech; theories of language development in the normal child.

2481 Basic Articulation Disorders (3) Prereq.: COMD 2081. Introduction to speech therapy, development, etiology, evaluation and treatment of disorders.

2482 Basic Language Disorders of Children (3) Prereq.: COMD 2081 or equivalent. Differentiation diagnosis and remediation of major language disorders of children.

2483 Basic Fluency Disorders (3) Prereq.: COMD 4381 or equivalent. For clinical practicum take COMD 4683, 4684, or 4685. Stuttering and allied disorders; emphasis on speech therapy and intervention.

2484 Basic Voice Disorders (3) Prereq.: vocal physiology, dynamics characteristics and measurement of fundamental frequency, and differential diagnosis and management of voice disorders of functional and normal voice.

4980 Audiologic Assessment (3) Prereq.: COMD 4250, 4190. Practice and application in pure-tone and speech audiometry; middle-ear measurements, differential diagnosis; physiological and acoustic evaluation of audiometric potentials.

4980 Auditory Rehabilitation in Children (3) Prereq.: COMD 4153, 4190. Methods of management including modes of communication, auditory and speech-reading training, amplification, and identification and intervention, and educational placement.

6811 Clinical Preparation and Observation Laboratory (1) S 2 hrs. lab. For majors in communication sciences and disorders. Study of clinical problems in speech, language, and hearing disorder. May be taken for a max. of 8 sem. hrs. of credit each. On- and off-campus practicas in speech, language, and hearing disorders.

6949 Clinical Practice in the Medical Environment (1-4) Prereq.: consent of instructor. Clinical experiences in a hospital or medical practitioner's office.

4750 Independent Research in Speech Science or Linguistics (1-3) May be repeated for a max. of 6 hrs. of credit each. Also offered as LING 4750. Readings in speech science or linguistics directed by a senior faculty member.

4751 Special Topics in Communication Disorders (3) May be taken for a max. of 3 hrs. undergraduate or graduate credit when topics vary.

**1020 Speech Science (3) Motor and articulator phonetics, including palato癀articulation, sibilants, and aspects of signal detection and perception.

**1021 Instrumentation and Methods for Speech and Hearing (4) Prereq.: COMD 4153 or equivalent. 3 hrs. lecture, 2 hrs. lab. Instrumentation techniques for assessment and research in speech and hearing; both theory and application are emphasized.

**1533 Research Design in Communication Science and Disorders (3) Prereq.: E SYST 4301, 4302 or equivalent. Empirical research design problems in speech and hearing, emphasis on measurement validity and reliability.

**1719 Hearing Science (4) Prereq.: COMD 4250. Auditory transmission and processing from the outer ear to the cortical area; psychophysical phenomena germane to human audition.

**1792 Hearing Aids: Electroacoustics and Fitting (3) Prereq.: COMD 7191, 7490. Electroacoustic analysis of hearing aids, earmold acoustics, selection and evaluation procedures, special devices, and problems in communication and speech processing.

**2780 Neuroanatomical Bases of Speech and Hearing (3) Prereq.: BIOL 2140 and COMD 4250 or equivalent. Study of structures associated with speech production, nervous system as it relates to sensory/motor and cognitive processes underlying speech and hearing.

**7380 Articulation Disorders (3) Prereq.: COMD 4381. Development of normal articulation; etiology, nature, and treatment of articulatory disorders.
3781 Language and Learning Disorders (3) Prereq.: COMD 4392. Language and the communicative aspect of language development and treatment models for language intervention; relationship between language and learning; emphasis on school-aged child.

3782 Voice Disorders (3) COMD 4384. Incidence, etiology, concomitant problems; assessment and management of voice dysphonias, aphorisms, and laryngeotomies.

3783 Cleft Palate/Orofacial Disorders (3) Prereq.: COMD 4250, 4380. Oral anatomy, physiology, and embryology; etiology and classification of orofacial cleft; surgical, dental, speech, hearing, and psychosocial concomitants and their management.

3784 Early Communicative Intervention (3) Prereq.: COMD 4382 or equivalent. For clinical practitioners, take COMD 7645 or 7680. Cognitive, social, and environmental conditions associated with “high risk” for communicative disorders; intervention approaches (prevention, evaluation, direct stimulation of child-caregiver interactions) and service delivery models (home-based, center-based).

3785 Neuropathologies of Speech (3) Prereq.: COMD 4250, 4381, and 7280, or equivalent. Physiological and anatomical bases of dysarthria, apraxia, and related speech disorders due to neuropathy in the adult population; emphasis on diagnosis, description, and clinical management.

3786 Introduction to Augmentative/Alternative Communication (3) Current issues, terminology, and technological developments; augmentive and alternative communication systems and system components; assistive devices and systems; augmentive communication assessment; intervention guidelines and procedures.

3787 Aphasia in Adults (3) Prereq.: COMD 7280 or equivalent consent of instructor. Neurological bases of aphasia and related disorders; appropriate therapeutic methodologies.

3788 Fluency Disorders II (3) Prereq.: COMD 4385 or equivalent. Etiology and nature of speech fluency disorders.

3789 Communicative Rehabilitation of Severely/Multiply Handicapped Individuals (3) Medical bases of severely handicapping conditions; alternative communication systems; assessment and intervention processes; pragmatics of interpersonal communication involving individuals who use non-speech modalities.

3790 Industrial Audiology and Hearing Conservation (3) Prereq.: COMD 7490. Audiological practices in industry and hearing conservation programs; professional, technical, business, and legal issues.

3791 Educational and Pediatric Audiology (3) Prereq.: COMD 7490. Identification and management of the young child; social and psychological concomitants of auditory disorders; genetic hearing loss and other high risk types of impairment related to hearing.

3793 Pathology of the Auditory System (3) Prereq.: COMD 4250, 4380. Anatomy and physiology of the auditory apparatus; aspects of hearing loss including conductive, sensory, neural, and central auditory dysfunction; diseases, abnormalities, and methods of medical intervention.

4780 Measurement and Diagnosis of Communication Disorders (3) Psychological and behavioral measurement of communication function; treatment planning for common speech/language disorders.

4790 Diagnostic Audiology I (3) Prereq.: COMD 7191. Behavioral tests and middle-ear measurements in relation to test purpose, scientific basis, assessment strategies, procedures, and interpretation.

4791 Diagnostic Audiology II (3) Prereq.: COMD 7490 or consent of instructor. Auditory evoked potentials and electroencephalography examined in relation to purpose, scientific basis, assessment strategies, procedures, and interpretation using cross-check principles.

5789 Auditory Rehabilitation of Adults (3) Prereq.: COMD 7192. Special needs of the adult hearing-impaired individual (communicative, social, and vocational); hearing aid use and components of the rehabilitation process.

6783, 7684, 7685 Graduate Clinical Practicum (1-6 each) Prereq.: credit or enrollment in the course dealing with the specific disorder in which practicum is to be taken. May be repeated for credit; may obtain the clock hours necessary for certification by the American Speech-Language-Hearing Association. Only 6 sem. hrs. of academic credit counted toward the degree, and although all practicum hours count for professional certification. 2-8 hrs.

7741 Quantitative Measurement of Speech (3) Prereq.: COMD 4250, 4380. Focus on research and measurement in communicative disorders. Rationale for and clinical utility of objective measures of speech and language function; emphasis on use of types of electronic instruments.

7750 Special Topics in Linguistics (3) May be taken twice for credit for the master’s degree and four times for the doctorate when topics vary. Also offered as LING 7750. Topics to be announced.

7752 Seminar in Linguistics (3) also offered as LING 7752. May be taken for a max. of 6 hrs. for the master’s degree and 12 hrs. for the doctoral degree when topics vary. Problems in analysis of language; emphasis on phonology and semantics.

7754 Psycholinguistics: Linguistic Perspectives (3) Prereq.: ENGL 4010 or equivalent. Also offered as PSYC 7754. Theories of constituent structure and their application; discourse/semantic principles and their application; speech errors and language universals.

7755 English for Speakers of Other Languages: Methods and Materials (3) Also offered as LING 7755. Problems of teaching English to speakers of other languages; assessment and production strategies for spoken language; discourse analysis, theoretical models, and second language acquisition, and development of a teaching syllabus; work with international students.

7756 Introduction to Speech: Phonetics and Linguistics (1-3) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. For advanced graduate students who wish to pursue research on special problems exclusive of thesis or dissertation. Also offered as LING 7756.

7780 Seminar in Communicative Disorders (3) Prereq.: consent of instructor. May be repeated for credit. Selected topics pertaining to diagnosis of communicative disorders.

7781 Independent Research: Speech Science (1-3) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. For advanced graduate students who wish to pursue research on special problems exclusive of thesis or dissertation.

7782 Individual Research in Communicative Disorders (1-6) Prereq.: credit for a max. of 6 sem. hrs. of credit. For advanced graduate students who wish to pursue research on special problems exclusive of thesis or dissertation.

7783 Dysphagia (3) Prereq.: COMD 4250, 7280. Characteristics, assessment, and management of swallowing disorders in children and adults occurring secondary to neurological or structural deficits.

7789 Seminar in Hearing Disorders (3) Prereq.: consent of instructor. May be repeated for credit. Exploration of current professional/scientific topics in clinical practice/research. Also of a 7789.

7791 Independent Research: Speech Science (1-3) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. For advanced graduate students who wish to pursue research on special problems exclusive of thesis or dissertation.

7850 Experimental Phonetics (3) Prereq.: Ph.D. standing and permission of instructor. May be taken for a max. of 9 hrs. of credit when topics vary. Research and modeling of the quantitative representation of human speech.

7853 Psychoacoustics (4) Prereq.: COMD 7191, 3 hrs. lecture, 3 hrs. lab. Admission to Ph.D. program required. Classic and contemporary readings about perception of sound; examination of psychoacoustical methods, signal detection theory, frequency processing, pitch perception, intensity processing; binaural hearing and temporal acuity.

7854 Physiological Acoustics (3) Prereq.: COMD 7191 and admission to doctoral program. Auditory system structure and function, physiological acoustics and psychoacoustic correlates.

7860 Advanced Seminar in Language Disorders (3) Theory, contemporary issues, and research related to language disorders as a method of inquiry and intervention; evaluation of research methodology.

7862 Advanced Individual Research in Communication Sciences (3) Prereq.: COMD 7190 and admission to doctoral program and consent of instructor. May be taken for a max. of 6 hrs. of credit. Research topics ancillary to dissertation.

8000 Thesis Research (1-12 per sem.) S/U” grading.

9000 Dissertation Research (1-12 per sem.) “S/U” grading.

COMMUNICATION STUDIES • CMST

General education courses are marked with stars (★).

1061 Speech Fundamentals (3) Credit will not be given for both this course and CMST 2600. An honors course, CMST 1061, is also available. Selection of subjects; public speaking materials; structure, style, and vocal and physical attributes of delivery; practice in communicative speaking.

1062 HONORS: Speech Fundamentals (3) Same as CMST 1061, with special honors emphasis for qualified students (students with ACT scores that qualify for ENGL 1003 and students with 3.00 cumulative GPA).

1150 Introduction to Communication Studies (3) Not a substitute for CMST 1061, 2040, 2060, or 2640. Fundamental principles and subject areas in the study of human communication.

2010 Interpersonal Communication (3) Theories and research in human communication; one-to-one interactions.

2040 Introduction to Performing Literature (3) The study of literature through performance; reading, analysis, and performance of prose, poetry, and drama.

2060 Public Speaking (3) Credit will not be given for both this course and CMST 1041. Theory and skills needed by the effective communicator; factors influencing speech; analysis of other speakers and practice in speaking.

2601 Speech Communication for Business and the Professions (3) For students in the professional colleges, particularly the E. J. Ourso College of Business. Speech communication used in business and professional organizations; proposal presentations, group decision making, parliamentary procedure, and interviewing.

2603 Argumentation and Debate (3) Prereq.: CMST 1061 or 2040. Principles of argumentation and debate; analysis, briefing, evidence, reasoning, and refutation; debating on vital questions.

2604 Small Group Communication (3) Aspects of group leadership; group discussion and the problems of communication in human relations.

2200 Practicum in Speech Communication (1) Prereq.: consent of instructor. May be taken for a max. of 1 sem. hrs.; however, no more than a total of 3 sem. hrs. in CMST 2200 and CMST 4290 may be taken for undergraduate credit. May not be used to satisfy an area requirement for majors. Pass-fail grading. Practical experience in major departmental activities outside the classroom under direct faculty supervision.

2862 HONORS: Contemporary Public Address (3) Effectiveness of public address in contemporary society, limitations of free speech, implications of public communications on public address; rhetorical practices in politics, education, religion, business, and minority and pressure groups.

3012 History of Film (3) Film as a mode of communication and an artistic form from 1895 to the present; classic films screened and studied.

3040 Performance Composition (3) Prereq.: CMST 2040. Study of the rhetorical and aesthetic elements of solo and group performance, including performances of literature, cultural performances, and experimental performances.

3041 Performance in Everyday Life (3) Communication-centered study of performance and theatricality in daily life.

3060 Advanced Public Speaking (3) Prereq.: grade of “B” or better in CMST 1061, 1062, or 2060. Refined skill development in platform speaking.

3106 Communication and Power (3) Relationship of various communication practices and social control; use of discourse to create, maintain, and resist power in dyads, groups, organizations, and communities.

3170 Rhetoric of the Contemporary Media (3) Various forms of media (television, radio, newspapers, music, pop-music); their promotion of cultural values and modes; student project; study of major rhetorical critics and theorists.

3113 Conversation (3) Analysis of verbal processes in conversation; emphasis on theory and research concerning language, messages, and social interaction.
General education courses are marked with stars (★).

1100 Computers in Society (3) Prereq.: consent of instructor. Credit will not be given for both this course and C SC 1248 or 1250 or 1351 or 2390. Credit will not be given for both this course and C SC 1250 or 1253 or 1350 or 2390. Fundamentals of problem solving, program design, algorithms, and programming using a high-level language with applications in elementary statistics.

1250 Introduction to Computer Science I (3) Prereq.: credit in a course in computer science, mathematical maturity. Credit will not be given for both this course and C SC 1254, 1351 or 2390. Fundamentals of algorithm development, program design, and structured programming using an object-oriented language.

1254 Computer Science II with C++ (3) Prereq.: C SC 1253, M ATH 1550 or registration in MATH 1435. Credit will not be given for both this course and C SC 1254 or 1250 or 1350 or 2390. Fundamentals of algorithm development, program design, and structured programming using an object-oriented language.

1351 Introduction to Computer Science II for Majors (3) Prereq.: credit in C SC 1350 and MATH 1550. Credit will not be given for both this course and C SC 1254 or 1250 or 1350 or 2390. Fundamentals of algorithm development, program design, and structured programming using an object-oriented language.

2259 Introduction to Discrete Structures (3) Prereq.: M ATH 1552 and C SC 1251 or 1254 or 1351. Credit will not be given for both this course and C SC 1254 or 1250 or 1350 or 2390. Credit will be given for only one of the following: C SC 2250, 2262, 2233 or IE 2260. Basic principles of digital programming in symbolic languages; application of electronic computers to typical scientific problems.

2262 Numerical Methods (3) Prereq.: MATH 1552 and C SC 1251 or 1351 or 2390. Credit will be given for only one of the following: C SC 2260, 2262, 2233 or IE 2260. Computational methods for solving numerical problems in science and engineering; numerical solutions to systems of simultaneous linear equations, nonlinear algebraic equations (towsolving), differentiation and integration, ordinary differential equations, interpolation, and curve fitting.

2270 COBOL Programming and Business Data Processing Systems (3) Prereq.: credit in a course in computer programming. Programming tools for producing business-oriented applications using COBOL programming; its use in business data processing systems.

2280 Computer Organization (4) Prereq.: C SC 2252. 3 hrs. lecture; 2 hrs. lab. Basic digital circuits; Boolean algebra and combinatorial logic, data representation and transfer, and digital arithmetic; digital storage and memory design; computer control functions, input-output facilities, system organization, and reliability; description and simulation techniques; features needed for multiprogramming, multiprocessing, and real-time systems; other advanced topics and alternate organizations.

2290 Advanced Programming and Introduction to Data Structures (3) Prereq.: C SC 1251. Credit will not be given for both this course and C SC 1254, or 1351 or 2390. Advanced programming techniques and basic concepts of data types, data structures, and advanced programming languages.

2390 C Programming (3) Prereq.: Any two-course programming sequence and permission of department. Credit will not be given for both this course and C SC 1254 or 1250 or 1255 or 1350 or 1351 or 2390. Syntax, the system interface, and modular programming using C.

2533 Introduction to Engineering Computation (3) Prereq.: MATH 1550. 2 hrs. lecture; 3 hrs. lab. Also offered as SE 2533. Problem solving techniques and structured programming using FORTRAN programming language. Application of symbolic solvers and technical computing tools.

2700 Special Topics in Computer Science I (1-3) Prereq.: C SC 1254 or 1351 or permission of department. May be taken for a max. of 6 hrs. of credit when topics vary. Total credit earned in C SC 2700 and 4700 should not exceed 9 hrs. Specialized areas of current interest in computer science.

3012 Advanced Data Structures and Algorithm Analysis (3) Prereq.: C SC 1254 or 1351 or 2390 and credit or registration in C SC 2250. Description and utilization of formal ADT representations, especially those on lists, sets, and graphs; time and space analysis of recursive and nonrecursive algorithms, including graph and sorting algorithms; algorithm design techniques.

3570 Introduction to Object Oriented Programming Using JAVA (3) Prereq.: C SC 1254 or 1351 or 2290 or 2390. Introduction to object-oriented science and related disciplines. COBOL programming; its use in business data processing systems.

3800 Object Oriented Design Patterns (3) Prereq.: C SC 1254 or 1351. Advanced object oriented software development; emphasis on the use of the unified modeling language as a design tool.

3939 Object Oriented Programming and C++ (3) Prereq.: credits in either C SC 1254 or 1351 or 2290 or 2390. Introduction to the object oriented paradigm, including encapsulation, inheritance, and polymorphism; implementation of these concepts using C++.

5051 Computer Organization and Design (3) Prereq.: C SC 2259. Credit will not be given for both this course and C SC 2280 or 2080E or 3750. Computer arithmetic, design of high-speed adders and multipliers, CPU concepts, instruction
faching and decoding, hardwired control, microprogramming control, main memory, I/O organization, assembler programming techniques, CPU instruction sets and addressing modes.

3999 Independent Undergraduate Research (1-3) Prereq.: consent of Murakami and equivalent. 4 cr. hrs. of credit. Individual readings, conferences, and program development in computer science.

4010 Programming Languages (3) Prereq.: CSC 3102. Credit in both this course and CSC 7001. Principles of programming language design; specification of syntax and semantics; underlying implementation of block structure languages. Additional material on context-free languages; selected advanced language theoretical topics; emphasis on technique.

4036 Operating Systems (3) Prereq.: CSC 4105. Batch process systems programs, their components, operating characteristics, user services and limitations; implementation techniques for parallel processing, output and interrupt handling; overall structure of multiprogramming systems on multiprocessor hardware configurations; addressing techniques; management systems; design and management, system accounting, and other user-related services; traffic control, interprocess communication, design of operating system interfaces; system updating, documentation, and operation.

4038 Software Engineering (3) Prereq.: CSC 4105. Software requirements analysis; design representation, program design, verification, validation, maintenance, and software planning.

4151 Compiler Construction (3) Prereq.: CSC 3102 or equivalent. Credit will not be given for both this course and CSC 9001. Programming language structures, translation, loading, execution, and storage allocation; compilation of simple expressions and statements; organization of compiler including compile-time and run-time symbol tables, lexicon parser, syntax, scan object code generation, error diagnostics, object code optimization techniques, and overall design; use of compiler writing, listing and bootstrapping.

4160 Interactive Computer Graphics (See ME 4573).


4362 Advanced Numerical Methods (3) Prereq.: CSC 2533 or equivalent. Advanced treatment of numerical computation in practice; methodology for enhancing the effectiveness, accuracy, and efficiency of traditional numerical techniques; emphasis on extrapolation.

4370 Software Modeling Techniques (3) Prereq.: CSC 3102 or equivalent. Examination of modern modeling techniques for complex/high quality software including static/dynamic software models and project management models.

4402 Introduction to Database Management Systems (3) Prereq.: CSC 3102 or equivalent. Student must be familiar with the concepts of fuzzy sets, fuzzy operations, fuzzy logic, and fuzzy rule-based systems; applications to engineering and decision making; emphasis on systematic methodology to construct fuzzy applications; software and simulation tools in solving real-world problems using fuzzy-set techniques.

4470 Fuzzy Sets and Applications (3) Prereq.: permission of instructor. The concepts of fuzzy sets, fuzzy operations, fuzzy logic, and fuzzy rule-based systems; applications to engineering and decision making; emphasis on systematic methodology to construct fuzzy applications; software and simulation tools in solving real-world problems using fuzzy-set techniques.

4590 Computer Networks (3) Prereq.: CSC 4103. Introduction to local, metropolitan, and wide area networks using the standard OSI reference model as a framework; introduction to the ISO reference protocol suite and network tools and programming; discussion of various networking technologies.

4601 Computer and Network Security (3) Prereq.: CSC 3102 or equivalent. The role of cryptography; protocols, architectures, and technologies for secure systems and services.

4602 Fundamental Computer Science for Teachers (3) Prereq.: ELRC 4509 or prior programming experience and credit in an education methods course numbered 3000 or above. Also offered as ELRC 4512. Advanced programming techniques; emphasis on structured programming; software and hardware organization, data structures, algorithms, and other topics to prepare students to teach computer science in secondary schools.

4700 Special Problems in Computer Science (3) Prereq.: CSC 3102 or permission of department. May be taken for a max. of 4 cr. hrs. when topics vary. Total hrs earned in CSC 2700 and 4700 should not exceed 9 hrs. Specialized areas of current interest in computer science.

4890 Introduction to Theory of Computation (3) Prereq.: CSC 2259. Introduction to infinite automata, regular expressions, context-free languages; selected advanced language theoretical topics; emphasis on technique.

4999 Advanced Independent Undergraduate Research (1-3) Prereq.: consent of instructor. May be taken for a max. of 4 cr. hrs. Individual readings, conferences, and program development in computer science.

7001 Computing Principles I (3) Prereq.: CSC 3102 or equivalent. Credit will not be given for both this course and CSC 4101 or 4351. Comparative computer language concepts, semantics, data types, control structures, functional languages, computer construction.

7002 Computing Principles II (3) Prereq.: CSC 7001 or equivalent. Fundamentals of operating systems, including evaluation methods; functional organization and architecture of computers, including the logic and control units in a microcomputer, input/output facilities, real-time systems, multiprocessors, multiprocessors, distributed processing, and networking.

7008 Operating Systems (3) Prereq.: CSC 7002 or equivalent. Functional aspects of operating systems; foundations of operating systems; includes Unix, VAX, AIX, MVS, and VM/370.

7009 Computer Architecture (3) Prereq.: CSC 7002 or equivalent. Introduction to modern computer architecture; includes coverage of formal specification languages; languages for concurrent processing; languages that support program verification techniques; and in-depth study of applicable languages.

7103 Advanced Operating Systems (3) Prereq.: CSC 4103. Concurrent programming; shared memory, communication, and operating-system design; distributed systems and network programming; distributed operating systems; synchronization and deadlock detection in distributed systems.


7125 Software Engineering (3) Prereq.: CSC 4330 or equivalent. Formal specification techniques, design techniques, abstraction, information hiding, modularity, software testing, automated testing tools, maintainability factors, and cost-estimation.

7200 Theory of Computation I (3) Prereq.: CSC 4980. Algorithms, computability, decidability, enumerability, formal replacements and Church's thesis; Turing machines, primitive recursive functions, λ-recursive functions; undecidable predicates.

7201 Theory of Computation II (3) Prereq.: CSC 7200. Theory of computation; problems for complexity classes, NP, PSPACE, and NL; characterization of polynomial time by alternating log space Turing machines and log space Turing machines by auxiliary pushdown stores; time-space trade-offs and combinatorial problems.

7235 Advanced Software Engineering (3) Prereq.: CSC 7355. Formal testing, validation and verification techniques; in-depth study of formal specification languages and techniques.

7300 Algorithm Design and Analysis (3) Characteristics of an algorithm; problems of algorithm existence; the design, implementation, and complexity of algorithms; algorithm case studies.

7333 Machine Learning (3) Prereq.: CSC 4444. Fundamental principles of machine learning; inductive learning; explanation-based learning; and algorithm approach to Boolean function learning; learning formal languages and recursive theories; neural network learning and genetic algorithms; applications.

7511 Advanced Compiler Design Theory (3) Prereq.: CSC 4351 or 7001. Automatic generation of LL(1), LR(1), LALR(1) parsers, syntax directed translation of high-level language control structures, error recovery, optimization of branching, local code optimization using directed acyclic graphs, loop optimization, global data flow analysis, and object-code optimization.

7570 Graph Algorithms (3) Prereq.: MATH 4171 or equivalent. Graph layout algorithms; networks; application of network flow techniques; polynomial time algorithms and NP-completeness; dynamic graph drawing.

7573 Algorithms for Parallel and Distributed Computing (3) Prereq.: CSC 7300 or equivalent. Parallel algorithms for sorting, matrix processing, network optimization, and other problems; implementation and efficiency measures of the algorithms on different machines, and VLSI systolic arrays.

7574 Computational Models for Mobile Robots (3) Prereq.: CSC 7300. Computational tools for design, analysis, and implementation of algorithms for robotic applications; existing computational paradigms, constraint representation and real-time modeling for robotic vision; image understanding and planning; autonomous navigation and sensor-fusion problems for mobile robots.

7575 Robot Vision (3) Prereq.: CSC 3102 or equivalent. CSC 7300. Computational aspects of vision; utilization of techniques from computer vision, pattern recognition, probability theory, and artificial intelligence; visual recognition and classification.

7580 Computational Geometry (3) Prereq.: CSC 7300 or equivalent. Computational techniques for geometric problems; geometric searching; convex hulls; Voronoi diagrams; proximity; intersections of geometric objects; applications of computational geometry.

7581 Computational Aspects of VLSI CAD (3) Prereq.: CSC 7300 or equivalent. Overview of VLSI design and fabrication process, abstract model of VLSI, combinatorial optimization algorithms; circuit partitioning; placement and floor planning; global routing; detailed routing; and circuit compaction.

7602 Data Base Management Systems (3) Prereq.: CSC 4402. Implementation of database systems (physical model and its mapping to conceptual model) ; data structures and their influence on performance, concurrency control, distributed databases; advanced database systems.

7620 Parallel and VLSI Computation (3) Prereq.: CSC 4351. Theoretical aspects of the design and analysis of algorithms for parallel computation; physical implementation of VLSI chips.

7642 Data Mining and Knowledge Discovery (3) Prereq.: CSC 7333. Introduction to data mining and knowledge discovery in databases; data cleaning, statistical techniques, association rule learning; time series and spatial data mining algorithms, clustering algorithms, data visualization.

7670 Computer Information Visualization (3) Prereq.: CSC 3102 or equivalent. Study of computer visualization principles, techniques, and tools used for explaining and understanding information; includes visualization algorithms, techniques, and applications.

7688 Artificial Intelligence (3) Prereq.: CSC 4444. Temporal and nonmonotonic logic; truth maintenance systems; probabilistic reasoning; deductive databases; automated learning, planning, and tutoring; story understanding; structure of domain dependent expert systems.

7690 Self-Adapting Computing Systems (3) Prereq.: CSC 4446 or permission of instructor. Interplay of three paradigms in soft computing; fuzzy sets and fuzzy logic, neural computing, and evolutionary programming; applications in image processing, diagnosis and classification, decision making, and other areas; software and simulation tools for problem solving in the soft-computing arena.

7695 Programming and Performance Evaluation of Parallel Computers (3) Prereq.: CSC 3102 or equivalent. CSC 7300. Parallel programming techniques; message passing and process synchronization performance evaluation; prediction of parallel architectures and algorithms; scalability analysis.
CONSTRUCTION MANAGEMENT • CM

Registration in any course above CM 2121 is restricted to students admitted to a senior college with a declared CM major or minor.

1010 Construction Graphics and Nomenclature (3) Credit will not be given for this course and ID 1780. 2 hrs. lecture; 2 hrs. lab. Graphic communication concepts and techniques relating to construction processes and nomenclature.

1030 Engineering Graphics (2) 4 hrs. lab. Not open to construction management majors. Conceptual visualization, and communication of creative design concepts; introduction to engineering drafting and USA Standards Institute standards; freehand sketching; three-dimensional forms used in solution of engineering problems; use of automated graphical techniques in design and design communication.

2012 Plan and Cost Analysis for Residential Construction (3) Prereq.: CM 1010 and credit or registration in MATH 1550. 2 hrs. lecture; 2 hrs. lab. Interpretation of working drawings and specifications; cost estimation; bidding; materials, methods, and equipment for residential construction.

2112 Materials, Methods, and Equipment I (3) Prereq.: credit or registration in CM 2012. Job planning, work methods, materials, and equipment required in building and heavy construction.

2131 Materials, Methods, and Equipment II (Heavy and Industrial Construction) (3) Prereq.: CM 2112. Continuation of CM 2112. Emphasis on both heavy and industrial equipment.

2141 Construction Planning and Scheduling (3) Prereq.: ISDS 1100 or IE 2060 and CM 2112 or IE 1002. Fundamentals of planning and scheduling techniques used in the construction industry to manage construction projects.

3100 Construction Surveying (3) Prereq.: CM 2121. 2 hrs. lecture; 2 hrs. lab. Principles of construction surveying, fundamental measuring procedures, error analysis, leveling, traverse measurements, horizontal curves, vertical curves, and earthwork calculations.


3131 Industrial Construction Estimating (3) Prereq.: CM 2131 and 3121. 2 hrs. lecture; 2 hrs. lab. Principles of estimating including quantity surveys, pricing analysis, and bid package preparation for industrial construction.

3141 Highway Construction (3) Prereq.: CM 3100. Basic fundamentals of highway construction including: earthmoving, drainage, road paving, bridge, and retaining walls; interpretation of plans and specifications; materials, methods, equipment, and estimating.

3210 Advanced Computer Applications for Construction Management (3) Prereq.: CM 2141. Application of software programs currently being used in the construction industry.

3311 Mechanical and Electrical Systems (3) Prereq.: CM 2121 and PHYS 2002. Mechanical and electrical systems in residential and commercial buildings; nomenclature and design consideration; emphasis on management, quality control, and installation procedures.

3400 Construction Materials (3) Prereq.: CM 2121. Fundamentals involved in design, evaluation, testing, and construction of asphalt, concrete, aggregates, steel, timber, and composite materials; mechanical properties of soils, compaction, and slope stability; construction of shallow and deep foundations, and retaining walls.

3501 Structural Technology I (3) Prereq.: MATH 1550 and PHYS 2001. Rigid and deformable body structural mechanics for construction management majors focusing on determination of stresses, strains, and equilibrium requirements of forces acting on structures and the internal load effects (stress and deformation) of these forces on the structural components.

3502 Structural Technology II (3) Prereq.: CM 3505. Structural design of ordinary timber, steel, and reinforced concrete buildings and bridges in accordance with appropriate design code specifications; emphasizes allowable stress design provisions to achieve safe and serviceable structural resistance to vertical and lateral load effects.

4200 Construction Administration (3) Prereq.: CM 2141, 3121 and credit or registration in CM 3000. Principles and theory of ownership, organization, supervision, productivity, bonding, and labor relations pertaining to the construction industry.

4201 Construction Law (3) Prereq.: CM 4200. The law of business and current legal problems, roles, and responsibilities associated with the construction industry; emphasis on claims avoidance.

4202 Construction Enterprise (3) Prereq.: CM 3210 and 4200. Open to Construction Management majors only. A comprehensive study of management as it relates to a single construction enterprise.

4206 Special Topics in Construction Management (3) May be taken for a max. of 6 sem. hrs. when topics vary. Research on a construction topic as chosen by the student under direct supervision of a chosen faculty member.

CURRICULUM AND INSTRUCTION • EDCI


1001 Introduction to College Study (3) Intended for entering freshmen. College-level readings and techniques for organizing text and lecture information for effective study; critical thinking and reading; time management; preparation for tests.

2001 Education, Schooling, and Society (3) Introduction to contemporary educational issues, especially as these are situated historically, culturally, socially, and politically; topics include: validity, theory, and politics of education, especially as related to gender, race, class, and technology.

2025 Foundations and Principles of Teaching in Elementary School (3) 2 hrs. lecture; 2 hrs. field experience in elementary schools. Open only to students enrolled in programs leading to teacher certification.

2030 Teaching, Schooling, and Society (3) Prereq.: Admission to Grades PK-1 or 1-6 teacher certification program. 2 hrs. lecture; 2 hrs. field experience in elementary school and middle schools. Experiences that join theory to practice; teaching as it operates in elementary school culture; a reflective approach to pedagogical thought and teaching in the historical and philosophical dimensions of discourse/practice.


2405 Principles and Practices in K-12 Programs (4) Prereq.: EDCI 1000 and enrollment in a program leading to teacher certification in grades K-12. 3 hrs. lecture; 2 hrs. lab/experience in multicultural settings. Managerial aspects of instruction; application of learning principles to the classroom setting.

2801 PK-3 Program Overview (1) Pass-fail grading. The nature of PK-3 instruction and expectations of the PK-3 teacher education program.

2271, 2272 Art Education for Elementary Schools (3) ART 2271 is prerequisite for ART 2272. 2 hrs. lecture; 2 hrs. lab. Critical analysis and evaluation of past and present concepts of art education; development of a functional art program for elementary schools; application of creative arts to classroom materials, techniques, and activities recommended for elementary school grades.

2409 Education and Diverse Populations (3) Prereq.: Admission to 1-6 teacher education certification program. 2 hrs. lecture; 2 hrs. lab/experience in multicultural settings. Differences among elementary students (grades 1-6) associated with their developmental levels, cultural and ethnic backgrounds, and gender.

2700 Characteristics of Learners with Exceptionalities (3) F,S,2 hrs. lecture; 2 hrs. lab/field experience. Requires field experience in a special education environment containing learners.
with exceptionalities. An introductory course on differences of learners with various exceptionalities; characteristics, educational programs, and resources for education and support.

3000 Children's Literature (3) Survey of children's literature across levels, and in diverse and multicultural settings, and inclusively written reading in children's literature and an appreciation of the value of literature for children.

3001 Student Development and Diversity (3) Prereq.: Credit for or registration in EDCI 2040 and concurrent enrollment in one of the following: BIOL 3001, CHEM 3001, ENGL 3201, FREN 3401, HIST 3001, MATH 3001, PHYS 3001, or SPAN 3001. 3 hrs. lab/field experience in multicultural settings. Differences among secondary student (grades 7-12) associated with their development levels, cultural backgrounds, genders, learning abilities, and special needs.

3002 Classroom Culture (3) Prereq.: EDCI 3001 and concurrent enrollment in one of the following: BIOL 3002, CHEM 3002, ENGL 3202, FREN 3402, MATH 3002, PHYS 3002, SPAN 3002. 2 hrs. lecture; 3 hrs. lab/field experience in multicultural settings. Learning processes of middle school and high school students in the social learning environment of the classroom, with attention to individual and group motivation, social interactions, integration of technology, and classroom management.

3122 Reading Instruction in the Elementary School (6) Prereq.: EDCI 2025; concurrent registration in EDCI 3113 for grades K-6; 2 hrs. lecture; 3 hrs. field experience in multicultural settings. Current instructional materials and methods in reading teaching at the elementary school level; understanding and skills in a laboratory situation of the common core standards.

3121 Reading Instruction in the Elementary School (6) Prereq.: EDCI 2025; concurrent registration in EDCI 3113 for grades K-6; 2 hrs. lecture; 3 hrs. field experience in multicultural settings. Reading in elementary grades majors. Instructional materials and methods in teaching language arts communicative skills at the elementary school level; understanding and skills in a laboratory situation in the public school.

3124 Curriculum Discipline: Mathematics Theory and Practice (6) Prereq.: Professional Practice Block 1, 12 sem. hrs. of mathematics, and concurrent enrollment in EDCI 3125 and MATH 2203. 2 hrs. lecture; 6 hrs. lab/field experience in multicultural, multi-level settings. Structures of the discipline of mathematics applied to teaching mathematics in grades 1-6; standards-based pedagogical strategies, techniques, and materials are coordinated with basic principles of learning.

3125 Curriculum Discipline: Science (3) Prereq.: Professional Practice Block 1, 12 sem. hrs. of natural science, and concurrent enrollment in EDCI 3125 and MATH 2203. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural, multi-level settings. Structures of the science disciplines applied to teaching science in grades 1-6; standards-based pedagogical strategies, techniques, and materials coordinated with basic principles of learning.

3126 Curriculum Disciplines: Mathematics (3) Prereq.: EDCI 2025 or 2030, 6 sem. hrs. of credit in mathematics courses, and concurrent enrollment in EDCI 3125 and 3127. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural, multi-level settings. Structures of the social science disciplines applied to teaching social studies in grades 1-6; standards-based pedagogical strategies, techniques, and materials coordinated with basic rationales and principles of learning.

3135 Teaching Reading in the Junior and Senior High School (3) Prereq.: EDCI 3159 or 3200 or equivalent. Approaches for teaching reading; general overview of reading approaches and materials.

3136 Reading in the Content Areas (3) Prereq.: EDCI 3159 or 3200 or equivalent. Approaches for teaching reading problems and solutions; the reading process, approaches, skills, and materials.

3137 Assessing and Guiding Classroom Reading (Instruction (3) Prereq.: EDCI 2400, 3000, and concurrent enrollment in EDCI 3200 and 3127. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural, multi-level settings. Advanced: reading instruction experience with particular emphasis on assessment in diverse and multicultural settings.

3142 Materials and Methods in Secondary School English (3) Prereq.: EDCI 2400 and credit for or registration in 21 of the 26 sem. hrs. of French courses required for a teaching minor in secondary school English. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3143 Materials and Methods in Secondary School French (3) Prereq.: EDCI 2400 and credit for or registration in 23 of the 26 sem. hrs. of French courses required for a teaching minor in secondary school French. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3144 Materials and Methods in Secondary School Social Studies (3) Prereq.: EDCI 2400 and credit for or registration in at least 6 sem. hrs. from among the following: BIOL 1002, 1003, 1004 or BIOL 1201, 1208, and either BIOL 1402 3148, BIOL 1201, 3124, 3125, EM 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209; 8 hrs. of physics (PHYS 2001, 2002, 2009, 2106 or PHYS 2101, 2102, 2108, 2109); credit for or registration in at least 6 sem. hrs. from among the science courses required for the teaching major (biology, chemistry, or physics) or minor (biology, chemistry, physics, or general science); selected by consent of 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3135 Materials and Methods in Secondary School Mathematics (3) Prereq.: EDCI 2400 and credit for or registration in 23 of the 26 sem. hrs. of Spanish courses required for a teaching minor in secondary school Spanish. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3134 Materials and Methods in Secondary School Speech (3) Prereq.: EDCI 2400 and credit for or registration in the speech course and EDCI 4403. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3149 Materials and Methods in Secondary School Spanish (3) Prereq.: EDCI 2400 and credit for or registration in 23 of the 26 sem. hrs. of Spanish courses required for a teaching minor in secondary school Spanish. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3160 Materials and Methods in Art in Elementary and Secondary Schools (3) Prereq.: EDCI 2405 and credit for or registration in 23 of the 26 sem. hrs. of Spanish courses required for a teaching minor in art. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.


3715 Teaching Reading in the Junior and Senior High School (3) Prereq.: EDCI 3159 or 3200 or equivalent. Approaches for teaching reading; general overview of reading approaches and materials.

3730 Reading, Writing, and Oral Communication in the Elementary School (6) Prereq.: EDCI 2400, 3000 and concurrent enrollment in EDCI 3127 and 3137. 3 hrs. lecture; 6 hrs. lab/field experience in multicultural, multi-level settings. Principles and practices of an effective program for reading, writing, and the oral language arts in grades 1-6.

3223 Adolescent Literature (3) See ENGL 3223.

3400 Educational Policies, Principles, and Practices for Special Populations (3) Credit in the following: EDCI 4404, HIST 4404, MATH 4003, PHYS 4003, 4008, or PSCI 2501. 24 hrs. lab/field experience in diverse and multicultural settings. Credit will not be given for both this course and EDCI 4456. Critical issues in the nature of knowledge and inquiry in specific school subjects.

3481 Curriculum in Grades 1-3 (3) Prereq.: HUEC 3181, 3382, 3383; membership in PK-3 teacher education program, and concurrent enrollment in EDCI 3482 and 3483. Comprehensive, integrated curriculum content for children in grades 1-3: reading/language arts, mathematics, social studies, science, and the arts.
4025 Modern Principles and Practices in the Elementary School (3) Prereq.: consent of instructor. Current issues in elementary education; research findings applied to the solution of instructional problems.

4030 Middle School Curriculum and Instruction (3) Principles and grades guides for middle school development; emphasis on reflective practice and middle grades students.

4040 Principles of Secondary Education (3) Prereq.: consent of instructor. Analysis of criticisms of secondary education; instructional and institutional issues in a complex political, social, and economic matrix; current theories and relevant research.

4055 Principles and Practices in Kindergarten Education (3) Prereq.: HUEC 3035 or PSYC 2076. 2.50 gpa required for registration. Same as HUEC 4055. Classroom organization and instructional management using pre-academic objectives for kindergarten as an entry point into elementary school.

4077 Methods of Teaching Nursing School and Kindergarten (3) Prereq.: HUEC 3035 or PSYC 2076. 2.50 gpa required for registration. 2 hrs. lecture, 2 hrs. lab. Same as HUEC 4057. Essentials needed for successful involvement with children from various socioeconomic and cultural groups at the nursery/kindergarten level; teaching methods, and materials providing optimum learning experiences for the child.

4080 Student Teaching in the Kindergarten (5) See HUEC 4058.

4113 Language Acquisition and Development of Communication Skills in the Young Child (3) Prereq.: ED CI 3112 or equivalent. Analysis of stages of native language acquisition and development of communication skills in children from birth to six years.

4241 Special Studies in Art Education (3) Research in areas directly related to the teaching of art.

4249, 4270 Art Education Workshop (3-3) Art as an integral part of the school curriculum; art activities and classroom procedures, materials, and techniques.

4272 Current Practices in Art Education (3) Contemporary trends and practices in art education; critical review of 4705 texts, journals, and other information sources.

4273, 4274 Art Education in the Elementary and Secondary Schools (3-3) For students concentrating in art education. Development of a functional art program for elementary and secondary schools; philosophy of art education; curriculum construction, teaching methods, planning, and measurement of the results of instruction.

4450 Principles and Practices in Secondary Education (3) Prereq.: consent of instructor. Analysis of criticisms of secondary education and of current proposals for reform; conflicting conceptions of teaching, learning, cognition and related approaches to curriculum, instruction, and evaluation; current theoretical and research approaches; implications for educational policy and practice.

4455 Principles and Practices in K-12 Education (3) Prereq.: consent of instructor. Analysis of criticisms of K-12 education and of current proposals for reform; conflicting conceptions of teaching, learning, cognition and related approaches to curriculum, instruction, and evaluation; current theoretical and research approaches; implications for educational policy and practice.

4460 Planning, Managing, and Evaluating School Instruction (3) Prereq.: cohort membership or consent of instructor. May be taken for a max. of 6 sem. hrs. when topics vary. Exploration of skills and techniques for organizing and assessing learning in schools.

4465 Seminar: Reflective Teaching in Secondary Subjects (3) Prereq.: cohort membership or consent of instructor. May be taken for a max. of 6 sem. hrs. when topics vary. Critical issues and pedagogical practices related to the reflective teacher of English, social studies, science, or mathematics.

4466 Seminar: Critical Issues in Secondary School Teaching (3) Prereq.: may be taken for a max. of 6 sem. hrs. when topics vary. Critical issues in the nature of knowledge and inquiry in school subjects: English, mathematics, science, and social studies.

4470 Reflective Practice in Foreign Language Education: K-12 (3) Prereq.: cohort membership or consent of instructor. Critical issues in foreign language learning; lesson plans for different approaches and methodologies; analysis of textbooks and materials for elementary and secondary schools.

4472 Teaching for Communication: K-12 (3) Methods and techniques conducive to language proficiency; development of listening, reading, writing, speaking skills; integration of theory and practice in peer-teaching, mini-lessons, and hands-on activities; emphasis on use of foreign language as vehicle of instruction.

4481 Student Teaching: Practice and Reflection in Grades 1-3 (12) Prereq.: HUEC 4381 AND 4382; concurrent enrollment in EDCI 4442. 4 hrs. lecture, 24 hrs. lab/field experience in multi-level, multi-cultural settings. Designed to partially fulfill student teaching requirements and to prepare students for student teaching in grades 1-3.

4482 Capstone Seminar in Early Childhood Education (3) Prereq.: HUEC 3381 and 4382; concurrent enrollment in EDCI 4481. Critically analyzing epistemology and contexts of learning; conducting action research; communicating teaching expertise.

4606 Materials and Methods for Teaching Computer Science (3) Prereq.: 3 sem. hrs. in computer science or equivalents. 3 hrs. lecture plus field experience. Materials and methods for planning instruction in computer science.

4655 Internship in Curriculum and Instruction (3-12) Prereq.: Permission of the College of Education Office of Field Experiences. Pass-fail grading. Specific teaching or practice experience in a public school setting; periodic evening seminars.

4701 Trends and Issues in Educating Learners with Exceptionalities (3) Prereq. requires field experience with student(s) with exceptionalities in a school setting. Emphasis on special educational needs, and instructional/practice issues in the child with special needs.

4702 Course in Teaching Reading in the Elementary School (3) Prereq.: ED CI 3125 or equivalent. May be taken for a max. of 3 sem. hrs. when topics vary. Critical issues in the nature of knowledge and inquiry in school subjects: English, mathematics, science, and social studies.

4705 Learning and Behavior Principles Applied to Students with Exceptionalities (3) Prereq.: ED CI 2700 and 4460. 3 hrs. lecture plus field experience. Development of intervention programs based on the principles of applied behavior analysis; emphasis on proactive strategies that promote learning and prosocial behavior.

4710 Consultation, Collaboration, and Co-teaching (3) Prereq.: ED CI 2700 or 4701. Professional roles; models and practices for building cooperative and inclusive environments for education; emphasis on consulting teacher, collaborative consultation, co-teaching, and building effective communication among educators, patients, and office professionals in providing education and other services to children with exceptionalities.

4715 Teaching Social and Functional Skills to Students with Disabilities (3) Prereq.: ED CI 4701, 4704, or equivalent. Instructional planning and methods for teaching functional and social behavior to students with disabilities.

4721 Legal and Ethical Issues in Special Education (3) Prereq.: ED CI 7105 or 7135 or equivalent. May be taken for a max. of 6 sem. hrs. of credit. Legal and ethical issues in special education; specific emphasis on IDEA, Section 504, case law, regulatory issues, professional responsibilities, and CEC standards for professional practice.

4722 Seminar on Transition for Students with Disabilities (3) An in-depth examination of the secondary/post-secondary transition of students with mild disabilities.

7033 Quality Assurance in Special Education (3) Prereq.: ED CI 7281, special education law, or permission of instructor. 3 hrs. lecture; 1 hr. lab. The design and implementation of quality assurance and compliance monitoring for programs serving students with disabilities; focus on the federal and state program requirements and quality assurance approaches prevalent in the field of disabilities.

7060 Teaching Reading in the Elementary School (3) Current instructional procedures and reading instruction in the elementary school; approaches and ideas for teaching reading to culturally different students. Focus on the federal and state program requirements and quality assurance approaches prevalent in the field of disabilities.

7065 Teaching Reading to Students with Diverse Cultural Backgrounds (3) Prereq.: ED CI 7105 or 7135 or consent of instructor. May be taken for a max. of 3 sem. hrs. of credit. Emphasis on special educational needs, and instructional/practice issues in the child with special needs.

7071 Topics in Reading Education (3) Prereq.: ED CI 7105 or 7135 or equivalent. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Issues and practices in elementary through adult reading education.

7080 Studies in the Teaching of Elementary School Science (3) Prereq.: ED CI 1113 or equivalent. Theoretical foundations, instructional skills, and materials for teaching elementary school science.

7090 Studies in the Teaching of Elementary School Mathematics (3) Techniques and materials for teaching elementary school mathematics; relationship between learning theories and acquisition of mathematical skills and concepts.

7109 Studies in the Teaching of Elementary School Social Studies (3) Methods and materials for teaching elementary-level social studies. Characteristics of learners from different cultural settings; analysis of methods and materials that support reading instruction for these students.

7110 Teaching Reading to the Adult Learner (3) Prereq.: ED CI 7105 or 7135 or equivalent. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Issues and practices in elementary through adult reading education.


7122 Teaching Reading to the Adult Learner (3) Prereq.: ED CI 7105 or 7135 or equivalent. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Issues and practices in elementary through adult reading education.
Disaster Science and Management • DSM

2000 Hazards, Disasters, and the Environment (3)
Exploration of the interaction processes between natural/technological hazards and society that cause disasters; introduction to the natural and man-made hazards and disasters; hazards and disaster management; environmental considerations and impacts.

2010 Fundamentals of Emergency Management (3)
Introduction and overview of emergency management functions and processes in federal, state, and local governments; roles of nonprofit and private organizations in disaster planning, response, recovery, and assistance; management issues in effective response and recovery to natural and man-made hazards.

3200 Technology and Emergency Management (3)
Application of technology that may be applied in emergency planning, response, recovery, and mitigation; current and emerging technology applications; technical and policy issues and problems associated with the use of technology in emergency management.

3900 Disaster Science and Management Internship (3)
Prereq.: DSM 2000 and junior standing. Written consent of DSM program coordinator and supervising faculty member. Faculty supervised field study with an agency or organization whose mission is considered relevant to the emergency management system or disaster planning, response, or mitigation.

3910 Hazards Seminar (1-3) Prereq.: DSM 2000 and junior standing. May be repeated for a max. of 3 sem. hrs. when topics vary. Guest speakers and presentation of reports and discussion with students and faculty concerning a broad range of topics, assignments, and topics related to disasters and emergency management.

4690 Crisis Management (3)
Introduction to crisis management as it is applied in public, private, and non-profit organizations; crisis management is a function of all organizations and supports strategic goals of ensuring survivability, economic viability, and organizational continuity.

4900 Research in Disaster Science and Management (3)
Prereq.: SOCL 2211 or equivalent and 12 hrs. of course work including DSM 2000 and core courses in the disaster science management concentration or minor; consent of instructor.

4990 Directed Readings in Disaster Science and Management (1-3) May be repeated for a max. of 6 sem. hrs. when topics vary. Consent of instructor. For students with at least junior standing and 12 hrs. of course work including DSM 2000 in the disaster science management concentration or minor.

7000 Policies and Practices of Emergency Management (3)
The evolution of hazard and disaster policies and emergency management organizational practices and their economic, social, and environmental impacts; the impacts of natural and man-made hazard and disaster policies, and issues in the public, private, and non-profit sectors.

7910 Disaster Science and Management (1) May be repeated for a max. of 2 sem. hrs. of credit as section vagaries for fall and spring semesters. Reports and discussions with students and faculty concerning a broad range of issues, problems, and topics related to natural and man-made hazards, disasters, and emergency management.

ECONOMICS • ECON

General education courses are marked with stars (∗).
320 Environmental Economics (3) Prereq.: ECON 2000 and 2010; or 2030. Market failure and government failure, benefit-cost analysis, the economics of energy, the efficient allocation of pollution, stationary, and mobile source air pollution, water pollution, and toxic wastes.

325 Applied Resource Economics (3) Prereq.: ECON 2000 and 2010; or 2030. Analysis of environmental and resource problems; cost-benefit and other empirical techniques used to examine these problems.

400 Industrial Organization and Public Policy (3) Prereq.: ECON 2000 and 2010; or 2030. Theory of the firm, perfect competition, monopoly, collusion and collusive strategies, strategic, duopoly, predation, antitrust, and experimental economics.

421 Health Care Economics (3) Prereq.: ECON 2000 and 2010; or 2030. Economics of health care with particular emphasis on hospitals, physicians, and other health care providers, as well as government programs.


4455 Internship in Economics (3) Prereq.: consent of instructor. On-the-job experience in approved positions with economic content.

4520 International Economics (3) Prereq.: ECON 2000 and 2010 and 2030. Theories of foreign trade, international payments, and the balance of trade and payments; international capital flows; international capital markets; the theory of international competition.

4540 Economic Forecasting (3) Prereq.: ECON 2000 and 2010, or 2030; and IDS 2000; or equivalent. Applications of methods used in economic forecasting; trend analysis, time-series modeling, regression analysis and combination forecasting.

4550 International Finance (3) Prereq.: ECON 2015 or equivalent. Exchange rates and the foreign exchange market; exchange rate determination in the short run and in the long run; alternative international currency systems, macroeconomic policy coordination under fixed and floating exchange rates.

4560 Central Banking and Monetary Policy (3) Prereq.: ECON 2000 and 2010; or 2030. Administration, fiscal importance, and economic effects of federal, state, and local taxes; emphasis on recent trends in taxation at each level of government and on significance of these trends for individu- als and the nation.

4320 Environmental Economics (3) Prereq.: ECON 2000 and 2010; or 2030. Market failure and government failure, benefit-cost analysis, the economics of energy, the efficient allocation of pollution, stationary, and mobile source air pollution, water pollution, and toxic wastes.

435 Applied Resource Economics (3) Prereq.: ECON 2000 and 2010; or 2030. Analysis of environmental and resource problems; cost-benefit and other empirical techniques used to examine these problems.

6550 Special Topics in Economic Education (1-3) May be taken for a max. of 6 sem. hrs. credit. For teachers who wish to investigate more advanced economic concepts and issues.

7070 Theory of Economic Growth (3) Theories of economic growth and their development.

7240 Public Finance Theory (3) Foundations of welfare economics for evaluating the equity of taxation and public spending policies; incidence and optimality of taxation.

7135 Advanced Topics in Public Finance (3) May be taken for a max. of 6 hrs. of credit when topics vary. Special issues in taxation, public expenditures, and political economy.

7240 Seminar in Labor Economics (3) Theoretical and empirical effects of the unemployment of workers, unionization of employees, and the related effects on labor market, labor force participation rates; discrimination; labor markets, human capital, the inflation-unemployment tradeoff.

7320 Seminar in Environmental and Resource Economics (3) Neoclassical and bio-economic tradition of resource utilization; emphasis on biophysical underpinnings of economics drawing from thermodynamics, ecology, geology, and demography; ethical issues of stewardship in resource management; hot economic issues in energy, materials, foods, and air and water pollution.

7325 Applied Resource Economics (3) Application of property rights, externalities, and benefit-cost analysis to resource allocation problems; intertemporal allocation, technical changes and resource substitution; and utilization of environmental resources.

7420 Health Care Economics (3) Prereq.: ECON 3710 or equivalent. Economics of health care with particular emphasis on demand and supply of health care services; roles of insurance and government in provision of health care services.

7470 Economics of Regulated Enterprise (3) Economic analysis of problems and policies of regulated enterprises, with emphasis on price determination and related issues in public utility and transportation regulation; and concentration in the manufacturing sector of the economy.

7570 Seminar in International Finance (3) 7575 Seminar in International Trade (3) Prereq.: ECON 4320 or equivalent. Topics in pure theory of international trade and finance; causes and effects of international trade, gains from trade, theory of tariff and effective protection, economic growth and trade, current problems, trade policies, factor market imperfections, theory of integration, and effects of uncertainty.

7580 Seminar in Economic Development (3) Prereq.: consent of instructor. Third World development from neoclassical, neomarkist, and neomalthusian perspectives.

7585 Advanced Topics in Financial Economics (3) See FIN 4720.

7590 Seminar in Monetary and Fiscal Policy (3) Determining, implementing, and evaluating monetary and fiscal policy; effect on the economy, monetary targets and indicators; role of interest rates in understanding monetary policy, sectoral impacts of monetary policy; role of fiscal policy in the economy.

7595 Seminar in Monetary Theory (3) Contemporary monetary theory; theories of supply and demand; integration of monetary and value theory; monetary equilibrium.

7610 Mathematics for Economists (3) Mathematical principles with frequent applications to economics: functions, derivatives, integrals, Taylor's series, matrix algebra, determinants, roots, quadratic forms, constrained and unconstrained optimizations, and principles of linear and nonlinear equation systems.

7615 Dynamic Analysis (3) Prereq.: ECON 7761 or calculus and linear algebra. Mathematical analysis of dynamic systems with applications to economic growth, non-linear differential equations, difference equations and operational control theory.

7630 Econometric Methods (3) Prereq.: calculus and linear algebra; or concurrent enrollment in ECON 7760. For students interested in developing research skills in econometrics. Empirical research methods in economics; statistical inference; estimation applied to a general linear model; problems involved in regression analysis; extensions of the general linear model.
**EDUCATION • EDUC**

**GENERAL COURSES**

5800 Special Topics in Education (1-3) V Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Direction and assistance for the practitioner in solving special problems in the school organization.

7300 Professional Development Seminar (2) F,S,SU

Introduction to educational leadership practitioners and scholars and to demands and expectations of doctoral study.

7811 Seminar in Current Trends in Education (3) S Open only to students who have completed qualifying examination for the doctoral degree. Current issues and trends; sources, bibliography, and research in the student's major.

7900 Independent Study (1-6) May be taken for a max. of 12 sem. hrs. of credit. Open to advanced graduate students. Directed individual study under the guidance of a graduate faculty member.

8000 Thesis Research (1-12 per sem.) "S"/"U" grading.

8900 Pre-dissertation Research (1-9) Prereq.: consent of department.

9000 Dissertation Research (1-12 per sem.) "S"/"U" grading.

**COUNSELOR EDUCATION**

4360 Foundations, Functions, and Administration of Counseling and Guidance Services (3) V Multidisciplinary foundations of guidance; major guidance functions; administration of guidance programs.

4361 Counseling Children (3) V Introduction to methods and procedures.

4365 Basic Course in Interpersonal Communication (3) F Introduction to basic communication skills and counseling techniques.

4600 Counseling for Disabling Conditions (3) S Etiology, identification, and counseling interventions for conditions and disorders which result in disabled and impaired functioning.

4601 Management of Counseling Services (3) S Case and program management procedures for client rehabilitation.

5100 Special Problems in Guidance and Counseling (3) V Prereq.: consent of instructor; 1 hr. lecture; 4 hrs. lab. May be taken for a max. of 9 hrs. of credit when topics vary.

7301 Orientation to the World of Work (3) V Prereq.: ELRC 7332. Also offered as HRE 7301. For elementary school counselors. Basic concepts underlying orientation, awareness, and exploration phases of the career development process.

7302 Group Dynamics and Techniques in the Elementary Schools (3) V Prereq.: ELRC 4361 and 4365. For elementary school counselors.

7350 Group Techniques and Dynamics in Counseling (3) S Dynamics of small group processes, theories of group counseling, and basic group leadership skills.

7331 Counseling Theory and Techniques (3) F Review of major counseling theories and intervention methods.

7352 Educational and Occupational Information (3) V See HRE 7122.

7333 Analysis of the Individual (3) S Overview of selection, administration, interpretation, and use of assessment and evaluation instruments and techniques in counseling.

7334 Vocational Counseling (3) V Prereq.: ELRC 7332 or equivalent. Also offered as HRE 7334. Materials and techniques in vocational counseling of adolescents and adults.

7600 Counseling Practicum in Elementary Schools (3-6) F,S Prereq.: consent of instructor; 2 hrs. conf.; 6-18 hrs. lab in work setting. Supervised experience in elementary schools.

7622 Practicum in School Counseling (3-6) F,S Prereq.: ELRC 4360, 4365, 7330, 7331, 7395, and consent of instructor; 1 hr. lab; 6-18 hrs. lab in work setting. Supervised experience in elementary, middle, or high school settings.

7644 Community Agency Counseling Practicum (3-6) F,S Prereq.: ELRC 4365, 4600, 4601, 7330, 7331, 7395, and consent of instructor; 2 hrs. conf.; 1 hr. lab; 6-18 hrs. lab in a work setting. Supervised clinical experience in community agency settings (e.g., counseling center, mental health center).

7765 Seminar in Counseling (3) Prereq.: ELRC 4365 and 7331; or equivalent. May be taken for a max. of 6 hrs. of credit when topics vary. Consultation with professor and peers regarding problems encountered in implementing counseling services.

7390 Advanced Counseling Theory and Techniques (3) S Prereq.: ELRC 7331 or equivalent. Theoretical approaches to individual counseling.

7392 Advanced Vocational Counseling (3) V Prereq.: ELRC 7332 or equivalent. Also offered as HRE 7392. Life career planning through vocational assessment and counseling; vocational counseling theory, research, and practice.

7393 Multicultural Counseling (3) S Overview of cross-cultural counseling skills and review of factors which influence behaviors of individuals from diverse populations.

7394 Advanced Group Counseling (3) S Prereq.: ELRC 7332 or equivalent. Small group counseling approaches.

7395 Family Counseling (3) S F,S Prereq.: consent of instructor. Introduction to family system principles and their application to program assessment, including family dynamics, family assessment, developmental stages, ethical and cultural issues.

7396 Advanced Family Counseling (3) S Prereq.: ELRC 7395 or equivalent. Practice in assessing family dynamics; supervised experience in developing and implementing therapeutic interventions.

7397 Special Topics in Counseling (3) F,S,Su Prereq.: consent of instructor; 1 hr. lecture; 4 hrs. lab. May be taken for a max. of 6 hrs. of credit when topics vary.

7398 Field Experiences in Vocational Counseling (3) F,S,Su Prereq.: ELRC 7332 and 7334. 1 hr. lecture; 4 hrs. lab. May be taken for a max. of 6 hrs. of credit. Also offered as HRE 7398.

7399 Supervised Counseling Internship (3-6) F,S Prereq.: ELRC 7336, 7362, or 7346 and consent of instructor. 2 hrs. conf.; 20-40 hrs. per week at counseling setting, serving children, adolescents, adults, or families. May be taken for a max. of 9 hrs. of credit.

**EDUCATIONAL ADMINISTRATION**

4400 Introduction to Educational Administration (3) F,S,Su Organization of the American educational enterprise; economic, political, social, and cultural forces that affect the administration of American education.


7401 Administration of School Personnel (3) S,F,Su Role of the school administrator in personnel planning, staff development, and employee relationships.

7402 Organizational Behavior and Educational Administration (3) Prereq.: ELRC 4400 and consent of instructor. Primarily for doctoral students in educational administration. Research, bibliography, and source materials; critical examination of organizational research studies.

7403 The Principalship in Elementary and Secondary Schools (3) F,S,Su Prereq.: ELRC 4400 or equivalent. Duties and responsibilities of the principal for organization, administration, and supervision of elementary and secondary schools.

7404 Internship in Educational Administration (3-6) F,S,Su Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. For advanced graduate students qualified for internship in educational administration. Pass-fail grading.

7406 Supervision of Child Welfare and Attendance (3) V Prereq.: ELRC 4400 and 7450; or equivalent. Role and function of the supervisor of child welfare and attendance; seminars, field study, and individual research; legal provisions, history, and philosophy.

7407 Politics, Policy, and Administration in Education (3) Prereq.: ELRC 4400 and consent of instructor. Primarily for doctoral students in educational administration. Critical analysis of educational policy and its development.

7408 School and Community Relations (3) F,S,Su Prereq.: ELRC 4400. Analysis of community demands on schools; organizational response from social science perspectives.

7409 Seminar in Educational Leadership (3) Prereq.: ELRC 4400. Exploration of theories of leadership, leading and empowerment, critical thinking, reflective practice, and school administration; school restructuring, leadership in unique contexts, and directions in educational change and reform.

7410 Cultural and Political Issues in Urban School Leadership (3) Focus on the role of leaders, including the principal, in urban schools; impact of societal factors on school leaders in urban elementary and secondary schools.

7422 Introduction to School Improvement/Action Research (3) F School effectiveness research; teacher effectiveness research; school improvement research; based on the knowledge of these literatures, students will be required to develop a research proposal whose objective is to improve school and/or faculty performance.

7423 Advanced School Improvement/Action Research (3) F,S,Su Prereq.: ELRC 4400. Analysis of community demands on schools; organizational response from social science perspectives.

7430 Best Practices of School Leadership I (6) Knowledge and experiential base to support decision making and action at a level of whole school responsibility.

7564 Educational Administration Theory (3) Prereq.: ELRC 4400 and consent of instructor. Primarily for doctoral students in educational administration. Critical analysis of educational policy and its development.

7568 School and Community Relations (3) F,S,Su Prereq.: ELRC 4400. Analysis of community demands on schools; organizational response from social science perspectives.

7569 Seminar in Educational Leadership (3) Prereq.: ELRC 4400. Exploration of theories of leadership, leading and empowerment, critical thinking, reflective practice, and school administration; school restructuring, leadership in unique contexts, and directions in educational change and reform.
EDUCATIONAL FOUNDATIONS

3600 Women, Gender, and Leadership (3) Also offered as WGS 1600.

4000 History of Education (3) F,S,SU Development of formal and informal education in multicultural settings from earliest times to the present.

4001 History of American Education (3) F,S,SU Cultural diversity and the response of educational thought and practice in America from colonial times to the present.

4002 Philosophy of Education (3) F,S,SU Key theories of human nature, culture, and society and their bearings on education.

4003 Cultural Pluralism in American Education (3) F,S,SU Development of major cultures in American society; their impact on American education; historical approaches to educating persons of different cultures; changing roles of schools in responding to cultural pluralism.

7000 Seminar in Philosophy of Education (3) Prereq.: ELRC 4002. Theories of education and schooling with special focus on the context of pluralistic societies.

7001 Ethics and Educational Leadership (3) F,S,SU Seminar on ethical theory, judgement, and practice in educational contexts.

EDUCATIONAL RESEARCH

3200 Classroom Assessment (3) F,S,SU Prereq.: credit or registration in a methods course appropriate to the student's teaching level or major or minor. Principles and techniques in development, administration, scoring, and evaluation of written performance; process, and other forms of classroom assessment; applications of technology in classroom assessment.

4000 Introduction to Applied Statistics in Educational Research (3) F,S,SU Basic descriptive and inferential statistics in educational research; systematic examination and interpretation of statistical information in published educational research.

4200 Introduction to Educational Measurement (3) F,S,SU Basic theory of educational measurement; assessment in the school setting: test construction and use; evaluation and applications of standardized tests; measurement in multisexual settings.

4249 Using Research and Applying Research in Education (3) F,S,SU For the specialist or nonthesis master's degree student. Instructing teachers and administrators to become consumer and producers of educational research.

7006 Educational Statistics (4) F Prereq.: ELRC 4006 or equivalent. 3 hrs. lecture; 2 hrs. lab. Descriptive and inferential statistics in educational research, computerized data analysis using SPSS or SAS, analysis of variance and covariance; application of multiple regression techniques in educational research.

7016 Advanced Educational Statistics (4) Prereq.: ELRC 7006 or equivalent. Utilization of standard statistical packages such as SPSS and SAS for analysis in educational setting; classical measurement theory and recent psychometric techniques such as item-response theory and criterion-referenced measurement.

7202 Seminar in Educational Measurement (3) Prereq.: ELRC 7006 and 7201. Basic theories and problems in educational measurement.

7203 Computer Assisted Testing (3) Prereq.: ELRC 7006. Computer adaptive testing, computerized item and test development; continuous and intelligent measurement; analyzing and reporting test results; legal issues and professional standards.

7220 Educational Program Evaluation (3) Prereq.: ELRC 4249 and either ELRC 4006 or 7000. Current models and issues in educational evaluation as a professional practice; design, implementation, and comprehensive evaluation plan that includes specification of theoretical framework, problem identification, data collection/analysis procedures, report writing, format, and content.

7221 Performance Evaluation in Education (3) Prereq.: ELRC 4249 and 4249 or equivalent. Current problems and research concerning performance evaluation of students, teachers, and administrators; methodological, professional, and legal issues.

7241 Educational Research Methodology (3) Prereq.: ELRC 4206 or 7006. Completion of a research proposal, preferably a pre-dissertation proposal, is required. Comprehensive and general review of qualitative and quantitative research methods in education.

7242 Experimental and Quasi-Experimental Designs in Educational Research (3) F,S,SU Prereq.: ELRC 7016 and 7241. Experimental and quasi-experimental designs in educational research; hypothesis and block designs and evaluation of internal/external validity; design and implementation of projects; analyzing variance data through computer programs; advanced analysis of variance and covariances; multiple regression.

7243 Qualitative Methods in Educational Research (3) Prereq.: ELRC 4249 or 7241. 3 hrs. lecture; 2 hrs. lab. Introduction to qualitative research traditions and methods in education, including: ethnography, grounded theory, and case study; major methods including observational techniques, interviewing, and document analysis; philosophical issues regarding the qualitative research approach; emphasis on qualitative data analysis, including the use of computer programs, such as ATLASi.

7248 Introductory Research Practicum (3) F By arrangement with a state agency. An internship in the educational setting for one semester.

7249 Advanced Research Practicum (3) Prereq.: ELRC 7248. By arrangement with a state agency, a local school system, or other educational agency. Students assume a leadership role in conducting research studies under the supervision of the course instructor and the professional practice supervisor at the site.

7251 Technology Systems in Educational Research (3) Prereq.: ELRC 4507 and 4249 or permission of instructor. 2 hrs. lecture; 2 hrs. lab. Technology innovations and models that facilitate educational research; telecommunications and technology transfer; computer-assisted assessment; technology-based data collection devices; computer analysis of text-based data; computer-aided dissemination of data.

7260 Advanced Methods in Educational Program Evaluation (3) Prereq.: ELRC 7220. Evaluation of a selected educational program; establishing program parameters; formative/summative evaluations; guides for conducting evaluations and small experiments; report writing.

7263 Advanced Qualitative Methods in Education (3) Prereq.: ELRC 7243 or ELRC 7247. A study of an educational institution or an individual's life; single- and multiple-case designs; analyzing case study evidence; report writing.

7270 Mixed Methods Research in Education (3) Prereq.: ELRC 4249 or 7241. Mixed methods as a separate research methodology; integrating both the quantitative and the qualitative approaches.

7280 Content Analysis (3) Prereq.: ELRC 4249 or 7241. Principles, theories, and strategies for systematically examining the content of textual and other mediated communication.

7290 Seminar: Educational Research Methodology (1-3) May be taken for a max. of 9 sem. hrs. of credit when topics vary. Advanced topics in educational research methods.

EDUCATIONAL TECHNOLOGY

2507 Introduction to Classroom Technology (3) Prerequisite: EDG 2506. Introduction to technology tools and effective technology integration methods to enhance student learning.

3500 Utilization of Instructional Materials (3) F,S,SU Open only to candidates for teacher certification. Basic techniques for preparing effective instructional materials.

4501 Selection and Utilization of Educational Media (3) Introduction to instructional technology; characteristics of media, objective specifications, and evaluation of instructional modules and systems.

4507 Computer Technology in Education (3) Prerequisite: EDG 3500. Applications of computer in instruction and instruction design; computer-assisted and computer-managed instruction; information storage and retrieval; use of micro/multi-computer systems.

5412 Fundamental Computer Science for Teachers (3) Prereq.: ELRC 4507 (or prior programming experience) and credit in an educational method course number 3000 or above. See CSC 4602.

4535 Educational Telecommunications and the Internet (3) Prereq.: ELRC 4507 or equivalent. 2 hrs. lecture; 2 hrs. lab. Use of telecommunications tools found in educational settings; integration of telecommunications resources into instruction; research using the World Wide Web; design, development, and evaluation of Web-based materials that include multimedia, security and legal issues; configuration of school and district networks; distance education applications; and emerging trends and research issues.

5505 Production of Instructional Materials (3) Prerequisite: EDG 3500. Production of video, audio, film, and other multimedia materials.

7240 Administration of Technology Programs (3) Prereq.: ELRC 4501 or 4507 or consent of instructor. Preparation for professional performance in planning, implementing, and evaluating educational technology programs. Topics include applications, facilities, finances, acquisitions, and staff development.
The accreditation process.

500 Technology in Educational Leadership (3) F,S,Su
Prereq.: ELRC 4507 and 7503; or equivalent. Instructional design for computer-assisted instruction; emphasis on learning theory, events of instruction, structuring instructional sequences for maximum content retention.

509 Authoring Systems for Educators (3) Prereq.: ELRC 4507 and 7503; or equivalent. 2 hrs. lecture; 2 hrs. lab. Authoring systems, with emphasis on Super PILOT and LOGO for individualized learning; system variables, transfer and portability parameters, student involvement, alternative systems, and formative and summative evaluation procedures.

516 Practicum in Educational Media (3-6) F,S
Prereq.: ELRC 7420 or 7505; or consent of instructor. 9-18 hrs. lab. Practice in teaching, producing, utilizing, and administering educational media.

57 Seminar in Educational Media (3) Prereq.: ELRC 7240 and 7607; or consent of instructor. Advanced topics in instructional technology.

520 Educational Technology in Business, Industry, and Government Agencies (3) Prereq.: ELRC 7503 and one of the following: ELRC 5505, 7502. Techniques used to meet training and development needs in business, industry, and government agencies.

525 Professional Development for K-12: Technology Integration (3) F Analyze effective professional development strategies; plan, design and implement, and evaluate technology staff development activities.

535 Advanced Telecommunications and Electronic Learning (3) F,S,Su Prereq.: ELRC 4507 or consent of instructor. Scope and elements of the online environment; telecommunications and technologies for online teaching and learning; design, development, or conversion of courses for online delivery; course management, assessment, and evaluation; policy issues.

550 Theory and Research in Educational Technology (3) Prereq.: ELRC 7240 and 7503. For advanced graduate students. Theoretical foundations and research in educational technology. Emphasis on theories of communication, learning theories, educational psychology, and behavioral sciences.

791 Educational System Analysis (3) V Prereq.: completion of 3 sem. hrs. in educational administration or equivalent. Same as EDC 5501. Techniques for designing instructional systems; emphasis on instructional objectives; design and selection of instructional alternatives; and evaluation of instructional systems.

7605 Higher Education and the Law (3) Legal issues concerning higher education, including tenure, academic freedom, time, sexual harassment, Tenure, discrimination, student discipline, and liability for accidents and injuries.

7607 Curriculum and College Teaching (3) Critical analysis of college curriculum and approaches to teaching; historical development of curricular models; introduction to teaching and learning.

7608 Finance in Higher Education (3) Public policy and theory of financing higher education; topics include tuition, pricing, tuition policy, financial management of institutions, and financial aid.

7609 Strategic Planning in Higher Education (3) Strategic plans for institutions of higher education; processes by which those plans are developed; higher education strategy within the context of the cultural and competitive environment; emphasis on current topics in organizational strategy.

7610 Assessment and Evaluation in Higher Education (3) Analysis of assessment and evaluation practices in higher education; role of assessment in policy development and strategic planning.

7611 College Students in the United States (3) Critical analysis of issues related to college students in the United States, including access, choice, climate, student organizations, and development and identity.

ELECTRICAL ENGINEERING • EE

2120 Circuits I (3) Prereq.: credit or registration in MATH 2080 and department. Time-domain analysis of electrical networks.

2130 Circuits II (3) Prereq.: EE 2120 and MATH 2090. Frequency-domain analysis of electrical networks.

2135 Electronics I (3) Prereq.: EE 2120. Terminal behavior of semiconductor devices and basic circuits.

2136 Electronics Laboratory II (2) Prereq.: concurrent registration in EE 2230. 1 hr. lecture; 2 hrs. lab.

2170 Digital Logic I (3) Prereq.: Admission to the College of Engineering. Boolean algebra; logic gates; minimization methods; analysis and synthesis of combinational logic networks; design examples.

2171 Digital Logic I (2) Prereq.: EE 2120. Analysis and design of sequential circuits; practical impact of design choices.

2173 Digital Logic Laboratory (2) Prereq.: EE 2730. 1 hr. lecture; 2 hrs. lab. Familiarization with conventional logic gates and flip-flops; design and testing of various combinational and sequential circuits.

2190 Comprehensive Electrical Engineering I (3) Prereq.: MATH 1720 or equivalent. For non-electrical engineering majors. Elementary circuits, devices, and systems in electrical engineering.

3060, 3061 Special Projects (2,2) Prereq.: consent of department. Pass-fail grading. Individual work with instructor on special project selected by instructor and student.

3070 Engineering Practice (3) Prereq.: permission of department. Either 6 weeks or 6 months of full time employment in an appropriate area. Pass-fail grading. Written final report required. Work experience in solving electrical and computer engineering problems in an engineering environment.

3120 Linear Systems Analysis (3) Prereq.: EE 2120 and MATH 2090. Methods of analysis for time-invariant linear systems.

3140 Probability for Electrical and Computer Engineering (3) Prereq.: MATH 2090. Basic concepts of probability theory with application to electrical and computer engineering; probability axioms; continuous, discrete, and conditional probability density and distribution functions; expectations and characteristic functions; introduction to statistical inference and stochastic processes.

3220 Electronics II (3) Prereq.: EE 2230, 2230, and 2231. Analysis and design of electronic circuits; emphasis on concepts and device models.

3221 Electronics Laboratory II (2) Prereq.: EE 2231 and concurrent registration in EE 2230. 1 hr. lecture; 2 hrs. lab.


3230 Electrical and Magnetic Fields (3) Prereq.: MATH 2057 and EE 2130. Maxwell's equations; wave propagation and reflection in isotropic media; static fields.

3410 Electric Power (3) Prereq.: EE 2130. Basic principles of electromagnetic energy conversion and power system analysis.

3411 Electric Power Laboratory (2) Prereq.: concurrent registration or credit in EE 3410. 1 hr. lecture; 2 hrs. lab.

3550 Introduction to Control Engineering (3) Prereq.: EE 3120: Modeling, realization, analysis, and feedback control design of dynamic systems.

3750 Microprocessor Systems (2) Prereq.: CSC 1253 and EE 2750. Theory and design of microprocessor, microcontroller technologies, architectures, assembly language, software development, input/output design, applications, and interfacing.

3751 Microprocessor Laboratory (2) Prereq.: EE 3750. 1 hr. lecture; 2 hrs. lab.

3755 Computer Organization (3) Prereq.: EE 2750 or equivalent. Structure and organization of computer systems; instruction sets; arithmetic; data path and control design.

3775 Data Structures and Object-Oriented Programming (3) Prereq.: CSC 1254 or 2290. Object-oriented programming, C++, abstract data types.

3950 Electronics (2) Prereq.: EE 2950. For nonelectrical engineering majors. Basic electronics and instrumentation.

3951 Electrical and Electronics Laboratory (2) Prereq.: credit or registration in EE 3950 or equivalent. 1 hr. lecture; 2 hrs. lab. For nonelectrical engineering majors. Basic electronics and electrical laboratory.

4000 Special Topics in Electrical Engineering (3) May be taken for a max. of 8 hrs. of credit when topics vary. Students in curricula other than electrical engineering should consult the instructor. ABET category: 3 hrs. engineering science. Selected topics of current interest.

4001 Special Topics in Electrical Engineering (3) May be taken for a max. of 6 hrs. of credit when topics vary. Students in curricula other than electrical engineering should consult the instructor. ABET category: 3 hrs. engineering science. Selected topics of current interest.

4002 Special Topics in Electrical Engineering (3) May be taken for a max. of 3 hrs. of credit when topics vary. Students in curricula other than electrical engineering should consult the instructor. ABET category: 3 hrs. engineering science. Selected topics of current interest.

4120 Network Analysis (3) Prereq.: EE 3120 and MATH 2097. ABET category: 2 hrs. design; 1 hr. engineering science. Linear networks, with introduction to filters and network synthesis.

4130 Graph Theory (3) Prereq.: EE 3120 or equivalent. Graph and subgraph properties, graph operations, enumeration techniques, and applications to analysis and synthesis of electrical networks; Kirchhoff's third and fourth laws.

4150 Digital Signal Processing (3) Prereq.: EE 3120 or equivalent. Fundamentals of processing signals by digital techniques; application to practical problems; z-transforms, discrete Fourier transform, digital filter design techniques, and fast Fourier transform.

4232 Solid State Devices II (3) Prereq.: EE 3232. Physics and analysis of advanced semiconductor devices, including photonic and high-frequency devices.

4240 Linear Circuit Design (3) Prereq.: EE 3232 and 3221. Credit or registration in EE 3232. 2 hrs. lecture; 2 hrs. lab. ABET category: 2 hrs. design; 1 hr. engineering science. Fabrication and use of discrete and monolithic integrated circuits; use of building blocks for design of analog systems.

4242 VLSI Design (3) Prereq.: EE 3210, 3220. 2 hrs. lecture; 2 hrs. lab. ABET category: 2 hrs. design; 1 hr. engineering science. Design and implementation of logic gates for application-specific integrated circuits; system design methodology using CMOS technology.

4250 Digital Integrated Circuits (3) Prereq.: EE 3220, 3221, and 3232. 2 hrs. lecture; 2 hrs. lab. ABET category: 2 hrs. design; 1 hr. engineering science. Design and implementation of digital circuit logic gates in bipolar and MOS technology; semiconductor memories and their operations.

4260 Semiconductor Measurements and Characterization (3) Prereq.: consent of department. 2 hrs. lecture; 2 hrs. lab. Properties of semiconductor materials; their influence on device characteristics; bulk measurements such as resistivity, mobility, and lifetime; diffusion profiles and oxide layers; thin film characterization techniques; I-V and C-V measurements; emphasis on silicon.

4262 Electronic Instrumentation and Metrology (3) Prereq.: EE 3220 and 3221 or equivalent. 2 hrs. lecture; 2 hrs. lab. ABET category: 2 hrs. design; 1 hr. engineering science.
science. Application of electronic principles to the design and development of practical systems including instrumentation, data analysis, and metrology; design and construction of term projects.

4270 Optical Electronics (3) Prereq.: EE 3320 or equivalent. Generalized theory of light interacting with various media; theory of optical systems; optical devices; design and construction of optical systems. 

4320 Microwave Engineering (4) Prereq.: EE 3320 or equivalent. Study of microwave systems; design and analysis of microwave systems; design and construction of microwave systems.

4330 Antenna Theory and Design (4) Prereq.: EE 3320 or equivalent. Study of antennas and antenna arrays; analysis of antennas; analysis of antenna patterns.

4340 Fiber Optic and Microwave Propagation (3) Prereq.: EE 3210 and 3320 or equivalent. Wave propagation at microwave and optical frequencies in metallic waveguides and optical fibers.

4420 Electric Machine Analysis (3) Prereq.: EE 3410 or equivalent. Generalized theory of electric machines; transient and steady-state analysis of symmetrical/unsymmetrical electric machines.

4430 Power System Analysis (3) Prereq.: EE 3410 or equivalent. Power system analysis using computer methods; power flow, economic power dispatch, and reliability.

4450 Distribution System Design (3) Prereq.: EE 3410 or equivalent. ABET category: 2 hrs. design; 1 hr. engineering science and computer systems design; emphasis on design and applications.

4460 Power Electronics (3) Prereq.: EE 3240 and 3410. 2 hrs. lecture; 2 hrs. lab. ABET category: 2 hrs. design; 1 hr. engineering science. Design of power semiconductor converters including controlled rectifiers, inverters, ac voltage controllers, and DC-DC converters.

4470 Harmonic Filter and Compensator Design (3) Prereq.: EE 3240 and 3410 or equivalent. ABET category: 2 hrs. engineering design; 1 hr. engineering science. Design of compensators and harmonic filters for distribution systems with nonsinusoidal voltages and currents.

4480 Nonsinusoidal Power System Analysis (3) Prereq.: EE 3410 or equivalent. Analysis of nonsinusoidal systems, harmonic generation, compensation, and filtering.

4490 Adjustable Speed Drives (3) Prereq.: EE 3410, 4420, and 4460. ABET category: 2 hrs. engineering design; 1 hr. engineering science. Design and simulation of DC and AC motor variable speed drives combined with an analysis of their static and dynamic properties.

4560 Introduction to Modern Control (3) Prereq.: EE 3450. State variable methods for analysis and design of control systems: realization, stability, and stabilization; observers, control design.

4580 Topics in Control System Design (3) Prereq.: EE 3450. State variable methods for analysis and design of control systems: realization, stability, and stabilization; observers, control design.

4585 Discrete Control System Design (3) Prereq.: EE 3350. ABET category: 2 hrs. design; 1 hr. engineering science. Design and simulation of digital control systems; implementation of digital control systems.

4610 Analog Communication (3) Prereq.: EE 3210 and 3410. Amplitude, frequency, phase and pulse modulation, noise in analog modulation, applications.

4625 Digital Communication and Networking (3) Prereq.: EE 3210 and 3410. Digital coding of analog information, baseband and impulse code modulation, decision theory, modulation, design considerations, applications.

4660 Random Processes I (3) Prereq.: EE 3410 or equivalent. Probability models; random variables and processes; second order processes; spectral analysis; filtering.

4700 Special Topics in Computer Engineering (3) Prereq.: EE 3410 or equivalent. Special topics in computer engineering. Students in computer science other than computer engineering should consult the instructor. ABET category: 1 hr. engineering science. Selected topics of current interest.

4701 Special Topics in Computer Engineering (3) Prereq.: EE 3410 or equivalent. Special topics in computer engineering. Students in curricula other than computer engineering should consult the instructor. ABET category: 1 hr. design; 2 hrs. engineering science. Selected topics of current interest.

4720 Computer Architecture (3) Prereq.: EE 3750 and 3755 or equivalent. Memory hierarchy; pipelining techniques; design philosophies; parallel computing fundamentals.

4740 Discrete Structures for Computer Engineering (3) Prereq.: EE 2750 or equivalent. Mathematical logic and proof methods; graph theory; complexity of algorithms; algebraic structures; applications in computer engineering.

4745 Neural Computing (3) Prereq.: EE 3120 and CSC 1 and 2. ABET category: 2 hrs. design; 1 hr. engineering science. Neural networks and automata; network architectures; learning models; applications to signal processing, vision, speech, and robotics; VLSI implementations.

4750 Microprocessor Interfacing Techniques (4) Prereq.: EE 3751, 2 hrs. lecture; 6 hrs. lab. ABET category: 2 hrs. design; 2 hrs. engineering science. Timing and design techniques of microprocessor interfaces to memory and input/output devices.

4760 Introduction to Compiler Optimization (3) Prereq.: EE 3750 and CSC 1 and 2. ABET category: 2 hrs. design; 1 hr. engineering science. Processor architecture, source program analysis, compiler optimization techniques, compiler design.

4770 Real Time Computing Systems (3) Prereq.: EE 3750. ABET category: 2 hrs. design; 1 hr. engineering science. Real time computing systems; systems components, architectures, I/O structure, interrupts, interfacing, A/D converters, and multiprogramming.

4780 Introduction to Computer Vision (3) Prereq.: EE 3750 or equivalent. ABET category: 2 hrs. design; 1 hr. engineering science. Computer processing of images, including image acquisition systems and computer systems for processing images; preprocessing techniques; image segmentation; emphasis on design of image processing systems.

4785 Introduction to Expert Systems (3) Prereq.: EE 3750 or equivalent. Introduction to expert systems, including rule-based systems; search strategies; representation and logic programming.

4790 Structure of Computers and Computations (3) Prereq.: CSC 3102 and EE 3753. Hardware and software complexity analyses; structures of both computers and computations.

7000 Advanced Topics in Electrical Engineering (3) Prereq.: EE 3750 or equivalent. ABET category: 2 hrs. design; 1 hr. engineering science. Compensation of single loop and multiloop systems; state estimation; stability; application to industrial controllers; design using computer simulation packages.

7050 Network Analysis and Synthesis (3) Prereq.: EE 3120 or equivalent. Network analysis and synthesis, network graph theory, state variable representation of networks, computer-aided analysis and design.

7100 Linear Active Network Analysis and Synthesis (3) Prereq.: EE 3120 or equivalent. Active network analysis and design, multiplier networks, pathological elements, inductors, filter theory.

7120 Computer-Aided Network Analysis (3) Prereq.: EE 3120 or equivalent. Computer-aided circuit analysis; transient analysis; computer-aided design; computer-aided testing; and other advanced computer-aided design and analysis techniques.

7150 Theory and Application of Digital Signal Processing (3) Prereq.: EE 4150 or equivalent. Digital filter design, spectrum analysis, digital hardware implementations, and applications.

7200 Advanced Topics in Electronics (3) Prereq.: EE 3120 or equivalent. ABET category: 2 hrs. design; 1 hr. engineering science. Selected topics of current interest.

7210 Semiconductor Device Modeling (3) Prereq.: EE 3320 or equivalent. ABET category: 2 hrs. design; 1 hr. engineering science. Semiconductor device modeling, including modeling of n-p junctions and quasi-neutral material; modeling of diodes and bipolar transistors.

7220 Semiconductor Devices I: Bipolar (3) Prereq.: EE 3320 or equivalent. Semiconductor material properties, current flows and non-equilibrium models, physical principles of p-n junctions, and quasi-neutral material; modeling of diodes and bipolar transistors.

7230 Physics of Device Electronics (3) Semiconductor physics and necessary assumptions for tractable device analysis; elements of statistical physics, transport phenomena in solids, band theory, semiconductor devices.

7231 Small-Geometry and High-Speed Devices (3) Prereq.: EE 7230 or equivalent. Charge carrier transport in small and high-electron mobility semiconductor devices, hot-electron effects, size effects and projection boundaries, heterostructure devices, tunneling devices, ballistic transport devices, and surfaces and interfaces in heterostructures.

7250 Integrated Circuit Engineering (3) Fabrication and application of computer chips and device design for monolithic integrated circuits; circuit design to circuit performance; thin- and thick-film circuitry.

7274 VLSI Systems (3) Prereq.: consent of instructor. Design and implementation of very large scale integrated systems; design of computer-aided design (CAD) systems; design of computer-aided testing (CAT) systems.

7244 Advanced Lithography and Metrology (3) Prereq.: EE 7240 or consent of instructor. Physical principles used in semiconductor manufacturing; optical lithography; x-rays; laser lithography; X-ray lithography; inspection techniques.

7245 Integrated Sensors and Actuators (3) Prereq.: EE 7240 and EE 4242 or consent of instructor. Sensor principles and applications; design considerations; and fabrication and application of integrated sensor devices.

7250 Semiconductor Power Devices (3) Prereq.: EE 3320 or equivalent. ABET category: 2 hrs. design; 1 hr. engineering science. Semiconductor power conversion devices with emphasis on physical mechanisms involved; fabrication of energy conversion devices for electric power systems.

7260 Semiconductor Materials (3) Theory and application of crystal growth from melt and chemical vapor deposition; preparation and purification of elemental and compound semiconductors; structural properties and their effect on electrical and physical parameters; amorphous semiconductors.

7280 Magnetic Materials and Devices (3) Prereq.: EE 3320 or equivalent. ABET category: 2 hrs. design; 1 hr. engineering science. Compensation of static magnetic domains; magnetic memory; current developments and applications of magnetic devices.

7310 Electromagnetic Theory and Techniques (3) Electromagnetic theory applied to radio propagation, waveguides, and microwave systems.

7350 Boundary Value Problems in Engineering (3) Prereq.: consent of instructor. Separation of variables method for solving certain classical partial differential equations, including properties of special functions and their applications to engineering problems.

7400 Advanced Topics in Power (3) Prereq.: EE 3120 or equivalent. ABET category: 2 hrs. design; 1 hr. engineering science. Compensation of static magnetic domains; magnetic memory; current developments and applications of magnetic devices.

7410 Faulted Power System Analysis (3) Development of positive, negative, and zero sequence parameters of power system components and their application in a variety of power system fault conditions.

7420 Power System Dynamics (3) Modern approach to power system transient stability studies; detailed synchronous machine models; their linearizations, excitation systems, and multimachine system stability analysis.

7430 Power System Reliability (3) Reliability analysis of power systems, including generation, transmission, and distribution.

7440 Power Transmission and Control (3) Prereq.: EE 4460 or equivalent. Analysis of HVDC transmission systems; high power switches and limitations; converter circuits, modeling control, and dispatch; analysis of transmission; transmission parameters; protection, harmonics, and filters.
4790 Advanced Electrical Drives (3) Prereq.: EE 4420, 4490, or consent of instructor. Advanced topics in electric drives including vector control of induction motor drives and permanent magnet synchronous motor drives.

5700 Advanced Topics in Controls (3) May be taken for a max. of 12 hrs. of credit when topics vary.

5710 Advanced Control Theory (3) Prereq.: EE 4560 or equivalent. Dynamic optimization applied to control systems; minimum principle, Hamilton-Jacobi-Bellman theory, dynamic programming, gradient algorithms, and functional analytic methods.

5725 Robust Control (3) Prereq.: EE 4650 and 4680. Internal stability, model uncertainty, robust stability, robust performance, controller parameterizations, design limitations, loop shaping H∞ control and other optimal robust control design techniques.

7500 System Identification (3) Prereq.: EE 4560, 4660 or equivalent. Conventional parameter estimation and adaptive modeling; control oriented identification; model uncertainties; model validation; review of research literature on system identification.


7560 Topics in Modern System Science (3) Prereq.: EE 4650 or equivalent. Research literature, operator theory and functional analysis applied to control engineering problems.

7570 Nonlinear System Analysis (3) Prereq.: EE 4450. Systems approach to study of nonlinear systems; includes limit cycles, analytical approximation methods, singular perturbations, Liapunov-Routh's stability, Popov criteria, and input-output stability.

7580 Computer Process Control (3) Prereq.: EE 4585 or equivalent. Theory and equipment for the implementation of computer-based control systems; includes supervisory, DDC, and hierarchical configurations, process and operator interface, real-time operations, industrial computer control systems; implementation of advanced control algorithms, time series analysis, and on-line process optimization.

7585 Advanced Digital Control Systems (3) Prereq.: EE 4585 and EE 4560. Theory and design of sampled-data control systems- including discretization of continuous-time systems and lifting of sampled-data systems; performance analysis in frequency and time domain; design techniques based on optimal controls; robustness analysis of sampled-data feedback control systems under plant perturbations.

7600 Advanced Topics in Communications (3) May be taken for a max. of 12 hrs. of credit when topics vary.

7610 Analog Communication (3) Prereq.: EE 4460 or equivalent. Random waves, receiver design, linear and nonlinear modulation; pulse modulation.

7620 Digital Communication (3) Prereq.: EE 4660 or equivalent. Receiver and transmitters in digital and analog systems; coding of information; transmission requirements; channel capacity and cutoff rate; intersymbol interference; fading and multiple-access systems.

7630 Detection and Estimation Theory (3) Prereq.: EE 4660 or equivalent. Hypothesis testing, detection of known and unknown signals, estimation of signal parameters, signal resolution.

7640 Information Theory, Coding, and Cryptography (3) Prereq.: EE 4660 or equivalent. Measures of information, characteristic capacity, Shannon'shaycock coding, rate-distortion theory, linear codes, cyclic codes, BCH and Goppa codes, convolutional codes, problems of data security, public key and digital designt; computational complexity ciphers.

7660 Random Processes I (3) Prereq.: EE 4660 or equivalent. Sequences of random variables, renewal processes, Markov chains, and queueing models.

7670 Communication Networks (3) Prereq.: EE 7660. Protocols, performance, and implementation of the data link layer and the network layer of communication networks.

7672 Switching and Multiplexing (3) Prereq.: EE 7660. Theory, implementation, and performance analysis of switch architectures and broadband integrated networks; traffic and congestion control.


7700 Advanced Topics in Computer Engineering (3) May be taken for a max. of 12 hrs. of credit when topics vary.

7710 Advanced Digital Logic (3) Prereq.: EE 3750 or equivalent. Mathematical foundations of Boolean algebra; vector switching functions, Boolean differential calculus, and fault detection.

7715 Computer Arithmetic (3) Prereq.: EE 3755 or equivalent. Number systems; arithmetic algorithms; high performance adders, floating-point arithmetic; residue number systems; hardware implementation.

7720 Computer Architecture (3) Prereq.: EE 4720 or equivalent. High performance computer architectures; vector processing; parallel processing and interconnection networks.

7725 Interconnection Networks (3) Prereq.: EE 4720 or equivalent. Interconnection network theory, analysis, and implementation; shared memory, coherent caches, and related topics.

7730 Image Analysis I (3) Prereq.: EE 3120 or equivalent. Basic fundamentals and techniques of digital image processing; hardware and software, applications, D transforms, preprocessing, texture analysis, and edge detection; emphasis on application of theory to practical problems.

7740 Image Analysis II (3) Prereq.: EE 4660 and 7730. Continuation of EE 7730. Formal mathematical treatment of image segmentation, shape analysis, texture analysis, and scene analysis.

7745 Neural Networks and Iterative Maps (3) Prereq.: EE 4745 or equivalent. Neural network approach to artificial intelligence; general properties of iterative maps; mapping networks for pattern recognition; optimization; genetic algorithms; implementation issues.

7750 Machine Recognition of Patterns (3) Prereq.: EE 4660 or equivalent and knowledge of programming language. Decision functions; Bayesian decision theory; cluster analysis; design of fuzzy, and fuzzy classifiers; unsupervised learning; feature selection.

7760 Logic Testing and Testable Design (3) Prereq.: EE 3755 and 3140 or equivalent. Switch level fault models, test generation for combinational and sequential circuits, VLSI testing, design for testability.

7765 Distributed Computing System Reliability (3) Prereq.: EE 3140 and 4270 or equivalent. Reliability measures, standards, evaluation, and bounds; multimode and statistical dependent failure analysis; distributed and parallel system reliability and availability, graceful degradation, performance; software reliability.

7770 Interconnection Networks (3) Prereq.: EE 4710 or equivalent. Internet concepts, networks, and transport layers, IP switching, Routing techniques, Internet security, Firewalls.

7780 Software Design Principles (3) Prereq.: CSC 3192 or equivalent. Principles of software design, engineering, and management; software production and correctness; object-oriented software architecture; software measures; other topics from software engineering.

7785 Program Parallelization (3) F Prereq.: EE 3755 or equivalent. Analysis and optimization of programs for a variety of architectures, parallelism in various programming languages, data parallelism, and shared memory parallelism.

7790 Structure of Computers and Computers II (3) Prereq.: EE 4790 or consent of instructor. Mathematical treatment of space and time complexity of computations; formal models of computers and computation.
4000 Special Projects for Creative Writing Majors (3)
Prereq.: at least one 2000-level course in creative writing. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Explorations in a wide variety of projects that basic courses are unable to accommodate.

4001 Written Creative Prose Workshop (3)
Prereq.: at least one 2000-level course in creative writing. Essays and reviews as literary forms, with guided practice in writing both.

4002 Scientific and Professional Writing for Peers (3)
Individualized practice will have well-defined projects. Principles and practice of effective research writing in academic and professional settings; emphasis on translating research results into publishable articles and effective grant proposals.

4003 Special Topics in Professional Writing (3)
Prereq.: permission of instructor. May be taken for a max. of 9 sem. hrs. of credit when topics vary. Scientific writing and society; writing user manuals; document design research; history and rhetoric of scientific and professional writing; theory and practice.

4004 Practicum in Technical Writing (3)
Prereq.: ENGL 3002 or 3003 and 4002 or 4003 or permission of department. 10 hrs. lab. Supervised writing and editing projects.

4005 Short Story Writing (3)
Prereq.: at least one 2000-level course in creative writing. Guided practice in short story writing; techniques involved.

4006 Writing the Novel (3)
Prereq.: at least one 2000-level course in creative writing. Guided practice in writing the novel; techniques involved.

4007 Writing Poetry (3)
Prereq.: at least one 2000-level course in creative writing. Guided practice in writing poetry; techniques involved.

4008 Writing Drama (3)
Prereq.: at least one 2000-level course in creative writing. Also offered as THTR 4008. Guided practice in writing plays; techniques involved.

4009 Advanced Screenwriting Workshop (3)
Prereq.: consent of instructor and at least one 2000-level course in creative writing. Practice in advanced screenwriting; students will be required to write a full-length screenplay or teleplay.

4017 Technical Editing (3)
Prereq.: ENGL 1001 or 3002 or equivalent. Practical experience in editing and preparing technical manuscripts; general instruction in functions of the technical editor.

4021 Capstone Seminar in Creative Writing (3)
May be taken for a maximum of 6 hrs. of credit when topics vary. Advanced seminar in which students consolidate their knowledge in English and obtain a perspective on the significance of that knowledge. Independent research project. Course topics will vary.

4023 Studies in Life Writing (3)
4316 Introduction to Literary Style (3) Stylistic analysis of the language of literature; emphasis on the major rhetorical, linguistic and literary theories of style and their concerns with author, reader, text, and context.

4475 American Folklore (3) Also offered as ANTH 4475. Folklore, presenting regional, religious, and occupational groups; relation of folklore to other aspects of American vernacular culture and to American literature.

4480 Folklore and Literature (3) Interrelationships between folklore and literature. Analysis of folklore by writers; similarities and differences between "oral literature" and "written literature."

4493 Women and Folklore (3) Examination of folk materials, including oral and written music, art, artifacts, and rituals; focus on how and why information about women in folklore is communicated.

4595 Studies in Women and Literature (3) May be taken for a max. of 6 hrs. of credit when topics vary. Authors such as Behn, Woolf, Chopin, Atwood, Clift; topics such as "Reading and Writing About Women's Lives," "The Female Gothic," "Women and Ethnicity," "Early Modern Women Writers."

4674 Studies in African-American Literature (3) May be taken for a max. of 6 hrs. of credit when topics vary. Authors such as Douglass, Harriet, Wright, Morrison; topics such as "Slave Narratives," "The Harlem Renaissance," "The Black Arts Movement," "The Black Diaspora, "African Survivals."

4710 Introduction to Linguistics (3) Also offered as LIN G 4710. Introduction to the major fields of linguistic study: phonology, morphology, syntax, semantics.

4711 History of the English Language (3) Also offered as LIN G 4711. Survey of the development of the English language, including its roots to the present day.

4712 Roots of English (3) Also offered as LIN G 4712. The use of language to reconstruct the ancient Indo-European physical and cultural world: myth, religion, ritual, law, and medicine.

4713 Syntax (3) Also offered as LIN G 4713. Basic principles of syntactic structure; topics include constituency, subordinate clauses, coordinate structures, question formation, topicalization, and the passive.

4714 Phonology (3) Also offered as LIN G 4714. Introduction to phonology, concentrating on the English language; phonetic and phonemic inventories; feature analysis and rules; analysis of linear, non-linear, and metrical paradigm.

4715 Semantics (3) Also offered as LIN G 4715. Approaches to the study of meaning: theories of the lexicon, word-formation and meaning; the interaction between sentence structure and signification; pragmatics.

4716 Introduction to Sociolinguistics (3) Also offered as LIN G 4716. Survey of the field of sociolinguistics; issues relating to language variation and change; class, gender, and ethnicity; language planning and public policy.

7001 LIN G 7001 Workshop (3) Prereq.: permission of instructor. M.A. or同等 level of proficiency in English. Issues related to the field of sociolinguistics: topics such as gender and language, "Oral and Literacy," "Technology and Politics of Literacy," "Working-Class Literacy.

7002 Topics in Language and Literature (3) Survey of one or more representative works of literature for the study of the influence of a particular language or languages. Specialized explorations in creative writing and critical study.

7006 Fiction Writing (3-6) May be taken for a max. of 6 hrs. of credit. Creative writing of nonfiction essays.

7007 Poetry Writing (3-6) May be taken for a max. of 12 hrs. of credit. Composition and critical evaluation of poetry; poetic forms and problems of poetry writing.

7008 Drama Writing (3-6) Also offered as THR 7008. May be taken for a max. of 12 hrs. of credit. Composition and critical evaluation of drama; techniques of dramatic composition and dialogue.

7097 Advanced Screenwriting Workshop (3-6) Prereq.: permission of instructor. May be taken for a max. of 12 hrs. of credit. Composition and critical evaluation of screen and teleplays; screenwriting composition and dialogue.

7098 Advanced Playwriting Workshop (3-6) Prereq.: permission of instructor. May be taken for a max. of 12 hrs. of credit. Composition and critical evaluation of screen and teleplays; screenwriting composition and dialogue.

7099 Advanced Screenwriting Workshop (3-6) Prereq.: permission of instructor. May be taken for a max. of 12 hrs. of credit. Composition and critical evaluation of screen and teleplays; screenwriting composition and dialogue.

7104 Renaissance Literature (3) Survey of representative works of English literature in poetry and prose in the 16th and 17th centuries.

7105 Restoration and 18th Century Literature (3,3) Comprehensive survey of major authors, contexts, and genres from the Restoration to the end of the 18th century.

7106 Romanticism (3) Poetry, prose, and aesthetic theory of the Romantic period from Anna Barbauld and William Blake to Mary Shelley and Walter Scott.

7106 Victorian Literature (3) Survey of Victorian prose and poetry from Bronte to Dickens and to the end of the century.

7107, 7071, 7072 American Literature I, II, III (3,3,3) (7070) Survey of American poetry and prose in the 17th and 18th centuries, (7071) the 19th century; and (7072) the 20th century.

7106 Forms of Prose Fiction (3) Prereq.: admission to M.F.A. program. May be taken for a max. of 6 hrs. of credit when topics vary. Fictional techniques in conventional and experimental short stories, novels, and novels; elements of plot, characterization, theme, setting, and tone; formal analysis of literary texts related to specific problems of writing.

7107 Prosy and Poetic Forms (3) Prereq.: admission to M.F.A. program. Representative forms of poetry from early sages to contemporary free verse; relationship to principles of versification; some concurrent practice in writing poetry in specific conventions.

7109 Forms of Film Writing (3) Prereq.: permission of instructor. Examination of screenplays and teleplays; techniques of exposition, characterization, and dramatization.

7124 Feminist Literary Theory (3) Introduction to major issues and movements relating to female writing. Specialized explorations in creative writing and critical study.

7137 Chaucer (3) May be taken for a max. of 6 hrs. of credit when topics vary. Poetry and prose in Middle English.

7147 Milton (3) Readings and critical analysis of the poetry and prose of John Milton.

7170 Ethnic Literatures of the United States (3) Survey of the literature of America's diverse ethnic cultures; theories of ethnicity, cultural studies, and critical race studies.

7173 Literatures of the American South (3) Southern writing from colonial times to the present.

7174 Survey of African-American Literature I (3) Writings of African Americans from the colonial/sla very period to the present.

7175 Survey of African-American Literature II (3) Writings of African Americans from 1915 to the present.

7182 Postcolonial Literatures (3) Survey of Anglophone literatures from formerly colonized nations.

7228 Modern Critical Theory and Cultural Studies (3) A basic introductory survey of modern historical and cultural studies. May be taken for a max. of 9 hrs. of credit when topics vary. Intensive study of a topic in history or theories of literature; topics include "Technology and Literacy," "Orality and Literacy," "Theory and Politics of Literacy," "Working-Class Literacy.

7222 Topics in Literary Studies (3) May be taken for a max. of 9 hrs. of credit when topics vary. Intensive study of a topic in history or theories of literature; topics include "Technology and Literacy," "Orality and Literacy," "Theory and Politics of Literacy," "Working-Class Literacy.

7321 Topics in Gender Theory (3) May be taken for a max. of 9 hrs. of credit when topics vary. Intensive study of a topic in history or theories of literature; topics include "Technology and Literacy," "Orality and Literacy," "Theory and Politics of Literacy," "Working-Class Literacy.

7522 Topics in Rhetoric and Poetic Theory (3) May be taken for a max. of 9 hrs. of credit when topics vary. Intensive study of a topic in history or theories of literature; topics such as "Rhetorics of the Self, "Lacanian Poetics," "Rhetoric and Politics," "Medieval Rhetoric, Media, and Representation (3) May be taken for a max. of 9 hrs. of credit when topics vary. Analysis of literature, film, and media as cultural representations of societal norms, beliefs, and needs.

7542 Topics in Rhetorics of Class and Gender (3) May be taken for a max. of 9 hrs. of credit when topics vary. Analysis of writing and language in light of their contextual and historical influence on the methods for their study; emphasis on class and gender.

7621 Research Methods in Composition, Literacy, and Rhetorical Studies (3) Survey and theoretical discussion of research methods in literary studies such as discourse analysis, theoretical analysis, interviews, talk-aloud protocols, and ethnography in the fields of composition studies, literacy studies, or rhetorical studies.

7622 Topics in Composition Studies (3) May be taken for a max. of 9 hrs. of credit when topics vary. Historical survey of the theoretical, research, and pedagogical issues in the field of composition studies, special topics such as "Genre Theory," "Assessment," "Technology and Composition Studies," "Postmodernism.

7623 Topics in Professional Writing and Technical Communication (3) May be taken for a max. of 9 hrs. of credit when topics vary. History or theories of professional writing and technical communication. Specialized explorations in creative writing and critical study.

7711 Forms of English (3) May be taken for a max. of 9 hrs. of credit when topics vary. Analysis of a topic or topics in the history of English, of the Germanic language, or of the Indo-European language family.

7713 Topics in Syntax and Semantics (3) Also offered as LIN G 7713. May be taken for a max. of 9 hrs. of credit when topics vary. Analysis of a topic or topics in the history of English, of the Germanic language, or of the Indo-European language family.

7714 Topics in Sociolinguistics (3) Also offered as LIN G 7714. May be taken for a max. of 9 hrs. of credit when topics vary. Analysis of a topic or topics in the history of English, of the Germanic language, or of the Indo-European language family.

7715 Topics in Language Acquisition (3) Also offered as LIN G 7715. May be taken for a max. of 9 hrs. of credit when topics vary. Specialized explorations in creative writing and critical study.

7717 Language (3) May be taken for a max. of 6 hrs. of credit when topics vary. Analysis of a topic or topics in the history of English, of the Germanic language, or of the Indo-European language family.

7921 Topics in Genre (3) May be taken for a max. of 9 hrs. of credit when topics vary. Intensive study of a topic in history or theories of literature; topics such as "Technology and Literacy," "Orality and Literacy," "Theory and Politics of Literacy," "Working-Class Literacy.

7922 Authors Seminar (3) May be taken for a max. of 9 hrs. of credit when topics vary. Detailed study of one or two authors in American, British, or other Anglophone literatures; attention to the life and time, predecessors, and influence.
Introduction to Pest Management (3) Prereq.: BIOL 1201, 1208, and either BIOL 1402 or BIOL 1502, or BIOL 1001, 1002, 1003, 1004; or equivalent. 2 hrs. lecture; 2 hrs. lab. Insect recollection and life cycles; factors affecting insect diversity and abundance; interactions between insects and the natural environment.

8000 Thesis Research (1-12 per sem.) “S”/“U” grading.
8000 Independent Study (1-3) May be taken for a max. of 3 sem. hrs. in an M.D. program. 6 sem. hrs. in an M.P.A. program, and 9 sem. hrs. in a Ph.D. program. Directed individual guided by the faculty member.
8000 Dissertation Research (1-12 per sem.) “S”/“U” grading.

ENTOMOLOGY • ENTM

2001 Insects in the Environment (3) F Prereq.: BIOL 1201, 1208; and either BIOL 1402 or BIOL 1502, or BIOL 1001, 1002, 1003, 1004; or equivalent. 2 hrs. lecture; 2 hrs. lab. Insect recollection and life cycles; factors affecting insect diversity and abundance; interactions between insects and the natural environment.

8000 Thesis Research (1-12 per sem.) “S”/“U” grading.
mimicking methodologies utilized by professional consulting firms; findings presented using professional format; i.e., final reports are well-organized, process treatment trains, and/or process sizing.

3272 Senior Project II: Consulting Format (3) Prereq.: EVEG 271/3. Senior Project II. Students and faculty design effort initiated in EVEG 271/3. Construction of prototypes and bench scale demonstrations; extension of designs; simulation analysis.

3273 Independent Undergraduate Research Project I (4-5) Prereq.: EVEG 41135 and consent of department. Independent research project under the direction of a faculty member. Students will identify and design the objectives and scope of the research and conduct appropriate analytical and experimental (field and/or laboratory) studies. Results and conclusion of the project are summarized in a report and defended orally.

3400 Environmental Engineering II (3) F,S Prereq.: CHEM 2060 (2261), EVEG 2000. Also offered as BE 3400. Fundamentals of microbiology, ecology, enzyme kinetics, and biochemistry as applied to environmental engineering; applications to biological wastewater treatment; bioremediation of soil, air, surface and ground waters, landfill, and natural systems.

4105 Quantitative Water Management (3) Prereq.: EVEG 3110. Quantitative tools used to solve water management problems: mass balance stoichiometric, kinetic, and equilibrium phenomena.

4110 Unit Operations Laboratory (2) Prereq.: CHEM 2060. EVEG 3110. EVEG 4135. Understanding of the physical, biological, and chemical operations and processes commonly utilized in environmental engineering; presentation of theoretical concepts and operational problems; laboratory experiments; and final reports.

4120 Design of Solid and Hazardous Waste Management Systems (3) Prereq.: EVEG 3110 and CHE 3102. Design of solid and hazardous waste systems; process selection, elements of waste management systems; physicochemical, biological, and thermal process design; regulations related to design of waste management systems.

4130 Control and Treatment of Urban Storm Water (3) Prereq.: EVEG 3100, 3110 or equivalent background. Fundamentals of the interrelated processes of urban hydrology, stormwater runoff, and stormwater treatment as impacted by anthropogenic activities within our constructed environment; design of hydraulic controls and unit operations and process control for storm water as a wastewater or reuse water.

4135 Water Quality Analysis for Natural Systems (4) Prereq.: CHEM 1201 and credit or registration in ENGL 2000. 1 hrs. lecture, 3 hrs. lab. Application and interpretation of standard sanitary, chemical, and microbiological methods to water quality problems in the areas of water supply, wastewater treatment, and pollution of natural waters.

4139 Lakes Management and Modeling (3) Prereq.: CE 2190. Integration and application of limnological and engineering principles to the development of engineered restoration and management solutions for lakes and their watersheds; development and application of dynamic models for system solution development.

4140 Design of Wastewater Management Facilities (3) Prereq.: EVEG 3100 and 3110; civil engineering students enrolled in this course must have credit in CE 4759; 2 hrs. lecture; 3 hrs. lab. Design of wastewater management facilities; process selection and evaluation using computer-assisted procedures; preparation of design drawings, reports, and cost estimates.

4150 Integrated Environmental System Design I (3) F Prereq.: EVEG 3110 and CHE 3102; Preliminary designs will be applied to final full designs in EVEG 4151. Principles of integrated environmental system design; economic, regulatory, and risk-based constraints in initial preliminary design; development of environmental objectives and scope of the study; development of financial, regulatory, and risk-based constraints in completion of environmental design projects developed in 4151; minimization, destruction, treatment, and disposal technologies in all media; emphasis on preliminary design and screening of classical management systems.

4151 Integrated Environmental System Design II (3) S Prereq.: EVEG 4150. Continuation of EVEG 4150. Final project designs are presented to representatives of the public and private sectors. Economic, regulatory, and risk-based requirements in completion of environmental design projects developed in 4151; minimization, destruction, treatment, and disposal technologies in all media; emphasis on preliminary design and screening of classical management systems.

4153 Hazardous Waste Management (3) Prereq.: consent of instructor. Identification and classification of wastes; regulations, treatment, storage, and disposal; technologies practiced.

4157 Design of In-Situ Waste Site Remediation Processes (3) F Prereq.: EVEG 3110 and CHE 3102. Design of surface and subsurface remediation of industrial and/or industrial waste sites; unit processes for containment and recovery integrated into design of treatment trains for control of sources of contamination; emerging technologies for vapor extraction, soil washing, bioremediation, and natural recovery employed to minimize cost and environmental impact.

4159 Design of Natural Systems for Wastewater Treatment (3) F Prereq.: EVEG 3110. Design of constructed wetland systems, and land application systems for wastewater treatment; economic analysis, design, and selection criteria of natural systems for treatment of municipal and industrial wastewater.

4780 Special Topics in Environmental Engineering Design (3) Prereq.: senior standing and departmental approval. May be taken for a max. of 6 sem. hrs. of credit when topics vary. More than one section of this course may be taken for credit concurrently when topics differ. Selected topics in environmental engineering design.

4781 Special Topics in Environmental Engineering (3) F,S Prereq.: senior standing and departmental approval. May be taken for a max. of 6 sem. hrs. of credit when topics vary. More than one section of this course may be taken for credit concurrently when topics differ. Selected topics in environmental engineering science.

ENVIRONMENTAL MANAGEMENT SYSTEMS - EMS

1011 Environment and Technology: Perspective on Environmental Science (4) F,S,Su (4) 9080.

2051 Soil Science (4) See AGRO 2051.

3040 Applied Environmental Management (4) S Prereq.: EMS 1101, ENGL 2000. 3 hrs. lecture; 3 hrs. lab. Applications of planning, management, and decision making to environmental policy, systems, and management; evaluation of environmental decision making; environmental ethics; analysis of environmental issues at the local, state, and national levels.

3045 Soil Conservation (2) See AGRO 3045.

3050 Environmental Regulations and Compliance (3) F Prereq.: EMS 1101, ECON 2300 or AEAC 2003. Local, state, and federal environmental regulations; enforcement of and compliance with regulations; roles of regulatory agencies.

3090 Environmental Internship (1-3) F,S,Su Prereq.: permission of department and junior standing. Credit will not be given for this course and AGRO 3090. Professional experience in some aspect of environmental management; student must submit a proposal explaining internship goals and education component; reports, employer evaluation, paper, and presentation are required.

4010 Applied Ecology (2) Prereq.: minimum of 10 sem. hrs. of biological and/or physical science. Also offered as EMS 4010. The biosphere, air, land, and aquatic environments; development of alternative techniques for controlling emerging environmental pollution; environmental risk assessment and management.

4035 Aquatic Pollution (3) Prereq.: EMS 1126 or OCS 1005 or OCS 1006, or OCS 2008 and 2009 or equivalent. Interdisciplinary study of the interaction between man and the aquatic environment and human impacts on freshwater biological systems; biological, ecological, social, legal, and managerial aspects of water pollution are examined through a series of case studies.

4036 Environmental Chemistry (3) See CHEM 4150.

4140 Radiobiology (3) F,S,Su See NS 4141.

4149 Design of Environmental Management Systems (3) Environmental systems planning at local, national, and international levels; identification of system requirements and available resources; definition of constraints, establishment of evaluation criteria; evaluation of alternative concepts and plans for subsystems; implementation using qualitative tradeoffs, mathematical models, and computer simulations.

4261 Energy and the Environment (3) Methods of stationary power generation, electricity production related to fuel production, transportation, and use; energy use and pollution problems related to transportation; energy resources, regulatory aspects, and solutions related to stationary and moving sources of air pollution.

4262 Environmental Hazards Analysis (3) Systematic framework for examining the nature and consequences of natural and man-made hazards; strategies that may be taken to plan, respond, recover, prevent, or mitigate hazards.

4264 Regulation of Environmental Hazards (3) Federal, state, and local regulation for mitigating the occurrence and effects of hazardous events, including the National Flood Insurance Act, Emergency Planning and Community Right to Know Act, and government response authority.

4266 Ocean Policy (3) National and state ocean policy; Law of the Sea; regulation of the high seas; marine pollution, marine resources, and marine scientific research; other related topics.

4477 Environmental Toxicology: Introduction and Applications (3) Prereq.: 6 hrs. of chemistry, 6 hrs. of life science, permission of instructor. Introduction to the basic principles of environmental toxicology; applications of these principles in industrial and other job related environments; regulatory perspectives; spills, anthropogenic pollution problems; human risk management; overview of toxic agents, routes of exposure, target tissues (human mammalian), and toxicological testing.

4500 Health Effects of Pollutants (3) Prereq.: minimum of 6 sem. hrs. of chemistry and 6 sem. hrs. of either biology or zoology. Effects of environmental pollutants on human health.

4900 Watershed Hydrology (3) Prereq.: 1 yr. introductory course. 1/2 hrs. lecture; 1 1/2 hrs. lab. Also offered as RN 4900. The principles of hydrology with emphasis on

ENVIRONMENTAL STUDIES - ENVS

1000 Environment and Technology: Perspective on Environmental Problems (3) Also offered as EMS 1011. Environmental quality problems: air, water, soil, and land, and society's response to such problems; analysis of the interrelationships and nature of ecological stresses.

1051 Soils and the Environment (3) Prereq.: EVG 1051. 4 hrs. lecture; 4 hrs. lab. Principles of soil science and the role of soil in the environment; soil classification and selection criteria of soils for treatment of municipal and industrial wastewater.

1126 Introduction to Environmental Sciences (3) Essential principles of environmental sciences; comprehensive and fundamental understanding of sound science, stewardship, and sustainability in local, national, and global decision making. Interactions and relations between humans and earth; an up-to-date look at today's global, national, and regional environmental issues.

2144 Environmental Issues in Economics and Water Resources (3) Economic principles and control mechanisms governing man's interaction with the biosphere; engineering principles and control mechanisms for the environment including unwanted and usable water; use cycles of water from its source through processing, reprocessing, use, reclamation, and disposal.

3999 Undergraduate Research (1-4) F,S,Su Prereq.: Permission of instructor. May be taken for a max. of 4 hrs. of credit. Individual study of a specific environmental problem or individual laboratory research.

4010 Applied Ecology (2) Prereq.: minimum of 10 sem. hrs. of biological and/or physical science. Also offered as EMS 4010. The biosphere, air, land, and aquatic environments; development of alternative techniques for controlling emerging environmental pollution; environmental risk assessment and management.

5707 Advanced Soil Physics (4) F See AGRO 7057.
Introduction to microcomputers and applications software; terminology; hardware; software: the operating system, word processing, spreadsheet applications, data management, graphics, communications.

1.201 Introduction to Statistical Analysis (F) 3 hrs. lecture. Prereq.: MATH 1021 or equivalent. Descriptive statistics; inferential statistical methods including confidence interval estimation and hypothesis testing for one and two population means, one- and two-sample tests of variance; simple linear regression and correlation; analysis of categorical data.

1.215 Exploratory Statistical Data Analysis (3) V Prereq.: EXST 2201 or equivalent. 2 hrs. lab. Applied statistical modeling: multiple regression, variable selection, serial correlation, repeated measures, multivariate tools, logistic regression, blocking and factorial design, categorical data analysis, and nonparametric techniques.

3.999 Supervised Independent Study and Research (1-4 V Prereq.: consent of instructor. May be repeated for credit when topics vary. Topics not covered in other experimental statistics courses.

4.087 Special Topics in Applied Statistics (3) V Prereq.: EXST 2201 or equivalent. May be taken for a max. of 6 sem. hrs. of credit. See CBS 4087.

7.003 Statistical Inference I (4) F,S 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. Credit will be given for only one of the following: EXST 7083, 7004, 7005. Basic concepts of statistical models and sampling; descriptive and inferential methods; normal, t, chi-square, and F distributions; tests of hypothesis and estimation; analysis of variance; regression, correlation, and categorical data; emphasis on social and behavioral sciences research problems; computer software applications.

7.001 Statistical Inference II (4) F,S 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. Credit will be given for only one of the following: EXST 7083, 7004, 7005. Basic concepts of statistical models and sampling; descriptive and inferential methods; normal, t, chi-square, and F distributions; tests of hypothesis, analysis of variance, regression, and correlation; emphasis on laboratory-oriented sciences research problems; computer software applications.

7.011 Nonparametric Statistical Methods (3) S Prereq.: EXST 7003 or 7004 or 7005 or equivalent. Technical, ecological, and economic considerations relating to air, water, and land quality management planning. 7.100 Environmental Toxicology (3) Prereq.: CBS 4001. Technical, ecological, and economic considerations relating to air, water, and land quality management planning. 7.110 Environmental Toxicology (3) Prereq.: CBS 4001. Technical, ecological, and economic considerations relating to air, water, and land quality management planning.

700 Special Problems in Environmental Sciences (1-4) F,S,Su May be taken for a max. of 4 hrs. credit. Individual study of a specific environmental problem.

7.50 Special Topics in Environmental Sciences (1-6) F,S,Su Research and methodological review of current topics.

7.95 Environmental Seminar (1) F,S,Su Reports and discussions of students/ facult y activities in environmental sciences.

7.98 Environmental Colloquium (2) Non-thesis students only. May only be taken during semester of graduation. Written and oral presentation review on a selected environmental issue, as approved by the departmental non-thesis committee.

800 Thesis Research (1-12 per sem.) S'T/"U" grading.

EXPERIMENTAL STATISTICS • EXST

General education courses are marked with stars (★).

2000 Introduction to Microcomputers (3) F,S,Su 2 hrs. lecture; 2 hrs. lab. Credit will not be given for this course and CSC 1100, ISDG 100, and/or ISDG 101. This course is waivered introduction to microcomputers and applications software; terminology; hardware; software: the operating system, word processing, spreadsheet applications, data management, graphics, communications.

2101 Introduction to Statistical Analysis (F) 3 hrs. lecture. Prereq.: MATH 1021 or equivalent. Descriptive statistics; inferential statistical methods including confidence interval estimation and hypothesis testing for one and two population means, one- and two-sample tests of variance; simple linear regression and correlation; analysis of categorical data.
of variance and experimental designs; completely randomized and block designs; Latin square designs; split-plot; arrangements of treatments; multiple comparisons; covariance analysis; multiple and curvilinear regression techniques; emphasis on social and behavioral sciences research; analysis of variance and covariance problems. 

7014 Experimental Statistics II (4) F Prereq.: EXST 7004 or equivalent. 3 hrs. lecture; 2 hrs. lab. Credit will be given for only one of the following: EXST 7013, 7014, 7015. Multiple classification analysis of variance and covariance, individual degrees of freedom, factorial arrangement of treatments, and multiple regression; emphasis on science/laboratory research problems. 

7015 Statistical Techniques II (4) F,S Prereq.: EXST 7005 or equivalent. 3 hrs. lecture; 2 hrs. lab. Credit will be given for only one of the following: EXST 7013, 7014, 7015. Multiple classification analysis of variance and covariance; sampling designs, parameter estimation, multiple regression and correlation, analysis of variance by simulation experiments; emphasis on field-oriented life sciences research problems. 

7022 Statistical Aspects of Quantitative Genetics (3) V Prereq.: EXST 7005 or equivalent; Statistical aspects of quantitative inheritance; partitioning of variance; covariance among relatives; theory of inbreeding; selection and breeding of species; single and multiple linear regression; computer simulation of inbreeding experiments; emphasis on fishery-oriented research problems. 

7023 Advanced Topics in Statistical Genetics (3) V Prereq.: EXST 4050 or equivalent and 7022. Topics not covered in other experimental statistics courses, such as best linear unbiased prediction of genetic merit; likelihood-based methods for genetic parameter estimation; analysis of selected populations; methods for quantitative genetic analysis of discrete data. 

7024 Biological Population Statistics I (3) V Prereq.: EXST 7005 or equivalent. Specialized sampling for estimation of plant and animal population parameters including density and abundance; survey methods, space-use, and spatial pattern; methods used include quadrats, line transects, plotless sampling techniques, change-in-ratio estimators including capture-recapture and exploitation or catch-per-effort estimators, and home range models. 

7025 Biological Population Statistics II (3) V Prereq.: EXST 7015 or equivalent. Extensive development and application of statistical techniques to parameter estimation in population dynamics; principles of model building and role of model building in population management. 

7031 Experimental Design (3) S Prereq.: EXST 7013 or 7014 or 7015 or equivalent. Comparison of designs, models, and analyses; emphasis on factorial experiments, complete and incomplete block designs, and confounding. 

7032 Survey Design (3) V Prereq.: EXST 7013 or equivalent. Comparison of experimental and quasi-experimental designs; repeated measures, covariance analysis, and control in factorial experiments; emphasis on social and behavioral science research problems. 

7034 Regression Analysis (3) F Prereq.: EXST 7013 or 7014 or 7015 or equivalent; and knowledge of matrix algebra. Theory and application of regression; knowledge of underlying principles; response surfaces, variable selection techniques, and nonlinear regression. 

7035 Applied Least-Squares (3) S Prereq.: EXST 7013 or 7014 or 7015 or equivalent. Applications of least squares methods; usual constraints, no constraints, and means model constraints to unbalanced cross classified and nested data; emphasis on analysis of variance and covariance for fixed effects models. 

7036 Categorical Data Analysis (3) S Prereq.: EXST 7013 or 7014 or 7015 or equivalent. Statistical techniques used in analyzing data from discrete distributions; contingency tables, loglinear and log models, logistic regression, and repeated measures nominal and ordinal data; emphasis on computer analysis and interpretation. 

7037 Multivariate Statistics (3) F Prereq.: EXST 7013 or 7014 or 7015 or equivalent; and knowledge of matrix algebra. An introduction to multivariate techniques and applications; emphasis on discriminant analysis, factor analysis and principal component analysis, canonical correlation, cluster analysis, and multivariate analysis of variance. 

7038 Statistical Methods for Spatial Data (3) F Prereq.: EXST 7003, 7004, or 7005. Overview of statistical methods for spatial data with emphasis on data analysis: fixed point spatial data, point pattern data, area data; topics include spatial correlation, variograms, kriging and spatial prediction; spatial sampling, and spatial experimental design; applications from other disciplines are encouraged, course work includes relevant statistical software and term project. 

7039 Statistical Methods for Reliability and Survival Data (3) S Prereq.: EXST 7013 or 7014 or 7015. Characteristics of lifetime data; non-parametric methods including Kaplan Meier estimation; lifetime parametric models, parametric methods for single distribution data; planning life test; system reliability concepts; failure time regression; accelerated testing. 

7041 Probability and Stochastic (3) F Prereq.: MATH 2057 or equivalent. Probability, random variables, discrete and continuous distribution functions; expected values, moment generating functions; functions of random variables. 

7061 Statistical Theory (3) S Prereq.: EXST 7060 or equivalent. Point estimation; hypothesis testing; interval estimation; large sample theory; new developments in statistical inference. 

7062 Advanced Topics in Statistical Theory (3) V Prereq.: EXST 7061. May be repeated for credit when topics vary. Topics in current interest; emphasis on theoretical development of statistical methodology. 

7083 Practicum in Statistical Consulting I (2) Su Prereq.: EXST 7013 or 7014 or 7015, and permission of instructor. 4 hrs. independent study. Pass/fail grading. Supervised application of statistical techniques to research problems; readings, oral presentations, and discussions on statistical consulting; problem solving and participation in real-life statistical consulting sessions under faculty supervision. 

7084 Practicum in Statistical Consulting II (2) F,S Prereq.: EXST 7083 and permission of instructor. 4 hrs. independent study. May be taken for a max. of 6 sem. hrs. credit. Primary responsibility for statistical consulting projects under the supervision of graduate faculty. 

7085 Special Problem in Statistics (1-3) F,S,Su Prereq.: consent of instructor. May be repeated for credit when topics vary. Pass/fail grading. Develop and present a 50-minute seminar on an advanced topic in statistics as a part of the department's seminar series. 

7086 Advanced Seminar in Statistics (1) F,S,Su Prereq.: consent of instructor. May be repeated for credit when topics vary. Pass/fail grading. Develop and present a 50-minute seminar on an advanced topic in statistics as a part of the department's seminar series. 

7087 Advanced Topics in Statistics (1-3) V Prereq.: consent of instructor. May be repeated for credit when topics vary. Lectures on advanced topics in statistics not covered in other experimental statistics courses. 

7151 Bayesian Data Analysis (3) V Prereq.: EXST 7013 or 7014 or 7015 or EXST 7004, or consent of department head. Introduction to Bayesian statistical methods and their application in fields such as agriculture, biology, engineering, and psychology; non-parametric, linear and exponential, hierarchical models; hypothesis testing and credible sets; posterior simulation via Markov Chain Monte Carlo; and performance of Bayesian procedures. 

7099 Independent Study (1-3) F,S,Su Prereq.: Permission of instructor. May be taken for a max. of 9 sem. hrs. of credit when topics vary. Independent study under the guidance of a faculty member. 

8000 Thesis Research (1-12 per sem.) "SYU" grading. 

FILM & MEDIA ARTS • FMA 

2001 Introduction to Film and Media Arts (3) Study of film, television, and video. 

3001 Special Topics in Film and Media Arts (3) May be taken for a max. of 6 hrs. of credit when topics vary. Selected topics relevant to the study of film and media arts. 

4001 Advanced Topics in Film and Media Arts (3) May be taken for a max. of 6 hrs. of credit when topics vary. Advanced topics relevant to the study of film and media arts. 

FINANCE • FIN 

In the Department of Finance, the second digit of the course number denotes the subject area of the course, as follows: 2—business law; 3—real estate; 4—risk and insurance; 6—finance (capital markets and financial institutions); 7—finance (investment management); 8—finance (investment analysis/portfolio theory); 9—general courses. Prerequisites for any finance course may be waived in exceptional cases with consent of the instructor and approval of the department chair. 

3205 Mineral Rights (3) Prereq.: FIN 3355. Law of mineral rights; emphasis on Louisiana oil and gas law; leases, royalty interest, title search, unitization, and pooling; mineral law of other states and of hard materials. 

3351 Principles of Real Estate (3) Prereq.: BLAW 3201 or FIN 3355. Purchasing and financing real estate relative to interest in realty, liens, contracts, deeds, titles, leases, brokerage, management. 

3352 Real Estate Valuation and Investment (3) Prereq.: FIN 3351 or 3355. Financial and investment analysis applied to single-family and income-producing real property; techniques for making investment decisions in alternative types of real property; cash flow analysis considering income tax effects, financial leverage, risk-return trade-offs, and alternative methods of disposition. 

3353 Real Estate Finance (3) Prereq.: FIN 3351 or 3715 or equivalent. Real estate financing decisions for residential and income-producing properties; risk-return analysis for varying conditions of financial leverage; decision making related to pricing, alternative financing methods, refinancing, mortgage portfolio management; financing methods; government involvement in mortgage market and housing finance. 

3354 Topics in Real Estate (3) Prereq.: FIN 3352 or 3353 or consent of instructor. Topics vary. 

3355 Real Property Law (3) Prereq.: BLAW 3201. Rights and obligations that attach to various types of ownership of immovable property both in Louisiana and Anglo-American jurisdictions. 

3440 Risk and Insurance (3) Prereq.: BLAW 3201. Nature of nonsppeculative risks and possible alternative methods of treating them; specific application of these methods to personal and business risks arising from life, health, property, and liability contingencies; influence of public policy on risk treatment. 

3441 Life and Health Insurance (3) Prereq.: FIN 3440. Analysis of insurance protecting against economic loss caused by termination of earning capacity, death, disability, or old age; derivation of premiums, reserves, benefits; legal aspects; operational features; use of contracts and provisions; disability income protection. 

3442 Property and Liability Insurance (3) Prereq.: FIN 3440. Property and liability risks; insurance coverages available to meet these risks; basic insurance principles that apply in various property and liability insurance contracts; functional aspects of insurance company operations. 

3440 Risk Management (3) Prereq.: FIN 3715. Risk management from the business manager's viewpoint; insurance and financial market methods of pooling and managing risk; identification and evaluation of risk; hedging, self-insurance, te-contracting and organizational design. 

3632 Bank Administration (3) Prereq.: FIN 3715. For students interested in commercial banking careers or in the role of banks within the American enterprise system. Economic role and evolution of banks; structure of banking; lending and investment techniques; bank organization and regulation; asset and liability management; credit risk management; bank performance analysis.
Native speakers of French will not receive credit for courses marked with an asterisk (*). General education courses are marked with stars (★).

**French**

- **Advanced Food Preservation (4)**: Focus on raw ingredients to final product. A study of raw ingredients to final product. Includes principles of food processing and food preservation.

- **Food Processing (3)**: Includes principles of chemistries of food processing and food preservation, including food science and food technology. A study of raw ingredients to final product.

- **Food Product Development (3)**: Involves the development of new food products, marketing, package design, and other aspects of product development.

- **Seafood Processing (3)**: Focuses on the principles of seafood processing and food preservation, including safety and quality assurance.

- **Flavor and Colors of Foods (3)**: Involves the study of flavorings and colorings in foods, including their chemical and physical properties.

- **Food Microbiology (4)**: Focuses on the principles of food microbiology, including foodborne pathogens and spoilage microorganisms.

- **Quality Assurance in the Food Industry (4)**: Involves the principles of food safety and quality assurance.

**Honors**

- **Intermediate French (3)**: Designed for students with previous study in French. Includes principles of French grammar and vocabulary.

- **Advanced French (4)**: Involves the principles of advanced French grammar and vocabulary.

**French Language**

- **French for Travelers 1 (3)**: Designed for students with previous study in French. Includes principles of French grammar and vocabulary.

- **French for Travelers 2 (3)**: Designed for students with previous study in French. Includes principles of French grammar and vocabulary.

**French Literature**

- **Old French and Medieval Literature (3)**: Focuses on the literature of the period, including medieval French literature.

- **Advanced French Syntax and Stylistics (3)**: Focuses on the principles of French syntax and stylistics.

**French Linguistics**

- **Introduction to French Linguistics (3)**: Focuses on the principles of French linguistics.

**French Phonology**

- **Phonology of French (3)**: Focuses on the principles of French phonology.

**French Syntax**

- **Advanced French Syntax and Stylistics (3)**: Focuses on the principles of French syntax and stylistics.

**French Seminars**

- **Seminar in Nutrition (1)**: Focuses on the principles of nutrition and health.

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**French Workshops**

- **Workshops in French (5)**: Focuses on the principles of French language and culture.

**French Literature**

- **French Literature in the 20th Century (3)**: Focuses on the literature of the 20th century.

**French Language**

- **French Language A (3)**: Focuses on the principles of French language.

**French Language**

- **French Language B (3)**: Focuses on the principles of French language.

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4047 Geographic Information Systems (3) Prereq.: CSC 1250 or 1253 or equivalent. Geographic information systems used in land resource management and planning; data structures and algorithms for automated retrieval and analysis of spatial data; structuring cartographic data into spatial data; integration of remotely sensed data into geographic information systems.

4048 Methods of Spatial Analysis (3) Prereq.: EXST 4001 or equivalent. Mathematical, statistical, and spatial analytical methods for handling and interpreting data related to geography.

HUMAN GEOGRAPHY
(B.A. candidates select two systematic and one regional course.)

4012 Elements of Cultural Geography (3) Culturally oriented proseminar in American geographical thought during the present century.

4066 Political Geography (3) Systematic, cultural-political geography; emphasis on technical and philosophical aspects and on American political landscapes; territorial political entities (cadastral, civil, national, imperial); role of the lands and sea, nature and objects of war; impacts of political entities on the landscape.

4072 Urban Historical Geography (3) Spatial evolution of cities and city-systems in western civilization through the classical, medieval, mercantile, and industrial periods to 1945.

4073 Urban Geography (3) Internal arrangement, external relations, and locational aspects of urban places, with emphasis on U.S.; urban places identified by presence of tertiary economic activities.

4074 Place and Culture (3) See ANTH 4074.

4077 Economic Geography (3) Location, characteristics, and relationships of primary, secondary, and tertiary economic activity; measurements and theories of location of economic endeavor.

4078 Environment and Development (3) Geographical theories and methods for analyzing relationship between environment and development.

4080 Environmental Historical Geography (3) Human-environment interaction from a historical geographical perspective; human agency in altering the environment and managing resources, and social response to environmental hazards.

4086 Human-Environment Interactions (3) Also offered as ANTH 4086. Cultural adaptation to difficult and distinctive environments, including mountains and highlands, the arctic, deserts, the humid tropics, and grasslands; subsistence strategies, local knowledge, household economies, land use practices, and resource management institutions.

Regional

4000 Modern India: Society and Culture (3) See SW 4000.

4001 Geography of Louisiana (3) Natural and cultural elements and regions.

4002 South Asian Society, Polity, and Culture (3) See INLA 4002.

4031 Latin America and the Caribbean (3) Physical and cultural geography of Latin America and the Caribbean.

4035 Geographical Survey of East Asia (3) General survey of the physical and cultural geography of the region; focus on economic development and international relations.

4050 Historical Geography of the South (3) Physical and cultural geography of southern U.S.; emphasis on geographical elements identified with the south and their historical development; environment, exploration, population, agriculture, and cultural landscape.

4052 Geography of the United States and Canada (3) Physical and cultural geography of the United States and Canada.

4055 Geography of Europe (3) Geographical survey of the natural, cultural, and economic resources of Europe and their relationships to the rest of the world.

PHYSICAL GEOGRAPHY (B.S. candidates select any three courses.)

Climatology

4013 Meteorology (3) May be taken for elective geology credit. Temporal and arclcal variations in composition and structure of the atmosphere; meteorological instruments and measurements.

4014 Climatology (3) Climatic phenomena; methods in development of regional climatology.

4015 Physical Climatology (3) Prereq.: GEOG 4013 or 4014 or equivalent and MATH 1352 or equivalent. May be taken for elective geology credit. Exchanges of radiation, energy, matter and momentum between the earth’s surface and the atmosphere that produce characteristic environmental conditions near the ground important to both rural and urban land uses.

4016 Methods of Climatological Analysis (2) Prereq.: GEOG 4013 and 4014; or equivalent. Analysis and interpretation of climatological data and application to physical and human problems.

4017 World Climates (3) Prereq.: GEOG 2050 or equivalent. Analysis of atmospheric circulation processes that produce differences in climates throughout the world; the earth’s problem climates and climatically sensitive zones most susceptible to floods, droughts, and other environmental stresses.

4018 Geological Hydrology (3) Prereq.: MATH 1021 or equivalent. 2 hrs. lecture; 2 hrs. lab. Analysis of basic hydrologic processes with geographical perspective; variability of runoff and groundwater; floods and droughts; climatic and land use impacts on local and global water resources.

4221 The Tropical Atmosphere (3) Prereq.: GEOG 4013 or 4014. Comparative analysis of the tropical and mid-latitude atmospheric circulation systems, including monsoon systems, tropical cyclones, and easterly waves; elements of interannual tropical variability such as El Nino-Southern Oscillation.

Geomorphology and Coastal

4021 Alluvial Morphology (3) Prereq.: GEOG 1001, 1003. May be taken for elective geology credit. Processes that originate and change land and hydrographic forms of alluvial surfaces, emphasis on Louisiana.

4022 Geomorphology (3) Prereq.: GEOG 1001, 1003. May be taken for elective geology credit. Basic principles underlying the study of land forms; emphasis on processes shaping the natural landscape.

4024 Coastal Morphodynamics (3) Prereq.: MATH 1021, 1022, or 1023. See OCS 4024.

4028 The Ocean World (3) May be taken for elective geology credit. Physical geography of the world’s oceans; geological and biological aspects of oceanography; ocean-atmosphere interactions; geomorphology and ecology of oceanic islands.

4029 Coastal Resources and Management (3) Introduction to coastal environments and contemporary global coastal and estuarine management.

Biogeography and Environment

4070 Environmental Conservation (3) Factors governing human use of the earth and its resources.

4082 Biogeography (3) Different approaches to description and interpretation of plant and soil distribution patterns.

4083 Quaternary Paleocology (3) Prereq.: GEOG 4082 and an additional course in historical or geographical, or equivalent. 2 hrs. lecture; 4 hrs. lab. Also offered as ANTH 4083. Theory and methods of reconstructing climatic, biological, geological, and human history during the Pleistocene and Holocene periods.

4085 Tropical and Subtropical Biogeography (3) Prereq.: GEOG 4082 or equivalent. Includes field trip during spring vacation. Principles of tropical ecology and biogeography taught as preparation for an expedition to tropical America where field methods will be illustrated and ecological diversity studied.

OTHER COURSES

2061 Physical Geography (3) Either GEOG 2050 or 2051 may be substituted for this course. Credit will not be given for both this course and GEOG 2050 or 2051. Analysis of landforms, hydrology, climate, vegetation, and soil, emphasis on world regional patterns.

2062 Cultural Geography (3) The only substitute for this course is satisfactory completion of both GEOG 1001 and 1003. Credit will not be given for both this course and GEOG 1001 or 1003. Nations of the world, integrated into regional patterns.

3065 Practical Geography of Petroleum Resources (3) Geographic aspects of petroleum resources; land and mineral ownership; compilation and application of maps, air photos, archives, surveys, and field work; utilization, site analysis, and impact; emphasis on Louisiana and Gulf Coast.

4023 Coastal and Shallow-Marine Depositional Systems (3) See GEOG 4023. May be taken for elective geology credit.

4090 The History of Geography (3) 3 hrs. lecture and proseminar discussion. Development of geography since ancient times; emphasis on the 19th and 20th centuries.

4164 Deltaic Geology (3) See GEO 4044.

4997 Special Topics in Geography (3) May be taken for a max. of 0.6 hrs. of credit when topics vary.

4998 Independent Reading and Research in Geography (1-6) May be repeated for credit. An honors course; GEOG 4999, is also available. Supervised reading or research on topics selected by qualified advanced students.

4999 HONORS: Independent Reading and Research in Geography (1-6) Same as GEOG 4998, with special honors emphasis for qualified students.

7074 Poetics of Place (3) Same as ANTH 7074.

7091 Introduction to Graduate Study (1) Same as ANTH 7091. Techniques and norms of their profession for incoming graduate students.

7092 Introduction to Research Methods in Geography (3)

7109 Settlement Geography: Exploration (3) May be taken for a max. of 0.6 hrs. of credit with consent of department.

7119 Form-Process Relationships in Coastal Environments (3) V

7171 Selected Topics in Geography (3) May be taken for a max. of 9.9 hrs. when topics vary.

7172 Advanced Physical Geography (3) May be taken for a max. of 9.9 hrs. of credit with consent of department.

7192, 7923, 7929 Research and Field Work in Geography (3-6 each) Each course may be repeated for credit.

7246 Advanced Geomorphology (3) May be taken for a max. of 9.9 hrs. of credit with consent of department.

7325 Quantitative Methods for Geographical Analysis (3) Prereq.: EXST 3003 or equivalent. Spatial analytical methods for handling and interpreting data related to geography.

7347 Geographical Literature (3)

7398 Culture History (3) May be taken for a max. of 9 hrs. of credit with consent of department.

7411 Coastal Ecology (3) Prereq.: GEOG 4028 or equivalent. 2 hrs. lecture; 2 hrs. lab. All students must have weekends free.

7422 Coastal Climatology (3) Prereq.: GEOG 4028 and a basic course in either meteorology or climatology, or consent of instructor. Meteorologic and climatologic phenomena occurring in coastal areas.

7466 Coastal and Estuarine Resources (3) Prereq.: GEOG 4028 and 4029; or equivalent. Nature of coastal and estuarine resources and their perception, evaluation, and exploitation.

7950 Problems in the Geography of Latin America (3) Prereq.: reading knowledge of Spanish or Portuguese. Problems in the cultural and economic geography of Latin America.

7960 Hydroclimatology (3) Prereq.: GEOG 4014 or 4015 or equivalent. 1 hr. lecture; 4 hrs. lab. Field measurements and laboratory analyses of radiation and water budgets in rural and urban environments; emphasis on evapotranspiration rates and climatic consequences.
GEOLOGY GEOG

General education courses are marked with stars (★).

★ 1001 General Geology: Physical (3) In honors course, GEOG 1002, is also available. Earth materials and land forms; processes at work on and within the earth.

★ 1002 HONORS: General Geology: Physical (3) Same as GEOG 1001, with special honors emphasis for qualified students.

★ 1003 General Geology: Historical (3) Prereq.: GEOG 1001. An honors course. GEOG 1004, is also available. History of the earth and life on it, as deciphered from study of its rocks and fossils.

★ 1004 HONORS: General Geology: Historical (3) Same as GEOG 1003, with special honors emphasis for qualified students.

1066 Dinosaurs, Catastrophes, and Extinctions (3) Not for major credit for geology majors. History of dinosaur discoveries and methods of study; dinosaurs' relationship to birds and mammals; impact of dinosaurs on earth's geological history; emphasis on catastrophes and patterns of extinction.

1111 Geology of National Park Areas (3) Credit will not be given for both GEOG 1001 and 1111. Geological study of areas supervised by the National Park Service. Areas covered will include most of the National Parks and Monuments, and many other federally owned lands.

1601 Physical Geology Laboratory (1) Prereq.: credit or concurrent enrollment in GEOG 1001. Lab related to GEOG 1001. Properties of minerals and rocks; practical application of geological principles, using topographic and geological maps; geological factors relating to energy exploration and environmental problems, with emphasis on southern Louisiana.

1602 Historical Geology Laboratory (1) Prereq.: GEOG 1001; credit or concurrent enrollment in GEOG 1003. Lab related to GEOG 1003. Sedimentary rocks and environments, geological sequences, fossils, and the historical geological record as illustrated in the field.

2020 Geology and the Environment (3) ★ Prereq.: GEOG 1001. Interaction between human activities and geological processes, hazards, and materials; emphasis on environmental geology of Louisiana and the Gulf Coast region.

2061 History of the Biosphere (3) Prereq.: GEOG 1003, 1602, BIOL 1201. 2 hrs. lecture; 3 hrs. lab. One or two field trips required. Characteristics and geologic history of selected taxa with significant fossil records; use of paleontological data (paleobiologic, paleoenvironmental, geochemical, and biostratigraphic) in geology and evolutionary studies; influence of the biosphere on Earth over geologic time.

2066 Continents Afloat and Global Tectonics (3) ★ Prereq.: GEOG 1001. Fundamental concepts of plate tectonics; implications for the evolution of continents and ocean basins; observational evidence for continental drift; historical development of plate tectonics as a scientific hypothesis.

2081 Mineralogy (3) Prereq.: CHEM 1201, 1202, and 1212; 2 hrs. lecture; 3 hrs. lab. Elementary crystallography; general chemical and physical properties of minerals.

2082 Petrography (3) Prereq.: GEOG 2081. 2 hrs. lecture; 3 hrs. lab. Optical mineralogy, phase diagrams; and rock forming minerals.

3032 Introduction to Sedimentology and Depositional Environments (3) Prereq.: GEOG 1001, 1003, 1601, or equivalent; concurrent registration in GEOG 2081, GEOG 3071, or consent of instructor. 2 hrs. lecture; 2 hrs. lab. One field trip and one field exercise in nearby area. Sediment types, textures, sedimentary structures, and major minerals used to understand sedimentary processes leading to different depositional environments.

3041 Igneous and Metamorphic Petrology (3) Prereq.: GEOG 2082; 2 hrs. lecture; 3 hrs. lab. Composition, textures, structures, distribution, and origin of igneous and metamorphic rocks.

3071 Structural Geology (4) Prereq.: GEOG 1003, 1602; 3 hrs. lecture; 3 hrs. lab. Geometry, kinematic, and dynamic analysis of geologic structures and structural systems resulting from deformation; introduction to tectonics; introduction to field techniques and geologic maps; generation of geologic maps and cross-sections.

3666 Field Geology (6) Su only Prereq.: GEOG 3012, 3041, and 3071; or equivalent. Students planning to take this course should apply to the camp director for MRS 4126. March 15. Camp fee. Six weeks of field-based projects in the Rocky Mountains of Colorado, New Mexico, and Wyoming; fundamentals of the study of rocks and geologic features in their natural settings.

3909 Geological Research (1-3 F, S, Su) May be taken for a max. of 9 sem. hrs. of credit when topics vary. Advanced and/or emerging topics in the geosciences.

4012 Introduction to Micropalaeontology (3) F Prereq.: GEOG 2067 or equivalent. Lab. 3 hrs. lecture; 1 hr. lab. Morphology, classification, stratigraphy, paleoecology, and evolutionary patterns of common marine microfossils.

4019 Geoarchaeology (3) F Prereq.: GEOG 2067 or GEOG 2015 or consent of instructor. 3 hrs. lecture; 2 hrs. lab. Introduction to fieldwork problem. Geological, stratigraphical, geochemical, and geophysical techniques employed in the study of archaeological sites and materials.

4020 Coastal and Shallow-Marine Depositional Systems (3) Also offered as MATH 3023. Dynamics of sediment transport in coastal zones and on continental shelves; sea-level changes; morphological, sedimentary, and stratigraphic attributes of coastal and shallow-marine lithofacies.

4031 Introductory Sedimentation (3) Prereq.: GEOG 1003. 2 hrs. lecture; 2 hrs. lab. Mineralogy, texture, structures, and stratigraphy of sediments and sedimentary rocks; their origin through weathering, erosion, transportation, deposition, and diagenesis.

4035 Advanced Sedimentology (3) Prereq.: GEOG 3032. Field trips required. Physical sedimentary processes in nonmarine and marine depositional systems, including fluvial, alluvial fan, lacustrine, oolian, and carbonate and clastic marine environments; influence of tectonics, climate, and sea level on sedimentary architecture and sequences.

4043 Earth Materials and the Environment (3) Prereq.: CHEM 1202, GEOG 1001, 2081 or permission of instructor. Earth materials and surface environments: weathering and environmental processes; physical-chemical behavior of ashflow siliciclasts, silica, zeolites, and associated health hazards; potential geologic reservoirs of hydrogen and carbon.

4044 Petroleum Geology (3) Prereq.: GEOG 2066, 3012, 3071, and MATH 1550. Modern concepts of the origin, migration, entrapment and production of hydrocarbons from sedimentary basins.

4045 Stratigraphy (3) Prereq.: GEOG 3082 or permission of instructor. The succession and age relationships of rock strata including their form, lithologic components, fossil content, geophysical and geochemical properties and their interpretation in terms of environment, mode of origin, and geologic rate.

4062 Exploration and Environmental Geophysics (3) Prereq.: GEOG 3071 and MATH 1552 or permission of instructor. 2 hrs. lecture; 3 hrs. lab. Principles and methods of exploration, analysis, and interpretation of borehole data, electric logs, and samples of rocks and fluids; construction of geological maps and sections showing sediment facies, geologic structure, geotemperature, fluid pressure and water salinity, analysis of fluid migration, oil and gas accumulation, and geothermal resource.

4082 Physical Hydrogeology (3) S Prereq.: GEOG 3032 or 4031 and MATH 1552 or permission of instructor. Subsurface fluid flow in geologic media; emphasis on geological controls of the origin and migration of pore water, including saline brines, in sedimentary basins; topics including crustal scale flow, petroleum migration, ore formation, and subsurface flow regimes in Louisiana.

4084 Petroleum Geomicrobiology (3) Prereq.: GEOG 3032 or BIOL 2061, 3005. PETE 4084 strongly recommended. 2 hrs. lecture; 3 hrs. lab. Microbial effects and controls on geologic, geochemical, and ecological processes; biochemical tracers and fossils of microbially mediated processes through time; introduction to biogeochemical processes.

4085 Geochemistry of Sediments and Natural Waters (3) Prereq.: GEOG 2082 and MATH 1550. Controls on the composition of natural water, mass balance of chemical interactions in the geochemical evolution of sedimentary rocks, the ocean, and the atmosphere; major geochemical cycles.

4111 Vertebrate Paleontology (3) Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab. Also offered as GEOG 4112. Processes of vertebrate distribution and the nature of vertebrate fossils; Mississippian River delta compared to other modern and ancient deltas.

4164 Deltaic Geology (3) Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab. Also offered as GEOG 4164. Processes of deltaic sedimentation and the nature of deltaic sediments; Mississippi River delta compared to other modern and ancient deltas.

4166 Subsurface Geology (3) Prereq.: GEOG 1001, 1003, 1602, PETE 4084 strongly recommended. 2 hrs. lecture; 3 hrs. lab. Principles and methods of exploration, analysis, and interpretation of borehole data, electric logs, and samples of rocks and fluids; construction of geological maps and sections showing sediment facies, geologic structure, geotemperature, fluid pressure and water salinity, analysis of fluid migration, oil and gas accumulation, and geothermal resource.

4182 Physical Hydrogeology (3) S Prereq.: GEOG 3032 or 4031 and MATH 1552 or permission of instructor. Subsurface fluid flow in geologic media; emphasis on geological controls of the origin and migration of pore water, including saline brines, in sedimentary basins; topics including crustal scale flow, petroleum migration, ore formation, and subsurface flow regimes in Louisiana.

4666 Coastal Field Geology (4) Su only Prereq.: consent of instructor. Also offered as OCS 4666. Camp fee. Four-week field course on the Louisiana coast utilizing facilities operated by Louisiana Universities Marine Consortium. Sedimentary environments, coastal processes, and environmental geological problems of the Mississippi delta plain.

6001 Topics in Earth Sciences for Teachers (3) Su May be taken for a max. of 9 sem. hrs. when topics vary. Consent of instructor is required for the second and third times. Various aspects of the earth sciences for elementary, middle, and high school teachers in the science classroom.

7603 Deep-Water Depositional Environments (3) Prereq.: introductory course in sedimentology, e.g., GEOG 4031. Different types of sediment in deep water and on various transport processes; emphasis on submarine fan systems, their lithologic and seismic response; geological factors responsible for variation in end products.

7021 Fluvial Processes and Systems (3) Prereq.: consent of instructor. Fluid flow, sediment transport, and fluvial depositional processes; river systems as conveyor belts for sediment delivery to sedimentary basins; fluvial sediments in the modern Mississippi and other river systems.
GREEK • GREK

General education courses are marked with stars (★).

1001 Elementary Greek (5) Readings to provide mastery of simple Greek prose; forms, vocabulary, syntax, and grammar.

1002 UNRS: Elementary Greek (5) Same as GREK 1001, with special honors emphasis for qualified students.

★ 2051 Intermediate Greek (5) Prereq.: GREK 1001 or equivalent. Continuation of GREK 1001. Readings in prose texts of moderate difficulty.

2052 UNRS: Intermediate Greek (5) Same as GREK 2051, with special honors emphasis for qualified students.

★ 2053 Homer (5) Prereq.: GREK 2051 or equivalent. Readings from the Iliad and Odyssey; selections from various books; some attention to aesthetic and historical problems.

★ 2055 Greek Drama (3) Readings in Greek drama including a representative play of Sophocles or Euripides.


2065 Plate's Dialogues (3) Prereq.: GREK 2053 or equivalent. Readings from Plato's dialogues.

2066 Attic Oratory (3) Prereq.: GREK 2053 or equivalent. Readings from Attic orators such as Demosthenes, Andocides, Antiphon, Lysias.

4023 Special Topics in Greek Poetry (3) May be taken for a max. of 6 hrs. of credit. Readings and studies in one or more of the following: Homer, Hesiod, Pindar, Greek lyric poetry, Aeschylus, Sophocles, Euripides, Aristophanes.

4024 Special Topics in Greek Prose (3) May be taken for a max. of 6 hrs. of credit. Readings and studies in one or more of the following: Herodotus, Thucydides, the Pre-Socratics, the orators, Plato, Aristotle.

4915 Independent Work (1-3) May be taken for a max. of 6 sem. hrs. of credit. Permission of department required. Readings in Greek literature directed by a senior faculty member.

7003 Seminar in Greek Literature (3) May be taken for a max. of 15 hrs. of credit as topic varies.

HEBREW • HEBR

General education courses are marked with stars (★).

1001 Beginning Hebrew (4) Also offered as REL 1001. This course counts toward the fulfillment of a foreign language requirement only when taken under the HEBRB rubric. The alphabet, basic grammar, vocabulary of classical Hebrew; simple prose passages from the Bible.

★ 1002 Beginning Hebrew (4) Also offered as REL 1002. Prereq.: HEBRB/HEBR 1001 or equivalent. This course will count toward the fulfillment of a foreign language requirement only when taken under the HEBRB rubric. Basic grammar and vocabulary of classical Hebrew; simple prose readings from the Bible.

★ 2003 Intermediate Hebrew (4) Also offered as REL 2003. Prereq.: HEBRB/HEBR 1002 or equivalent. This course counts toward the fulfillment of a foreign language requirement only when taken under the HEBRB rubric. Biblical narratives and poetry; details of syntax; development of vocabulary.

★ 2004 Intermediate Hebrew (4) Also offered as REL 2004. Prereq.: HEBRB/HEBR 2003 or equivalent. This course counts toward the fulfillment of a foreign language requirement only when taken under the HEBRB rubric. Biblical narratives and poetry; details of syntax; development of vocabulary; textual criticism.

HISTORY • HIST

General education courses are marked with stars (★).

★ 1001 Western Civilization to 1500 (3) An honors course, HIST 1002, is also available. Ideas, trends, and institutions in western civilization from earliest times to the Reformation.

★ 1002 HONORS: Western Civilization to 1500 (3) Same as HIST 1001, with special honors emphasis for qualified students. Supervised reading, discussion, research, and writing.

4001 Greece of the City State (3) Political, social, and cultural evolution of the Greek world from the Bronze Age to the foundation of the City States; the role of Greece in the foundation of the Roman Empire; attention to growth of democratic institutions.

4003 The Roman Republic (3) The Roman state, culture, and social and political development of the city from the origin of the city to the dictatorship of Julius Caesar.

4004 Rome of the Caesars (3) The growth of absolute government, spread of Christianity, and other political, cultural, and social movements from the establishment of the Principate to the fall of the Western Empire.

4005 History of the Christian Church: 50-450 (3) See REL 4005.

4006 History of the Christian Church: 450-1350 (3) See REL 4006.

4007 The Early Middle Ages, 300-1000 (3) History of Europe from Constantine the Great to the end of the Carolingian period; development of medieval society and institutions.

4008 The Later Middle Ages, 1000-1500 (3) History of Europe from the Investiture Controversy to the voyages of Columbus; developments in social, cultural, and political institutions.

4009 The Renaissance (3) Italian society and thought from Dante to Machiavelli, with emphasis on the medieval foundations of Renaissance culture; northern Europe from the Hundred Years War to the Reformation, with emphasis on political and economic development.

4011 The Age of the Reformation (3) Also offered as REL 4011. Sixteenth century Europe, with emphasis on Protestant and Catholic reform movements.

4012 History of Modern Christian Thought (3) See REL 4012.

4014 The Old Regime and the Enlightenment (3) Institutions of the Old Regime, with emphasis on the Enlightenment era.

4015 French Revolution and Napoleon (3) Background, constructive developments, and territorial changes resulting from wars of the period, with emphasis on Europe's emergence into a new era.

4016 19th Century Europe (3) The period 1815-1870.

4017 20th Century Europe (3) Survey of 20th century European history; emphasis on the role of total war in social, political, and cultural change and the impact of modern nation-state ideologues.

4020 Modern Italy (3) Intellectual, economic, social, and political history of Italy from the Enlightenment to present; emphasis on national unification, Fascism, and World War II; post-war economic development and terrorism.

4021 France to 1770 (3) Cultural, political, economic, and social survey of France from earliest times to the pre-revolutionary period.

4022 France since 1770 (3) Cultural, political, economic, social, and intellectual survey of France from the pre-revolution to the present.

4023 Spain since 1469 (3) Political, economic, and social development from the marriage of Ferdinand and Isabella to the present.

4024 The Dutch Republic and Empire: 1500-1800 (3) Political, economic, social, and cultural history of one of the great nation-states of the West; emphasis on the Golden Age of Rembrandt and Vermeer.

4025 Germany from the Reformation to Bismarck (3) German political, social, and cultural development from 1500 to 1890; the Thirty Years' War; the rise of Prussia; the nationalism of the 19th century.

4026 20th Century Germany (3) The states that have existed in Germany since 1890; the Wilhelminian Empire; the Weimar Republic; the Third Reich; and the Germany of today.

4028 The First World War (3) The First World War, 1914-1918, including controversies regarding its origin and outcome.

4029 Eastern Europe: 1700-1914 (3) Emphasis on the rise of nationalism in the 19th century.

4030 Eastern Europe: 1914-Present (3) Emphasis on the independent nation-states after World War I, impact of totalitarianism, and the current liberalization.

4031 The Balkans: 1453-1878 (3) Origins of the Balkan peoples, development of the Ottoman Empire, and rise of the autonomous Balkan nation-states.

4032 The Balkans: 1879-Present (3) Events leading up to and including World War I, problems of the inter-war period, World War II, and rise and decline of Communism in Southeastern Europe.

4033 Russia to 1861 (3) Kievan Rus, the Tsardom of Muscovy, and Imperial Russia to the emancipation of the serfs.

4034 Russia since 1861 (3) Reaction and reform from 1861 to 1905; failure of parliamentary democracy amid war and revolution; Leninism and Stalinism; relaxation of totalitarian rule since Stalin's death.
HONORS • HNRS

General education courses are marked with stars (★).

★ 1001 Seminar in Ancient Western Civilization (3) Prereq.: ENGL 1000/1001 or equivalent. Coreq.: HNRS 1003. Credit will not be given for this course and HNRS 1101. Curricular equivalent of ENGL 1002, 1003 or a humanities elective. The ancient world, including literature, history, philosophy, religion, government, and fine arts.
★ 1003 Lectures in Ancient Western Civilization (3) Coreq.: HNRS 1001. Credit will not be given for this course and HNRS 1103. Curricular equivalent of a 3 hr. history, social sciences, or humanities elective. Lectures, readings, and examinations coordinated with HNRS 1001.
★ 1008 Introduction to the Life Sciences (4) 2 hrs. lecture; 4 hrs. lab. Not open to students who have had BIOL 1001, 1002, 1003, 1004, 1005, 1006, or 1007. Continuation of HNRS 1008. A basic course, organized in accordance with the principle of organic evolution, emphasizing phylogeny, morphology, function of multicellular organisms, and people's relationship with them.
★ 1101 Seminar in Comparative Civilizations (3) Prereq.: ENGL 1000/1001 or equivalent. Coreq.: HNRS 1103. Credit will not be given for this course and HNRS 1101. Curricular equivalent of a 3 hr. history, social sciences, or humanities elective. Lectures, readings, and examinations coordinated with HNRS 1101.
★ 2002 Seminar in Roman and Medieval Civilization (3) Prereq.: ENGL 1001 and 1003; or HNRS 1101 and 1103; or ENGL 1002; or ENGL 1003. Coreq.: HNRS 2004. European civilization from ancient Rome through the Middle Ages; includes literature, history, philosophy, religion, government, and fine arts.
★ 2004 Lectures in Roman and Medieval Civilization (3) Prereq.: HNRS 1101 and 1103; or ENGL 1002; or ENGL 1003. Coreq.: HNRS 2002. Lectures, readings, and examinations coordinated with HNRS 2002.
2011 The Age of Enlightenment (3) Literature, philosophy, history, art, science, and the age of enlightenment.
★ 2012 The 19th Century (3) Perspectives fundamental to 19th century culture; relevant works of literature, philosophy, art, science.
★ 2013 The 20th Century (3) May be taken for a max. of 6 hrs. of credit. Selected themes in 20th century civilization.
808 Principles and Practices in Olericulture (4) F-E
Prereq.: AGRO 2631 and HORT 2500; 3 hrs. lecture; 5 hrs. lab. Review of crops, commercial vegetable industry; seed handling, field microclimate modification, transplant handling, stand establishment, influence of soil chemical and physical properties, and greenhouse vegetable production.

808 Principles and Practices in Fruit and Nut Production (4) S-O Prereq.: HORT 2500 or equivalent; 3 hrs. lecture; 2 hrs. lab. Required field trips. Psychological principles involved in growing pomological crops; overview of state, U.S., and worldwide fruit and nut industry; marketing and production strategies.

4090 Golf Course Operations (4) S Prereq.: HORT 4006; 3 hrs. lecture; 2 hrs. lab. Golf course management; construction, cultural practices; environmental concerns.

4096 Postharvest Physiology (4) S-E Preq.: PLHL 1060. 3 hrs. lecture; 2 hrs. lab. Physiological changes associated with storage and handling of fruits and vegetables; current practices used in extending shelf-life; basic and advanced laboratory analysis techniques.

7050 Plant Tissue Culture (4) Preq.: BIOL 4024, PLHL 1060. HORT 2061, 2 hrs. lecture; 6 hrs. lab. The in vitro culture of selected higher vascular plants; media preparation; callus, callus, and organ cultures; protoplast isolation, culture, and fusion; embryo genesis and plant regeneration and haploid culture.

7070 Advanced Plant Breeding (4) S-See AGRO 7710. 2 hrs. lecture; 5 hrs. lab. Genetic principles of crop genetic improvement and plant improvement.

7071 Advanced Plant Genetics (4) S-O Preq.: AGRO 2138 or equivalent. See also AGRO 7710. Theory and practical applications of recombinant DNA, extrachromosomal inheritance, and molecular techniques in plant genetics.

7074 Quantitative Genetics in Plant Improvement (3) See AGRO 7710.

7093 Seminar (1) May be taken for a max. of 4 hrs. of credit. Topics of current interest in horticulture.

8000 Thesis Research (1-12 per sem.) Preq.: Permission of department. "S"/"U" grading.

8900 Research Problems in Horticulture (3) Preq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Students minorin in horticulture may take this course only once. Pass-fail grading.

9000 Dissertation Research (1-12 per sem.) "S"/"U" grading.

**HUMAN Ecology • HUEC**

In the School of Human Ecology, the third digit of the course number denotes the subject area of the course as follows: 1 and 2—human nutrition and food; 3 and 4—apparel, textiles, and merchandising; 5 and 6—family, child, and consumer sciences; 9 and 0—general courses.

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**FAMILY, CHILD, AND CONSUMER SCIENCES**

2506 Family Dynamics (3) F Prereq.: HUEC 1000. A systems approach to examining family processes and development throughout the life span.

2601 The Family in a Consumer Society (3) Preq.: ECON 2030 or AGEC 2075. An introduction to the field of family consumer education, encompassing your own family's birth through age eight.

2505 Development of Young Children (4) Preq.: HUEC 1001. 3 hrs. lecture; 2 hrs. field observations. Development of children from prenatal to age eight in the family and other developmental contexts; field observations with infants and toddlers, observations and practical experiences in the School of Human Ecology's Preschool Laboratory and in other early childhood settings.

2506 Young Children's Cognitive and Linguistic Development (3) Preq.: HUEC 2050. An introductory survey of current theory and research on young children's cognitive and linguistic development; special attention is given to the development of oral language, reading skills, and educational implications for early childhood educators.

2507 Adult-Child Relationships (3) S Preq.: HUEC 2050. Parent-child and other adult-child interactions and relationships; emphasis on the development and interactive nature of adult-child relationships including the influence of adult-child relationships on child outcomes and adult behavior.

2507 Field Experience in Family, Child, & Consumer Science (1-4) Preq.: HUEC 2050 and 2085. 2.5-5.5 hrs. experience per week. For majors only. May be taken for a max. of 4 sem. hrs. credit. Supervised professional experience designed to integrate academic learning with practice.

2507 Contemporary Housing Issues (3) F Preq.: HUEC 2050 and 2085. Housing issues and problems; solutions to the housing problems including government policies and government, nonprofit, and collaborative programs.

2509 Professional Seminar in Family, Child, and Consumer Sciences (2) Preq.: at least 2 cr. hrs. of HUEC 2507. For majors only. Pre-interim seminar; the family, child, and consumer sciences.

3381 PK-K Curriculum (3) Preq.: membership in PK-3 teacher education program and concurrent enrollment in HUEC 2505. PK-K curriculum content for children in pre-kindergarten and kindergarten: reading/language arts, mathematics, science, social studies, and the arts.


3901 The Adolescent and the Family (3) Preq.: HUEC 2505 or equivalent. Development, growth, and guidance of the adolescent in the family, home, and community.

4008 Families: Policy and Law (3) Preq.: POLI 2051 or 2070 or HIST 3071 or GEOG 4001 or equivalent. Marriage and family as legal institutions; history and development of family law principles; overview of the public policy process; emphasis on family policy issues.

4095 Principles and Practices in Kindergarten Education (5) F Preq.: off-campus experience in the PK-3 preschool program and concurrent enrollment in HUEC 2505. 2.50 hrs. required for registration; same as EDCI 4155. Classroom organization and instructional management using preacademic objectives for the kindergarten as an entry point into the elementary school.

4096 Foundations of Reading Concept Development (3) Preq.: HUHEC 4035 or PSYC 2076, and EDSE 4000; 2.50 hrs. required for registration in the School of Human Ecology Preschool Laboratory; theories, processes, and models for the young children's concept formation; social and physical environmental factors of the family, the preschool, and society affecting cognitive processes and preparedness for reading.

4075 Methods of Teaching Nursery School and Kindergarten Education (3) Preq.: HUEC 3055 or PSYC 2076; 2.50 hrs. required for registration; 2 hrs. lecture; 2 hrs. lab. Same as EDCI 4057. Essentials needed for successful involvement with children from various cultural and social groups in the nursery/kindergarten level; philosophy, teaching methods, and materials providing optimum learning experiences for the nursery and kindergarten age child.

4058 Student Teaching in the Kindergarten (5) Preq.: prior application, EDCI/HUEC 4057, and credit or registration in EDCI/HUEC 4055 for undergraduates; credit or registration in EDCI/HUEC 4055 for students with elementary certification; 40 hrs. practicum. 2.50 or better GPA required for registration. Same as EDCI 4058. Supervised experiences in planning and guiding children's activities in nursery school and other early childhood education programs for various cultural groups and socioeconomic levels.

4059 Student Practicum in the Nursery School and Other Early Childhood Settings (5) Preq.: prior application required: EDCl 3200, HUEC 4056, and HUEC/HUCI 4057; and credit or registration in EDCI/HUEC 4055 for students with elementary certification; 60 hrs. practicum. 2.50 or better GPA required for registration. 40 hrs. practicum. Supervised experiences in planning and guiding children's activities in nursery school and other early childhood education programs for various cultural groups and socioeconomic levels.

4060 Organization and Administration of Early Childhood Programs (3) Preq.: EDSE/EDCI 4051 or equivalent; 2.50 hrs. required for registration. Historical, cultural, and philosophical foundations; finances, budgeting, staff duties, policies and legal aspects, equipment and physical plant, parent education and communication, public relations.

4062 Families and Consumer Law (3) Preq.: HUEC 2061. Advanced study of federal and state “consumer bills,” one semester as a family member, effectiveness of warranties and the judicial process regarding consumers' rights; responsibilities delegated to consumers.

4064 Family Stress Management (3) Preq.: HUEC 2065. Strategies for family management; 3 hrs. lab/life stress management theory and research.

4065 Family Life Education (3) S Preq.: HUEC 2061 or 3400. Survey of family life education history, philosophy, and topics; planning, implementation, and evaluation of family life education programs in diverse settings.

4067 Internship in Family, Child, and Consumer Sciences (8) Preq.: HUEC 2099 and 4 cr. hrs. in HUEC 2067: 7 hrs. lecture; 14 hrs. lab. For majors only, senior standing. Application must be made at the school one semester prior to proposed enrollment. Supervised professional observation and experience in family, child, or consumer sciences.

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**GENERAL HUMAN ECOLOGY**

1000 Human Ecology as a Profession (3) Attributes that identify human ecology as a profession; historical and philosophical view of its mission, interrelationship of its various specializations, and competencies and commitments necessary in the various specializations.

2011 Special Topics in Human Ecology (1-3) Preq.: consent of director for majors in human ecology. May be taken for a max. of 6 hrs. of credit when topics vary. Contemporary issues in human ecology of interest to special professional and business groups.

2011 Reading and Research in Human Ecology (1-6) Open to advanced students of high academic standing by consent of director. May be taken for a max. of 6 hrs. of credit. Students are responsible for registering with a faculty member with whom they will select the area of reading and research.

2011 Special Topics in Human Ecology (1-3) Preq.: consent of director. May be taken for credit for a max. of 6 sem. hrs. when topics vary. Lectures and/or laboratories on selected topics not covered in other human ecology courses.

2090 Research Methods in Human Ecology (3) Philosophy of human ecology research; issues and trends, design and methodology.

2091 Independent Reading and Research in Human Ecology (1-6) Preq.: Permission of department. May be taken for a max. of 6 sem. hrs. of credit. Directed individual reading and research in a selected area of human ecology.
3030 Field Study in Textiles, Apparel, and Retailing (3) May be taken for a max. of 6 hrs. of credit when field site varies. Must be supervised by Continuing Education. 28 hrs. of on-campus seminars. Fee to cover expenses. Structured educational experiences in major industrial sectors and professional settings abroad.


3034 Textile and Apparel Manufacturing (3) Prereq.: HUEC 3032. Overview of the global textile and apparel complex; emphasis on mass production processes including statistical quality control and specific colorations as well as legal restrictions.

3037 Intermediate Apparel Product Design (4) Prereq.: HUEC 2037. 2 hrs. lecture; 4 hrs. lab. Principles and application of two-dimensional or flat pattern design; development of foundation blocks for use in designing various garment styles and details; conceptualization and execution of original garment design.

3040 Interior Textiles (3) Prereq.: HUEC 2040 and ART 1001 or equivalent. 2 hrs. lecture; 2 hrs. lab. Factors involved in selection, performance, and maintenance of textile products used in residential and commercial interiors.

3045 Apparel Merchandising Strategies and Assessment Planning (3) Prereq.: Credit or registration in HUEC 3032 or 3034; MATH 1022 or MATH 1431 or STAT 2201; and consent of instructor. Assortment planning and sales strategies; quantitative concepts and procedures used in apparel buying; management and integration of purchasing and sales in purchasing.

3045 Visual Merchandising and Promotion Strategies (3) Prereq.: HUEC 2045. Display elements and techniques; visual merchandising; special events strategies; public relations and promotions.

3230 Pattern Design with Computer Application (4) S Prereq.: HUEC 3037. 2 hr. lecture; 4 hrs. lab. Application of two-dimensional patterns, making principles to varied garment styles and designs; and execution of original garment design; introduction to proprietary computer software.

3232 Apparel Design Studio (3) Prereq.: HUEC 2032, 2077, ART1447 or 1438. 1 hr. lecture; 4 hrs. studio. Fashion illustration techniques; adaptation of inspirational themes to designs for diversified apparel markets; pre-portfolio development of graphics for the apparel market.

3403 Textile and Apparel Product Evaluation (3) F S Prereq.: HUEC 2041. 2 hrs. lecture; 2 hrs. lab. Fabric and apparel structure and their relationships to performance and end-use characteristics; textile and apparel product standards and specifications; standard test methods for evaluating physical, aesthetic comfort, performance, and functional properties.

3407 Advanced Apparel Product Design (4) Prereq.: HUEC 3210. 2 hrs. lecture; 4 hrs. lab. Principles and application of three-dimensional pattern design.


3430 Advanced Textiles (3) S Prereq.: HUEC 2040 and CHEM 1002 or MATH 1022 or equivalent. 2 hrs. lecture; 2 hrs. lab. Characteristics of natural and manufactured textile fibers; physical and chemical modifications to meet consumer needs; textile dyes and finishes; methods of fiber identification and chemical testing of textiles.

3431 Textile and Apparel Economics (3) F S Prereq.: HUEC 3034, ECON 2030. Not for graduate credit. Application and analysis of economic concepts and principles associated with the textiles and apparel industry; overview of global economics and contemporary trade policy.

3440 Synthesis: Textile and Apparel Product Processes (3) Prereq.: HUEC 4037. 1 hr. lecture; 4 hrs. lab. Multi-functional team approach to creative problem solving; apparel product design, development, evaluation, and presentation; using six: 8 hrs. lab; Off-the-shelf through contemporary technology and design.

3466 Advanced Topics in Apparel Merchandising (3) F Prereq.: HUEC 3041. Application of principles of product development, buying and management of apparel merchandising; current industry issues and trends; emphasis on theory and related strategies.

4079 Internship in Textiles, Apparel, and Merchandising (3 or 6) S Prereq.: senior standing with a GPA of at least 2.30 on all HUEC courses taken at LSU and permission of departmental representative for orientation to enrollment. MKT 3401. Merchandising concentration: credit or registration in HUEC 3043 and 3045; apparel design concentration: credit or registration in HUEC 3045, 3230, and 3405; marketing concentration: HUEC 3432. Each hour of credit requires 40 hrs. of supervised experience. Not for graduate credit. May be taken for a max. of 9 sem. hrs. of credit. All internship experiences must be under the direction of the Emerging Learning Center representative. Each semester requires 120 hrs. of supervised experience.

4700 Entrepreneurship in Human Ecology (3) S Prereq.: ART 3450 or consent of instructor. Application of principles of entrepreneurship with an emphasis on home-based and/or microbusinesses; case studies of successful entrepreneurs.

4702 History of Dress and Adornment Prior to 1700 (3) Emphasis on history and function of dress functions for individuals within culture and society; relationships of gender, environment, technology, economics, religion, and aesthetics.

4702 History of Dress and Adornment After 1700 (3) Emphasis on history of modern and pre-modern dress styles and details; design and execution of original garment design.

4707 Consumer Behavior in the Apparel Merchandising Environment (3) Emphasis on consumer behavior theories and their applications to apparel purchase and patronage decisions and merchandising research.

4700 Bio-Composites: Production and Evaluation (3) Bio-composite materials and applications, with case studies to illustrate design and evaluation of related composite materials.

4704 Introduction to Research in Textiles, Apparel Design, and Merchandising (3) F Introduction to research and literature in textiles, apparel design, and merchandising.

4702 Research in Textiles (3) S 2 hrs. lecture; 4 hrs. lab. Research methods; data analysis and testing; trends and recent developments.

4703 Seminar: Textiles, Apparel Design, and Merchandising (3) May be taken for a max. of 6 hrs. of credit when topics vary. Analysis and discussion of selected research and creative topics.

4706 Microscopy of Fibers and Polymers (3) Analysis and characterization of fibers and polymers using microscopy and chemical techniques; emphasis on textile fibers and fabrics, including modern, historic, and archaeological specimens.

4707 Modern Fiber Science and Technology (3) S 2 hrs. lecture; 2 hrs. lab. New techniques for obtaining fibers and polymers derived from renewable resources, such as lycocell and plant derived polysaccharides; examination of non-fiber materials used for the development of high performance fibers for space and other industrial applications.

4708 Critical Characterization of Fibers and Polymers (3) S 2 hrs. lecture; 2 hrs. lab. Analysis and characterization of fibers and polymers using thermal, thermo-electrical, and thermo-mechanical techniques; evaluation of textile fibers and fabrics including bio-derived materials and classical specimens.

4709 Individual Field Experience In Textiles, Apparel Design, and Merchandising (3) Prereq: or Consent HUEC 7901; or consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Advanced individual, supervised, field-based study in selected areas of textiles, apparel design, and merchandising; emphasis on analysis, synthesis and application of research data and contemporary trends within selected businesses, industries, agencies and institutions.

7518 Studies in American and European Design (3) See catalog. May be taken for a max. of 6 sem. hrs. of credit when topics vary.

7519 Seminar in American Dress: 18th Century to 1880 (3) See THTR 7519.

7520 Seminar in American Dress: 1880 to the Present (3) See THTR 7520.

HUMAN RESOURCE EDUCATION • HRE

1000 Keyboarding (1) 2 hrs. lab. Presentation of the complete keyboard: keyboarding using the “touch” system; emphasis on correct keystroking using proper techniques; introduction to simple letter styles, tabulations, manuscripts, and simple business forms.

1001 Industrial Engineering: Maintenance and Repair (3) V 6 hrs. lab. Design, construction, operation, and maintenance procedures of industrial engines, including electrical, cooling, lubricating, and fuel systems.

1003 Keyboarding Applications and Document Processing (2) Prereq.: HRE 1000 or equivalent. 1 hr. lecture; 2 hrs. lab. Students will be familiar with Microsoft Word or other word processing software packages. Students are also expected to know how to navigate in a document to format, print documents, and understand the basics of using email. Ofted through correspondence study only. Applying basic skills to the formatting of letters, reports, tables, memos, and other kinds of personal and business communications.

2000 Document Production (3) Prereq.: HRE 1003 or equivalent. 2 hrs. lecture; 2 hrs. lab. Application of advanced and emerging functions in the production of letters, documents, and reports; specialized documents and terms (legal, medical, technical); emphasis on production skills.

2001 Foundations of Human Resource Education (3) F 2 hrs. lecture; 2 hrs. lab. Foundation of the economic, sociological, and political influences on the historical development of workforce education; organization and delivery of workforce education programs and practices at the secondary and post-secondary levels.

2008 Individual Field Experience in Occupational Home Economics (1-3) Prereq.: consent of instructor. A max. of 5 sem. hrs. of credit may be earned in each occupational area. Pass-fail grading. Individual, supervised, field-based study in selected businesses and industries; emphasis on business practices, procedures, and regulations in a specific occupational home economics area.

2012 Woodworking Technology (3) V 6 hrs. lab. Advanced machine tool operations, job procedures, design and finishing.

2012 Advanced Metals (3) V 5 hrs. lab. Founding, forging, heat treatment, and machine tool work.

2020 General Electricity (3) V 5 hrs. lab. Fundamental principles of electricity; direct and alternating currents.

2031 Basic Electronics (3) V 6 hrs. lab. Basic electronic principles and circuitry as applied to diodes, vacuum tubes, power transformers, inductors, capacitors, resistors, and rectifiers.

2040 Technical Drawing, Reading, Sketching, and Take-off (3) V 5 hrs. lab. Blueprint reading of the mechanical and building trades; freehand shop sketching, materials takeoff, and estimating.

2041 Industrial Crafts (3) V 6 hrs. lab. Techniques of art and craft using techniques designed for obtaining fiber and other kinds of personal and business communications.

2045 Fundamentals of Air Conditioning and Refrigeration (3) S 1 hr. lecture; 4 hrs. lab. Principles, parts, components, functions, and application of air conditioning and refrigeration systems; emphasis on installation, performance, operation, inspection, repair, and maintenance.

2053 Occupational Safety (3) F Identification of accident-producing conditions and factors, safety materials handling, machine safeguarding, hand tools, and occupational health.

2070 Business Communication (3) Prereq.: ENG 1002. Communication theories and translation to business; basic forms of business communication.
4723 Advanced Leadership Development (3) S Prereq.: HRE 2723 and 3722. Focus on developing the leadership skills and competencies needed to effectively lead organizations and communities to achieve their vision and goals.

4801 Teaching Internship: Professional (3) V Prereq.: Consent of instructor. Permission of instructor. Not for graduate credit. Professional responsibilities; teacher association work; teacher, parent, and student organization activities; school visits and certification.

4802 Internship: Preparation (3) V Prereq.: Concurrent enrollment in HRE 4801 and 4803. Permission of instructor. Not for graduate credit. Evaluation of student's ability to operate and maintain an instructional laboratory; development of curriculum materials for organizing and evaluating the teaching environment.

4803 Internship: Delivery (3) V Prereq.: Concurrent enrollment in HRE 4801 and 4803. Permission of instructor. Not for graduate credit. Evaluation of student's ability to operate and maintain an instructional laboratory; development of curriculum materials for organizing and evaluating the teaching environment.

4804 Professional Development Internship (3-12) F,S,Su May be taken for a max. of 12 sem. hrs. of credit. Not for graduate credit. Permission of instructor. Students are mentored in the business community as they learn various skills that will make them highly employable.

4805 Making the Transition from College to Work (1) Course is taken in conjunction with an internship, practicum, or work experience. INTRODUCTION to the skills needed to successfully make the transition from college to career life; emphasis on the skills needed to quickly learn how to be a top performer new employee and avoid typical mistakes college graduates make as new employees.

4809 Advanced Problems in Human Resource Education (1-3) F,S,Su May be taken for a max. of 6 sem. hrs. credit. Not for graduate credit. Permission of instructor. Individual study for master's or doctorate.

4819 Special Topics in Educational Administration (1-3) V May be taken for a max. of 6 sem. hrs. of credit when topics vary. Individual and group study of selected topics under the direction of a faculty member.

4849 Special Topics in Industrial Education (1-3) V May be taken for a max. of 6 sem. hrs. of credit. Permission of instructor. Individual and group study of selected topics under the direction of a faculty member.

4859 Special Topics in Business Education (1-3) V May be taken for a max. of 6 sem. hrs. of credit when topics vary. Permission of instructor. Individual and group study of selected topics under the direction of a faculty member.

7001 Principles of Human Resource Education (3) V Principles of workforce education and development programs conducted aby business, industry, government, and educational institutions at all levels; relationships to adult education, career/technical education, human resource development, career development, general education, and society.

7083 Philosophy of Human Resource Education (3) F Major philosophies that have influenced human resource education; philosophical approaches to problems in human resource education.

7061 Foundations of Agricultural Education (3) V Events and organizations that contributed to the development of agricultural education.

7024 Comparative Extension Education (3) S Prereq.: HRE 7222 or equivalent. Comparative analysis of systems of extension education on a world-wide basis.

7025 Advanced Adult Learning Theory and Practice (3) Advanced study of adult learning theory and research; emphasis on learning theory and research in adult learning with implications for adult learning practice.

7041 Foundations of Industrial Education (3) V History and philosophy of industrial arts/technology education and vocational/trade and industrial education.

7056 Vocational Education (3) V Historical foundations; relevant state and federal legislation; organization and administration of business education in public secondary education.

7101 Advanced Instructional/Curriculum Design in Human Resource Education (3) V Introduction to the theory, principles, research, and practices that contribute to the knowledge base of curriculum development and instructional design in human resource education.

7112 Program Development in Agricultural Education (3) V Development of curriculum; organization and use of committees; organization of facilities; utilization of the FFA in instruction.

7122 Program Development (3) F Concepts relating educational planning, planned change, and social change to development of effective extension education programs.

7142 Program Development in Industrial Education (3) V Program research, development, evaluation, and implementation.

7171 Instructional Design for Human Resource Development (3) S Comprehensive introduction to the theory, principles, research, and practices of instructional systems design (ISD) in human resource education (HRD) and training.

7242 Programmed Instruction (3) V Principles of programed instruction; emphasis on methods and application of instruction and development of materials.

7243 Program Development in Home Economics Education (3) V Principles and applied practices in developing programs in home and family life education for multicultural groups.

7201 Advanced Teaching Techniques in Human Resource Education (3) S Prereq.: S-U-O Principles underlying the human resource teaching/learning process; use of effective human resource teaching methods and strategies.

7202 Systems of Teaching and Learning Styles (3) V Analyzing how individuals perceive and process information; interrelationships with personality, leadership, management, supervision, administration, applications in education, business, industry, formal and informal settings.

7203 Discipline in Human Resource Education (3) S Prepr: Organization, and handling of classroom discipline problems; emphasis on models of discipline and development of a personal philosophy of discipline.

7205 Teaching in Higher Education (3) F,S Methodology for effective college teaching; student motivation; planning for instruction, delivery, and evaluation.

7213 Pedagogical Advances in Agricultural Education (3) V Developments in education; their impact on agricultural education.

7218 Teacher Education (3) V Development and functions of the comprehensive agricultural teacher education program.

7222 Principles and Practices of Extension Education (3) S Prereq.: HRE 7222 or equivalent. Learning and teaching concepts applied in the execution of an extension educational program.

7255 Improvement of Instruction in Keyboarding, Word Processing, Shorthand, and Clerical Practices (3) V Techniques and strategies related to the teaching of clerical skills.

7256 Improvement of Instruction in General Business, Accounting, and Bookkeeping (3) V Techniques and strategies related to the teaching of accounting and general business.

7271 Leading Learning in Human Resource Development (3) S Principles, research, and practices of facilitating learning in human resource development (HRD) including facilitation skills for traditional classroom training, as well as informal work-based learning strategies.

7301 Orientation to the World of Work (3) V See ELRC 7301.


7332 Educational and Occupational Information (3) V Also offered as ELRC 7332. Classification and analysis of educational, occupational, and social information, occupational trends and surveys; use of occupational information by teachers, guidance counselors, and others.

7334 Vocational Counseling (3) V See ELRC 7334.

7392 Advanced Vocational Counseling (3) V See ELRC 7392.

7398 Field Experiences in Vocational Counseling (3) V See ELRC 7398.

7401 Administration of Adult Human Resource Education Programs (3) S Prereq.: S-U-O Principles underlying the adult human resource education program.

7571 Performance and Needs Analysis in Human Resources Development (3) S Prereq.: S-U-O Principles underlying the analysis of performance problems in organizations; emphasis on the application of performance theory and use of tools and techniques for analyzing organizational, process, and individual level performance problems.

7573 Strategic Human Resources Development for Global Organizations (3) S The phenomenon of globalization and its impact on the problems, practices, programs, theories, and methodologies used by human resource development to improve performance in work systems.

7575 Managing Change in Organizational Systems (3) S Introduction to the theory, methods, and practice of organizational change and development; emphasis on the role of the HRD practitioner as change agent and the interventions used to lead and manage organization change.

7602 Program Evaluation Design (3) S Prereq.: S-U-O Principles underlying the conceptualization, design, implementation, and utility of vocational educational programs.

7604 Evaluation Methods (3) S Concepts and principles of evaluation applied to programs in extension education.

7606 Program Improvement in Home Economics Education (3) S Principles and procedures for evaluating and improving home economics programs for diverse groups.

7701 Organization and Administration of Workforce Education (3) V Principles of organization, leadership, and administration; development of skills needed for effective workforce education leadership.

7702 Supervision in Human Resource Education (3) S Concepts and practices of supervision in workforce teaching at local and state levels.

7703 Supervision of Professional Field Experiences in Human Resource Education (3) S Philosophy, principles, and procedures in supervision of student teaching in human resource education.

7716 Organization, Administration, and Supervision of Agricultural Education (3) S Principles, organization and supervision of vocational agricultural education.

7723 Leadership and Organization (3) S Principles of leadership theory, group dynamics, social organization, and organizational administration to problems of organizing extension education programs.

7725 Leadership Development Strategies in Organizations (3) S Principles of leadership theory, group dynamics, social organization, and organizational administration to problems of organizing extension education programs.

7741 Administration and Supervision of Vocational Trade and Industrial Education (3) S Principles, theoretical, and operational considerations in administering and supervising secondary and postsecondary vocational trade and industrial education programs and staff.

7766 Home Economics in Higher Education (3) S Goals and objectives of home economics program development, roles and responsibilities of faculty.


7803 Independent Study in Human Resource Education (1-3) S Prereq.: Consent of instructor. May be taken for a max. of 6 sem. hrs. credit when topics vary. Faculty directed study of relevant topics in workforce education.

7805 Seminar in Human Resource Education (1-6) F,S,Su May be taken for a max. of 6 sem. hrs. credit when topics vary. Selected topics of interest to human resource education.

7809 Practicum for the Human Resource Educator (3-9) S,F,Su Prereq.: Consent of instructor. Practical experience under the guidance of practicing vocational educators in various educational settings.
INDUSTRIAL ENGINEERING • IE

Industrial Engineering Fundamentals (3) Design; introduction to computer; description of the profession.

Introduction to the Use of Computers (3) Prereq.: eligibility to take MATH 1550 or equivalent. Credit will not be given for both this course and CSC 2212. 2 hrs. lecture; 3 hrs. lab. Principles of digital programming; application of subroutines; application of electronic computers to typical engineering problems; OS operation; Microsoft Office, and Groupware.

Principles of Engineering Economy (3) Credit will not be given for both this course and IE 3710. Planning economic studies for industry, including consideration of rate of return, cost and yield studies, depreciation and tax relationships, increment costs, replacement, and introduction to multivariate alternative studies.

Introduction to Multivariate Studies (3) Prereq.: MATH 1552. Probability, discrete and continuous distributions, functions of random variables, basic concepts of integral theory, tests of hypotheses including goodness-of-fit and independence.

Project Engineering Management (3) Series of design projects; development of engineering experience; introduction to project engineering; level of detail, scheduling computations, project cost control, time-cost trade-off, PERT, and computer processing.

Operations Research (3) Prereq.: MATH 1552 or equivalent. Linear programming formulation, graphical solution, simplex method; special cases in simplex method; introduction to decision analysis; queuing problems, network flow problems, and Markov chains, decision processes, queuing theory and applications.

Manufacturing Processes and Methods (3) Prereq.: IE 2713 and credit or registration in IE 3300. 2 hrs. lecture; 3 hrs. lab. Modern manufacturing processes integrated into total manufacturing systems; CAD/CAM flexible manufacturing operations; metal casting, forming, welding; production processes and machinery; measurement, inspection, and quality assurance.

Advanced Engineering Statistics (3) Prereq.: IE 3302. 2 hrs. lecture; 3 hrs. lab. Modern business and industry processes and machinery; measurement, inspection, and quality assurance.

Information Systems Engineering (3) Prereq.: IE 2800. 2 hrs. lecture; 3 hrs. lab. Analysis and design of information systems; project relating comprehensive computer systems to support client-server service applications; ethics and professionalism.

Data Collection and Analysis in Organizations (3) Prereq.: IE 7901 or equivalent. Survey and correlational research in vocational education; emphasis on selection and development of appropriate measuring devices.

Research Design (3) Prereq.: HRE 7901 or equivalent. Research design, emphasis on research concepts and procedures and their application to extension education.

Application, Interpretation, and Reporting of Research Results (3) Prereq.: HRE 7901 or equivalent. Survey and correlational research in vocational education; emphasis on selection and development of appropriate measuring devices.

Industrial Engineering Training (3) Prereq.: IE 7002, 7003, and credit or registration in IE 4425 or equivalent. 2 hrs. lecture; 3 hrs. lab. Interfacing programs to databases; analysis and development of client-server applications in industrial and business settings; interfacing databases and industrial applications to the Internet; analysis, design, and implementation of industrial and business networks.

Industrial Quality Control (3) Prereq.: IE 3302. 2 hrs. lecture; 3 hrs. lab. Principles and applications of quality control; theory of statistical sampling and control and related economic analysis.

Human Factors Engineering (3) Prereq.: senior standing; 2 hrs. lecture; 3 hrs. lab. Human performance in human-machine systems, including information processing, display and control design, workplace design, and environmental effects on user performance.

Safety Engineering (3) Occupational safety and health; accident prevention; design and implementation of safety protection systems; control analysis; control of hazardous physical and environmental hazards.

Fundamentals of Industrial Hygiene Engineering (3) Prereq.: senior standing. Basic principles of chemical hazards, air contaminants, and monitoring radionuclides, sound and vibration, and thermal stresses; theoretical foundation and application of theory in the control of occupational health.

Biomechanics for Engineers (3) See IE 4323.

Human Computer Interaction (3) Prereq.: IE 2060 or equivalent. Systems approach to the identification, design, analysis, and development of human-operated information processing systems; applications to practical problems in industry, military, health systems, and education.

Knowledge-Based Systems in Engineering (3) Prereq.: IE 4425 or equivalent computer experience. 2 hrs. lecture; 3 hrs. lab. Tools and techniques of knowledge-based expert systems applied to engineering problems; expert systems theory; systems building tools; state-of-the-art engineering expert systems.

Manufacturing Automation (3) Prereq.: IE 3201 and 3605. 2 hrs. lecture; 3 hrs. lab. Application of computer-based manufacturing systems technologies; computer numerical control automation; programming of numerically controlled machine tools using Compact II and APT; robotics with multidegree of freedom linkages; more in CAD/CAM; computer-automated part programming.

Systems Integration in Manufacturing (3) Prereq.: IE 2060, 2803; IE 2950. 2 hrs. lecture; 3 hrs. lab. Principles and applications of integration technologies to monitoring, control, and integration of manufacturing operations at all levels within the organization.

Engineering Maintenance Management (3) Prereq.: IE 1002; 3392; and credit or registration in IE 4425. Design, operation, and monitoring of facilities and equipment, including consideration of maintenance costs; maintenance organization and systems, preventive maintenance, maintenance planning and scheduling, reliability control, labor performance measures, and spare parts.

Simulation in Industrial Engineering (3) Prereq.: IE 3510, 2060, credit or registration in IE 4425. 2 hrs. lecture; 3 hrs. lab. Also offered as DSIS 4511. Discrete-event simulation of industrial and service systems; theory and practice of constructing design programs applied to industrial plant operations and service-industry systems.

Operations Research in Engineering II (3) Prereq.: IE 3510. Stochastic models; decisions under uncertainty; arrival and departure distributions; advanced topics in mathematical programming.

Plant and Systems Design (3) Prereq.: IE 1002, 3201, 3510, and senior standing in College of Engineering. Emphasis on engineering economic analysis, design of physical-manufacturing systems, integrated materials-handling systems into the plant, design of plant-service systems, site and plant location, and projects involving plant design using optimization techniques; ethics and professionalism.

Reliability Engineering (3) Prereq.: IE 3510. Reliability in design; reliability models; reliability assessment before production development and testing; and special problems of maintenance, spare parts, and Markov processes.

Industrial Engineering Design Project (3) Prereq.: IE 3503; credit or registration in IE 4419, 4423, 4511, and 4516. Must be taken during the last semester of the undergraduate program. For student who graduate must be taken in the fall semester immediately prior to graduation; for spring or summer graduates, must be taken in the spring semester immediately prior to graduation. Students not meeting this requirement will be dropped from the course. Application of previous industrial engineering courses in a comprehensive design project; preparation for the PE exam in industrial engineering.

Special Topics in Industrial Engineering (1-3) Prereq.: senior standing. May be taken for a max. of 6 hrs. credit; topics may be taken concurrently if topics vary. Topics in industrial engineering not sufficiently covered in other undergraduate courses.

Advanced Engineering Economy (3) Prereq.: IE 3201 or equivalent. Engineering economic analysis, multiple projects and constraints, utility in project selection, preference ordering theory, and capital equipment pricing theory.

Project Engineering (3) Prereq.: IE 3201 or equivalent. Large-scale engineering construction or development projects from schematic to on-line condition.

Probability Theory in Engineering (3) Prereq.: IE 4382 or equivalent. Random variables and their functions; transformation of random variables; sets of random variables and random sequences; Markov processes, random processes, discrete and continuous Markov processes, birth and death processes, and waiting line theory.

Industries Systems Simulation (3) Prereq.: IE 4511 or equivalent. Design and analysis of simulation models for industrial systems including advanced techniques for random number generation, random variate generation, design and analysis of simulation experiments, and variance reduction techniques.

Advanced Information Systems Engineering (3) Prereq.: IE 4425 or equivalent. 2 hrs. lecture; 3 hrs. lab. Advanced concepts of information systems engineering with emphasis on middleware architectures/technologies for integrating databases; design issues and methodology for developing and implementing distributed information systems; and design and implementation of data-warehouses and online analytical processing (OLAP) systems.

Advanced Quality Control (3) Prereq.: IE 3510 or equivalent. Advanced procedures of statistical quality control, statistical analysis of quality control data, economic aspects of quality assurance, cost of quality, quality control, and relationship of quality control to productivity and to ability of American products to compete in world markets.

Ergonomics in Work Design (3) Prereq.: IE 4461 or equivalent. 2 hrs. lecture; 3 hrs. lab. Introduction to anthropometry, functional anatomy and physiology, and their application in work design and task assessment.
7463 Industrial Hygiene Engineering (3) Prereq.: IE 4463 or equivalent or consent of instructor. Evaluation and control of industrial environments; noise and vibration, industrial illumination, radiation, thermal stresses, air quality and contamination; design of ventilation systems.

7464 Work Physiology (3) Prereq.: IE 4464 or equivalent. Study of worker’s physiological responses (cardiovascular, pulmonary, muscular) to work applicable to task design and evaluation, employee selection and placement, and work-rest scheduling.

7465 Occupational Biomechanics (3) Prereq.: IE 4465 or equivalent. Ergonomics of the use of interactive computer systems; general characteristics and requirements of people-oriented computer systems from the perspective of different disciplines and tasks, e.g., text editing.

7470 Artificial Intelligence Manufacturing Systems (3) Prereq.: IE 4425 or equivalent. Application of artificial intelligence tools and techniques to computer integrated manufacturing systems including planning, product design, process planning, factory scheduling and control, robotics, and intelligent warehouse systems.

7480 Automation and Computer-Aided Manufacturing (3) Prereq.: IE 3280 and MATH 1532; or equivalent. Automated flow-line production, numerical control, industrial robots, computer numerical control, manufacturing, process monitoring and control, group technology, flexible manufacturing systems, and material requirements planning.

7485 Advanced Microcomputer Applications (3) Prereq.: IE 3452 or 3510; 2 hrs. lecture; 3 hrs. lab. Advanced topics in microprocessors/microcomputer control in manufacturing; input/output design; interfacing; hardware and software considerations.

7490 Advanced Maintenance Management (3) Prereq.: IE 3510 or 4490; or equivalent. Statistical and operations research applied to maintenance management.

7540 Advanced Reliability Engineering (3) Prereq.: IE 4540 or equivalent. Analysis of reliability, maintainability, and availability of large production facilities; applications to a variety of environments.

7541 Linear Programming Algorithms (3) Prereq.: IE 3510 or equivalent. Optimization of linear objective functions subject to linear constraints; vector spaces, convex analysis, polyhedral sets; matrix versions of simplex, revised simplex, bounded variables; duality theory and primal-dual simplex algorithms; postoptimal and parametric analysis; decomposing large-scale problems; bounded variable algorithms.

7551 Queueing Theory (3) Prereq.: IE 3510 or equivalent. Fundamentals of queuing processes, transient and limiting behavior, measures of effectiveness; birth and death processes; Poisson and Markov processes, queueing theories, priorities, balking, batch arrivals, and services; matrix representation of certain queuing systems; applications; statistical inference, design and control of queues.

7561 Programming Methods in Operations Research (3) Prereq.: IE 3510 or equivalent. Aspects of advanced programming methods for the constrained and unconstrained problems; development of goal, zero-one, gert, and multiple objective programming with application to industrial processes and planning.

7571 Network Modeling and Optimization (3) Prereq.: IE 3510 or equivalent. Network analysis; shortest path algorithms, minimal cost network flows, transportation and assignment problems, transshipment problems, optimal network flows, out-of-kilter algorithm, maximal flow algorithms; single and multi-commodity flows; applications to manufacturing industries.

7464 Equipment Failure Analysis and Prevention (3) Prereq.: credit or registration in IE 4540 or equivalent. Analysis, monitoring, and prevention of failures in mechanical systems; failure analysis techniques; Weibull failure analysis techniques; and failure management.

7467 Administration of Engineering and Technical Personnel (3) Prereq.: consent of instructor. Also offered as CHE 7302. Problems encountered by engineering personnel in administering other engineers and/or technical personnel; human relations; engineer as leader, supervisor, and administrator; wage and salary administration.

7465 Management of Technology (3) Cross-listed with MG 7901. Importance of technology management to state, region, nation, company, industry, management of R&D and product/process development; preparation of business plans; differences between invention, innovation, and role of entrepreneur.

7720, 7721 Industrial Engineering Problems (1-3,1-3) May be taken for a max. of 6 sem. hrs. of credit when topics vary. Important student interest in specialized industrial engineering areas such as design and analysis of complex production and supply-chain control, maintenance, quality control, and reliability, ergonomics and human-computer interaction, and information systems.

7761 Production Planning and Control (3) Prereq.: IE 4419 or 4510 or equivalent. Deterministic and probabilistic inventory models, static and dynamic models for production planning; multi-stage, multi-echelon production systems; forecasting and scheduling; line balancing and workforce scheduling.

7762 Supply Chain Systems (3) Prereq.: IE 3510 and 4419, or equivalent. Components in supply chain systems; product life-cycle modeling, rotational production and supply, integrated component supply systems, multi-source supplier and buyer systems, just-in-time supply chain systems, warehousing and distribution systems, supply transportation system, and information technology for supply chain systems.

7765 Lean Production Systems (3) Prereq.: IE 4419 and 4510, or equivalent. Principles and components of lean production systems; industrial process mapping, workflow analysis, resource reduction, market characterization, logistics and inventory reduction; elimination of work-in-process, waste reduction, zero inventory and just-in-time production systems; material flow control; process and operational variability reduction; role of buffers and process stabilization.

7768 Sequencing and Scheduling (3) Prereq.: IE 3510 or 4419 or equivalent. Scheduling models for single and parallel machines, job shops, flow shops, and open shops; stochastic scheduling models for machines, job shop flow shops, and open shops; computational complexity and industrial applications.

7771 Design of Manufacturing Systems (3) Prereq.: IE 4419 and 4510 or equivalent. Principles in modeling, analysis, design, and operations; mass manufacturing, cellular manufacturing, machine location and layout, job routing and loading strategy; material handling and storage/retrieval systems.

7899 Seminar (1) All industrial engineering graduate students are expected to enroll every semester. Only 1 sem. hr. of credit allowed toward degree. Pass/fail grading.

8000 Thesis Research (1-12 per sem.) “S”-“U” grading.

3000 Conceptual Foundations for Operations Research (3) Prereq.: MATH 1021 or equivalent. Not open to under-graduate students. Foundations for work in operations research; fundamentals of analysis, systems of linear equations, selected topics from modern algebra.

3070 Independent Reading and Research in Information Systems and Decision Sciences (1-6) Prereq.: ISDS 3100 and consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. Student is responsible for registering with a faculty member and selecting an area of reading and/or research.

3075 Internship in Information Systems and Decision Sciences (3) Prereq.: permission of instructor and department chair required. Pass/fail grading. At least the equivalent of 144 hours per semester (3 credits) of learning experience in information systems under the general supervision of an ISDS faculty member and direct supervision of an information systems or decision sciences professional. Grading based on the faculty member's evaluation, a written report by the professional supervisor, and a written evaluation by the student.

3100 Management of Information Resources (3) Prereq.: ISDS 1100. Information as a resource; issues in information resource management; elements of information systems; development and maintenance of information systems; controlling information resources.

3105 Internet Development Tools (3) Prereq.: ISDS 1100 or equivalent. Understands and its structure for use in business; technologies employed to develop Internet applications; development of business applications for Internet.

3110 Database Processing for Management (3) Prereq.: ISDS 1100. Structure and function of managerial databases; design options and implementation of database management systems in the firm; laboratory practice includes use of a particular software system.

3115 Introduction to Operations Management (3) Prereq.: ISDS 2003. Principles and methodologies concerning productivity and quality of manufacturing and service organizations; production and service systems design; process and capacity design; total quality management; systems for just-in-time and purchasing management; inventory and materials management.

3120 Management of the IT Function (3) Issues in managing the Information Technology (IT) function, including the discussion of how technology has underpinned the "new economy," formulating an IT strategy, structuring and managing the IT function, and emerging trends in IT.

3200 Advanced Business Programming (3) Prereq.: ISDS 3105 and credit or registration in ISDS 3110. Computer programming methods for business systems emphasizing contemporary programming environments and applications development interfaces.

4000 Introduction to Statistical Theory (3) Prereq.: proficiency in basic statistical methods and MATH 1552, or consent of instructor. Development of probability distribution and statistical inference; theoretical foundations for estimating and testing hypotheses about means, proportions, and variances; chi-square tests.

4010 Basic Forecasting Models (3) Prereq.: ISDS 3000 or equivalent. Single-equation multiple regression and time series modeling procedures for business and economic forecasting; using time series data in regression models; time series modeling, including classical decomposition procedures and exponential smoothing; use of computer programs for regression and time series modeling and forecasting.

4011 Sample Survey Methods (3) Prereq.: ISDS 3000 or equivalent. Designing sampling systems; alternative sample designs; problems of bias; techniques of inference from alternative designs; criteria for selecting optimal sampling plans; methods and applications of sample surveys.

4012 Applied Nonparametric Statistics (3) Prereq.: ISDS 3000 or equivalent. Techniques of nonparametric statistics including techniques for one-sample problems, comparison of two treatments, paired comparisons, randomized complete blocks, comparison of more than two treatments, tests of randomness and independence, and measures of correlation.

4013 Bayesian Probability and Statistical Methods (3) Prereq.: ISDS 3000 or equivalent. Bayesian probability distributions; Bayesian estimation and inference; application of Bayesian techniques to business problems.

4020 Operations Research for Managerial Decisions (3) Prereq.: ISDS 3000 or equivalent. Special topics in decision making, including linear programming, network optimization, and introduction to the specific applications of linear programming.
7211 Process and Planning Control I (1.5) Prereq.: ISDS 7210. Cases and management techniques to control business processes in industrial and service area, including: requirements planning, manufacturing resource planning, operations control; overview of computerized packages, enterprise management systems, decision problems, and case projects.

7220 Supply Chain Management (3) Prereq.: BADM 7120 or equivalent. Process analysis and critical issues in revolutionizing management of the entire supply chain; system productivity analysis, demand management, inventory management, distribution planning, integration in supply chain; emphasis on case study, spreadsheets, and software applications; network design, warehouse location, outsourcing, supply chain, and information, EDI and DSS technologies in supply chain management; case study and SCM software.

7230 Project Management (3) Prereq.: BADM 7210 or equivalent; HD M 7050 or equivalent. Project planning setting goals and objectives, project planning, evaluation and review; incentives and qualitative analysis, and project accounting. Computer analyses with state-of-the-art project management software.

7272 Operations Strategy (3) Prereq.: BADM 7210 or equivalent; HD M 7050 or equivalent. Perspective for managers to integrate enterprise strategy into an overall business strategy; issues in selection of the capabilities, characteristics, and configuration of facilities; assignment of facility locations; aggregate capacity; vertical integration; operations infrastructure; organizational structure and jobs; extensive use of case analyses drawn from service and manufacturing problem situations.

7275 Advanced Operations Management (3) Prereq.: BADM 7120. May be taken for a max. of 9 hrs. of credit when topics vary. Topics such as material requirements planning, decision analysis, quality control, scheduling, layout, capacity; design, quality control, design, industrial design, network analysis; emphasis on application of techniques.

7501 Information Technology (3) Prereq.: ISDS 1100 or equivalent. Contemporary topics in information systems; survey of information system analysis and design; introduction to business database communication; database management systems and knowledge based systems; enterprise-wide systems and information systems control.

7505 Information Technology and Entrepreneurship (3) Prereq.: BADM 7210 or equivalent. Foreign policy, globalization and outsourcing, internationalization of business opportunities, technological entrepreneurship, entrepreneurial process, entrepreneurial thinking, process of decision making, effectuation, causation, knowledge management, technological entrepreneurship.

7510 Database Management (3) Prereq.: BADM 7050. Analysis, design, and implementation of databases based on the relational database model; data modeling using entity-relationship models; logical and physical database design; design of database management systems, data and database administration; emerging database technologies and advanced database applications.

7514 Information Management (3) Prereq.: ISDS 7510 or equivalent. Decision support systems, online analytical processing, multidimensional data modeling, web-enabled data warehousing, data marts, data mining. Knowledge management, Internet business intelligence.

7520 Network Information Systems (3) Prereq.: BADM 7050. Broad overview of network technologies including protocols, network operating systems, and network management: LAN, WAN design; Internet technology; network security.

7522 Internet Systems Development (3) Prereq.: ISDS 7522. Design, implementation, and testing of web-based systems, server-side programming, web-database connectivity, integration of Web and other business applications, and web development methods, emphasis on self-management, cross-project coordination, technology and time management; construct Internet based systems and manage Internet based systems development.

7530 Information Systems Analysis and Design (3) Prereq.: BADM 7050; ISDS 7510. Both courses may be taken concurrently. Analysis and design of information systems from a business requirement perspective; systems development methodology; topics include requirements determination; feasibility determination; project management; evaluation of software development strategies and application design; modeling using ER diagrams, and DFDs; systems implementation.

7535 Information Technology Management (3) Prereq.: BADM 7050. Management of the organization’s information technology (IT) resources; planning and management of IT strategy, applications; hardware/software infrastructure; information resources, and IT professionals; organization and governance of the IT function; IT policies and standards, measurement of IT investments and returns, and deployment of new information technologies.

7540 Electronic Commerce (3) Prereq.: BADM 7050. Use of information technology and the Internet in creating new forms of business organization; creating a marketplace; distribution/interaction/re-frequency and virtual organization.

7543 Electronic Commerce II (1.5) Prereq.: ISDS 7540. Continuation of ISDS 7540. Advanced management issues, organizing principles and technologies; working in electronic communities; newspapers, virtual communities, extranet and intranet.

7550 Collaborative Computing (1.5) Prereq.: BADM 7050. Foundation of collaborative computing; issues of motivation, syndromic anonymity, group size, group proximity, and group tasks.

7550 Enterprise Systems (3) Prereq.: BADM 7050. Study of the broad area of Integrated Enterprise-wide Systems; emphasis on features and capabilities of enterprise systems and their related technologies, the methodologies used to implement these systems in organizations, and the implications of their deployment in organizations.

7553 Business and Systems Change (3) Prereq.: ISDS 7550. Foundation of critical issues in the design and implementation of business and information systems change including business process reengineering, project change management, and information systems design and management of systems personification of business, and the change that these enabling emerging and disruptive technologies and systems permit that have the greatest impact on industries.

7555 Auditing Enterprise Systems (1.5) Prereq.: ISDS 7550 and ACCT 7100. Principles of auditing enterprise wide information systems in business; audit plans; controls and security issues.

7560 Social and Organizational Issues in MIS (3) Prereq.: BADM 7050. Impact of electronic communities on organizations; implications of design choices on business; ethical considerations.

7565 Global Information Technology Management (3) Prereq.: BADM 7050. National IT policies; IT and national culture; communication management in multinational companies; IT diffusion in developed versus developing countries; IT and national development; global electronic commerce; global telecommunications infrastructure; international and competitive advantage through global IT management.

7900 Contemporary Issues in Statistics and Management Science (3) Prereq.: advanced Ph. D. study and consent of instructor. Contemporary issues in design science, their implications for contemporary management science.

7910 Contemporary Issues in Production/Operations Management (3) Prereq.: advanced Ph. D. standing or consent of instructor. For a max. of 9 hrs. of credit when topics vary. Philosophical foundations and contemporary issues in production/operations management.

7920 Enterprise Information Management Information Systems (3) Prereq.: advanced Ph. D. standing or consent of instructor. For a max. of 9 hrs. of credit when topics vary. Philosophical foundations and contemporary issues in information management systems.

7950 Research Seminar in Information Systems Topics (3) Required for all Ph.D. students. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Contemporary research and critical issues in information systems.

7990 Project (3-6) Prereq.: permission of instructor. May be taken for a max. of 6 hrs. of credit. Pass-fail grading.

8000 Thesis Research (1-12 per semester) *3/”S”/”U” grading. 8000 Pre-dissertation Research (1-9) May be repeated for credit.

9000 Dissertation Research (1-12 per semester) *3/”S”/”U” grading.

INTERIOR DESIGN • ID

General education courses are marked with stars (★)

★ 1051 Introduction to Interior Design (3) Contemporary practice of interior design as a profession; responsibilities of the interior designer.

1711 Basic Design Foundation (3) V Prereq.: controlled admission to program in interior design at first year entry level or permission of department. 6 hrs. studio. Credit will not be given for this course and ART 1011.

1730 Interior Design Technical Drawing (3) F,S,Su Prereq.: completion of the Basic Design Foundation in interior design at first year entry level or permission of department. 1 hr. lecture; 4 hrs. studio. Introduction to the graphic tools, techniques, and applications designed to create architectural ideas; an immersion in the graphic language of drawing.

2722 Interior Design Awareness I (3) Not open to interior design majors. Discipline of interior design; principles presented in historical and philosophical contexts; analysis of the use of spatial elements.

2750 Interior Design Studio I (4) F Prereq.: admission to professional program; interior design or permission of department. Concurrent enrollment in ID 2781. 8 hrs. studio. Basic design problems in the built environment; emphasis on design process, form and principles of spatial organization.

2751 Interior Design Studio II (4) Prereq.: ID 2750 or equivalent. 8 hrs. studio. Exploration and analysis of design decisions related to interior space.

2770 Color and Illumination I (3) Prereq.: sophomore standing in the major; nonmajors by consent of instructor only. 1 hr. lecture; 4 hrs. studio. Nature, theory, and art of color and light applied to two- and three-dimensional basic design elements.

2774 Interior Construction and Systems III (3) F Prereq.: admission to professional program. Building systems and construction methods; code requirements for interior.

2775 Interior Materials and Furnishings III (3) S Prereq.: ID 2774 or equivalent. Types and sources of materials; finishes and furnishings used in interior spaces.

2781 Interior Design Graphics (3) F Prereq.: admission to professional program. Concurrent enrollment in ID 2750. 6 hrs. studio. Graphic representation methods used to illustrate and investigate form, spatial order, and the design process.

2785 Computer Visualization III (3) F Prereq.: admission to professional program or consent of instructor. Credit will not be given for this course and ARCH 2173, IE 2183, or LA 2183. Review of computer modeling and rendering and three-dimensional modeling for spatial designers.

★ 3741 History of Interior Design and Decoration I (3) Development of interior design, decoration and furnishings through the early 19th century; design as an expression of cultural values.

★ 3742 History of Interior Design and Decoration II (3) S Design, decoration, and furnishings of 19th and 20th century interiors; social, industrial, and technological influences on modern design.

3751 Interior Component Design (3) Prereq.: ID 2751 or equivalent. Emphasis on the design development of interior components; scale model and computer simulated design prototypes.

3752 Interior Design Studio III (4) Prereq.: ID 2751 and ID 2791. Concurrent enrollment in ID 2750. 6 hrs. studio. Interior design studio investigations of design concept/image; design implications of function, space, and scale.

3753 Interior Design Studio IV (4) S Prereq.: ID 2752 or equivalent. 8 hrs. studio. Design development of interior environments.

3759 Special Studies in Interior Design (1-6) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. Advanced studio work in predetermined areas of specialization.

3761 Interior Design Internship (3) F,S,Su Prereq.: completion of all 2000-level interior design courses and consent of instructor. Pass-fail grading. At least 20 hours of work per week (35 hours per week in summer session) supervised by an interior design faculty member and a professional designer in an approved firm.

3765 Field Studies in Interior Design (1-6) V Prereq.: selection made in consultation with program in interior design at the sophomore year or permission of instructor. Intensive travel experiences in a variety of locales; participation in local, national, and/or international journeys with an emphasis on the built environment.

3770 Color and Illumination II (3) Prereq.: junior standing in major; nonmajors by consent of instructor only. 1 hr. lecture; 4 hrs. studio. Color and light and qualitative aspects of color/light; application to interior design.

3782 Interior Design Construction Documents (3) Prereq.: ID 2751 or equivalent. 3 hrs. studio. Design and documentation of interior architectural details.
2002 Italian for Travelers (3) F.S Does not count toward satisfying the foreign language requirement for undergraduates. Basic vocabulary, exercises in comprehension and conversation. Must complete MUS 2018 and 2019 before enrolling in this course. Study of Italian with major emphasis on oral and written expression.

★ 2101 Intermediate Italian (3) F.S Prereq.: ITAL 1002. Supplementary work in language laboratory. Basic lexicon and structure of Italian; emphasis on communicative language use.

2102 Intermediate Italian (3) F.S Prereq.: ITAL 2101. Supplementary work in language laboratory. Basic lexicon and structure of Italian; emphasis on communicative language use.

★ 2121 Readings in Italian Literature (3) Prereq.: ITAL 2102. Readings in contemporary and older literature of Italy; emphasis on comprehension as well as oral and written expression.

3001 Italian Culture and Civilization (3) Taught in English. Italian culture and civilization from the medieval era to the present. Students with prior knowledge of Italian language will receive credit for courses marked with an asterisk (*).

3002 Advanced Oral Communication (3) Prereq.: ITAL 2102. Enhancement of oral communication skills through debating contemporary issues.

3003 Advanced Grammar and Composition (3) Prereq.: ITAL 2105. Intensive study of advanced Italian grammar, sentence structure, syntax, and composition.

★ 3071 Survey of Italian Literature (3) Prereq.: ITAL 2155. Development of Italian literature from the beginnings to the Renaissance.

★ 3072 Survey of Italian Literature (3) Prereq.: ITAL 2155. Continuation of ITAL 3071. Principal authors and literary movements from the Renaissance to the present.

4041 Translation (3) Prereq.: ITAL 3060 or equivalent. Study of translation methodology between Italian and English; emphasis on the different semantic, morphological, and syntactical contexts of the two languages.

4051 Dante (3) Dante, with emphasis on the Inferno.

4052 The Renaissance (3) Literary origins and productions of the Italian Renaissance; writings of Petrarch, Boccaccio, Lorenzo de Medici, Poliziano, Sannazzaro, and Ariosto.

4053 Modern Italian Literature (3) Prereq.: ITAL 3000-level Italian course or equivalent. Selected works of modern Italian writers and literary critics of the 19th and 20th centuries.

4100 Special Topics in Italian Studies (3) Prereq.: ITAL 3000-level Italian course or equivalent. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Study of various aspects of Italian culture and literature from different periods.

4915 Independent Work (1-3) F.S.May be taken for a max. of 3 sem. hrs. credit. Permission of department is required. Readings in Italian literature directed by a senior faculty member.

7971, 7972 Seminar (3,3) Old Italian language and pre-Renaissance literature; Italian literature of the 18th and 19th centuries.

JAPANESE • JPN

Native speakers of Japanese will not receive credit for courses marked with an asterisk (*).

General education courses are marked with stars (★).

*1001 Beginning Japanese (5) Students with prior knowledge of Japanese may not take this course for credit. Required topics: pronunciation, grammar, vocabulary, exercises in comprehension and conversation. Must complete MUS 2018, 2019 before enrolling in this course.

★ 1002 Intermediate Japanese (3) Prereq.: JPN 1001 or equivalent. Language laboratory work required. Basic lexicon and structure; emphasis on communicative language use.


3801 Traditional East Asian Literature (3) See CHIN 3801.

3802 Modern East Asian Literature (3) See CHIN 3802.

KINESIOLOGY • KIN

Courses offered are of two types: (1) basic activity courses such as tennis, golf, etc. open to all students of the University; and (2) professional courses in kinesiology. All basic activity courses are offered on a pass/fail grade basis.

BASIC ACTIVITY COURSES

Students in these classes must furnish and wear clothing suitable to the activity.

1123 to 1160 Beginning Courses (1 sem. hr. each) Pass/fail grading

1123 Archery

1124 Tennis

1125 Golf

1126 Gymnastics

1128 Rifflery

1129 Education

1130 Bowling

1132 Ballroom Dance

1133 Children’s Rhythms For elementary grades, physical education, or special education majors.

1134 International Folk Dance

1135 Golf for Business and Life

1136 Swimming

1140 Scuba Diving Prereq.: KIN 1236 or consent of instructor.

1142 Conditioning Exercises

1144 Aerobic Dance

1145 Weight Training

1147 Chinese Kung Fu

1148 Chinese Self Defense

1150 Recreational Dance

1151 Racquetball

1152 Tai Chi I

1154 Martial Arts

1155 Jogging

1156 Outdoor Living Skills American Red Cross Standard First Aid Certificate recommended.

1157 Aerobic Swimming Prereq.: KIN 1236 or intermediate swimming skills.

1158 Canoeing Prereq.: must be able to swim 50 yards with a personal flotation device; tread water for one minute and swim 50 yards without a personal flotation device.

1160 Adapted Physical Education For students who cannot participate in vigorous physical exercise due to physical disability or other handicapping condition.

1224 to 1257 Intermediate Courses (1 sem. hr. each) Pass/fail grading

1224 Tennis

1236 Swimming

1244 Aerobic Dance

1246 Weightlifting

1251 Racquetball

1252 Tai Chi II

1254 Martial Arts

1255 Jogging

1257 Aerobic Swimming

1336 to 1338 Advanced Courses (1 sem. hr. each) Pass/fail grading

1336 Swimming

1337 Advanced Lifesaving Prereq.: KIN 1236 and 1336 or Advanced Swimming Certificate

1338 Water Safety Instructor’s Course Prereq.: valid Advanced Lifesaving Certificate.

PROFESSIONAL COURSES

In the Department of Kinesiology, the second digit of the course number denotes the area of interest for professional courses, as follows:

4—kinesiology activity for majors;
5—kinesiology theory; 6—health.

1405 Track and Field (1) 3 hrs. lab. For kinesthetics majors or minors.

1406 Basketball (1) 3 hrs. lab. For kinesthetics majors or minors.

1407 Softball (1) 3 hrs. lab. For kinesthetics majors or minors.

1408 Volleyball (1) 3 hrs. lab. For kinesthetics majors or minors.

1499 Flag Football (1) 3 hrs. lab. For kinesthetics majors or minors.
4505 Practicum in Human Movement Science (3) Prereq.: enrollment in the College of Education; senior standing; KIN 2180, 2181.系列产品和or equivalent. May be taken for a max. of 6 sem. hrs. of credit. Observation and practice of skills, techniques, and protocols of patient care within local clinics, hospitals, and other health care facilities, development disability centers, and private practices.

4510 Knowledge Structure Approach to Skills Analysis (3) Prereq.: physical education cohort membership or consent of instructor. Analysis of the skills and subskills of selected team, dual, and individual movement activities. 4512 Lifespan Motor Development (3) Analysis of changes in motor behavior from infancy to older adulthood; current theoretical perspectives; current issues; correlates of motor development.

4514 Quantitative Analysis of Human Movement (3) Prereq.: KIN 3514 or equivalent. Theory and application of kinematic, kinetic, and electromyographic data acquisition and analysis in the study of human movement as it relates to performing motor skills. 4515 Sports Seminar (3) Trends and issues related to the development and maintenance of athletic abilities in a variety of sports.

4517 Sports Administration (3) Policies and practices in the administration of athletic programs in academic settings.

4520 Psychosocial Aspects of Physical Activity (3) Prereq.: senior or grad standing. Psychological and sociological perspectives of physical activity; theories and research related to sport and exercise behavior; and psychological factors that influence movement and performance in physical activity settings.

4525 Human Anatomy and Functional Impairment (3) Prereq.: KIN 3508 or equivalent. Anatomy of selected systems and the mechanisms and effects of impairment.

4538 Practicum in Applied Fitness (6) Prereq.: KIN 3534, 3535, 12 hrs. lab. For Kinesiology majors. Pass-fail grading. Practical application of exercise testing, exercise prescription, and leadership.


4550 Reflective Teaching in Health and Physical Education (3) Prereq.: Psychological education cohort membership or consent of instructor. Critical issues and pedagogical practices of the reflective teacher in health and physical education.

4600 The School Health Program (3) Problems involved in promoting health of school children; prevention of and protection against infectious diseases; physical inspection and examination; health instruction; provision of a wholesome environment.

4601 Community Health Issues (3) Community health aspects and problems of tobacco, alcohol, drugs, venereal disease and other communicable diseases; other community health problems.

4602 Community Safety Education (3) Covers all grade levels in the school health program; community programs; home, traffic, and recreational safety; emphasis on organization and development in these programs.

4605 Habituating and Addictive Drugs in Our Culture (3) Prereq.: KIN 1600 and senior or graduate standing. Harmless, harmful, and addictive substances that affect physiological well-being and behavior or mood; interaction of psychological, sociological, and physiological components.

4606 Introduction to Health Promotion (3) Prereq.: PSTC 2000a. Junior standing. Recommended: PSTC 4083. Psychological and behavioral perspectives of health promotion; theories and research related to health behavior change; analysis of effective interventions designed to promote health behavior change.

4900 Independent Study (1-3) May be taken for a max. of 6 sem. hrs. of credit. Open to advanced undergraduate or graduate students. Reading, research, and/or field work on selected topics.

7501 Advanced Research Methods (3) Analysis of multivariate statistical methods and statistical analysis used in kinesiology research.

7502 Curriculum Construction in Physical Education (3) Contemporary educational trends in curriculum theory, issues, philosophical orientation, and models derived from research and experience.

7503 Dimension of Aging (3) Focus on physical, cognitive, and emotional aspects of biological aging; role of physical activity and lifestyle issues and their interaction with chronologically and developmentally based ability.

7504 Tests and Measurements in Kinesiology (3) Measurement theory applied to testing in educational, fitness, and other kinesiology settings.
LANDSCAPE ARCHITECTURE • LA

General education courses are marked with stars (★).

1101 Landscape Representation I (3) 6 hrs. studio.
Freeland and mechanical representation and observational skills in diagramming; emphasis on the development of a vocabulary, basic skills, and techniques of landscape architecture representation.

1102 Landscape Representation II (3) Prereq.: LA 1001. 6 hrs. studio. Developing skills in computer-aided visualization and illustrative documentation of landscapes; introduction to digital imaging, drafting, and photo manipulation.

1201 Introduction to Landscape Architecture (3)
Introduction to the profession of landscape architecture for non-majors; overview of professional concerns and responsibilities; awareness of natural and planned landscapes, as well as the importance of using land in an efficient and effective manner.

1202 World Landscape Architecture (3)
Exploration of contemporary landscape design from around the world, including historic landscapes and gardens, urban plazas, and pedestrian areas; parks and infrastructure.

1203 Views of the American Landscape (3)
Concepts, patterns, and the way that shape human attitudes and activities concerning the American landscape; natural systems as links between managed landscapes and built environments; environmental, socio-cultural, and natural relationships.

1204 Cities of the World (3)
Exploration of cities around the world, including their history and development, urban systems, and how they influence city form and design.

2001 Landscape Design I (6) Prereq.: LA 1102. Consent of school director. 12 hrs. studio. Introduction to two- and three-dimensional design processes, sequence, meaning, and dynamic change; application to a simple design.


2003 Landscape Design III: (6) Prereq.: LA 2002. 12 hrs. studio. Advanced representation techniques for planning and design at the community and neighborhood scale; emphasis on relationships of uses, transportation infrastructure, public services, and a mix of housing and commercial types.

2001 Landscape Design I: Land Design (3) Prereq.: MATH 1021 and 1022 or equivalent; and LA 1102 or equivalent; consent of instructor. 2 hrs. lecture; 2 hrs. studio. Introduction to basic surveying for landscape architects; surveying systems and legal land descriptions; introduction to landscape architectural construction systems and the relationship among earth, plants, and structures, topographic mapping conventions, grading design, drainage, and water management, roadway design and alignment.

2003 Landscape Design III: Prereq.: LA 2001 and 1102. 6 hrs. studio. Advanced representation techniques for planning and design at the community and neighborhood scale; emphasis on relationships of uses, transportation infrastructure, public services, and a mix of housing and commercial types.

2001 Landscape Design II: Grading, Drainage, and Roads (3) Prereq.: LA 2301 or equivalent; consent of instructor. 2 hrs. lecture; 2 hrs. studio. Advanced grading and drainage design; theory of aesthetic grading and best management practices and sustainability; landscape architectural systems and infrastructures including advanced roadway design and alignment.

3302 Landscape Technology III: Design Detailing (3) Prereq.: LA 3301 or equivalent; consent of instructor. 2 hrs. lecture; 2 hrs. studio. Introduction to and understanding of the design and implementation through construction processes, detailing as an extension of design, architectural materials, basic structural systems, habitants, technical specifications as a means of ensuring design intent.

3301 Plant Materials I (3) Prereq.: LA 2491 or equivalent. 6 hrs. lab. Identification and study of plant materials with specific recognition of the visual and ecological characteristics of plants.

3401 Plant Materials II (3) Prereq.: LA 3401. 2 hrs. lecture; 4 hrs. lab. Continuation of LA 3401 with the inclusion of basic principles of planting design and landscape design.

4001 Landscape Design: Landscape Planning and Development V (6) Prereq.: LA 3002 and 3002. 12 hrs. studio. Landscape planning and design from the regional to the site development scale; emphasis on generating planning and design strategies for urbanization and development that are informed by an understanding of the ecology and culture of the region, and based on principles of sustainability.

4002 Landscape Design: Specialization VI (6) Prereq.: LA 4001. 12 hrs. studio. Studio projects addressing various aspects of landscape architecture.

4101 Advanced Digital Representation (3) Prereq.: LA 4201. 12 hrs. studio. Advanced techniques in digital representation, such as 3-D modeling, terrain modeling, animation, advanced imaging, and rendering.

4201 Theories of Landscape Planning (3) 2 hrs. lecture; 2 hrs. lab. Practical theoretical literature in landscape analysis and planning; application of theories and principles of planning and design techniques, mapping systems (GPS), and remote sensing/image processing technology.

4203 Reading the Louisiana Landscape (3) Advanced seminar exploring the use of diverse sources to research and understand regional landscapes and apply these findings to professional practice.

4204 Planning Disaster Resilient Communities (3) Theory and methods of planning resilient communities considering hurricane, earthquakes, cyclones, tsunami, and landslides chiefly in regions located near low-lying coastal areas and countries bordering the Pacific Rim.

4301 Landscape Specialization I (3) Prereq.: LA 3002 or equivalent. 2 hrs. lecture; 2 hrs. studio. Specialty topics in landscape architecture construction and design implementation.

4501 Field Studies in Landscape Architecture (1-3) May be taken for a max. of 6 hrs. of credit. Students are responsible for paying travel expenses associated with this course. Field trip to landscape architectural office, projects, historic sites, and schools throughout the U.S. and abroad.

4502 Independent Study in Landscape Architecture (3) Prereq.: Consent of School Director. Independent study must be pre-approved by the supervising faculty member. Program of individual study under faculty guidance, including lecturing, reading, and exercises as needed to develop skills in methods of inquiry related to the area of specialty.

4503 Advanced Projects in Landscape Architecture (3) Prereq.: Consent of instructor. Faculty directed projects for small groups of students investigating specific areas of research in landscape architecture, with attention to conservation ethics and legal regulations leading to sustainability of the landscape.

3001 Landscape Design III: Site Planning and Design (6) Prereq.: LA 2002 and 2001 and 2201 or equivalent. 12 hrs. studio. Arrangement of buildings, circulation, and other landscape design elements; emphasis on earthwork and drainage.

3002 Landscape Design IV: Community Design (6) Prereq.: LA 2001 and 2002 and 2001 or equivalent. 12 hrs. studio. Planning and design at the community and neighborhood scale; emphasis on relationships of uses, transportation infrastructure, public services, and a mix of housing and commercial types.

3001 Landscape Design II: Grading, Drainage, and Roads (3) Prereq.: LA 2301 or equivalent; consent of instructor. 2 hrs. lecture; 2 hrs. studio. Advanced grading and drainage design; theory of aesthetic grading and best management practices and sustainability; landscape architectural systems and infrastructures including advanced roadway design and alignment.

7001 Graduate Landscape Design I: Basic Design (6) Prereq.: consent of the school. 12 hrs. studio. Introduction to two- and three-dimensional design, design process and implementation, meaning and dynamic change; application to simple landscape design.

7002 Graduate Landscape Design II: Site Design (6) Prereq.: LA 7001. 12 hrs. studio. Arrangement of buildings, circulation, and other landscape design elements; emphasis on design process and implementation.

7003 Graduate Landscape Design III: Community Design (6) Prereq.: LA 7002 and consent of the school. 12 hrs. studio. Landscaping planning and design at the community and neighborhood scale; emphasis on relationships of uses, transportation infrastructure, green infrastructure, public services, and a mix of housing and commercial types.

7004 Graduate Landscape Design IV: Landscape Planning and Development (6) Prereq.: consent of the school. 12 hrs. studio. Landscape planning and design from the regional to the site development scale; emphasis on generating planning and design strategies for urbanization and development that are informed by an understanding of the ecology and culture of the region, and based on principles of sustainability.

7005 Landscape Design V: Urban Landscape Design (6) Prereq.: LA 7004. 12 hrs. studio. Investigation of urban structures and systems and design of urban landscapes and elements.

7006 Graduate Landscape Design VI: Final Project (6) Prereq.: LA 7005, 7201. 12 hrs. studio. Intensive development of a comprehensive landscape design and/or independent design project.

7011 Graduate Landscape Representation I (3) 6 hrs. studio. Advanced representation techniques for planning and design representing the culture of the region and based on principles of sustainability.

7012 Graduate Landscape Representation II (3) Prereq.: LA 7011. 6 hrs. studio. In depth exploration of representation techniques developing skills of visualization and representation using freehand, mechanical, and digital imaging projects.

7013 Graduate Landscape Representation III (3) Prereq.: Consent of the school. Research and practice.

7014 Graduate Landscape Representation IV (3) Prereq.: Consent of the school. Research and practice.

2051 Intermediate Latin (5) Prereq.: LATN 2051 or equivalent. Reading comprehension approach to language continued in extensive passages of moderate difficulty; vocabulary building and basic Latin grammatical constructions.

2053 Intermediate Latin (3) Prereq.: LATN 2053 or equivalent. NonLaboratory comprehension approach includes material of the difficulty of 1st century Latin poetry and prose.

2065 Golden Age Narrative Poetry (3) Prereq.: LATN 2053 or equivalent. Reading comprehension approach to narrative poems, including selections from Vergil's Aeneid and/or Ovid's Metamorphoses.

2066 Golden Age Lyric (3) Prereq.: LATN 2053 or equivalent. Readings from Roman prose writers (excluding the historians); the major speeches, letters, and/or philosophical works of Cicero.

2073 Roman Historians (3) Prereq.: LATN 2053 or equivalent. Readings from Roman historians; selections from Livy and/or Tacitus; prose style and philosophy of history of the author(s).

2074 Golden Age Lyric Poetry (3) Prereq.: LATN 2053 or equivalent. Readings from the lyric poets; selections from the Carmina of Catullus and/or the Odes of Horace, with attention to emotional content.

LATIN • LATIN

General education courses are marked with stars (★).

1001 Elementary Latin (5) NonLaboratory reading course in classic Latin; emphasis on comprehension rather than grammatical and/or contextual clues used to read extensive passages of simple Latin.

2051 Intermediate Latin (5) Prereq.: LATN 2051 or equivalent. Reading comprehension approach to language continued in extensive passages of moderate difficulty; vocabulary building and basic Latin grammatical constructions.

2053 Intermediate Latin (3) Prereq.: LATN 2053 or equivalent. NonLaboratory comprehension approach includes material of the difficulty of 1st century Latin poetry and prose.

2065 Golden Age Narrative Poetry (3) Prereq.: LATN 2053 or equivalent. Reading comprehension approach to narrative poems, including selections from Vergil's Aeneid and/or Ovid's Metamorphoses.

2066 Golden Age Lyric (3) Prereq.: LATN 2053 or equivalent. Readings from Roman prose writers (excluding the historians); the major speeches, letters, and/or philosophical works of Cicero.

2073 Roman Historians (3) Prereq.: LATN 2053 or equivalent. Readings from Roman historians; selections from Livy and/or Tacitus; prose style and philosophy of history of the author(s).

2074 Golden Age Lyric Poetry (3) Prereq.: LATN 2053 or equivalent. Readings from the lyric poets; selections from the Carmina of Catullus and/or the Odes of Horace, with attention to emotional content.
7001 Intensive Latin Language (3) A specialized course intended to provide a reading knowledge of Latin. For graduate students who have had undergraduate Latin and have a familiarity with another foreign language is recommended. Successful completion of this course will be regarded as sufficient preparation for LATN 4006. Does not count toward satisfying foreign language requirement for undergraduates, although hours may count toward baccalaureate. Credit can be given for both this course and introductory Latin courses. Syntactic, grammar, and lexicology of Latin; graduated readings from representative authors.

7002 Information Services (3) Prereq.: major or permission of department. Preparation for reference and bibliographic services; selection and use of general, scholarly, and specialized reference resources in various subject fields.

7003 Principles of Collection Management (3) Basic principles of collection management, emphasis on changing community and user needs analysis, selection strategies, and tools.

7004 Principles of Management for Librarians and Information Specialists (1) Prereq.: major or permission of department. Basic functions of management and their application to the operations of libraries and information service agencies.

7005 Foundations of Library and Information Science (3) Prereq.: major or permission of department. Must be taken in the first semester of residence or prior to registration for the tenth hour of coursework to be counted for the M.L.I.S. degree, whichever occurs first. History, theory, practice, philosophy, and current organization of the information service profession.

7006 Information Technologies (3) Prereq.: major or permission of department. Hardware, software, networking, and telecommunications issues relating to technologies used in libraries and information settings; experience with appropriate software packages and search systems.

7101 Information Needs Analysis (3) Prereq.: major or permission of department. Conceptual foundations of bibliographic organization and resource development; basic principles and methods of designing, organizing, and accessing bibliographical lists; principles, methods, issues, and trends of resource selection for user populations.

7102 Bibliographic Resource Development (3) Prereq.: major or permission of department. Evaluation of information system performance; systems analysis techniques; development and use of performance measurements; strategies for improving system performance.

7103 Media and Services for Children (3) Developmentally appropriate library and information services for young children, emphasis on literature and uses of literature in schools and libraries.

7104 Media and Services for Young Adults (3) Developmentally appropriate library and information services for young adults, ages 15 to 18; emphasis on literature and uses of literature in schools and libraries.

7105 Media and Services for Young Adolescents (3) Developmentally appropriate library and information services for young people, ages 11 to 14; emphasis on literature and its value in the lives of prepubescent youths.

7106 Advanced Topics in Collection Management (3) Prereq.: major or permission of department. Analysis of the professional attitudes and approaches to meeting information needs of individuals and communities; community analysis, user studies, and reference interview.

7107 Bibliographic Resource Development (3) Prereq.: major or permission of department. Conceptual foundations of bibliographic and resource development; development and use of performance measures; strategies for improving system performance.

7108 Media and Services for Children (3) Developmentally appropriate library and information services for children; emphasis on literature and uses of literature in schools and libraries.

7200 Resources for the Humanities (3) Information resources in major areas of the humanities.

7201 Resources for the Social Sciences (3) Information resources for the social sciences.

7202 Resources for Science and Technology (3) Information resources for major areas of pure and applied science.

7203 Sources of Government Information (3) Government publications as products of government activity and as sources of information.

7205 Business Information Resources (3) Information resources in major areas of business and economics.

7400 School Media Centers (3) Philosophy and objectives of library media centers and information services in schools; emphasis on the roles and responsibilities of the library media specialist.

7401 Academic Libraries (3) Study of libraries in higher education; their development, organization, financing, and administration; human resources; collections; services; and futures.

7402 Cooperatives, Consortia, and Networks (3) Major types of local, state, regional, and national cooperation among all types of libraries, including organization, governance, services, and uses of technology.

7403 Special Libraries and Information Centers (3) Major types of special libraries; their purpose, organization, and structure in business, government, and other organizations; principles of administration; technical processing; reference services; special methods, routines, and resources.

7404 Health Sciences Information Centers (3) Administration, organization, function, and services of health sciences libraries; collection development and reference emphasis on major print and electronic information resources.

7405 Public Libraries (3) Role of the public library in past and present American society; its relationship to the social and political communities.

7406 Literature and Methods for Readers’ Advisory Services (3) Value and role of leisure reading in public libraries; interview techniques, support processes, and bibliographic resources for providing services to adults and older adolescent readers.

7407 Principles of Archives Management (3) Identification, collection, arrangement, description, preservation, and use of the full range of historical documents in both institutional and private repositories.

7408 Human Computer Interaction (3) Human information processing, relationships and interactions between humans and information systems, leading to more effective system design and evaluation; human-computer interface, user modeling, system design approaches, evaluation methods.

7501 Management of Information Systems (3) Management of the selection, acquisition, implementation, and operation of computer systems within the context of library and information service agencies.

7502 Networks for Information Professionals (3) Prereq.: LIS 7008 or permission of instructor. Standards, policy, theory, and technical issues related to electronic networks; impact on information systems of libraries and organizations.

7503 Information Technology and Public Policy (3) Examines the impact of information technology and public policies on economic, social and political systems; focuses on major public policies related to information technologies within the United States and selected countries.

7504 Preservation Management of Physical Records (3) Study of preservation as a management function, highlighting causes of deterioration of print and non-print collections, as well as policies and practices that ensure their maximum usable life.

7601 Electronic Description of Archival Materials (3) Prereq.: LIS 7004 or permission of instructor. Application of document analysis to produce MARC records, Dublin Core records, and SGML/XML tagging; overview of electronic publishing and Web publications of archival materials and finding aids.

7604 Principles of Records Management (3) Application of systematic and scientific controls to recorded information; life-cycle concept, legal requirements, and implications of technology, as well as records inventory, appraisal, classification, retention, and protection.

7605 Information Science (3) History and philosophy of information science and information retrieval; survey of current research.

7606 Abstracting and Indexing (3) Principles of abstracting and indexing for print and electronic environments; controlled vocabulary and thesaurus development; manual and computerized abstracting and indexing techniques; effectiveness of abstracting and indexing methods.

7607 Electronic Information Resources (3) Prereq.: LIS 7002 or permission of instructor. Use of electronic information resources and systems; analysis and comparison of various search mechanisms.

7608 Cataloging and Classification (3) Principles underlying description, subject access, and organization of library resources and authority control; current national standard cataloging rules, Library of Congress Subject Headings, Dewey Decimal Classification, Library of Congress Classification, and MARC (machine-readable cataloging) formats are emphasized.
7609 Seminar on Cataloging and Classification (3) Prereq.: LIS 7608 or consent of instructor. Research methodology applicable to library and information science; emphasis on data collection and analysis.

7610 Information Literacy Instruction (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7101, 7102, and 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site.

7700 History of Books and Libraries (3) History and current relationships of the book and libraries; rise of the library as a formal institution within society.

2000 The Art and Practice of Library Storytelling (3) Role of storytelling as a form of communication; preparation and presentation of stories for all age groups; planning story programs.

7801 The Illustrator as Storyteller (3) Study of effects of visual design in semesters from children's literature; use of artistic media in review sources; survey of works of noted children's books illustrators.

7807 Information Literacy Instruction (3) Theories, techniques, strategies, and current practice for teaching the effective and efficient use of academic, school, public, and special library resources.

7905 Field Experience in Library and Information Science Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of library and information science centers.

7906 Field Experience in Library and Information Science Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of library and information science centers.

7907 Field Experience in School Media Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7101, 7102, and 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library media centers.

7916 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7918 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7919 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7920 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7921 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7922 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7923 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7924 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7925 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7926 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7927 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7928 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7929 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7930 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7931 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7932 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7933 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7934 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7935 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7936 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7937 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7938 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7939 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7940 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7941 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7942 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.

7943 Field Experience in School Libraries and Information Centers (3) Prereq.: completion of 24 hrs. of LIS courses, including LIS 7400, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site. Experience in administration and management of school library and information centers.
4620 Human Behavior in Organizations (3) Prereq.: MGT 3280. Behavioral sciences applied to understanding human dynamics in organizations; focus on individual, interpersonal, group, and intergroup behavior; impact of human behavior on organizational effectiveness.

4701 Management Innovation (3) V. The competitive environment; innovative process and invention evaluation; anatomy of successful innovation; management of creativity; patenting intellectual property; collaboration and networking; governmental influence on innovation.

4702 Managing Technology Transfer (3) V Models of technological strategies; industrial and technological transfer; technological transfer and industrial innovation; domestic and international aspects of technology transfer.

4701 Management of Technology (3) See BE 7645.

7111 Entrepreneurship Management (3) F Investigation, analysis, and development of entrepreneurial feasibility studies and business plans.

7202 Business and Society (3) F Role of business in a broad societal context; changes occurring in business and resulting modifications of the relationship of business to society; roles of business viewed by business and society.

7203 Development of Management Thought (3) F-O Origin and growth of conceptual contributions; contributions of leaders associated with major schools of management thought; implications of management thought for the management process, empirical, human behavior, social system, decision theory, and quantitative methods.

7212 Seminar in Management (3) V Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Directed work in advanced topics.

9800 Seminar in Advanced Business Problems (3) May be taken for a max. of 6 hrs. of credit when topics vary. Directed work in advanced topics.

MARKETING • MKT

2000 Marketing and Society (3) Not open to students in the E. J. Ourso College of Business. Marketing aspects of contemporary social issues; emphasis on methods for dealing with social issues in marketing activities.

3401 Principles of Marketing (3) Prereq.: ACCT 2000 or 2001, and either ECON 2000 or ECON 2009 and 2010. Lecture-discussion, case analysis, marketing-simulation game; the field of marketing; marketing environment, functions, and institutional structure at a macro level; marketing strategy and policies at a micro level; problems of cost and productivity; view points of society, consumer, and marketing manager.

3418 Sports Marketing (3) Application of marketing concepts to sports and leisure activities; emphasis on planning and strategy development.

3411 Consumer Analysis and Behavior (3) Prereq.: MKT 3401. Dynamics of consumer markets; their significance to marketing executives; identification and measurement of market segments; analysis of their behavioral patterns as a basis for marketing strategy.

3413 Marketing Research (3) Prereq.: MKT 3411 and ISDS 2009. Population sampling, techniques, concepts, and methodology involved in applying research to marketing problems.

3421 Marketing Communication: Promotion (3) Prereq.: MKT 3401. Nature and contributions of personal selling and advertising to the firm's problems of demand stimulation; concepts related to advertising, promotion effort to facilitate communication programs for products and/or services.

3427 Buyer-Seller Communication (3) Prereq.: MKT 3401. Communication theory and sales principles needed for successful sales career; buyer behavior and sales tactics; sales strategies; consumer-buyer relationships.

3431 Retail Management (3) Prereq.: MKT 3411. Store organization, operation, and management; retail method of inventory control; problems connected with retail buying and selling.

3433 Distribution Channels, Structure, and Management (3) Prereq.: MKT 3401. Distribution channel functions, structures, and processes; the channel as an economic and behavioral system; relationship between channel members; marketing manager's viewpoint; vertical marketing systems including franchises; channel design, communication information systems; management by different channel members; evaluation of channel performance.

4441 Business Marketing (3) Prereq.: MKT 3401. Strategies developed by manufacturers to compete for markets; differences between industrial and consumer markets; function of industrial purchasing with regard to selection of sources. Emphasis on management of purchasing policies; strategic overview of marketing; how companies buy and sell from each other; not confined to industrial companies.

3500 Marketing Tools Fundamentals (3) Prereq.: credit or registration in MKT 3401 and permission of department. Coverage of current and emerging computer-based and other tools used by marketing practitioners.

4443 Marketing Research Field Project (3) Prereq.: MKT 3401 and permission of the department. Advanced marketing research problems and theory.

4423 Sales Management (3) Prereq.: MKT 3401. Principles of sales planning and control; organizing sales departments, developing territories, motivating sales persons, and controlling sales operations.

4427 Direct Marketing (3) Principles of direct marketing process; planning and implementation of direct marketing campaigns; direct marketing through direct mail, catalogs, publications, telephone, and electronic media; list management and data base marketing; direct marketing campaigns for consumers, business customers, and international markets.

4440 Marketing on the Internet (3) Prereq.: MKT 3401 and permission of department. Appreciation of marketing principles and practices pertaining to the use of the Internet by organizations.

4422 Strategic Marketing (3) Prereq.: MKT 4440 or consent of instructor. Strategic principles, practices, and policies concerning the development and implementation of a strategic plan for use in electronic commerce on the Internet with emphasis on the Internet as an alternative marketing delivery system.

4443 International Marketing (3) Prereq.: MKT 3401. Global marketing addressing international processes; global marketing as all-encompassing (import-export, joint ventures, foreign subsidiaries, licensing, management contracts); marketing systems in various countries; strategies for international and multinationals.

4445 Internship in Marketing (1-6) Prereq.: Senior standing or consent of instructor. Primarily for seniors in marketing. May be repeated for a max. of 6 sem. hrs. credit. Pass-fail grading. On-the-job experience in approved marketing positions.

4451 Marketing Management (3) Prereq.: MKT 3415, senior standing or consent of instructor. Analytical principles used in development of strategies for solving marketing problems; policy areas of promotion, distribution channels, and promotion integrated in development of the firm's total marketing effort.

4457 Independent Study: Advanced Marketing Problems (1-6) For undergraduate students in the E. J. Ourso College of Business with a gpa of 3.0 or above. May be repeated for a max. of 6 sem. hrs. credit. Pass-fail grading. Independent research under direction of a faculty member.

4488 Advanced Topics in Retailing Management (3) Prereq.: MKT 3431. Application of retailing theory and management techniques in areas of strategic planning and its interfaces with retailing operations; market area analysis, locational strategies and site selection; merchandising policies and store operations; store management, product distribution, and departmental layout.

4499 Services Marketing (3) Prereq.: MKT 3401. Developing, pricing, distributing, and promoting the service; control of quality of customer encounters through service automation; opportunities for service quality measurement and assurance; role of marketing in service organization structure; strategic implications of service structure industries.

7111 Marketing Tools Fundamentals (3) Prereq.: credit or registration in BADM 7100 or equivalent. Coverage of current and emerging tools used by marketing practitioners, including computer systems, market segmentation tools, market share analysis, competitive intelligence, applications to real and/or simulated market situations.

7120 Customer Decision Making and Brand Marketing Strategy (3) Prereq.: BADM 7100 or equivalent. Treatment of key elements of customer decision making with emphasis on formulation of brand marketing strategy based on consumer behavior models, constructs, and information.

7130 Marketing Research and Brand Analysis (3) Applications of marketing research methods such as qualitative research techniques, marketing surveys, marketing experiments, and brand analysis techniques.

7140 Promotion Management and Strategy (3) Prereq.: BADM 7100 or equivalent. Examines the techniques and methods used by marketing communicators with emphasis on theory and best practices; including development of a marketing promotions strategy for a present or emerging marketing organization.

7159 Global Marketing Issues and Strategies (3) Prereq.: BADM 7100 or equivalent. Examination of marketing strategies and tactics available to organizations seeking to compete with organizations in the global environment.

7160 Services and Professional Services Marketing (3) Prereq.: BADM 7100 or equivalent. Introduction to services marketing with emphasis on issues involved in planning, implementing, and controlling professional services marketing.

7180 Brand Marketing Strategy (3) Prereq.: MKT 7120 and 7130. Coverage of brand marketing strategy formulation, including market and competitor analysis, plus resource allocation; emphasis on issues involved in marketing strategy formulation and implementation.

7443 Advanced Seminar in International Marketing (3) Prereq.: MKT 4451 or BADM 7100 or equivalent. Marketing management decision processes and marketing systems in the global environment; application to multinational business operations and strategy development; marketing techniques of foreign market entry; product, pricing, promotion, and distribution decisions.

7445 Topics in Advanced Marketing Management (5) Prereq.: BADM 7100 or permission of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Survey of marketing management problems; may be repeated for a max. of 6 sem. hrs. credit. Pass-fail grading. On-the-job experience in approved marketing positions.

7471 Marketing Strategy (3) Design, implementation, and evaluation of marketing plans; marketing models; demand forecasting; marketing programming; product, price, promotion, and distribution policies; information systems; marketing audit; application of select marketing tools as strategic aids to marketing management; model-building approach used to demonstrate tool applications in product, price, promotion, and distribution strategies.
7476 Marketing Theory and Thought (3) Evolution of marketing concepts, terminology, principles, and theory; development of a frame of reference for understanding the meaning and consequences of theory; prediction of future theoretical developments.

7477 Seminar in Advanced Marketing Problems (3) May be taken for a max. of 9 hrs. of credit.

7488 Applications of Marketing Theory (3) Prereq.: MKT 7475 and 7476: Marketing theory development and testing; theory operationalization and refinement.

7489 Marketing Models (3) Prereq.: BADM 7100 or concurrent. Synthesis of theory, content area, and methodology in marketing through the study of modeling; modeling phenomena, functional forms, and analytical techniques of path analysis, simultaneous equation systems, and structural equation modeling.

7713 Marketing Construct Analysis (3) Prereq.: MKT 4431 or BADM 7100 or permission of instructor and BDS 7024 or equivalent. Open to doctoral students. Treatment of the theory, conceptualization, and measurement of constructs used in marketing research with emphasis on the development and refinement of marketing construct measures.

7714 Advanced Marketing Research Techniques (3) Prereq.: BADM 7100. Advanced designs and techniques applied to marketing research; theory and assumptions of analytical and practical uses of applied statistical methods; marketing strategy; interpretations of empirical results.

7717 Advanced Seminar in Consumer Behavior (3) Prereq.: MKT 4431 or BADM 7100. Open only to doctoral students. Theoretical, conceptual, and methodological issues for new ideas underlying the mass media and consumer research.

7720 Seminar in Marketing Theory and Experimental Methods (3) Prereq.: BADM 7100 or equivalent. Nature and importance of mass communication, marketing, and research methods; validity and implications in marketing and consumer research; experimental and quasi-experimental design; pluralism in marketing and consumer research.

8000 Thesis Research (1-12 per sem.) "S"/"U" grading. May be taken for a max. of 6 hrs. of credit; only 3 hrs. may be counted toward a degree in Mass Communication. At least 15 hours of work in the thesis are under general supervisory supervision of a faculty member and direct supervision of a professional in some field of mass communication.

4050 Media Management (3) Concepts and principles of management, entrepreneurship, leadership, organizational behavior, and strategic planning applicable to media organizations; study of social, political, ethical, technological, and legal issues confronting media companies.

4709 Media Ethics and Social Responsibility (3) Prereq.: majors or minors only or permission of department. Role of the media as socially responsible institutions; ethical issues, policies, and practices in gathering, processing, and disseminating content.

4095 American Media History (3) Themes and trends in the historical development of media, including journalism, advertising, and public relations.

4103 Comparative Media Systems (3) World mass media; news agencies, communication organizations, differing philosophies, international news flow, and political, economic, cultural, and structural influences.

4111 Mass Media Practices (3) Prereq.: consent of Mansh School of Mass Communication; concurrent registration in MC 4211. Keyboarding proficiency of at least 35 words per minute. 1 hr. lecture. 3 hrs. lab. Preparation of written materials for dissemination through the mass media; emphasis on informational and persuasive communication.

2011 HONORS: Media Writing (3) Same as MC 2010, with special honors emphasis for qualified students.

2015 Visual Communication (3) Prereq.: keyboarding proficiency of at least 35 words per minute and passing score on the computer keyboarding test. Majors and minors only and permission of department. 1 hr. lecture; 3 hrs. lab. Preparation of written materials for dissemination through the mass media; emphasis on informational and persuasive communication.

2020 Foundations of Advertising and Public Relations (3) Prereq.: majors and minors only or permission of department. Theories and principles of advertising and public relations; their social and economic roles.

2025 The Business of Entertainment Media (3) Examination of the creative, economic, and legal factors that drive and constrain American popular media to provide contents with the informative and strategic elements of mass media to critical consumers of these media.

7200 Production and Performance (3) 2 hrs. lecture; 2 hrs. lab. Production techniques and performance techniques for use in video and audio programming of electronic media.

3018 Foundations of Media Research (3) Prereq.: majors and minors only or permission of department: LIS 1010. Role of the research communication process; basic concepts of research evaluation.

3080 Mass Media Law (3) Prereq.: majors and minors only or permission of department. Introduction to the legal rights and restraints on the mass media; emphasis on First Amendment considerations.

3650 Electronic Media and Society (3) Organizational and economic foundations of electronic mass media; history, regulation, social significance, and responsibility.

3700 Electronic Media, Law, Regulation, and Public Policy (3) Prereq.: MC 3630. Development of telecommunication and regulation through case studies relating to the Federal Communications Act; rules and policy decisions of the Federal Communications Commission; regulatory bodies; emphasis on current legal issues affecting telecommunication media; legal documents and literature.

3998 Internship (3) S,Su Prereq.: 3.0 gpa in 12 or more hrs. of mass communication and consent of internship faculty supervisor and school dean. Pass-fail grading. May be taken for a max. of 6 hrs. of credit; only 3 hrs. may be counted toward a degree in Mass Communication. At least 15 hours of work in the internship are under general supervisory supervision of a faculty member and direct supervision of a professional in some field of mass communication.

4050 Media Management (3) Concepts and principles of management, entrepreneurship, leadership, organizational behavior, and strategic planning applicable to media organizations; study of social, political, ethical, technological, and legal issues confronting media companies.

4095 Media Ethics and Social Responsibility (3) Prereq.: majors or minors only or permission of department. Role of the media as socially responsible institutions; ethical issues, policies, and practices in gathering, processing, and disseminating content.

4095 American Media History (3) Themes and trends in the historical development of media, including journalism, advertising, and public relations.

4103 Comparative Media Systems (3) World mass media; news agencies, communication organizations, differing philosophies, international news flow, and political, economic, cultural, and structural influences.

4111 Mass Media Practices (3) Prereq.: consent of Mansh School of Mass Communication; concurrent registration in MC 4211. Keyboarding proficiency of at least 35 words per minute. 1 hr. lecture. 3 hrs. lab. Preparation of written materials for dissemination through the mass media; emphasis on informational and persuasive communication.

2011 HONORS: Media Writing (3) Same as MC 2010, with special honors emphasis for qualified students.

2015 Visual Communication (3) Prereq.: keyboarding proficiency of at least 35 words per minute and passing score on the computer keyboarding test. Majors and minors only and permission of department. 1 hr. lecture; 3 hrs. lab. Preparation of written materials for dissemination through the mass media; emphasis on informational and persuasive communication.

2020 Foundations of Advertising and Public Relations (3) Prereq.: majors and minors only or permission of department. Theories and principles of advertising and public relations; their social and economic roles.

2025 The Business of Entertainment Media (3) Examination of the creative, economic, and legal factors that drive and constrain American popular media to provide contents with the informative and strategic elements of mass media to critical consumers of these media.

7200 Production and Performance (3) 2 hrs. lecture; 2 hrs. lab. Production techniques and performance techniques for use in video and audio programming of electronic media.

4720 Television Creative Projects (3) Prereq.: Grade of “B” or better in MC 2010, and one of the following: MC 2010, 101, 102. The administration of the department. Master’s students with projects requiring broadcast skills are encouraged to take this course. Techniques of television production for non-journalism majors; introduction to television studio, nonlinear video editing, graphics, and studio production.

4971 Special Topics in Mass Communication (3) Prereq.: consent of instructor. Also offered as CMST 4971. May be taken for a max. of 6 hrs. of credit when topics vary. Analysis and discussion of a selected topic that goes beyond present advanced course offerings.

4999 Independent Study (3) Prereq.: gpa of at least 3.00 and consent of school. Approval of written proposal required before enrolling. Pass-fail grading. Readings, projects, conferences, and reports at student’s direction.

7000 Professor in Mass Communication and Public Affairs (1) Open to graduate students of mass communication only. Pass-fail grading. Introduction to graduate study in mass communication; topics include the Mass School of Mass Communication Faculty’s research areas, survey of the field, university’s research supports, and professional and academic career preparation.

7001 Research Methods in Mass Communication (3) Resource tools, methods, and theories for identifying and investigating critical issues in mass communication.

7002 Mass Communication Philosophy and Principles (3) Examination of the most influential principles, philosophies, and paradigms underlying the development of the mass media in the Western world.

7003 Case Studies in Mass Communication (3) Evaluation using the case study method of problems and challenges facing mass communication organizations, with particular emphasis on management issues.

7055 Public Opinion and Public Affairs (3) Formation and development of public opinion; interaction of media organizations and public constituencies in building public support for ideas and policies.

7010 Seminar in Communication Literature (3) Basic issues and problems in mass communication as highlighted in relevant journals and books; journal articles and books of a catalytic nature.

7155 Mass Communication and Society (3) Roles of the mass media; responsibilities of the communicator; interaction of mass media and society.

7012 Survey Research Methods in Mass Communications (3) Design, development, execution, and analysis of public opinion surveys as related to mass communication problems; practical issues related to survey sampling, questionnaire construction and design, modes in interviewing, interviewer training and interviewer effects, and data preparation and analysis.

7014 Qualitative Research Methods in Mass Communication (3) Application of qualitative methods to mass communication research; creation of qualitative research design and the philosophy of science, theory construction and the core issues involved in conducting qualitative research.

7016 International Mass Communication (3) How nations get their news, organize and operate mass communication associations, newspapers, magazines, radio, and television.

7017 Media Industries and Behavior (3) How industry structures in various media influence decision making, effects of competition and monopoly on media behavior, economic performance in media and its effect on content.

7018 Legal Problems of the Mass Media (3) Specific current legal problems affecting the mass media; basic principles of legal research methods.

7019 Media Systems; Policy and Technology (3) The impact of changing technologies and public policies for entrepreneurship in media enterprises, especially new and emerging media systems.

7020 Electronic Media Systems (3) Integration of traditional electronic media with new media systems; policies, economics, and regulatory matters- cable television.

7021 Mass Communication Theory (3) Survey and exploration of origins, basic concepts, debates, and applications of major theories of mass communication; nature and utility of theoretical understanding of mass media ideologies, industries, content, and reception.
7024 Seminar in First Amendment Law (3) Prereq.: MC 7018, an equivalent graduate-level mass media law course, or permission of instructor. Principles and theories underlying First Amendment jurisprudence as it relates to the press and speech; an examination of significant cases and legal issues through original research projects.

7028 Seminar in Mass Communication Policy (3) The influence of public affairs and policy issues on media performance; original research concerning communication policies implemented through legislative and administrative decision making.

7201 Advanced Research Methods in Mass Communication and Public Affairs (3) Prereq.: MC 7001 or equivalent. Open to graduate students of mass communication and other fields of social sciences. Survey of research methods and research designs applicable to mass communication and public affairs.

7771 Independent Research: Mass Communication (1-3) F, S, Su. Permission of instructor and the associate dean for graduate studies. May be repeated for 6 sem. hrs. of credit. For advanced graduate students who wish to pursue research on special problems, exclusive of thesis or dissertation, for which there is no organized course.

7999 Special Topics in Mass Communication (3) Prereq.: consent of instructor. May be taken for a max. of 9 hrs. of credit when taken in advanced study; with reading and discussion, of topics in mass communication.

8000 Thesis Research (1-12 per sem.) "S"/"U" grading.

8001 Professional Internship (3) Prereq.: skills and professional course as specified in Mass Communication Policy Statement 104; contractual agreement with outside organization's practicum supervisor; consent of faculty intern coordinator; and permission from the school's associate dean for graduate studies. Written report containing a graduate research component is required. Pass-fail grading. The student works in a professional capacity for at least 15 hours a week (28 hours in summer term) under the guidance of a faculty member and direct supervision of a management-level practitioner in some field of mass communication (advertising, journalism, electronic media, political communication, public relations, or other appropriate organizational position).

8002 Professional Project (1-6) A research component is required. Pass-fail grading. A project, approved by the student's advisor, committee, related to the student's area of professional interest.

8009 Public Affairs Service Externship (9) Prereq.: consent of Mass School of Mass Communication. A public affairs service externship. Students will be placed in one of a variety of management settings where the extern will be meaningfully engaged in public affairs planning and execution. An advanced full-time field practicum in a public affairs capacity.

9000 Dissertation Research (1-12 per sem.) "S"/"U" grading.

ADVERTISING

4033 Direct Response Advertising and Promotion (3) Prereq.: MC 2029. Types and roles of direct response advertising; history and evolution; skills that advertising agencies and other organizations use to build and maintain relationships with customers and others.

4034 Advertising Media Analysis and Planning (3) Prereq.: MC 2020 or MKT 3401. Major analytical plan on current advertising problem required. Quantitative study of techniques and processes for determining advertising media; media selection, budget allocation, and levels of message intensity.

4040 Advertising Problems (3) Prereq.: MC 3031 and 4034. Seminar in advertising problems and related readings.

4041 Sports Writing and Production (3) Prereq.: MC 2010 and 3101, or MC 1101 and 3065. Writing, reporting and producing sports stories for both print and electronic media.

4042 Mass Media, Sports, and Society (3) News coverage of the political, economic, and cultural roles of sports institutions and the social roles of professional athletes.

4045 Advertising Campaigns (3) Prereq.: MC 2020, 3031, 4040. 2 hrs. lecture; 2 hrs. lab. Team developments of advertising campaigns on a competitive basis (simulated advertising agency operations); emphasis on research, marketing, and advertising problems; budgetary planning, media strategy, and creative design.

7025 Advertising Theory and Processes (3) Role of advertising in communication, marketing, and society; analysis of various advertising processes.

7216 Issues in Advertising (3) Prereq.: MC 2020. Socioeconomic, legal, ethical and cultural issues related to advertising as an institution.

JOURNALISM

3001 Business Journalism (3) Writing for and editing house magazines, trade journals, and other specialized publications; business news reporting for the daily newspaper.

3002 Feature Writing (3) Prereq.: MC 2010 and 3101 or permission of department. 1 hr. lecture; 3 hrs. lab. Development of skills to report, write, and produce a weekly television newscast and public affairs show.

3103 Advanced Print News Writing (3) Prereq.: MC 3101, 2 hrs. lecture; 2 hrs. lab. Specific application of news-gathering techniques; covering courts, law enforcement agencies, government business; using polls and other statistical methods; relational databases.

3104 Advanced Broadcast News Gathering (3) Prereq.: MC 3102, 1 hr. lecture; 3 hrs. lab. Development of strategies of broadcast reporting and presentation skills; news-gathering focus on depth, context, and presentation of information.

3151 Advanced Reporting (3) F, S Prereq.: "C" or better in MC 3010, 3101, and 3103. 1 hr. lecture; 3 hrs. lab. Individually arranged hours conducted at The Advocate. Reporting news for The Advocate. Reporting news for The Advocate.

4019 Magazine Editing and Production (3) Prereq.: MC 2015 and 3103. 1 hr. lecture; 3 hrs. lab. Magazine project required. Techniques of magazine editing and production; analysis of magazine industry and specific magazines and their audiences; editorial objectives and formulas, issue planning, article selection, layout, illustration, typography, printing, and circulation.

4011 Scholaristic Journalism (3) Basic communication techniques and instruction methods for scholaristic journalism students; content for the scholaristic newspaper, book, or yearbook.

4013 Scientific Journalism (3) Principles of researching and writing that involve subjective expression: interpretive reporting, news analysis, essays, editorials, and columns, critical reviews, and interviews.

4025 Public Affairs Reporting (3) Prereq.: MC 3101 and permission of instructor. 2 hrs. lecture; 2 hrs. lab. Using public records to document fraud, abuse, or interesting and significant social change.

4260 Long-Form Video Production (3) Prereq.: MC 3100, 2 hrs. lecture; 2 hrs. lab. 2 hrs. video programs to inform mass electronic media audiences.

4270 News Production for the Internet (3) Prereq.: MC 2010, 3019, and 3101. Open to undergraduate and graduate students approved by the Mass School's 1st-year lab. Advance reporting for an electronic publication, using converging media technology to create content for a news website.

4500 Advanced Journalism (3) Prereq.: MC 3101, 3102, and either 3103 or 4104 or permission of instructor. 1 hr. lecture; 3 hrs. lab. Techniques of news editing and producing, public affairs video production techniques; production of laboratory newspaper; techniques of producing all aspects of a television news program, including videoconferencing, nonlinear video editing, producing a newscast and on-set news performance.

7011 News Workers and Their Organizations (3) The impact of individual organizations on the news industry; the influence of news on individuals; the influence of the audience on the media content; media impact on political attitudes, behaviors, especially voting.

4515 Case Studies in Media and Political Campaigns (3) Examination of political campaigns as they involve American media; the media client and message; developing media messages for political campaigns.

4520 Advanced Seminar in Political Communication (3) Assessment and development of media strategies for a particular actor, political issue, or political viewpoint; topics may vary from semester to semester; students will complete a project a strategic political communication that will integrate knowledge derived from previous course work in this area. 4900 Independent study on an individual basis involving American media; the media client and message; developing media messages for political campaigns.

7056 The News Media and Governance (3) News media influence on political actors, processes, and outcomes in American politics; public policy towards the news, strategic political communication, and influences of public officials and other political actors on the framing and structure of content.

7036 Seminar in Media and Public Affairs Theory (3) Required for Mass School of Mass Communication Ph.D. students. Advanced studies in the application of mass communication theory to public affairs and public policy issues, problems, and issues.

PUBLIC RELATIONS

3000 Principles of Public Relations (3) Mass communication techniques applied to theories and principles of the public relations function.


4001 Public Relations Writing (3) Prereq.: MC 2010, 3101, and 3019, and keyboarding proficiency of at least 15 words per minute. 2 hrs. lecture; 2 hrs. lab. Developing and writing news releases, speeches, audio-visual scripts, feature stories, and other public relations communications.


4005 Public Relations Campaigns (3) Prereq.: MC 3018, 4001, and 4004. 2 hrs. lecture; 2 hrs. lab. Developing and implementing public relations communication campaigns; hands-on experience in designing and producing print and audio-visual materials for campaigns; emphasis on use of planning and evaluation techniques.

7060 Public Relations Campaigns and Tactics (3) Formal and informal models, tasks, and techniques used to formulate and complete management activities of public relations and to function within a marketing system.

7007 Public Relations Administration (3) Principles of public relations management and application of research techniques, strategic planning, organizing, staffing, leading, and controlling.

POLITICAL COMMUNICATION

3505 Media and Policy Processes (3) Impact of the media on American politics through their interactions with political actors and involvement in the policy-making process; use of strategic political communication in government, and the media's role in spotlighting policy problems and suggesting policy solutions.

3506 Media, Politics, and the Public (3) Interaction among media, politics, and the public in American society; process of public opinion formation and the influence of the audience on media content; media impact on political attitudes and behaviors, especially voting.

4515 Case Studies in Media and Political Campaigns (3) Examination of political campaigns as they involve American media; the media client and message; developing media messages for political campaigns.

4520 Advanced Seminar in Political Communication (3) Assessment and development of media strategies for a particular actor, political issue, or political viewpoint; topics may vary from semester to semester; students will complete a project a strategic political communication that will integrate knowledge derived from previous course work in this area. 4900 Independent study on an individual basis involving American media; the media client and message; developing media messages for political campaigns.

7056 The News Media and Governance (3) News media influence on political actors, processes, and outcomes in American politics; public policy towards the news, strategic political communication, and influences of public officials and other political actors on the framing and structure of content.

7036 Seminar in Media and Public Affairs Theory (3) Required for Mass School of Mass Communication Ph.D. students. Advanced studies in the application of mass communication theory to public affairs and public policy issues, problems, and issues.
7088 Public Relations Programming and Production (3)  
Prereq: MC 4111 or equivalent writing proficiency. 2 hrs. lecture; 2 hrs. lab. Writing public relations messages for print and broadcast; program proposals; practice in writing, graphic design; and layout of messages.

7013 Public Affairs Advertising Campaigns (3) The application of advertising theory and process to public affairs campaigns; emphasis on strategy development in the context of political or issues-oriented campaigns.

7209 Public Communication Practices (3) The role mediated communication plays in defining/influencing/altering relationships among various stakeholders and interest groups, with emphasis on mass communication strategies used to formulate and execute public affairs programs.

7210 Public Communication Administration (3) Principles of public affairs, issues management, and political communication; application of research techniques in communication campaigns, strategies of campaign settings; planning, organizing, staffing, leading, and controlling communication campaigns in corporate and governmental settings.

**MATHEMATICS • MATH**

General education courses are marked with stars (★).

No student may receive more than nine semester hours of credit in mathematics courses numbered below 1550, with the exception of students who are pursuing the elementary education degree and following the 12-hour sequence specified in that curriculum. No student who has already received credit for a mathematics course numbered 1550 or above may register for this course.

0092 Preparation for College Mathematics II (3) Prereq: MATH 0091 or placement by department. 3 hrs. lecture. For students not prepared to take MATH 1009, 1015, or 1021. Not for degree credit; 3 sem. hrs. will be added to the degree program of any student taking this course. No student who has received credit for a mathematics course numbered 1000 or above may register for this course. Linear equations and inequalities, polynomials and factoring, algebraic fractions, operations on radical expressions, rational exponents, quadratic equations, graphing.

1009 Mathematics for Prospective Elementary School Teachers I (3) V Prereq: MATH 0092 or placement by department. Offered by correspondence only. Logic; counting numbers, integers, rational numbers, real numbers; emphasis on field properties; set nomenclature and some number theory; units of measurement.

1010 Mathematics for Prospective Elementary School Teachers II (3) V Prereq: MATH 1009. Offered by correspondence only. Continuation of MATH 1009. Measurement, informal geometry, systems of equations, introduction to probability and statistics.
1015 Basic Mathematics and Applications (3) Prereq: MATH 0092 or placement by department. Credit will not be given for both this course and MATH 1011, 1012, or 1023.

Offered by correspondence only. Basic mathematical skills of graphing, formulas for geometric measurement, systems of linear equations, and an overview of analytic geometry, logarithms and application to exponential growth and decay, triangle trigonometry and its application to geometry and measurement.

1021 College Algebra (3) F,S,Su Prereq: MATH 0092 or placement by department. Credit will not be given for both this course and MATH 1013 or 1015. 3 hrs. lecture; 1 hr. lab. Trigonometric functions and identities, inverse trigonometric functions, graphs, solving triangles and equations, complex numbers, polar coordinates.

1025 Mathematics of Commerce (3) F,S,Su Prereq: MATH 0092 or placement by department. Primarily for students in liberal arts and social sciences. Mathematical approaches to contemporary problems, handling of data, and optimization using basic concepts from algebra, geometry, and discrete mathematics.

1029 Student Success in Precalculus (3) F,S,Su Prereq: MATH 0092 or placement by department. Credit will not be given for both this course and MATH 1015 or 1023. 3 hrs. lecture; 1 hr. lab. Trigonometric functions and identities, inverse trigonometric functions, graphs, solving triangles and equations, complex numbers, polar coordinates.

1027 Calculus I (5) F,S,Su Prereq: MATH 2011 or equivalent. Credit will be given for only one of the following: MATH 1431, 1441, 1550. Analytic geometry, limits, derivatives, integrals.

1030 Introduction to Contemporary Mathematics (3) F,S,Su Prereq: MATH 0092 or placement by department. Primarily for students in liberal arts and social sciences. Mathematical approaches to contemporary problems, handling of data, and optimization using basic concepts from algebra, geometry, and discrete mathematics.

1100 The Nature of Mathematics (3) S,F,Su Not for science, engineering, or mathematics majors. For students who desire an exposure to mathematics as part of a liberal education. An honors course, MATH 1101, is also available. Logic; the algebra of logic; computers, and number systems; networks and combinatorics; probability and statistics.

1101 HONORS: The Nature of Mathematics (3) V Prereq: a grade of "A" in MATH 1021 or consent of department. Same as MATH 1100, with special honors emphasis for qualified students. Logic; the algebra of sets, logic, and networks; probability and statistics; game theory; infinities; famous impossibilities and unsolved problems.

1201 Number Sense and Open-Ended Problem Solving (3) F,S,Su Prereq: MATH 1021. Primarily for students in the elementary education curriculum. Cardinality and integers; decimal representation and the number line; exploratory data analysis; not a problem solving strategies; written communication of mathematics.

1202 Geometry, Reasoning, and Measurement (3) F,S,Su Prereq: MATH 1201. Primarily for students in the elementary education curriculum. Synthetic and coordinate geometry in two and three dimensions; spatial visualization and counting procedures; symmetries and tilings; history of geometry; written communication of mathematics.

1311 Calculus with Business and Economic Applications (3) F,S,Su Prereq: MATH 1021 or equivalent. Credit will be given for only one of the following: MATH 1311, 1441, 1550. 3 hrs. lecture; 1 hr. lab. Differential and integral calculus of algebraic, logarithmic, and exponential functions; applications to business and economics; such as maximum-minimum problems, marginal analysis, and exponential growth models.

1345 Mathematics for Business Administration (3) Prereq: MATH 1431 or equivalent. Offered by correspondence only. Sets and counting; probability; including conditional probability, discrete and continuous random variables, variance, and normal distributions; matrices and echelon method for solving systems of equations; functions of several variables and partial derivatives; optimization problems and exponential growth models.

1441 Calculus with Application to Technology (3) F,S,Su Prereq: MATH 1021 and 1022; or 1023; or consent of department. Credit will be given for only one of the following: MATH 1431, 1441, 1550. Differentiation and integration of algebraic and trigonometric functions; application to technology.
4025 Optimization Theory and Applications (3) Prerequisite: MATH 2085 or equivalent. Basic mathematical tools and techniques for solving optimization problems: n-dimensional geometry and convex sets; classical and search optimization of functions of one and several variables; linear, nonlinear, and integer programming.

4027 Differential Equations (3) Prerequisite: MATH 2057 and 2085. Ordinary differential equations, with attention to theory.

4031 Advanced Calculus I (3) F. Completeness of the real line, Bolzano-Wierstrass theorem and Heine-Borel theorem; continuous functions including uniform convergence and completeness of [a,b]. Riemann integration and the Darboux Criterion.

4032 Advanced Calculus II (3) SI. Derivative, including uniform convergence, the mean value theorem and Taylor's Theorem; absolute and uniform convergence of series, completeness of sequence spaces, dual spaces; real analytic functions; functions of bounded variation, the Stieltjes integral, and the dual of [a,b].

4035 Advanced Calculus of Several Variables (3) F. Prerequisite: MATH 2085 and 3041. Topology in n-dimensional space, differential calculus in n-dimensional space, inverse and implicit function theorems.

4036 Complex Variables (3) F, S. Prerequisite: MATH 2085 and 4031. Elementary analytic functions, integration, power series, residues, and conformal mapping.

4038 Mathematical Methods in Engineering (3) F.S. Prerequisite: MATH 2057 and 2085 and 2090 and 2037. Also offered as ME 4556. Vector analysis; solution of partial differential equations by the method of separation of variables; introduction to orthogonal functions including Bessel functions.

4039 Introduction to Topology (3) V. Prerequisite: MATH 4031 or equivalent. Examples and classification of two-dimensional manifolds, covering spaces, the Brouwer theorem, and other selected topics.

4050 Interest Theory (3) F. Prerequisite: MATH 3355. Measurement of interest (including accumulated and present value factors), annuities certain, yield rates, amortization schedules and sinking funds, and bonds and related securities.

4056 Mathematical Statistics (3) S. Prerequisite: MATH 3355. Suggested for preparation for actuarial exams. Experimental design, sampling methods, nonparametric methods, hypothesis testing, and regression.

4058 Elementary Stochastic Processes (3) S. Prerequisite: MATH 2085 and 3355. Markov chains, Poisson process, and Brownian motion.

4060 Numerical Analysis I (3) F. Prerequisite: MATH 2057; basic programming ability in Fortran, Pascal, or C; Newton's method, Lagnuer interpolation, least-squares approximation, orthogonal polynomials, numerical differentiation and integration, Gaussian elimination.

4066 Numerical Analysis II (3) S. Prerequisite: MATH 4065 and one of MATH 2057, 2085, 2040, 4027. Numerical solutions of initial value problems and boundary value problems for ordinary and partial differential equations.

4153 Finite Dimensional Vector Spaces (3) S. Prerequisite: MATH 2057 or 2085. Vector spaces, linear transformations, determinants, eigenvalues and eigenvectors, and topics such as inner product space and canonical forms.

4158 Foundations of Mathematics (3) V. Prerequisite: MATH 2057 or equivalent. Real number systems, sets, relations, product spaces, order, and cardinality.

4171 Theory of Graphs (3) S. Prerequisite: MATH 2085 or equivalent. Basic mathematical concepts of undirected and directed graphs, trees, connectivity and traversability, planarity, colorability, network flows, matching theory, and applications.

4172 Combinatorics (3) F. Prerequisite: MATH 2085 or equivalent. Topics selected from permutations and combinations, generating functions, principle of inclusion and exclusion, configurations and designs, matching theory, existence of partial differential equations.

4181 Elementary Number Theory (3) F. Prerequisite: MATH 2057 or 2085. Divisibility, Euclidean algorithm, prime numbers, congruences, and topics such as Chinese remainder theorem; and some basic results in number theory.

4200 Abstract Algebra I (3) F. Prerequisite: MATH 2085 or equivalent. Credit will not be given for both this course and MATH 4023. Elementary properties of sets, relations, mappings, integers; groups, subgroups, normal subgroups, quotient groups, homomorphisms, automorphisms, and isomorphism theorems.

4201 Abstract Algebra II (3) S. Prerequisite: MATH 4200 or equivalent. Ideals in rings, factorization in polynomial rings; unique factorization and Euclidean domains, field extensions; applications to number theory.

4325 Fourier Transforms (3) V. Prerequisite: MATH 1552 and at least one from MATH 2057, 2065, 2070, 2085, 2090. For students majoring in mathematics, physics, and engineering. Fourier analysis on the real line, the integers, and finite cyclic groups; the fast Fourier transform; generalized functions; attention to modern applications and computational methods.

4340 Partial Differential Equations (3) V. Prerequisite: either MATH 2057, 2090, and knowledge of Laplace transforms; or MATH 2057, 2065, or 2070 and 2085. First-order partial differential equations and systems, canonical second-order linear equations, Green's functions, method of characteristics, properties of solutions, and applications.

4345 Special Functions (3) V. Prerequisite: either MATH 2057 and 2090; or MATH 2057, 2065, 2070 and 2085. Sturm-Liouville problems, orthogonal functions (Bessel, Laguerre, Legendre, Hermite), orthogonal expansions including Fourier series, recurrence relations and generating functions, gamma and beta functions, Chebyshev polynomials and approximations.

4470 Error-Correcting Codes (3) V. Prerequisite: MATH 2057 or 2090 or equivalent knowledge of linear algebra. Vector spaces over finite fields, basic properties of codes, examples of important codes and decoding schemes, bounds on sizes and rates of codes, the weight enumerator polynomial, perfect codes, and other topics.

4700 History of Mathematics (3) S. Prerequisite: MATH 2040, 2057, and 2095; students entering the course should have a firm sense of what constitutes a proof. This course will have substantial mathematical content; topics such as early Greek mathematics, from Euclid to Archimedes; algebra and number theory from Germain to Cayley to Hilbert; the calculus of Newton and Leibniz; the renewed emphasis on rigor and axiomatic foundations in the 19th and 20th centuries; interactions of mathematics with technology and the natural sciences; biographies of significant mathematicians.

4998 Senior Seminar for Mathematics Majors (3) S. Prerequisite: the student should be within two semesters of completion of requirements for a mathematics major; for undergraduate credit only; under guidance of professor teaching the course, student will undertake several independent reading projects and write expository papers; oral presentations will follow preparation of written papers.

4999 Selected Readings in Mathematics (1-3) S. Prerequisite: consent of department. May be taken for a max. of 9 sem. hrs. credit.

6300 Topics in Mathematics for Secondary Teachers (1-3) V. Prerequisite: MATH 4605 and one of MATH 2040, 2057, 2090. Graduate study designed for teachers; an opportunity for teachers to explore the calculus of Newton and Leibniz; the renewed emphasis on rigor and axiomatic foundations in the 19th and 20th centuries; interactions of mathematics with technology and the natural sciences; biographies of significant mathematicians.

7200 Geometric and Abstract Algebra (3) Prerequisite: MATH 2085 or equivalent. Linear algebra, rings, finite fields, group theory, symmetry, and applications.

7210, 7211 Algebra I, II (3) S. 7210 offered S.; 7211 offered F. Prerequisite: MATH 7200 or equivalent. Groups: Sylow Theorems, finitely generated abelian groups; rings and modules: structure theorems, Galois theory; fields: algebraic, transcendental, normal, separable field extensions; Galois theory, valuation theory, Noetherian and Dedekind domains, topics from commutative rings.

7280 Seminar in Commutative Algebra (1-3) V. Prerequisite: consent of department. May be repeated for credit with the consent of department. Advanced topics such as commutative rings, homological algebra, algebraic curves, or algebraic geometry.

7290 Seminar in Algebra and Number Theory (1-3) V. Prerequisite: consent of department. May be repeated for credit with the consent of department. Advanced topics such as algebraic number theory, algebraic semigroups, quaternions, or algebraic K-theory.

7311 Real Analysis I (3) Prerequisite: MATH 4032 or equivalent. Axioms of choice, Lebesgue measure and integration, convergence theorems, bounded variation and absolute continuity, differentiation, Minkowski-Hauder inequalities, Riesz-Fischer theorem.

7312 Real Analysis II (3) Prerequisite: MATH 7311 or equivalent. Ascoli theorem, Stone-Weierstrass theorem, Hahn-Banach theorem, uniform boundedness theorem, Hilbert spaces, weak topologies, general measure and integration, Riesz representation theorem, other related topics.

7320 Ordinary Differential Equations (3) Prerequisite: MATH 2085 and 4031; or equivalent. Existence and uniqueness theorems, approximation methods, linear equations, linear systems, stability theory; other topics such as boundary value problems.

7325 Numerical Analysis and Applications (3) S. Prerequisite: MATH 2057 or equivalent. The computer representation of real and integer numbers, floating point number systems, error in computation, computer arithmetic, computer organization, and computer languages.

7350 Complex Analysis (3) Prerequisite: MATH 7311 or equivalent. Theory of holomorphic functions of one complex variable; path integrals, power series, singularities, mapping properties, normal families, other topics.

7360 Probability Theory (3) Prerequisite: MATH 7311 or equivalent. Probabilities and expectations, independence, convergence concepts, laws of large numbers, convergence of series, law of iterated logarithm, characteristic functions, central limit theorem, limit theorems, random walk, martingales.

7370 Lie Groups and Representation Theory (3) V. Prerequisite: MATH 7312, 7250 and 7510 or equivalent. Lie groups, Lie algebras, subgroups, homomorphisms, the exponential map. Also topics in finite and infinite dimensional representation theory.

7375 Waves (3) Prerequisite: MATH 7341 or equivalent. Fourier series, Fourier transform; windowed Fourier transform or short-time Fourier transform; the continuous wavelet transform; discrete wavelet transform; multiresolution analysis; construction of wavelets.

7378 Undergraduate Functional Analysis (1-3) V. Prerequisite: consent of department. May be repeated for credit with consent of department. Advanced topics such as topological vector spaces, Banach algebras, operator theory, or nonlinear functional analysis.

7390 Seminar in Analysis (1-3) V. Prerequisite: consent of department. May be repeated for credit with consent of department. Advanced topics such as harmonic analysis, potential theory, partial differential equations, representation theory, several complex variables, or probability theory.

7400 Combinatorial Theory (3) Prerequisite: MATH 7200 or equivalent. Problems of existence and enumeration in the study of arrangements of elements into sets, combinations and permutations; other topics such as generating functions,
MECHANICAL ENGINEERING • ME

2312 Introduction to Mechanical Engineering Design (2) Prereq.: ENGL 1001, CM 1030, PHYS 2101, ME 2533, or equivalent. V Prereq.: consent of department. May be repeated for credit with consent of department. Advanced topics such as advanced engineering design, design methodologies, computer-aided design, and professional ethics; product realization; professional ethics; professional development.

2334 Thermodynamics (4) Prereq.: Grade of "C" or better in CHEM 1202, MATH 1552, PHYS 2101; credit or registration in ME/CSC 2533. Thermodynamic systems and control volumes; heat transfer; properties of pure substances, work and heat; 1st and 2nd law; power and refrigeration cycles; ideal gas mixtures, vapor-mixture mixtures and psychrometric chart; combustion.

2533 Introduction to Engineering Computation (3) 2 hrs. lecture; 3 hrs. lab. See CSC 2533.

2733 Materials of Engineering (3) Prereq.: CHEM 1202 and credit or registration in PHYS 2102. Classification and study of engineering materials, their structure, properties, and behavior; typical metals and alloys, plastics and rubber, and ceramic materials; phase equilibrium and manipulation of properties and behavior by adjustment of composition and processing variables; responses of engineering materials to stress and environmental variables.

3133 Dynamics (3) S, Su Prereq.: Grade of "C" or better in CE 2450 and MATH 1552. 2 hrs. lecture; 2 hrs. recitation. Vectorial treatment of kinematics and kinetics of particles and rigid bodies; force, mass acceleration; impulse and momentum; and work and energy.

3143 System Dynamics and Modeling (3) F Prereq.: CSC/ME 2533 or better in MATH 2090, and credit or registration in ME 3384. Bond graph and lumped-parameter techniques for deriving dynamic equations of physical systems; analysis and frequency domain analyses, numerical simulation of mechanical systems.

3249, 3250 Engineering Practice (1-3,3-1) S, Su Preq.: consent of instructor. Pass-fail grading. A minimum of 6 weeks of full-time employment or transmission participation in a summer program. Same as ENG 3949, 3950. Selected engineering problems in an industrial environment.

3333 Thermodynamics (3) Prereq.: PHYS 2101 and MATH 1552; or equivalent. Not open to mechanical engineering majors who have completed one of the following courses: ENGR 3049, 3050, or equivalent. Credit or registration in ME 2533 or better in MATH 2090, and credit or registration in ME 3384. Bond graph and lumped-parameter techniques for deriving dynamic equations of physical systems; analysis and frequency domain analyses, numerical simulation of mechanical systems.
4743 Deformation and Fracture of Engineering Materials (3) Prereq.: CE 3404 and either ME 2733 or equivalent. Effect of temperature, strain rate, corrosion, and microstructure on stress-strain behavior and fracture of engineering materials, including metals, ceramics, and plastics.

7443 Advanced Heat Transfer (3) Prereq.: ME 2334, ME 2733 or equivalent. Applications of the principles of diffusion, phase transformation, and thermodynamics to describe the kinetics of microstructural evolution in engineering materials.

7453 Fundamentals of Corrosion Science and Engineering (3) Prereq.: ME 2333 or equivalent, and any first course in thermodynamics. Corrosion principles, polarization, passivation, inhibition, and other phenomena; principal methods used in corrosion prevention.

7483 Composite Materials: Manufacturing, Properties, and Design (3) Prereq.: ME 2734 and CE 3404 or equivalent. Constituent materials, micro- and macromechanics, mechanical behavior, fracture, manufacturing and design of components made of composite materials, including polymeric, ceramic, and metal matrix materials.

4843 Gas Dynamics (3) Prereq.: ME 2334; a grade of "C" or better in MATH 2090; or equivalent. Derivation and review of basic equations of compressible fluid flow; reduction of the general problem to 1-D flow; 1-D flow in nozzles with and without friction; 1-D flow with heat addition; normal shock wave, Prandtl-Meyer turn, and oblique shock waves.

4853 Turbomachinery (3) Prereq.: ME 2334, 3834, and 4433. A review of axial- and radial-flow pumps, compressors, and turbines; determination of optimum flow angles and dimensions, blade design, blade selection, and performance prediction.

4933 Advanced Topics in Mechanical Engineering (3) May be taken for a max. of 6 hrs. of credit when topics vary. Two sections may be taken concurrently.

4943 Special Problems in Aerospace Engineering (3) Prereq.: senior standing in mechanical engineering or related discipline. May be taken for a max. of 12 sem. hrs. of credit when topics vary. Acrodynamic problems of special interest and design of water, land, and space transportation systems.

5713 Advanced Vibrations (3) Prereq.: ME 4243 or equivalent. Advanced topics in inverse problems in vibration; active vibration control; dynamic absorption; wave propagation and reflection; numerical methods for controls systems.

5723 Advanced Machine Design (3) S Prereq.: ME 4244 or equivalent.

5724 Bearing Design and Lubrication (3) Prereq.: consent of instructor. Design of fluid flow in bearings; principles of hydrodynamics lubrication and application to journal and thrust bearings; effect of environment on type of lubrication systems and lubricants; heat generation in bearing and heat transfer; compressible fluid and solid lubricants.

7263 Computer-Aided Geometric Modeling (3) S Prereq.: ME 4527 or equivalent. Mathematical elements of modeling complex freeform curves in two and three dimensions for design, analysis, and display; wireframe, surface, and solid geometric modeling; computer graphics and algebraic, constructive, and projective geometry.

7343 Advanced Heat Transfer I (3) F Prereq.: MAT 4016 or equivalent. Steady and transient heat conduction.

7443 Advanced Heat Transfer II (3) F Prereq.: ME 7483 or equivalent. Convection heat transfer.

7453 Advanced Heat Transfer III (3) S Prereq.: consent of instructor. Radiation heat transfer and advanced topics.

5733 Numerical Methods in Applied Mechanics (3) Computer methods used to solve engineering problems; advanced numerical methods.

7683 Advanced Experimental Methods (3) S Prereq.: consent of instructor. 2 hrs. lecture; 3 hrs. lab. Applied course in contemporary analog and digital laboratory tools and techniques.

7683 Advanced Engineering System Dynamics (3) Prereq.: ME 4183 or equivalent. Dynamic system modeling; bond graph, state-determined systems; simulation; controllability/observability.

7643 Advanced System Modeling (3) Prereq.: ME 7633 or equivalent. Mathematical models and dynamic behaviors of complex, large-scale, multi-domain systems; bond-graph modeling methods, simulations using contemporary software.

7673 Advanced Mechanical Systems Control (3) Prereq.: ME 4513 or equivalent. Design and analysis of intricate control systems; adaptive and robust control techniques; state estimation; stability theory; control and stability of distributed parameter systems; inverse problem solutions.

7723 Materials Characterization Using Electron Beam Methods (3) Prereq.: ME 2733. 2 hrs. lecture; 3 hrs. lab. Theory and principles of electron optics, electron microscopy, and spectroscopy; preparation, observation, and characterization of materials by electron beams.

7733 Flow and Fracture in Solids (3) S Prereq.: CE 4440 or equivalent. Plastic deformation of single crystals and polycrystalline aggregates; theories of ductile and brittle fracture; internal friction; fatigue, creep, and stress rupture; residual stresses; plastic forming of metals.


7753 Thermodynamics of Solid Materials (3) Prereq.: ME 2733 and any first level course in Thermodynamics. Review of first and second laws of thermodynamics; material property relationships; chemical equilibrium in reactions; solid solutions and phase diagram enunciations; reaction kinetics and non-equilibrium thermodynamics.

7763 Advanced Corrosion Science and Engineering (3) S Prereq.: ME 4760 or equivalent. Advanced topics in corrosion; stress corrosion, high temperature corrosion, hydrogen embrittlement, etc.; thermodynamics of surfaces and corrosion.

7813 Computation of Boundary Layer Flows and Heat Transfer (3) Prereq.: ME 3834 and 4433 or equivalent, and ME 5553. Different methods for the solution of parabolic or boundary layer equations; use of a computer program for two-dimensional boundary layers; wall boundary layers, jets and wakes, flows in pipes, annuli, nozzles, and diffusers.

7823 Computation of Fluid Flow and Heat Transfer (3) Prereq.: ME 3834, 4433 and ME 4533, or equivalent. Finite-difference methods for incompressible fluid flows; numerical methods for turbulence, radiation, and combustion; their computing implementations; application of prediction procedures for practical situations.

7833 Inviscid Fluid Flow (3) S Prereq.: ME 7883 or equivalent. Potential flow, shock waves, multi-dimensional compressible flow; computational gas dynamics.

7843 Viscous Fluid Flow (3) S Prereq.: ME 7863 or equivalent. Navier-Stokes equations; Stokes and Oseen approximations for low Reynolds numbers; incompressible laminar boundary layer theory; transition; turbulent boundaries, compressibility effects, and numerical methods.

7853 Advanced Boundary Layer Theory (3) S Prereq.: ME 7843 or equivalent. NonNewtonian and turbulent fluid mechanics.

7863 Fluid Dynamics (3) F Prereq.: credit or registration in MATH 4038 or equivalent. Fluid dynamics as continuum mechanics; potential flow using complex variables in two dimensions and superposition in three dimensions; viscous flow and Navier-Stokes equations; compressible flow, including Mach waves, shocks, and linearized aerodynamics.

7901 Seminar (1-2) All graduate students are expected to attend this course every semester; only 1 sem. hr. of credit in this course allowed toward degree. Pass-fail grading.

7903 Independent Study in Mechanical Engineering (3) May be taken for a max. of 6 hrs. of credit. Directed independent study for graduate students.

7933, 7943 Mechanical Engineering Problems (3,3) 7953 Advanced Topics in Mechanical Engineering (3) May be taken for a max. of 6 hrs. of credit when topics vary; with consent of department. Mechanical engineering treatment of various areas of interest.

8000 Thesis Research (1-12 per sem.) "S"/"U" grading.

9000 Dissertation Research (1-12 per sem) "S"/"U" grading.

MEDICAL PHYSICS • MEDP

General education courses are marked with stars (⭐).

⭐ 2051 Radiation Science for Medical Applications (3) F.S Matter and energy; structure of the atom and nucleus; radioactivity; types of radiation; radiation interactions; dose and biological effects; safety; background radiation; applications of nuclear science in medicine, cancer therapy, and imaging.

4101 Trajectory Methodology for Biophysical Sciences (3) F 2 hrs. lecture; 3 hrs. lab. Specifically for students in the biological sciences. Properties of ionizing radiation, instruments for detection and measuring radiation, and bioeffects.

4111 Introduction to Medical Imaging (3) F.S Prereq.: PHYS 2002 or equivalent; MATH 1550, KIN 2500 or equivalent. Physics and engineering aspects of medical imaging systems: X-ray imaging, computed tomography, magnetic resonance imaging, ultrasound, and nuclear medicine; clinical applications, expectations, and limitations of the modalities.

4331 Radiation Protection and Exposure Evaluation (3) F. Prereq.: PHYS 2102 or equivalent. Control and evaluation of radiation exposure in research and medical environments.

4332 Medical Physics and Health Physics Laboratory (1) Prereq.: credit or registration in MATH 2090 or better in MATH 2090; or equivalent. Radiation measurement instrumentation; applied health physics and medical physics exercises in radiation surveys; inspections; exposure calculations.

4351 Radiation Detection and Instrumentation (2) F.S Prereq.: PHYS 4098 or equivalent, credit or registration in MEDP 4352 or consent of instructor. Principles of radiation detection; construction; theory; applications of radiation detection systems; selection, calibration, and electronic matching of systems to counting problems; sophisticated detectors and electronics for measuring various radiation fields.

4991 Special Problems in Medical Physics and Health Physics (1-4) Prereq.: thorough knowledge of mathematics, science, and engineering related to the topic or proposed problem; and consent of instructor. May be taken for a max. of 52 sem. hrs. of credit when topics vary. Theoretical or experimental problems involving the application of medical physics and health physics technology.

4995 Seminar (1) F.S Elective seminar especially for undergraduate minors in nuclear science, and undergraduate majors in physics and astronomy with a concentration in medical physics. Course may be repeated on audit basis only.

7101 Advanced Trazer Methodology for Biological Sciences (3) S Prereq.: MEDP 4101. 2 hrs. lecture/demonstration; 3 hrs. lab. Qualitative and quantitative aspects of tracer applications in modern biological research; combining tracer techniques with other analytical methods.

7111 Advanced Medical Imaging Physics (3) F.S Prereq.: MEDP 4111, 4511, CSCI 2262 or equivalent. Topics related to advanced research and clinical imaging physics; theory of image formation; quantitative analysis of imaging systems by Fourier methods and QC/acceptance testing; radon transform and theory of image reconstruction; tracer methodology for quantitative imaging; topical subjects of current clinical research.

7121 Radiobiology (3) S Prereq.: MEDP 4331 or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Effects of ionizing radiation on cellular, molecular, and organ systems levels of biological organization; study of x-rays, gamma rays, accelerator beams, and neutrons in interaction with living systems; cohesive treatment of radiation biophysics with applications in medical physics and radiation oncology.

7210 Clinical Principles of Radiation Therapy (3) S Prereq.: MEDP 4331, 7121. 2 hrs. lecture; 3 hrs. lab. Clinical principles utilized in the treatment of malignant disease with external beam irradiation and sealed source brachytherapy techniques.

7240 Clinical Cancer Therapy Rotation (3) F.S Prereq.: MEDP 4331, 7121. Clinical rounds under the direct supervision of the medical and clinical physics staff on a daily basis. Performance of dosimetry and treatment planning.
activities for external beam and brachytherapy cancer treatment modalities under medical and physical staff supervision.

7270 Advanced Radiation Therapy Physics (3) S Preq.: MEDP 7256. May be taken for a max. of 4 sem. hrs. credit. Radiation therapy physics; dosimetry; radiation therapy for oncology; and radiation therapy physics

7280 Advanced Clinical Cancer Therapy Rotation (2) S Preq.: MEDP 7256: Sequence to MEDP 7256. May be taken for a max. of 4 sem. hrs. credit. Clinical rotations in medical oncology, hematology, and radiation oncology.

7331 Radiation Therapy Physics (3) F Preq.: MEDP 4351. Methods for measuring and analyzing radiation and absorbed radiation doses in ion-irradiation techniques, photonic methods, solid-state systems, electronic systems, and diagnostic methods, as applied to isotopic and machine sources.

7530 Radiation Shielding (2) F Preq.: credit in Radiation Shielding. Design and analysis of shields, collimators, and compensators in clinical and industrial settings; calculation of output rates, geometric transformations, and attenuating factors associated with photon, neutron, and charged particle attenuation in shielding and other media; computation of dose and dose equivalents with applications in medical physics and nuclear facilities.

7537 Radiation Interactions and Transport (3) F Preq.: PHYS 2202 or equivalent. Selection of computer programs, laboratory experience in computer programming, also offered as PHYS 7537. Photon, neutron, and electron interactions and energy deposition; the Boltzmann equation, elementary analytical solutions; deterministic computer modeling methods including spherical harmonics and discrete ordinates techniques; continuous slowing down and Fokker-Planck approximations.

7538 Monte Carlo Simulation of Radiation Transport (3) S Preq.: MEDP 7537 or consent of instructor. CSC 2282 or equivalent computer programming, also approved as PHYS 7538. Monte Carlo method; phase-space tracking; dose response estimates, biasing methods; integral form of the Boltzmann equation; condensed-history method for charged particles; neutron, photon, and electron transport; shielding of medical physics; and medical physics applications.

7991 Advanced Projects in Medical Physics and Health Physics (1-3) Preq.: MEDP 4101 or 4311, and consent of instructor. Theoretical or experimental problems involving the application of medical physics or health physics technology.

7992 Advanced Topics in Medical Physics and Health Physics (1-3) Preq.: MEDP 4101 or consent of instructor. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Advanced treatment of a specific area of medical physics or health physics technology of current interest.

7995 Seminar (1) F Required every semester for degree candidates in medical physics and health physics. Only 1 sem. hr. of credit may be counted toward degree.

7999 Report Project (1-4) Preq.: MEDP 4101 or 4311; and consent of instructor. May be repeated for credit. Detailed analysis of a technical problem or a comprehensive design project.

8000 Thesis Research (1-12 per sem.) "S"/"U" grading.

**MILITARY SCIENCE • MILS**

Nonimmigrant aliens require approval from their governments prior to enrollment in these courses.

1010 Rifle and Pistol Marksmanship (1) 1 hr. lecture; 1 hr. lab. Restricted to freshmen and sophomores or permission of instructor. Rifle and pistol safety; breathing techniques; zeroing; physical and mental conditioning; sighting and aiming; standard firing positions; practical application on indoor firing range.

1011 First Year Basic Army (1) F,S 1 hr. lecture; 1.5 hrs. lab. Role of the U.S. Army, National Guard, and Reserves; warfare doctrine; the Army's writing style; military briefings; leadership dynamics; drill and ceremonies; other military qualification level I skills.

1012 First Year Basic Army I (1) F,S 1 hr. lecture; 1.5 hrs. lab. MILS 1011 or permission of instructor. General Army unit organization; basic first aid; physical fitness; other military qualification level I skills.

1014 First Year Basic Army II (1) F,S Preq.: MILS 1011 and 1012 or permission of instructor. 2 hrs. lecture; 1.5 hrs. lab. Map symbols and references systems; land navigation; small unit tactics; written and oral communication; other military qualification level I skills.

1016 Second Year Basic Army I (2) F,S Preq.: MILS 1011 and 1012 or permission of instructor. 2 hrs. lecture; 1.5 hrs. lab. Map symbols and references systems; land navigation; small unit tactics; written and oral communication; other military qualification level I skills.

1018 Second Year Basic Army II (2) Preq.: MILS 1011 and 1012 or permission of instructor. 2 hrs. lecture; 1.5 hrs. lab. Placing, organizing, and managing the army forces of small organizations; time management; tactics; branches of the Army; leadership; other military qualification level I skills.

3001 Small Unit Leadership (3) F Preq.: MILS 2161 and 2162 or equivalent. 2 hrs. lecture; 6 hrs. lab. Practical leadership development through repeated application at small unit level. Includes tactical concept and procedures, leadership development, advanced land navigation, oral and written communication, team building, and physical fitness.

3012 Advanced Small Unit Leadership (3) S Preq.: MILS 3011. 2 hrs. lecture; 6 hrs. lab. Continuation of tactical concepts and procedures to include defensive and offensive operations; continues the comprehensive study of staff organization and function, logistics, leadership development, professionalism, and leader training.

3013 ROTC Advanced Camp (3) Su Preq.: MILS 3012 and 3012. To receive academic credit, student must enroll in summer session prior to departure for Advanced Camp. Five week course conducted at an Army post with instructors and cadets representing ROTC programs from the United States, Puerto Rico, and Guam. Intense leadership application and training in military skills; oral and written orders, light infantry tactics and weapons systems, and confidence building events.

4011 Professional Leadership I (3) S Preq.: MILS 3012. 2 hrs. lecture; 6 hrs. lab. Not for graduate credit. Senior standing required. Leadership and fundamental principles that guide Army officers at every stage of a military career.

4012 Professional Leadership II (3) S Preq.: MILS 4011. 2 hrs. lecture; 6 hrs. lab. Not for graduate credit. Senior standing required. Leadership skills in designated command and staff positions and other practical settings; topics include: professionalism, Military Justice System, Supply and Logistics, Personnel and Administration, battle analysis, Code of Conduct.

4055 Civil War I (3) See HIS 4055.

4066 Military History of the United States (3) See HIS 4066.

4130 World War II (3) See HIS 4130.

**MUSIC • MUS**

Applied Music and Ensemble Courses

Admission to applied music courses is by audition only. Secondary and primary applied courses, MUS 2100-2152 and 3100-3154, are offered for 2 or 3 credits. Students who elect 2 credits will receive 60 minutes of individual instruction per week. Graduate applied courses are offered for 2-6 credits.

All applied music and ensemble courses may be repeated for credit every semester.

**APPLIED MUSIC COURSES**

All students registering for 2130-34 and 3130-34 may be required to participate concurrently in one of the following major performing organizations: MUS 4232, 4233, 4234, 4235, 4236, 4250, 4251, 4252, 4254, or 4261.

Secondary Applied Music Courses

These courses are designed for students who are not qualified to either major or minor in the specific instrument designated by the course number.

2130 Secondary Voice (2-3)

2131 Secondary Flute (2-3)

2132 Secondary Harpsichord (2-3)

2133 Secondary Organ (2-3)

2134 Secondary Harp (2-3)

2135 Secondary Violin (2-3)

2136 Secondary Viola (2-3)

2137 Secondary Cello (2-3)

2138 Secondary String Bass (2-3)

2139 Secondary Flute (2-3)

2140 Secondary Oboe (2-3)

2141 Secondary Clarinet (2-3)

2142 Secondary Saxophone (2-3)

2143 Secondary Bassoon (2-3)

2144 Secondary Trumpet (2-3)

2145 Secondary French Horn (2-3)

2146 Secondary Euphonium (2-3)

2147 Secondary Trombone (2-3)

2148 Secondary Tuba (2-3)

2149 Secondary Percussion (2-3)

2151 Secondary Composition (2-3)

2152 Secondary Guitar (2-3)

2153 Secondary Electroacoustic Composition (2-3)

2154 Secondary Jazz Study (2-3)

Primary Applied Music Courses

These courses are for students whose declared major or minor is the specific instrument designated by the course number.

3130 Primary Voice (2-3)

3131 Primary Piano (2-3)

3132 Primary Harpsichord (2-3)

3133 Primary Organ (2-3)

3134 Primary Harp (2-3)

3135 Primary Violin (2-3)

3136 Primary Viola (2-3)

3137 Primary Cello (2-3)

3138 Primary String Bass (2-3)

3139 Primary Flute (2-3)

3140 Primary Oboe (2-3)

3141 Primary Clarinet (2-3)

3142 Primary Saxophone (2-3)

3143 Primary Bassoon (2-3)

3144 Primary Trumpet (2-3)

3145 Primary French Horn (2-3)

3146 Primary Euphonium (2-3)

3147 Primary Trombone (2-3)

3148 Primary Tuba (2-3)

3149 Primary Percussion (2-3)

3151 Primary Composition (2-3)

3152 Primary Guitar (2-3)

3153 Primary Electroacoustic Composition (2-3)

3154 Primary Jazz (2-3)

Graduate Applied Music Courses

7030 Graduate Voice (2-6)

7031 Graduate Piano (2-6)

7032 Graduate Harpsichord (2-6)

7033 Graduate Organ (2-6)
ENGLISH COURSES

Admission to ensemble courses is by audition only, with the exception of 4230, 4232, and 4233. These courses are open to all students, including freshmen and sophomores. Courses marked with an asterisk (*) requirement to participate in a major ensemble each semester.

GENERAL COURSES

Music General education courses are marked with stars (★).

1001, 1002 Voice Class (2-2) Open to nonmajors with consent of instructor. Group instruction in voice production.

1010 In Concert (1) 2 hr. lab. May be taken for a max. of 3 hrs. of credit. An elective course open to all University students; designed to develop proper audience etiquette and to expose students to a wide variety of music performances.

1019 Diction for Singers, I, II, I (1.1) 1 hr. lecture; 1 hr. lab. Phonetics and phonemes used in singing in differing languages; 1018 includes the phonetic alphabet and English diction; 1019 includes the phonetic alphabet and Italian diction.

1020 Performance Craft for Singers (1) Preparatory for MUS 4240. May be substituted for MUS 1018. May be taken for a max. of 2 hrs. of credit. Workshop exploring performing artistry for the singer through individual coaching and class exercises such as movement, dance, and improvisation; stage terms, stage deportment, and stage etiquette; performance anxiety.

1108, 1109 Piano Class (2.2) MUS 1108 or consent of instructor is prerequisite for 1109. Open only to nonmusic majors. Instruction for the beginner and lower intermediate student.

1130, 1131, 1132, 1133 Group Piano I, II, III, IV (1 each) Open only to music majors. Required of all nonmusic majors who do not meet proficiency requirements. Functional use of the piano.

1700 Recital Hour (0) May be repeated. Pass-fail grading. Weekly student recital and music seminar.

1731, 1732 Introduction to Music Study LI, LI (4,4) 3 hrs. lecture; 2 hrs. lab. Grade of “C” or better in 1731 required for registration in 1732. Fundamental elements of music from historical, cultural, and theoretical perspectives; development of skills in reading, notating, and listening to music; cultivation of studying and writing skills.

1733 HONORS: Introduction to Music Study II (4) Same as MUS 1732, with special honors emphasis for qualified students.

★ 1751 Music Appreciation (3) Primarily for nonmusic majors. Credits will not be given for this course and MUS 1755. The art of music, with emphasis on listening skills; a nontechnical approach to understanding vocabulary and materials of music and musical literature with other disciplines in the humanities.

★ 1755 HONORS: Music Appreciation (3) Primarily for nonmusic majors. Credit will not be given for this course and MUS 1751 or 1752. Study of the musical art emphasizing the development of critical listening skills and a non-technical, but thorough musical vocabulary; additional emphasis placed on the historical correlation of both vernacular and art music to corresponding developments in the other arts and disciplines.

★ 1799 Rudiments of Music (3) Not open to music majors.

2000 History of Jazz (3) Open to nonmusic majors. Survey of the evolution of jazz and jazz styles.

2018, 2019 Diction for Singers III, IV (1.1) Phonetics and phonemes used in singing in different languages; 2018 includes the phonetic alphabet and German diction; 2019 includes the phonetic alphabet and French diction.

2053 Survey of Music History I (3) Prereq.: Grade of “C” or better in MUS 1732 or 1733. Music of Western Civilization to ca. 1750.

2054 Survey of Music History II (3) Prereq.: Grade of “C” or better in MUS 1732 or 1733. Music of Western Civilization from ca. 1750 to the present.

2170 Music in American Education in the Elementary School (1) Music fundamentals, materials, methods, and skills involved in teaching general music in the elementary school.

2175 Beginning Folk Guitar (3) Beginning level performance class; emphasis on literature and techniques used in the performance of folk music; basic music theory analysis.

2200 Instrumental and Vocal Techniques (1-1) May be repeated for credit. For prospective secondary school teachers of instrumental music. 2 hrs. lecture; 1 hr. lab. Woodwind, brass, percussion, and strings each may be taken for 2 hrs. of credit; voice may be taken for 1 hr. of credit only. Development of fundamental skills in wind, string, and percussion instruments and voice.

2731, 2732 Music Theory I, II (4,4) Prereq.: Grade of “C” or better in MUS 2731 or 2732. Grade of “C” or better in MUS 2731 is prerequisite for MUS 2732. 3 hrs. lecture; 2 hrs. lab. Basic tonal harmony and voice leading; phrase structure, analysis of musical form and genre; sight-singing and keyboard harmony skills, melodic and harmonic analysis.

2733, 2734 HONORS: Music Theory I, II (4,4) Same as MUS 2731, 2732, with special honors emphasis for qualified students.

2741 Composition Techniques I, II (2-3) Prereq.: permission of instructor. May be taken for a max. of 9 hrs. of credit. Development of basic skills in composition; analysis and audition of selected scores.

2751 Jazz Improvisation I (2) Prereq.: MUS 2732 or equivalent. Introduction to performance course in jazz improvisation; emphasis on its theoretical basis.
47 Post-Nonal Styles and Practices (3) Prereq.: A grade of "C" or better in MUS 3732. Study of principal currents of musical composition in the modern era; analysis of selected works and creative application of techniques, procedures, and formal schemes studied.

4721 Modulation Counterpoint (3) Prereq.: Grade of "C" or better in MUS 2732 or equivalent. Writing and analysis of contrapuntal music with modal bases.

4723 Tonal Counterpoint (3) Prereq.: Grade of "C" or better in MUS 2732 or equivalent. Writing of counterpoint in two and three parts to a given cantus firmus; imitative contrapuntal forms such as the invention and the fugue.

4739 Elementary Orchestration (2) Prereq.: Grade of "C" or better in MUS 2732. Treatment of scoring techniques.

4731 Intermediate Orchestration (2) Prereq.: MUS 4370. Orchestrating for full orchestra including extraordinary instruments; avant-garde orchestral practice.

4735 Jazz Arranging (2) Prereq.: MUS 3732 or consent of instructor. Jazz arranging styles and techniques, from Dixieland to modern jazz.

4740 Business of Music (2) Surveys of contracts, copyrights, economics, and production planning as they relate to performers, teachers, and composers of music in the fields of recording, concerts, publishing, broadcasting, motion pictures, and music theater; copyright; performance rights societies, unions, and guilds.

4745 Computer Music (3) May be taken for a max. of 6 hrs. of credit when topics vary. Focused study of various topics in computer and digital media such as computer music programming, sound diffusion techniques, interactive computer music and digital media systems, internet media applications, analysis of computer music.

4747 Music, Technology, and Society (3) History and critical study of the impact of electronics and recording technologies on the creation and performance of music, and its subsequent impact on the role of music in society.

4749 Seminar in Music History (3) Prereq.: Grade of "C" or better in MUS 2735 and 2734 or equivalent permission of instructor. May be taken for a max. of 6 hrs. of credit when topics vary.

4750 Music of the Middle Ages and the Renaissance (3) Prereq.: Grade of "C" or better in MUS 2735 and 2734 or consent of instructor. The history of music from ca. 800 to 1600.

4753 Folk and Traditional Music: Music History and Literature (2) Baccalaureate history of folk and traditional music; emphasis on Anglo-American folk songs.

4757 Piano Literature I (3) A survey of the keyboard repertoire from the late renaissance through Haydn and Mozart.

4758 Piano Literature II (3) A survey of piano literature from Beethoven to the present.

4761, 4762 The Care and Repair of Band and Orchestral Instruments (1,1) Prereq.: MUS 2300 or equivalent. 2 hrs. lab. For students with experience in instrumental music and a practical knowledge of the problems in instrumental upkeep.

4763, 4764 Piano Methods and Materials (3,3) Materials and techniques for the piano teacher.

4660 Marching Band Techniques (3) Charting techniques for marching bands in contemporary drill design; practical projects in charting drill.

4671 Piano Design, Construction, and the Theory of Tuning and Temperament (2) 1 hr. lecture; 2 hrs. lab. Open only to music majors. Piano and harpsichord design, construction, regulation, voicing, and tunings; knowledge important to pianists; laboratory experience in regulation, tuning, and voicing.

4679, 4770 Supervised Studio Instruction (2,2) Program tailored to needs of each student by the major applied teacher who supervised the student's studio teaching program.

4772 Harp Technology and Maintenance (2) Required of all harp majors. Individual projects and study of harp history and development, design and regulation.

4773 Orchestral Repertoire for Harp (1) Required of all harp majors. May be taken for a max. of 8 hrs. of credit. Independent study of major orchestral excerpts; includes audition preparation.

4774 Harp Pedagogy (2) Required of all harp majors. Independent studies in materials and methods for the harp teacher.

4791 Introduction to Opera (3) Open to majors and nonmajors. History, production, and performance of opera from 1500 to the present.

4796 Senior Project in Music Theory (2) A written project on an approved topic in music theory. Required of all theory students in the composition curriculum.

4797 Senior Recital (1-3) May be taken for a max. of 3 hrs. of credit.

4799 Coaching in Applied Music (2) Open to music students with the recommendation of the appropriate applied music faculty. May be repeated for credit. Max. amount of credit applicable toward a degree is 6 sem. hrs.

4901 Basic Techniques of Audio Recording (3) Basic properties of audio and various forms of sound energy; analysis of complete audio systems for recording and sound reinforcement and individual system components; aspects of stereo concert recording; emphasis on microphone placement techniques; professional music production techniques, including editing and tape duplication.

7001 Keyboard Skills for Pianists (1) Techniques of accompanying, including sight-reading, score reading, transposition, and harmonization.

7003 Advanced German Diction for Singers (1) 1 hr. lecture; 1 hr. lab. The rules of pronunciation and the International Phonetic Alphabet; coaching in the Lied and operatic literature including spoken dialogue.

7007 French Diction for Singers (1) 1 hr. lecture; 1 hr. lab. The rules of pronunciation utilizing the International Phonetic Alphabet; coaching in operatic and song literature; emphasis on research and repertoire.

7029 Advanced Italian Diction for Singers (1) 1 hr. lecture; 1 hr. lab. The rules of pronunciation utilizing the International Phonetic Alphabet; coaching in operatic and song literature; emphasis on research and repertoire.

7121 Seminar in String Literature (2) Methods, solos, and chamber music for strings.

7126, 7127 Seminar in Woodwind Literature I, II (2,2) Methods, solos, and ensemble literature for woodwinds.

7128 Seminar in Brass Literature (3) Methods, solos, and ensemble literature for brass instruments.

7130 Seminar in Percussion Literature (2) Methods, solos, and ensemble literature for percussion instruments.

7170 Advanced Vocal Pedagogy (4) Fundamentals of anatomy, physiology, and acoustics of voice production; emphasis on vocal registers, breath management, and articulation; pedagogical philosophies used to train the classical singing voice in the Western tradition of art song and opera.

7172 Stringed Instrument Pedagogy (2) Methods and materials for instruction in stringed instruments.

7173 Woodwind Instrument Pedagogy (2) May be taken for a max. of 2 hrs. of credit for the M.M. and 2 hrs. of credit for the D.M.A. or Ph.D. Independent studies in the methods and materials for instruction in woodwind instruments.

7174 Brass Instrument Pedagogy (2) Methods and materials for instruction in brass instruments.

7175 Percussion Instrument Pedagogy (2) Methods and materials for instruction in percussion instruments.

7217 Music Technology III (3) Prereq.: MUS 4215, 4216 or equivalent. Production of technological products for music education; theoretical foundations and research; implementation and evaluation of products in an educational setting.

7221 Solo Literature for the Voice (3) Prereq.: MUS 4351 and 4352, or equivalent. Solo vocal literature in German and French; emphasis on styles and traditions.

7222 Solo Literature for the Voice (3) Prereq.: MUS 4351 and 4352, or equivalent. Solo vocal literature by English, American, Italian, Spanish, Russian, Spanish, and Latin American composers; emphasis on styles of performance.

7279 Historical Perspectives of Voice (3) Development of voice technique and pedagogy from the late 17th century to the present; definition of the bel canto style; historical schools of vocal training; examination of historical writings by Tosi, Mascioli, Gaspari Marchesi, Vennard, and other individuals of primary historical eminence.
7271 Principles of Voice Production (3) Prereq.: CMOD 4250 and 4153. Anatomy and physiology of the respiratory, phonatory, and muscular systems used in the production of the human voice; theories of phonation; acoustics of the vocal tract; laryngeal biomechanics; control of fundamental frequency and its relation to overall voice quality. Development of an understanding of the voice and care of the human voice.

7500 Advanced Teaching Practicum (1-2) Prereq.: MUS 4763 and 4764. May be repeated for credit. A total of 3 hrs. is applicable to the M.M. degree. Supervised teaching internship of instrumental and/or vocal music education in group settings.

7501 Piano Pedagogy and Literature (1-2) Prereq.: MUS 4763 and 4764; or equivalent. Piano methods and literature at the elementary and intermediate levels.

7502 Piano Pedagogy and Literature (2) Prereq.: MUS 4763 and 4764; or equivalent. Piano methods and literature at the intermediate and advanced levels.

7521 Instrumental Accompanying (2) May be repeated for a max. of 4 sem. hrs. of credit. Repertoire and techniques of accompanying for instrumental genres.

7522 Vocal Accompanying (2) May be repeated for a max. of 4 sem. hrs. of credit. Repertoire and techniques of accompanying for vocal genres.

7570 College Teaching in Music (3) History of music in higher education; current issues, problems, and techniques of college teaching in music; development of effective college-level teaching skills.

7600 Sources of Music Study & Research (3) Focuses on finding, evaluating, using, and citing materials in print, online, and recorded sources for music research.

7700 Survey of Analytical Techniques (3) Prereq.: MUS 3703 and 3704 or passing of the Music Theory Diagnostic Examination. Survey of analytical tools and concepts for common practice and post-tonal practice.

7701 Pedagogy of Music Theory (3) Prereq.: MUS 3703 and 3704 or successful passing of the Music Theory Diagnostic Examination. Techniques for teaching undergraduate music theory and aural skills courses; comparisons of principal philosophies and textbooks.

7703 Contemporary Musical Practices (3) 6 sem. hrs. applicable to the M.M degree when topics vary; 6 additional sem. hrs. applicable to the D.M.A. degree when topics vary. Compositional trends in contemporary music; discussion of books on composition; analysis of major compositions.

7704 Studies in Schenkerian Analysis (3) Prereq.: MUS 3703 and 3704 or successful passing of the Music Theory Diagnostic Examination. May be taken for a max. of 6 sem. hrs. of credit; 3 sem. hrs. applicable to M.M degree; 3 additional hrs. applicable to Ph.D. or D.M.A. degrees. Ideas and practices of tonal theorist Heinrich Schenker; their effect on modern music and performance in this century.

7710 Theory and Analysis of Tonal Music (3) Prereq.: MUS 3703 and 3704 or successful passing of the Music Theory Diagnostic Examination. Survey of analytical tools and concepts for common practice and post-tonal practice. May be taken for a max. of 6 hrs. of credit when topics vary. Focused study of various topics in computer music such as development of new computer music systems, interactive computer music, multimedia composition, alternative human-computer interfaces for music, sound installations, and advanced analysis of computer music.

7747 History of Electroacoustic Music (3) The history of electroacoustic music; developments in technology, aesthetics, and style since the 1930s; present; survey and analysis of representative music from the genre.

7749, 7750 Special Studies in Piano Literature (3,3) Each course may be taken for a max. of 6 hrs. of credit when topics vary. Focused study of various topics in computer music such as development of new computer music systems, interactive computer music, multimedia composition, alternative human-computer interfaces for music, sound installations, and advanced analysis of computer music.

7746 Advanced Computer Music (3) Prereq.: MUS 4745, or consent of instructor. Advanced use of musical techniques in digital sound synthesis and composition; analysis/synthesis techniques, granular synthesis, physical modelling, interactive computer music, multimedia composition, alternative human-computer interfaces for music, sound installations, and advanced analysis of computer music.

7747 History of Electroacoustic Music (3) The history of electroacoustic music; developments in technology, aesthetics, and style since the 1930s; present; survey and analysis of representative music from the genre.

7748 Advanced Computer Music (3) Prereq.: MUS 4745, or consent of instructor. Advanced use of musical techniques in digital sound synthesis and composition; analysis/synthesis techniques, granular synthesis, physical modelling, interactive computer music, multimedia composition, alternative human-computer interfaces for music, sound installations, and advanced analysis of computer music.

7770 Music in the Romantic Era (3) Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination. History of music from the Romantic period and with the early Romantic; emphasis on performance for performance.

7772 Survey of Wind Literature I (2) A survey of orchestra, large wind ensemble, and large wind band literature (more than 20 performers) from the French Revolution to the present.

7775 Survey of Symphonic Literature I (2) A survey of orchestral literature from the Baroque period of music and ending with the early Romantic; emphasis on performance for performance.

7776 Survey of Symphonic Literature II (2) A survey of orchestral literature from the Baroque period of music and ending with the early Romantic; emphasis on performance for performance.

7779 Advanced Choral Conducting (3) Prereq.: previous study of conducting. Each course may be taken once for the M.M. and once for the D.M.A. or Ph.D. Independent study of the techniques required to conduct all styles of wind music with emphasis on score analysis and performance practices.

7780 Introduction to Research in Music (3) Required of all doctoral candidates; research methodology, report writing. Each master's students who will write theses. Development of music research skills including knowledge of research resources and materials; use of library facilities; practice in a clear and logical writing style; and use of wide variety of methodologies and modes of inquiry.

8000 Thesis Research (1-12 per sem.) May be taken for a max. of 9 hrs. of credit when topics vary. Advanced study in individual subject areas of music.

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NUCLEAR SCIENCE • NS
General education courses are marked with stars (★).

3411 Fundamentals of Nuclear Radiation Science (3) F,S Preq.: one sem. of MATH 1021 or equivalent and one sem. of physics. Radiation effects and properties of materials used in radiation sources; accident sequences; radiation detection and measurement.

4566 Nuclear Reactor Systems (3) F Preq.: credit for or concurrent enrollment in NS 4527. Reactor safety analysis; nuclear power reactor systems and control system analysis.

7520 Nuclear Materials (3) V Preq.: NS 4101 or equivalent. Nuclear materials, principles of nuclear materials, and nuclear systems utilizing radioactive materials.

7527, 7528 Reactor Engineering (3,3) F,S Preq.: consent of instructor. Nuclear reactor system design; theoretical reactor concepts; reactor analysis and design; reactor systems and safety systems.

7556, 7567 Advanced Nuclear Reactor Systems (3,3) F,S Preq.: credit for or concurrent enrollment in NS 4527. Advanced nuclear reactor systems, reactor analysis, reactor design, and reactor operation.

OCEANOGRAPHY AND COASTAL SCIENCES • OCS
General education courses are marked with stars (★).

5010 Introduction to Oceanography (3) An honors course, OCS 1006, is also available. The world’s oceans, their origin and evolution; interactions between physical, biological, chemical, and physical processes in the marine environment; use and abuse of oceans.

1006 HONORS: Introduction to Oceanography (3) Similar as OCS 1005 with special honors emphasis for qualified students. Interaction of biology, chemistry, and physical processes in the ocean; effect of human activities.

2008 Introduction to Marine Sciences: Life Processes (4) 3 hrs. lecture; 3 hrs. lab. Does not satisfy major field course requirement for students in natural science curricula. Also offered as BIOL 208 at Southern University in Baton Rouge. Life and environmental processes in marine and aquatic settings; their influence on coastal Louisiana.

2009 Introduction to Marine Sciences: Geological and Physical (3) 3 hrs. lecture; 1 hr. lab. Does not satisfy major field requirement for students in natural science curricula. Geophysical and physical processes in the oceans and marine environments; their influence on coastal Louisiana.

2010 Introduction to Waves and Beaches (3) Introduction to the physical and geological coastal oceanographic processes that shape the coastal zone; various coastal oceanographic environment types; and coastal processes and human interaction with these environments.

2095 Introduction to Marine Sciences (4) Su only Preq.: credit for or concurrent enrollment in NS 4527. Nuclear reactor systems, reactor analysis, reactor design, and reactor operation.

4001 Special Topics in Oceanography and Coastal Sciences (1-6) May be taken for a max. of 9 sem. hrs. credit when topic varies. Similar as OCS 1005 with special honors emphasis for qualified students. Interaction of biology, chemistry, and physical processes in the ocean; effect of human activities.

4005 Special Field Topics in Oceanography and Coastal Sciences (1-6) Su only May be taken for a max. of 9 sem. hrs. of credit when topic varies. Similar as OCS 1005 with special honors emphasis for qualified students. Interaction of biology, chemistry, and physical processes in the ocean; effect of human activities.

4010 Marine Science for Teachers (4) Su only Preq.: credit for or concurrent enrollment in NS 4527. Nuclear reactor systems, reactor analysis, reactor design, and reactor operation.

4012 Biology of Marine Vertebrates (3) Preq.: credit for or concurrent enrollment in NS 4527. Nuclear reactor systems, reactor analysis, reactor design, and reactor operation.

4021 Weather Analysis and Satellite Meteorology (3) F Preq.: consent of instructor. Differential and integral calculus; vector analysis; wave and heat transfer; ocean currents; atolls; and coastal processes and human interaction with these environments.

4024 Coastal Morphodynamics (3) Preq.: credit for or concurrent enrollment in NS 4527. Nuclear reactor systems, reactor analysis, reactor design, and reactor operation.

4570 Nuclear Reactor Analysis (3) Preq.: credit for or concurrent enrollment in NS 4527. Nuclear reactor systems, reactor analysis, reactor design, and reactor operation.

5001 Principles of Teaching Elementary School Music (3) Preq.: MUED 1000 and MUED 2045. Materials, methods, and current trends in music teaching at the elementary level; curriculum development.


5350 Student Teaching in Music (12) Preq.: see “Requirements for Student Teaching” in the School of Music section of this catalog. 1 hr. lecture; 30 hrs. lab. Pass-fail grading.
4030 Techniques of Research Presentation (1) F S Pass- fail grading. May be taken for a max. of 2 hrs. of credit when topics vary. Guidelines for effective scientific seminar presentations.

4040 Environmental Pollution Transport Processes (3) Prereq.: CHEM 3150, PHYS 2101, and PHYS 2102. Focus on the role of fluid-physical principles to characterize pollutant dispersion and transport processes in an atmospheric, oceanic, and terrestrial environments, particularly across the coastal zone.

4051 Salt Marsh Ecology (4) Su only Prereq.: general biology and 10 semester hours of biology. Four weeks at Gulf Coast Research Laboratory, Ocean Springs, Mississippi. Botanical aspects of local marshes; plant identification, composition, structure, distribution, and development of coastal marshes; biological and physical interrelationships; primary productivity and relation of marshes to estuaries and associated fauna.

4052 Phycology (4) Prereq.: BIOL 1202 and 1209. 2 hrs. lecture, 3 hrs. lab. Prereq.: BIOL 1202.

4090 Marine and Environmental Microbiology (3) F O Prereq.: BIOL 2051 or equivalent. Also offered as BIOL 4052, Phycolgy (4).

4095 Marine Field Ecology (4) Su only Prereq.: general biology, invertebrate or vertebrate zoology, introductory chemistry, and consent of instructor. Five weeks at Louisiana Universities Marine Laboratory, Cocodrie, Louisiana. Relationships of marine and estuarine organisms to environmental factors; interactions among organisms; ecological processes of energy and materials flow; field studies of communities and ecosystems of the Louisiana coastal zone.

4126 Chemical Oceanography (3) S See GEOL 4081.

4128 Wetland Hydrology and Hydrodynamics (3) F Prereq.: MATH 1550, 1552, GEOL 1001 or equivalent. Basic surface water and ground water hydrology in wetland environments with an emphasis on hydrologic principles, application of hydrologic techniques to wetlands, and understanding of hydrodynamics in these ecosystems.

4146 Deltic Processes and Products (3) Prereq.: consent of instructor. River delta formation and associated sedimentary processes with special emphasis on the Mississippi River delta and adjoining coastal, shelf-edge, and slope regions; comparisons of the Mississippi delta with other modern deltas.

4145 Environmental Chemistry of Wetlands (3) F E Prereq.: CHEM 2060 or equivalent. Transformations of pollutants and toxic substances that affect the solubility, bioavailability, and fate of organic and inorganic substances in wetlands; emphasis on biological and physicochemical properties of wetlands that enhance this degradation of organic substances.

4160 Wetland Delineation and Functional Assessment (3) F O Prereq.: one semester course in soils, biology or ecology or consent of instructor; 2 hrs. lecture; 3 hrs. lab. Delineation of wetlands covers wetland soil chemistry, soil taxonomy, hydric soil indicators, hydrophytic plant communities, wetland hydrology; use and interpretation of federal and state wetland delineation procedures; field measurement techniques; wetland functions; functional assessment methodologies in wetland evaluation and mitigation.

4170 Physical Oceanography (3) Prereq.: CE 2200 and graduate standing or consent of instructor. Physics of the ocean; with emphasis on dynamical problems; physical properties of water; wave motion in the ocean; wind-driven currents; topography and bottomography of the ocean's surface; special emphasis on the earth's rotating coordinate system, water waves, general circulation.

4171 Oceanographic Instrumentation (3) F Prereq.: two-semester introductory course in geology. Principles of marine geology; sediments and sedimentation in the marine environment; structure and near shore zone to the abyssal plain; geological effects of bottom currents; sea-level history; geophysical techniques; continental drift and sea-floor spreading: tectonics of the ocean's crust.

4305 Plants in Coastal Environments (3) V Prereq.: one-semester course in biology or ecology; or consent of instructor; 3 hrs. lecture; weekend field trips as needed. Also offered as BIOL 4080. Ecology of Louisiana's major coastal plant communities; emphasis on influence of environmental factors controlling plant distribution and productivity; physiological, morphological, and anatomical mechanisms aiding plant survival; man's impact on Louisiana's coastal plant communities.

4372 Ecosystem Ecology (4) F Prereq.: graduate standing or consent of instructor: 3 hrs. lecture; 2 hrs. lab. Preparation of field trips; synthesis and presentation of data collected on field trips; understanding of major ecosystems; shallow coastal waters, and associated coastal environments; training and field use of equipment required for estuarine research.

4418 Ecosystem Modeling and Analysis (3) F Prereq.: MATH 1552 and knowledge of a programming language. Mathematical description and analysis of ecological systems; emphasis on systems approach using matrix and energy flow models for quantifying and analyzing interdependence and dynamics in ecosystems; linear flow models; dynamic networks of optimization models, stochastic models, and computer techniques for modeling, validation, sensitivity analysis, and parameter optimization.

4465 Coastal Zone Management (1-4) S-O Also offered as MEMP 5365. Written and oral presentation required; special projects relating to the primary field of interest permitted. Resources allocation and environmental quality issues in coastal and estuarine zones of the U.S.; evaluating alternative solutions to topical coastal zone issues; preparing legal devices for meeting the issues, regulations, contracts, and deed restrictions; traditional law courses in water law, environmental law, natural-resources law, and land-use planning.

4500 Fisheries Acoustics (3) Prereq.: 8 sem. hrs. of introductory biology or zoology with laboratory; 6 sem. hrs. of physics. 1 hr. lecture; 6 hrs. lab and field work. Theory and application of acoustics in the study and assessment of living marine resources.

4550 Biological Oceanography (3) S-O Prereq.: two-course undergraduate science sequence above 2000 level; or graduate student status in science department. Participation in oceanographic cruise is generally required. Biology of open oceans, continental shelves, and large river deltas.

4560 Wetland Loss, Restoration, and Management (3) Prereq.: two-course sequence in science above the 2000 level. Participation in field trips to local wetlands and management agencies is required. Coastal wetlands, restoration, and management; wetland values, use, and potential management issues.

4660 Coastal Field Geology (4) Su only See GEOL 4666.

7110 Toxicology of Aquatic Environments (3) S-O Prereq.: consent of instructor. 5 hrs. lecture; 3 hrs. lab. Basic chemistry of marine and environmental toxicology; effects on marine animals and plants; experimental techniques; concentration and toxicology of marine and environmental toxicants.

7119 Oceanography and Coastal Sciences 321

7122 Gravity Waves in Shallow Water (3) V Prereq.: MATH 1530, 1552; PHYS 2101, 2102. Linear and nonlinear theories of water gravity waves considered by classical mathematical derivation and numerical methods; wave transformation in shallow water; characteristics of boundary layer under wave action; wave-related phenomena in near shore zone.

7123 Oceanographic Data Analysis (3.5) F S Prereq.: MATH 1550, 1552; PHYS 2101, 2102. Statistical techniques for analysis of oceanographic time and space series data; spectrum analysis; objective analysis; empirical orthogonal functions and Kalman filters.

7124 Applied Coastal Plant Ecology (3) S Prereq.: 6 sem. hrs. in biology or environmental science. Field trips included. Students are responsible for paying for travel expenses associated with coastal plant ecology; field experiences in coastal habitat restoration and management; applied wetlands' functions, wet-land classification, evaluation and delineation; and environmental assessment monitoring.

7125 Estuarine Dynamics (3) V Prereq.: consent of instructor. Wind-driven and mass-driven currents in estuaries, turbulence and mixing in estuaries, eutrophic, storm surges, internal waves, salt balance, and inlet flows.

7126 Circulation and Mixing in Coastal Waters (3) V Prereq.: OCS 4170. 2 hrs. lecture; 3 hrs. lab. Currents in coastal systems; buoyancy driving, wind driving, coastal jets, long shore pressure gradients; physical conditions controlling hypsometric classification of estuaries; mixing and dispersion of pollutants and oil slicks for environmental management.

7127 Dynamics and Sedimentary Response Features of Coastal Environments. Studies of major dynamical forcing mechanisms and sedimentary–geomorphic responses in major types of coastal environments (deltas, sandy coasts, and coral reef coasts); variability of physical processes and corresponding response features.

7129 Global Climate Change and Wetlands (2) Prereq.: consent of instructor. Impact of projected global climate change on stability and functioning of coastal and interior wetland ecosystems; feedback of biogeochemical changes in wetlands caused by climate change.

7130 Marine Isotope Biogeochemistry (3) F Prereq.: graduate standing or consent of instructor. Concepts and laboratory principles for stable and radioactive isotopes, first-hand experience interpreting isotopic data, modern applications in oceanography and biogeochemistry.

7131 Marine Geochemistry (3) S Geophysical processes in the marine environment, including water column gasses (oxygen, carbon dioxide, sulfuric acid), wave processes, and interactions across the sediment-water interface, and early diagenesis; emphasis uranium-thorium decay series radionuclide applications in marine geochemistry.

7132 Coastal Physical/Chemical Systems: Analytical Methods (3) F-O Prereq.: consent of instructor. 2 hrs. lecture; 3 hrs. lab. Sampling techniques; proper handling and preservation of samples; sample processing for analysis; application of spectrophotometry and chromatography analytical instrumentation for the determination of nutrients, trace and toxic metals, synthetic organics (pesticides and industrial organics), and petroleum hydrocarbons in water, soil, and sediment samples; techniques presented in terms of application of analytical chemistry to environmental and natural systems.

7165 Biogeochemistry of Wetland Soils and Sediments (3) S-E Some as AGRO 7165. Microrgan and redox chemistry processes in fresh water systems; interactions of estuarine-flooded soils and sediments affecting the transformations of nutrients and toxic materials.

7170 Satellite Oceanography (3) F Prereq.: OCS 4170 or equivalent. Oceanographic measurements and observations using satellite-borne sensor systems; radiance-ocean-atmosphere interactions; satellite systems, sensor design, and data types; analysis of infrared, visible, and microwave data for deep ocean, coastal, and estuarine phenomena.

7181 Marine and Estuarine Plankton (3) S-E Prereq.: background in ecology and phytoplanktonology, limnology, or physiology; and consent of instructor. Structure and function of marine plankton populations; changes related to various
4940 Political Philosophy (3) Prereq.: PHIIL 1000 or 2020 or equivalent. Freedom, obligation, authority, justice, law, the state, and revolution.

4946 Philosophy of Law (3) Moral issues in foundations of law and legal authority; nature of law; civil disobedience; principles of punishment; law and morality; moral legislation; Good Samaritan laws; moral basis of contract law.

4984 Phenomenology (3) Prereq.: PHIIL 2035 or 4946 or equivalent. Contemporary phenomenology; reading in Husserl.

4951 Philosophy of Science (3) Prereq.: consent of instructor. Philosophical issues related to concept formation and theory construction in the natural, behavioral, and social sciences.

4952 Topics in Metaphysics (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary. Topics include ontology, modalities, universals, truth, causation, reductionism, identity (physical and personal), realism, and the meaning of life.

4953 Contemporary Analytic Philosophy (3) Prereq.: one logic course and either PHIIL 2035 or 4936. Topics from leading philosophers in such contemporary movements as logical empiricism, formalism, and ordinary language analysis, including Moore, Russell, Wittgenstein, Carnap, Goodman, Ryle, Strawson, and Quine.

4954 Recent Speculative Philosophy (3) Prereq.: two other philosophy courses, being and knowing in recent absolute idealism, process philosophy, and phenomenological existentialism.

4972 Kant's Moral Philosophy (3) Study of selected Kant's works in moral philosophy, including the Metaphysics of Morals, Metaphysics of Morals, and the Critique of Practical Reason, and Anthropology From a Pragmatic Point of View.

4991 Independent Reading and Research (1-3) Prereq.: written consent of instructor. May be taken for max. of 6 hrs. of credit when topics vary. Total credit earned as a graduate student in PHIIL 4991 and PHIIL 7991 combined may not exceed 9 hrs.

7901 Seminar in Contemporary Analytic Philosophy (3) Philosophy of realism, anti-realism, and philosophy of logic and mathematics.

7903 Seminar in Continental Philosophy (3) Major figures and/or movements in continental philosophy.

7905 Seminar in History of Philosophy (3) May be taken for a max. of 9 hrs. of credit when topics vary. Study of a major philosopher at school of philosophy.

7910 Seminar (3) May be taken for a max. of 6 hrs. of credit when topics vary. May be offered as UNG 7910 when topic is appropriate.

7911 Independent Reading and Research (1-6) Prereq.: written consent of instructor and departmental director of graduate studies. Total credit earned as a graduate student in PHIIL 4991 and PHIIL 7991 combined may not exceed 9 sem. hrs.

9000 Thesis Research (1-12 per sem.) “S”/“U” grading.

PHYSICAL SCIENCE • PHSC

General education courses are marked with stars (★).

★ 1001 Physical Science (3) Prereq.: MATH 1021. Credit will not be given for both this course and any other college-level physics course. First half of a two-semester survey course in the physical sciences; topics in the first semester are taken primarily from the field of physics.

★ 1002 Physical Science (3) Prereq.: PHSC 1001. Credit will not be given for both this course and any other college-level astronomy course. Second half of a two-semester survey course in the physical sciences; topics in the second semester are taken primarily from the fields of astronomy, chemistry, and geology.

★ 1021 Physical Science with Laboratory (3) F/S Prereq.: MATH 1201 or 1029. Credit will not be given for this course and PHSC 1001. 2 hrs. lecture; 2 hrs. lab. Exposition of physical science concepts through laboratory investigations; topics such as nature of matter, forces and motion, electricity and magnetism, and the atomic nucleus.

★ 1022 Physical Science with Laboratory (3) F/S Prereq.: MATH 1201 or 1029. Credit will not be given for this course and PHSC 1001. 2 hrs. lecture; 2 hrs. lab. Exposition of physical science concepts through laboratory investigations; topics such as changes in matter, light and color, energy, and observational astronomy.

PHYSICS • PHYS

Prerequisites: All prerequisites in physics courses should be rigorous.

Corequisites: A student may not continue in a course after dropping a corequisite course prior to the last day of the midsemester examination period.

Of the 7000-level courses, those numbered in the 7200s, as well as 7343, 7363, 7383, 7398, and 7411 are offered every year; 7353 and 7373 every other year. All other courses are offered sporadically as interest demands and in order to provide a varied curriculum.

General education courses are marked with stars (★).

1100 Introduction to Physics (3) Prereq.: credit or registration in MATH 1356. Measurement, vectors, kinematics, Newton's laws of motion, wave motion, temperature, the electric field, DC circuits, and geometrical optics.

★ 1201, ★ 1202 General Physics for Physics Majors (1-4) F/S Prereq. for 1201: PHYS 1100 or placement by examination; credit or registration in MATH 1350. Prereq. for 1202: PHYS 1201 and credit or registration in MATH 1352. 4 hrs. lecture/demonstration. Primarily for students intending to major in physics. Credit will not be given for these courses and PHYS 2001, 2002, or 2011, 2102. Fundamentals of classical physics and some concepts of modern physics; calculus and vector analysis introduced and used in development of subject matter.

★ 1208, ★ 1209 General Physics Laboratory for Physics Majors (1-1) F/S Prereq. for 1208: credit or registration in PHYS 1201. Prereq. for 1209: credit or registration in PHYS 2002. 3 hrs. lab. Credit will not be given for these courses and PHYS 2108, 2109, 2120, 2129. Laboratory to accompany PHYS 1201, 1202.

★ 2001, ★ 2002 General Physics (3,3) F/S Prereq. for PHYS 2001: MATH 1022 or 1023; Prereq. for PHYS 2002: MATH 1023. 3 hrs. lecture/demonstration. Credit will not be given for these courses and PHYS 1201, 1202, 2101, 2102. Mechanics, heat, sound, light, electricity, and magnetism; topics in modern physics.

★ 2101 General Physics for Technical Students (3) Prereq.: PHYS 1100 or placement by examination; credit or registration in MATH 1352. Credit will not be given for both this course and PHYS 1201, 2001. Mechanics, wave motion, thermodynamics, and kinetic theory.

★ 2102 General Physics for Technical Students (3) F/S Prereq.: PHYS 2101 and MATH 1352. Credit will not be given for both this course and PHYS 1202, 2002. Electricity, magnetism, physical optics, and topics from modern physics.

★ 2108 Introductory Physics Laboratory (1) Prereq.: credit or registration in PHYS 2001 or 2101. 3 hrs. lab. Credit will not be given for both this course and PHYS 1209. Laboratory to accompany PHYS 2001 and 2101.

★ 2109 General Physics Laboratory (1) Prereq.: PHYS 2108 and credit or registration in PHYS 2002 or 2102. 3 hrs. lab. Credit will not be given for both this course and PHYS 1209. Laboratory to accompany PHYS 2002 and 2102; electricity, magnetism, geometrical and physical optics, and other topics in modern physics.

2111 Elementary Mathematical Physics (3) F Prereq.: PHYS 1202 or 2102; and credit in MATH 1352. Mathematical methods of physics; vector calculus, complex variables, Fourier series, matrices and determinants, differential equations with applications to selected problems in physics.

2813 Introductory Modern Physics (3) F Prereq.: PHYS 1202 or 2102. Elementary modern physics; special relativity, wave/particle duality, quantum mechanics, hydrogen atom, many-electron atoms, nuclear structure, elementary particles, solid state, astrophysics, and cosmology.

2817 Introductory Modern Physics Laboratory (1) F Coreq.: PHYS 2203. Required for physics majors. Laboratory to accompany PHYS 2203.

2221 Introduction to Mechanics (3) Prereq.: PHYS 1202 or 2102 and MATH 1352. Mechanics with emphasis on corresponding mathematical techniques.
7065 Transport Processes in Plants (3) F Prereq.: BIOL 3060. Same as BIOL 7065.

7067 Selected Topics in Plant Physiology (2) F Prereq.: consent of instructor. May be repeated for credit twice. Same as BIOL 7067.

7068 Current Literature in Plant Physiology (1) F.S.May be taken twice for credit in a master’s program and twice in a doctoral program. Also offered as BIOL 7068. Critical analysis of recent literature in the field.

7070 Host-Parasite Interaction and Disease Resistance (3) S-E Prereq.: PLHL 4000 and PLHL 7065; or equivalent. 2 hrs. lecture; 2 hrs. lab. Genetics, physiology, and biochemistry of disease development and resistance in plants; mechanisms of pathogen-host interactions and virulence, susceptibility, and disease consequences. Lecture and laboratory.

7082 Soilborne Plant Pathogens (3) F Prereq.: PLHL 4000 or equivalent. Physiology, ecology, and pathology of soilborne plant pathogens; control strategies including cultural, biological, and chemical disease suppressive soils.

7083 Epidemiology and Crop Loss Assessment (3) S-E Prereq.: PLHL 4000 and 4001 or equivalent. Interactions between plant pathogens and populations and the environment; measurement and prediction of disease spread; increase; disease management strategies; techniques to assess crop losses due to plant diseases.

8000 Thesis Research (1-12 per sem.) S-U"/"U grading. Faculty supervised experiences in plant pathology research, disease diagnosis, and control.

8090 Special Research Problems (1-5) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. credit. Faculty supervised, independent research other than thesis or dissertation.

9001 Dissertation Research (1-12 per sem.) S-U"/"U grading. Doctoral dissertation research.

POLITICAL SCIENCE • POLI

General education courses are marked with stars (★).

★ 1001 Fundamental Issues of Politics (3) F, S, Su Central questions at issue in politics; their significance.


★ 2051 American Government (3) F,S,Su An honors course. May be taken for a max. of 3 sem. hrs. credit. Discussion of the American political system; separation of powers, judicial review, separation of powers, and political parties at local, state, and national levels.

★ 2053 Introduction to Comparative Politics (3) F,S,Su Survey of politics in democratic, post-communist, and developing societies; emphasis on major actors and institutions.

2056 Government of Louisiana (3) F,S,Su Prereq.: POLI 2051 or equivalent. State and local government and politics in Louisiana.

★ 2057 Introduction to International Politics (3) F,S,Su Basic principles, problems, and processes of international politics; evolution and nature of the nation-state; concepts of sovereignty, power, and national interest; patterns of conflict and cooperation; foreign policies of the major powers.

2060 Introduction to Political Theory (3) F,S,Su Basic concepts of analysis of normative and empirical political thought.

2070 Public Policy Making: An Introduction (3) S Sequential process of policy making from problem identification through policy formulation, adoption, implementation, and evaluation of impact; application to such areas as civil rights, welfare, urban affairs, taxation, and government spending.

3000 HONORS: Thesis (3) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. credit.

3001 Bachelor’s Thesis or Research (1-12 per sem.) Prereq.: consent of instructor. May be repeated for credit. Same as BIOL 7067. May be taken twice for credit in a master’s program and twice in a doctoral program.

4010 Research Methods in Political Science (3) S, S Basic components of the research process in political science, including design and structure of research, modes of observation, and techniques of analyzing data.

4021 Budgetary Process and Policy Making (3) Prereq.: POLI 2051 or equivalent. Budgeting by public agencies; impact of political actors, institutions, and processes on budgetary policies at the national, state, and local levels of government.

4022 American Constitutional Law (3) F Prereq.: POLI 2051 or equivalent. Law of the Constitution and place of the Supreme Court in the American political system; separation of powers, judicial review, federalism, and federal powers.

4023 Cooperation and Proportionality in American Politics (3) S Prereq.: POLI 2051 or equivalent. Political relevance of major forms of conflict and cooperation; First Amendment freedoms; rights of criminal defendants and ethnic minorities.

4024 Jurisprudence (3) F Prereq.: POLI 2051 or equivalent. Legal philosophy of natural law, positivism, idealism, sociological jurisprudence, and legal realism; relationships of law, morality, and political culture.

4025 Judicial Politics (3) F Prereq.: POLI 2051. Political role of U.S. state and federal courts; organization, staffing, financing; judicial policy making; public perception of the judicial process.

4026 Campaigns and Elections (3) Prereq.: POLI 2051 or equivalent. Examination of campaigns and elections in the U.S. political system at the national, state, and local levels.

4027 Politics of Sexual Diversity (3) Prereq.: POLI 2051 or equivalent. The political meanings of sexual identity; evolution of lesbian and gay social movements and of political organizations that favor and oppose the expansion of gay rights; law, public opinion and policy-making regarding sexual diversity.

4028 Gender and American Politics (3) S, S Also offered as WGST 4028. The role of gender in the political arena in the United States.

4030 Political Attitudes and Public Opinion (3) V,Beliefs and attitudes among the mass public; emphasis on attitude formation and change.

4031 Political Parties in the United States (3) F Structure and function of political parties at local, state, and national levels; voting studies of presidential elections.

4032 Interest Groups in American Politics (3) V Interest group politics; effect of voluntary organizations on political behavior.

4034 Political Participation (3) V Voting behavior, conventional participation, and political protest and violence; political behavior and public policy.
POULTRY SCIENCE • PLSC

1049 Poultry Science and Production (3) F.S: Principles and practices of commercial poultry production.

2040 Techniques of Judging and Evaluating Poultry and Poultry Products (2) F.S 4 hrs. lab. May be taken for a max. of 4 hrs. of credit when topics vary. Principles and techniques in evaluation of poultry and poultry products.

3001 Apprenticeship in the Poultry Industry (3-6) V Prereq.: junior standing with an overall gpa of 2.50 or on alt work taken at LSU; consent of department head and industry cooperators. May be taken for a max. of 12 sem. hrs. of credit. Pass-fail grading. Supervised work in egg processing, broiler processing, feed manufacturing, hatchery management, or flock supervision for a period of not less than two months.

3900 Poultry Research (1-3) F.S.F.Su Prereq.: consent of department. May be taken for a max. of 6 sem. hrs. of credit. May be taken for a max. of 3 sem. hrs. of credit when topics vary. Topics from current poultry production as poultry production areas.

7016 Advanced Poultry Nutrition (3) S Prereq.: DARY 3010 or equivalent. Current nutritional concepts in the scientific feeding of poultry.

7090 Advanced Laboratory Techniques in Animal Research (4) S-F.S. Prereq.: BIOL 4077 or equivalent. 2 hrs. lecture; 4 hrs. lab. Chemical and physiochemical methods and techniques; modern laboratory materials and equipment.

7091 Poultry Seminar (1-5) F.S Prereq.: consent of instructor. May be taken for a max. of 5 hrs. of credit. Special topics in advanced breeding and genetics.

7093 Advanced Poultry Research (1-5) F.S.F.Su Prereq.: consent of department. May be taken for a max. of 9 sem. hrs. credit. Research in poultry nutrition, breeding, production, and market products.

8000 Thesis Research (1-12 per sem.) “S”/“U” grading.

PSYCHOLOGY • PSYC

General education courses are marked with stars (*).

★ 2000 Introduction to Psychology (3) F.S. 2001, is also available. Understanding, prediction, and control of human behavior.

★ 2001 HONORS: Introduction to Psychology (3) Same as PSYC 2000, with special honors emphasis for qualified students.

★ 2004 Psychology of Adjustment (3) Adjustment mechanisms in normal adults; abnormal behavior and major personality theories.

2011 General Statistics (3) Prereq.: eligibility for MATH 1021, LSU and overall gpa of at least 2.50. Open to psychology majors; open to others with permission of instructor. Machine computation and elementary theory relating to basic statistical techniques; normal distribution, descriptive statistics, statistical inference, product moment correlation, simple rank order correlation, t test, and simple analysis of variance.

2014 Experimental Psychology (3) Prereq.: PSYC 2013 or equivalent. PSYC 2011 and 2017 may not be taken concurrently. 2 hrs. lecture; 2 hrs. lab. Senior college standing required. LSU and overall gpa of at least 2.50. Open to psychology majors; open to others with permission of instructor. Topics in general experimental psychology; sensation, perception, learning, and motivation.

2040 Social Psychology (3) Prereq.: 1 sem. hrs. of psychology or sociology. Cultural forces affecting attitudes, social learning, perception, and communication of individuals and groups.

2060 Educational Psychology (3) Principles of learning, motivation, development, and evaluation as related to the educational process.

2070 Developmental Psychology of the Life Span (3) Prereq.: PSYC 2000 or equivalent. Survey of developmental processes across the life span.

2076 Child Psychology (3) Prereq.: PSYC 2000 or 2060 or equivalent. Psychological and social development of the child.

2078 Adolescent Psychology (3) Prereq.: PSYC 2000 or 2060 or equivalent. Adolescent behavior considered in terms of psychological, social, and physical development.

2099 Undergraduate Practicum in Psychology (1-3) Prereq.: PSYC 2000 or 2001, and consent of instructor; LSU and overall gpa of at least 2.50. May be taken for a max. of 3 sem. hrs. of credit. Student responsible for registering with a faculty member. Individually supervised experience in psychological laboratories and community agencies.

3018 Advanced Experimental Psychology (3) Prereq.: PSYC 2000 or equivalent. 2 hrs. lecture; 2 hrs. lab. Super- vised research in general experimental psychology; selection, design, execution, analysis, and reporting of the psychological experiment.

3020 Psychological Tests and Measurements (3) Prereq.: PSYC 2000 or 2001 and a first course in statistics. Test construction, standardization, validation; intelligence, clerical, mechanical, spatial aptitude tests; interest and personality tests; test batteries.

3050 Introduction to Personnel and Industrial Psychology (3) Prereq.: PSYC 2000 or 2001. Organizational psychology; leadership, job satisfaction, motivation; human relations psychology; human engineering psychology; personnel psychology; industrial, military, and governmental selection, testing, and interviewing; consumer psychology.

3081 Personality (3) Prereq.: PSYC 2000 or 2060 or equivalent. Determinants and dynamics of personality; theory and research.

3082 Introduction to Abnormal Psychology (3) Prereq.: PSYC 2000 or 2060 or equivalent. Abnormal personality and behavior.


3140 Advanced Social Psychology (3) Prereq.: PSYC 2040 or equivalent. Current theories of socialization; existing methodologies and interdisciplinary influences.

3201 Psychological Theories of Religion (3) See REL 3201.

4008 History of Modern Psychology (3) Prereq.: PSYC 2000 or 2001 and 6 additional hrs. of psychology; LSU and overall gpa of at least 2.50. May be taken for a max. of 12 sem. hrs. of credit; open to other matriculated students with permission of instructor. Historical survey of psychology, with reference to schools of psychology.

4017 Intermediate Research Methods (3) See SOCL 4211.

4030 Psychology of Thinking and Decision Making (3) Prereq.: PSYC 2000 or 2060. Experimental methods and research findings on the nature of human thought processes, comprehension, choice behavior, and problem solving.

4031 Sensory and Perceptual Processes (3) Prereq.: PSYC 2000 and 2017, or equivalent. Theories, data, and procedures in classical and modern approaches to sensory and perceptual processes.

4032 Psychology of Learning (3) Prereq.: PSYC 2000 or 2001. Behavior from the standpoint of learning; recent experimental literature in the learning area; major theories of learning.

4033 Psychology of Memory and Forgetting (3) Prereq.: PSYC 2000 or 2001. Major theoretical concepts; review of experimental literature in the field of memory and forgetting.

4034 Physiological Psychology (3) Prereq.: PSYC 2000 or 2060, or equivalent. Functioning of the nervous system with respect to sensation, perception, learning, and motivation.

4035 Drugs and Behavior (3) Prereq.: PSYC 2000 or 2017, or consent of instructor. Modes of action and effects on behavior of therapeutic drugs and drugs of abuse.

4036 Comparative Psychology (3) Prereq.: PSYC 2000 or 2001. Behavioral development across species with reference to evolutionary and genetic factors relevant to understanding human behavior.

4037 Neuropharmacology (3) Prereq.: PSYC 2000 or 2001. Primarily for students in psychology and basic sciences. Basic pharmacology; neurochemical and physiological mechanisms of drug actions on the nervous system; pharmacology of drugs of abuse and psychoactive medications.

4038 Emotion and Motivation (3) Prereq.: PSYC 2000 or equivalent. Experimental procedures, data, and theories in emotion and motivation; physiological relationships.

4039 Madness and Medicine (3) Prereq.: PSYC 2000 or 2001. The history of medical treatments for mental disorders.

4040 Research and Theory in Sexuality (3) Prereq.: PSYC 2000 or 2001 and one additional course in psychology; or KIN 2600. Sexual behavior viewed from different theoretical perspectives; emphasis on empirical sexual research literature.

4049 Advanced Industrial/Organizational Psychology (3) Prereq.: PSYC 2000 and 3030 or equivalent. Research, theory, and applications in industrial/organizational psychology; focus on psychological assessment of job candidates; learning; applied organizational training; emotion, motivation, social processes, cognition in the job setting, and leadership.

4070 Developmental Psychology (3) Prereq.: PSYC 2000 or 2001. Theories of development, contemporary issues, and research findings at successive ages of human development; psychological changes throughout the lifespan.

4072 Developmental Psychology of Adulthood and Aging (3) Prereq.: PSYC 2000 or 2060. Theories, issues, and research findings on psychological changes occurring throughout adulthood and later life.

4080 Applied Behavior Analysis (3) Prereq.: PSYC 4031 or graduate standing. Methods, analysis, and intervention in the application of basic learning principles; emphasis on school applications.

4111 Intermediate Statistics (3) Prereq.: PSYC 2000 or 2001. Preparation for graduate study in statistics and research design in psychology. Continuation of procedures and elementary theory in statistics; analysis of variance, correlation (product moment, partial, multiple, and other methods), and nonparametric statistics.

4146 Advanced Educational Psychology (3) Prereq.: PSYC 2000 or 2001 and 1 additional hrs. of psychology. Psychological theory and research as applied to the teaching-learning process.
4176 Advanced Child Psychology (3) Prereq.: PSYC 2060 and 4 additional hrs. of psychology. Study of problem-solving development, child behavior, and research methodology.

4178 Advanced Adolescent Psychology (3) Prereq.: PSYC 2060 and 4 additional hrs. of psychology. Psychological theories of adolescent behavior and problems.

4999 Independent Reading and Research in Psychology (1-4) Prereq.: LUSU and overall GPA of at least 2.50. May be taken for a max. of 6 hrs. of credit. Open to senior and graduate students. Student responsible for registering with a faculty member and selecting area of reading or research.

7029 Measurement of Behavior (3) Prereq.: PSYC 2011 or equivalent; graduate standing in psychology or consent of instructor. Techniques and theories of behavior measurement: problems of data collection; reliability, validity, design, and analysis of measurement instruments for the psychological sciences.

7030 Cognitive Basis of Behavior (3) Prereq.: graduate standing in psychology or other matriculated graduate students with consent of instructor. Cognitive processes involved in memory, language, decision making; role of cognitive variables in offending behavior.

7034 Biological Basis of Behavior (3) Prereq.: graduate standing in psychology or other matriculated graduate students with consent of instructor. Selected biological systems involving behavior; research in social and organizational psychology.

7060 Professional School Psychology (3) Prereq.: graduate standing in psychology or consent of instructor. Roles and functions of the school psychologist.

7111 Advanced Statistics (3) Prereq.: PSYC 2011 or equivalent; graduate standing in psychology or consent of instructor. Data analysis, regression, factor analysis, multivariate analysis, measures of central tendency; correlation; probability; statistical inference; analysis of variance; multivariate procedures; structural equation modeling; psychological sciences.

7117 Methodology and Research Design (3) Prereq.: PSYC 2011 or 7111; graduate standing in psychology or consent of instructor. Scientific approach to psychological questions, research, design, and methodology; logic and philosophy underlying psychological theory and research; social psychology of the psychological experiment; experimental and quasi-experimental designs; problems in observation and measurement of behavioral variables; methodological and philosophical considerations in analysis of data.

7125 Psychological Assessment 1 (3) Prereq.: graduate standing in clinical psychology or consent of instructor. Clinical assessment techniques including individual tests of intelligence, mental status examination, inventory and behavioral assessment; procedures for both children and adults.

7165 Psychoeducational Assessment (3) Prereq.: graduate standing in psychology or consent of instructor. Assessment in clinical psychology or educational psychology. Instruction and practice in administration and interpretation of individually administered psychological and educational tests and diagnostic achievement techniques.

7166 Nonbiased Assessment in the Schools (3) Prereq.: PSYC 7165 or equivalent; graduate standing in clinical or school psychology or consent of instructor. Methods and problems in psychological assessment including theory and research on test bias; alternatives to standardized tests.

7171 Developmental Disorders and Psychopathology of Children (3) Prereq.: graduate standing in clinical or school psychology or consent of instructor. Theories, research, and contemporary issues related to normal and problem behaviors of children.

7185 Behavior Therapy (3) Prereq.: graduate standing in clinical or school psychology or consent of instructor. Modern treatment and assessment procedures based on learning theory and the biological orientation; as applied to a wide variety of clinical disorders.

7640, 7641 Practicum in Social-Industrial Psychology (1-4, 4) Prereq.: consent of instructor. Each course may be taken for a max. of 4 hrs. of credit. Supervised experience in social-industrial psychology.

7660 School Psychological Consultation (3) Prereq.: graduate standing in psychology or consent of instructor. Instruction and practice in psychodynamic consultation on short-term behavior and academic problems for teachers and other school personnel.

7668, 7669 Practicum in School Psychology (1-4, 1-6) Prereq.: admission to doctoral program in school psychology or consent of instructor. Each course may be taken for a max. of 12 hrs. of credit. Pass-fail grading. Closely supervised experience in schools in which students perform psychodynamic consultation. Each semester the group will consist of members of multidisciplinary teams; case studies include children with specific learning disabilities, behavior disorders, and mental retardation.

7670, 7671 Practicum in Developmental Psychology (1-6 each) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. of credit. Supervised experience in developmental psychology.

7688, 7689 Practicum in Clinical Psychology (1-3, 1-3) Prereq.: consent of instructor and enrollment in clinical psychology training program. 12 sem. hrs. are required. Supervised experience in the application of clinical psychological assessment and intervention techniques with behaviorally disordered populations (adult, child, medical).

7690 Teaching of Psychology Practicum 1 (3) Prereq.: PSYC 7990. Course may be taken for a max. of 4 sem. hrs. of credit. Closely supervised experience in teaching in which students will function as the instructor of record for an undergraduate course in the Psychology department; objectives include enhanced teaching skills and the development of a philosophy of teaching.

7754 Psycholinguistics: Linguistic Perspectives (3) Prereq.: ENGL 4101. See COMD. Also offered as LING 7754.

7925 Psychological Assessment II (3) Prereq.: PSYC 7125 or equivalent; graduate standing in clinical psychology or consent of instructor. Administration and interpretation of objective and projective tests of personality and psychopathology; neuropsychological assessment techniques.

7926 Advanced Personality Diagnosis (3) Prereq.: PSYC 7925 or equivalent; graduate standing in clinical psychology or consent of instructor. Interpretation of assessment techniques; practice in determining differential diagnosis; treatment planning based on assessment techniques.

7927 Psychopathology and Behavior Change (3) Prereq.: graduate standing in clinical psychology or consent of instructor. Theoretical and empirical considerations relevant to psychoanalytic, humanistic, behavioral, and cognitive-behavioral approaches for treating disordered behavior.

7928 Advanced Techniques in Adult Clinical Psychology (3) Prereq.: PSYC 7125, 7185, 7927, and 7982; graduate standing in clinical psychology or consent of instructor. Common assessment methods and empirically supported treatment procedures for the major adult behavior disorders.

7929 Cultural Diversity Issues in Counseling and Therapy (3) Prereq.: graduate standing in clinical psychology or consent of instructor. Issues of individual and cultural diversity training; including definitions of multicultural perspectives, various theories and cultural/ethnic issues regarding counseling of diverse populations; practical strategies of service delivery and current research.

7937 Seminar in Behavioral Neurology (3) Prereq.: graduate standing in clinical psychology or consent of instructor. Neuroanatomy of central nervous system and assessment techniques; neurophysiology and diagnostic criteria.

7938, 7939 Seminar in Experimental Psychology (3,3) Each course may be taken for a max. of 12 hrs. of credit when topics vary.

7947 Advanced Seminar in Behavior Analysis (3) Prereq.: graduate standing in school psychology or consent of instructor. May be taken for a max. of 12 hrs. when topics vary. Theories, concepts, and research methods in behavior analysis; issues in the application of behavior analysis, including assessment and treatment of behavior disorders.

7950 Industrial/Organizational Psychology Internship (3 or 6) Prereq.: completion of general psychology. May be taken for a max. of 12 sem. hrs. of credit. Open only to students nominated by the Department of Psychology and accepted by an approved internship program. May be taken for a max. of 15 sem. hrs. of credit. Supervised evaluation and treatment of individuals manifesting mental disorders.

7999 Professional Considerations in Psychology (3) Prereq.: graduate standing in psychology. Required of all clinical and school doctoral candidates. Professional ethics, practice, and responsibility.

8000 Thesis Research (1-12 per semester) S/U grading. 8939 to 8999 Independent Research (1-6 each) Prereq.: consent of instructor. Each course may be repeated for credit; a max. of 15 sem. hrs. in this series is allowed toward doctoral requirements. Pass-fail grading. Depending on the area of independent research, students register for research in:

8939 Experimental Psychology

8949 Social Psychology

8959 Industrial Psychology

8979 Developmental Psychology

8989 Clinical Psychology

8999 Personality Psychology

9000 Dissertation Research (1-12 per semester) S/U grading.

PUBLIC ADMINISTRATION • PADM

5010 Statistical Methods for Public Administration (3) Prereq.: college algebra or equivalent; lab. Open only to students in the M.P.A. program. Also offered as ISDS 5010. Descriptive measures for populations and samples;
basic probability theory; distributions of discrete and continuous random variables; hypothesis testing and estimation for means, variances, and proportions; measures of association; regression analysis; index numbers; applications in public administration.

5400 Microeconomic Theory for Policy Analysis (3) Open only to students in the M.P.A. program or by consent of instructor. Also offered as ECON 5500. Concepts and analytical tools; their relevance for decision and policy making in public and nonprofit sectors; theories of demand, production, cost, market structures, and distribution; analysis of economic policies and problems, efficiency criteria, social impacts, and limitations of the market system.

7010 Decision Models for Public Administration (3) Open only to students in the M.P.A. program. Also offered as ISDS 7010. Models for decision making under conditions of certainty, risk, and uncertainty; statistical decision making with and without information; linear programming, using graphical and simplex methods; transportation and assignment problems; project management usingPERT and CPM; forecasting models; cost-benefit analysis; current topics in public administration.

7610 Healthcare Organization and Finance (3) Overview of effective management of healthcare organizations, including understanding of their historical development and future opportunities; current issues relating to financing, regulation, reimbursement, managed care systems, and system integration.

7620 Strategic Management of Healthcare Organizations (3) Cross-listed with MGT 7620. Strategic planning and development of healthcare organizations focusing on long-term viability issues, including financial decisions with organizational goals and consumer health.

7640 Legal and Ethical Issues in Health Care Management (3) Cross-listed with MGT 7640. Issues in the delivery of health care including patients’ rights, organizational responsibilities, malpractice issues, relationships among patient, providers, insurers, governmental influence in health care management, patient-provider relationships, advanced technology and medical alternatives, working with limited resources, and organizational efforts to deal with ethical issues.

7710 Public Financial Management (3) Cross-listed as FIN 7710. Financial management of public agencies, including sources of financing for different levels of governments, debt financing, and capital budgeting, as well as other related topics.

7800 Independent Study in Public Administration (3) Prereq.: at least 15 credit hours of graduate work; prior written approval of faculty supervising work. May be taken for a max. of 6 hrs. of credit. Independent study by M.P.A. student.

7850 Public Administration Internship (3) Prereq.: at least 15 credit hours of graduate work completed and approval of the Director of the M.P.A. Program. Required of all pre-service M.P.A. students. Work within a federal, state, or local government unit, nonprofit or private concern interfacing with the public sector; regular meetings with faculty; submission of a research paper and successful final evaluation. Internship is designed to connect academic and professional training to actual work experience.

7851 Public Administration Practicum (3) Prereq.: at least 15 sem. hrs. of graduate coursework completed and approval of the Director of the M.P.A. Program. Required of all M.P.A. students. In-service students will be determined by the M.P.A. Director. Related academic and professional training to work experience associated with the student’s present employment; regular meetings with faculty and preparation of research paper indicating relationship between principles of public management and work activities.

7900 Public Administration Colloquium (3) Required of all M.P.A. students in program. Research project required. Legal, ethical, economic, political, and management principles used in assessing public administration topics; policy roles and union issues.

7902 Seminar in Public Policy (3) Also offered as POLI 7902.

7910 Public Administration Theory and Practice (3) Contents and boundaries of public administration as discipline; topics include historical development of public administration as a field of study; organizational theory; professional ethics; policy development; management techniques to enhance productivity and performance; leadership; diversity; and other relevant issues for public managers; case studies intensively.

7911 Organizational Analysis for Public and Nonprofit Organizations (3) Analyzing elements of effective organizational structures in public and nonprofit sectors, and the development of diagnostic skills to improve performance; incorporates organizational behavior and theory in the study of achieving effectiveness, efficiency, and growth.

7912 Public Personnel Policy Explores human resource policies and issues in the U.S. federal government; processes of personnel administration; traditional aspects of personnel administration including recruiting, job classification, evaluation, and compensation; current topics include workforce diversity, drug abuse, whistle blowing, sexual discrimination, labor relations, and other relevant issues.

7914 Public Budgeting (3) Introduction to public budgeting; study of budget techniques; importance of budgeting in policymaking; and understanding the budget process.

7916 State and Local Government Administration (3) Examination and analysis of how state and local governments are structured and how they are managed; case studies will be used to illustrate state and local administration; current issues relating to financing, regulation, zoning, delivery systems of local.

7917 Program Evaluation (3) Prereq.: PADM 5010 or equivalent course in statistics. Also offered as POLI 7917. Assessing whether programs designed to advance the public good are reaching their goals; examining program objectives, social context in which program operates, developing research designs to assess particular programs; use of statistical analysis in measuring program elements, and developing indicators to monitor public program.

7920 Ethics in the Public Service (3) Examination and analysis of ethical dilemmas involving professional reasoning play in the practice of public administration; overview of dominant schools of classical ethical thought, including works of Plato, Aristotle, Kant, Rawls, and Bentham, and leading ethical theories such as consequentialism, deontology, virtue ethics, and ethical relativism; readings, case studies, and experiential exercises will be used to explore the role of ethics in public service.

7925 Seminar in Nonprofit Management (3) Overview of principal management functions as applied to nonprofit organizations.

RELIGIOUS STUDIES • REL

General education courses are marked with stars (★).

★ 1000 Religions of the World (3) Primarily for non-majors. Survey of the religions of the world such as Hinduism, Buddhism, Judaism, Christianity, Islam, and indigenous religious traditions.

1001 Beginning Hebrew (4) See HEBR 1001.

1002 Beginning Hebrew (4) See HEBR 1002.

1004 Old Testament (3) Scholarly study of the Hebrew Bible (Old Testament) in the background of the history and religious life of ancient Israel.

1005 New Testament (3) Introduction to the history, religion, and literature of early Christianity from about 30 to 150 CE; emphasis on the writings of the New Testament and the methods by which scholars study them.

1006 HONORS: New Testament (3) Same as REL 1005, with special honors emphasis for qualified students.

1007 HONORS: Old Testament (3) Same as REL 1004, with special honors emphasis for qualified students.

1015 HONORS: Introduction to Religion (3) Same as REL 1010, with special honors emphasis for qualified students.

2000 Introduction to the Study of Religion (3) Thematic introduction to the academic study of religion; ways of being religious; forms of religious utterance; beliefs and rituals; the place of religion in human life.

2001 Faith and Doubt (3) Intellectual sources of religious doubt; alternatives to traditional Judeo-Christian religion, including existentialism, Freudianism, and psychological behaviorism.


2010 HONORS: Introduction to Religion (3) Primarily for honors students and students concentrating in religious studies. Ideas about Jesus from antiquity to the present, including the modern quest for the historical Jesus.

2027 Asian Religions (3) Survey of the history, beliefs, and practices of the major religions of Southern and Eastern Asia, focusing on Hinduism, Buddhism, and the religions of China and Japan.

2028 Philosophy of Religion (3) Same as PHIL 2028. Meaning of religion as a persistent phenomenon in human societies; faith and reason, nature of divinity, arguments for and against God’s existence, religious knowledge and experience, and conflict, the problem of evil.

2029 Judaism, Christianity, and Islam (3) Survey of the history, beliefs, and practices of these three related religions.

2030 HONORS: Judaism, Christianity, and Islam (3) Same as REL 2029, with special honors emphasis for qualified students.

2034 Indigenous Religions (3) Introduction to the religions of the indigenous peoples of “First Nations” of the Americas, Africa, and Australia.

2120 The Holocaust (3) Responses of Judaism and the Christian church to Nazi Germany’s killing of the Jews; issues about God, human morality, Western civilization, and modernity.

2925 Independent Study/Tutorial (1) Prereq.: 3 sem. hrs. of religious studies courses and at least 2.50 GPA. May be taken for a max. of 3 hrs. of credit when topics vary. Readings, conferences, and reports under faculty direction.

3004 Archaeology and the Bible (3) Also offered as ANTH 3004. Major figures and discoveries influencing the historical study of the Bible, emphasis on exegetical and discovery of written documents and inscriptions.

3005 Paul and Early Christianity (3) Paul’s writings in historical context; assessment of his place in the development of the church; significant themes in his theology.

3101 Special Topics in Religious Studies (3) May be taken for a max. of 12 hrs. of credit when topics vary.

3135 Christian Philosophy (3) See PHIL 3135.

3228 Mysticism (3) Mystical religious experience in eastern and western religion; some attention to shamanism in the occult; mystical grounds for belief in God.

3303 Native American Religions (3) Survey of native North American religious traditions. Some topics to present; including issues of conversion and Christianization, freedom of religion, and gender.

3501 Apocalypse: Then and Now (3) Ideas about the end of the world from antiquity to the present; emphasis on the book of Revelation and its continuing influence.

3509 Comparative Mythology (3) See CLST 3109.

3502 Fundamentalism and Religious Nationalism (3) Also offered as INTL 3502. Investigates how the phenomenon of fundamentalism manifests itself in combinations of religion and politics in various countries around the world as a response to “modernity.”

3109 Judaism (3) Religious texts, faith, and practice in Judaism, from antiquity to the present.

3101 American Judaism (3) American Jewish history; Judaism as a cultural entity in the United States.

3102 American Catholic History (3) Roman Catholicism in its North American context: the European heritage; immigration; political, intellectual, and devotional life.

3104 Ancient Hebrew Prophets (3) Prophetic movement in ancient Israel; different modern interpretations of prophecy.

3124 The Literature of the English Bible (3) Also offered as ENGL 3124.

3201 Psychological Theories of Religion (3) Also offered as PSTC 3201. Use of various psychological theories to explain religious belief and practice, conversion experiences, ritual acts, and altered states of consciousness.

3202 Religion and Parapsychology (3) Extraordinary human experiences such as faith healing, death and dying, conversion, apparitions, and witchcraft, examined from the perspective of religious phenomenology, philosophy, and psychology.

3236 Literature and Religion: An Overview (3) See ENGL 3236.

3238 Religion and Film (3) Interaction between religion and film; approaches to the analysis of religion in film; emphasis on shared literary grounds.

3300 Women and Religion (3) Role of women in the religions of the world.

3786 The Religion of Islam (3) Also offered as INTL 3786. Introduction to the major religious and cultural dimensions of the Islamic world, both those that express its diversity and those that express its continuity; emphasis on the
7250 Seminar: Theoretical Study of Religion (3) Method, theory, and approaches in the study of religion; emphasis on classical and recent works in the discipline.

7600 Seminar: Western Religions (3) May be taken for a max. of 6 hrs. of credit when topics vary. Modern critical study of Western religions; relationship between religion and Western culture.

7700 Seminar: Asian Religions (3) May be taken for a max. of 6 hrs. of credit when topics vary. Texts, ideas, and practices of major religions; sociological, anthropological, historical, and psychological issues.

7990 Independent Study (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary.

RENEWABLE NATURAL RESOURCES • RNR

General education courses are marked with stars (★).

★ 1001 Natural Resource Conservation (3) F,S Relation of humans to the natural environment; ecology and conservation of soil, water, forest, range, wildlife, and fisheries resources.

1002 Issues in Natural Resource Management (1) F,S Prerequisite: Credit or registration in RNR 1001. Discussions of the ecological, social, economic, and political factors that affect human relationships with the natural environment and the exploitation and conservation of water, forest, range, wildlife, and fisheries associated with this course.

1003 Introduction to Wildlife Management (2) F,S Life history, habitat requirements, and management of wildlife; emphasis on species of sporting and economic value; careers in wildlife management.

1004 Conservation of Forest Resources (2) F,S Resources of forest and range land, including wood, wildlife, recreation, forage, and water; techniques of multiple-use management of forest lands.

2001 Dendrology (3) F,S 1 hr. lecture; 6 hrs. lab. Students are responsible for paying for travel expenses associated with this course. Study of the various trees of the U.S.; their identification, classification, nomenclature, and distribution. Examination of the historical, biological, and economic significance of trees.

2002 Introduction to Fisheries and Aquaculture (3) F,S History and scope of fisheries and aquaculture; production and harvest of economically important aquatic vertebrates and invertebrates; role of fisheries and aquaculture professionals in society.

2031 Principles of Wildlife Management (3) F Wildlife conservation and management; ecology and management of wildlife in relation to the objectives of consumptive and nonconsumptive interests.

2039 Introduction to Renewable Natural Resource Policy (3) F,S Development and implementation of policies in renewable natural resources; current environmental issues.

2043 Wood Science and Forest Products (3) F,S 2 hrs. lecture; 3 hrs. lab. Structural components of wood and identifying characteristics; basic physical properties; manufacture and uses of forest products.

2061 Problems in Natural Resource Management (1-4) F,S★ Prerequisite: Credit or registration in RNR 1001, 1002. General ecological principles tied to the conservation and management of plant and animal populations; emphasis on how populations interact in communities and ecosystems.

2102 Natural Resources Measurements (2) F,S★ 1 hr. lecture; 3 hrs. lab. Students are responsible for paying for travel expenses associated with this course. Field exercises in designing and conducting timber and multipurpose cruises; boundary location and other types of land surveying associated with forest resource management.

2201, 2210, and 2220, 2230, 2240. Two weeks of field practice. Students are responsible for paying for travel expenses associated with this course. Field tours of a range of forestry practices and field experiences in various silviculture practices.

2232 Study in Silviculture (1) F,S★ Prereq.: RNR 2001, 3002, and 3103. One week of field practice. Students are responsible for paying for travel expenses associated with this course. On-site studies of wood manufacturing facilities; exercises in product/ raw material relationships.

2304 Silvicultural Prescriptions (1) F★ Prereq.: RNR 3002 and 3103. One week of field practice. Students are responsible for paying for travel expenses associated with this course. Practical development of silvicultural prescriptions incorporating elementary economic analysis and silvicultural principles.

3041 Forest Practicum (1-4) F,S,Su 1-4 weeks practicum. Students are responsible for paying for travel expenses associated with this course. On-site study of the forested objectives and issues in forested ecosystems not found in the West Gulf Coastal Plain; experience gained through on-site tours and discussions with various natural resource professionals.

3103 Forest Biometrics (2) F★ Prereq.: RNR 2102, 2102, and MATH 1431. Principles in measuring trees, standing and standing value, and other forest resources; sampling and inventory techniques; statistical inference.

3105 Forest Biology (2) F★ Prereq.: RNR 2101. This is an 8-week course. The general University drop/add dates do not apply. The instructor will provide students with the drop/add dates established by the Office of the University Registrar. Topics include: tree anatomy, tree growth, tree physiology, forest genetics, and forest socioeconomics. Students are responsible for paying for travel expenses associated with this course. On-site study of the forested objectives and issues in forested ecosystems and sustainable management of forests.

3106 Timber Harvesting (2) F,S★ 1 hr. lecture; 3 hrs. lab. Students are responsible for paying for travel expenses associated with this course. On-site study of forest objectives and issues in forested ecosystems.

3404 Photogrammetry, GPS and GIS (3) F★ Prereq.: Permission of department. 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for travel expenses associated with this course. Principles, interpretation, and use of aerial photos, Global Positioning Systems (GPS), and Geographic Information Systems (GIS) in land measurements and forest management applications.

3505 Field Studies in Wildlife Habitat (2) F★ Prereq.: RNR 2101. This is an 8-week course. The general University drop/add dates do not apply. The instructor will provide students with the drop/add dates established by the Office of the University Registrar.
Methods of harvesting timber crops; logging equipment, planning, road layout, legal and social issues, environmental concerns, financial analysis of logging operations, and contracts; field trips and practical exercises included.

3107 Wood Procurement (2) Prereq.: RNR 3102. 3 hrs. lecture. Students are responsible for paying for travel expenses associated with this course. This is a 8-week course. The general University drop/add dates do not apply. The instructor will provide students with drop/add dates established by the Office of the University Registrar. Methods of purchasing and marketing timber crops; practical aspects of purchasing systems; value assessments, wood specifications, human relations, negotiations, ethics, competitive bidding; legal and social issues; contracts; records; wood storage; and global aspects; field trips and practical exercises included.

3108 Case Studies in Habitat Restoration (2) Prereq.: RNR 2101. 1 hr. lecture, 3 hr. lab, 2 weekend field trips. Students are responsible for paying for travel expenses associated with this course. This is a 5-week course. The general University drop/add dates do not apply because this is an 8-week course. The instructor will provide students with drop/add dates established by the University Registrar. Principles related to the context, planning, design, and implementation of habitat restoration and mitigation; evaluation of habitat restoration efforts using the case study method.

4002 Fisheries Literature and Communication (3) F 2 hrs. lecture; 3 hrs. lab. Organization and communication of technical fisheries literature.

4011 Wildlife Management Techniques (4) V Prereq.: RNR 2031 and E&EN 2201. 2 hrs. lecture; 6 hrs. lab. Weekend field trips. Students are responsible for paying for travel expenses associated with this course. Resource-oriented recreation in the forest; demand and supply; recreational planning and development of forest lands and waters; basic recreation management policies and principles.

4022 Principles of Aquaculture (4) Prereq.: RNR 2001 and E&EN 2201. 8 sem. hrs. of introductory zoology and 8 sem. hrs. of introductory biology or equivalent; 3 hrs. lecture; 3 hrs. lab with occasional field trips. Students are responsible for paying for travel expenses associated with this course. Principles underlying aquaculture of fish, crustaceans, and mollusks.

4023 Marine Natural Resources (3) S Survey of the biology, harvest, and management of commercially important marine organisms throughout the world; emphasis on stock trends and the effects of biological and socioeconomic factors on development of management programs.

4025 Limnology (3) Prereq.: Biol 1201, 1208 and CHEM 1201, 1202, 1212 or equivalent. For the biology, harvest, and management of commercially important marine organisms throughout the world; emphasis on stock trends and the effects of biological and socioeconomic factors on development of management programs.

4035 Ecology and Management of Upland Wildlife (3) F 2 hrs. lecture; 3 hrs. lab; extended field trips. Students are responsible for paying for travel expenses associated with this course. Ecology and management of wildlife in upland habitat; recreational leasing of forest land; current issues related to wildlife and land management; population survival, extinction, and evolution; conservation and management of wildlife populations; endangered species, management of threatened species, and preventing their extinction.

4036 Forest Management (4) Prereq.: ECON 2030 or AGEC 2003 or equivalent; RNR 3036, 3037, and 3040. 3 hrs. lecture; 3 hrs. lab. Forest management and silviculture; management of a single stand, even-aged and uneven-aged management, decision criteria, and decision variables, management of timber systems; timber harvesting; forest taxation and valuation; management of many stands; harvest scheduling.

4037 Biology of Fishes (3) Prereq.: RNR 4145 or consent of instructor. Morphological, physiological, and behavioral adaptations of fishes to their environments; relationships between fish biology and fisheries management.

4038 Forest Resource Economics (3) F Prereq.: ECON 2030 or AGEC 2003 or equivalent. Economic theory applied to forest resources and their utilization; structure of the forest products market, demand of forest products, timber supply and stumpage price; resource conservation and endangered species protection; taxation and government programs.

4039 Sustainable Natural Resources Policy (3) S History of forestry and forest legislation; development and evaluation of policies in forestry, wildlife, and fisheries; current issues.

4040 Fisheries Management (3) F Characteristics of fisheries; fisheries dynamics; socioeconomic aspects of fisheries; fisheries management and research techniques; managing wild fisheries stocks.

4042 Forest Products Marketing (3) S Marketing principles; forest products industry, structure, marketing activities, and competition in a global environment.

4044 Mechanical and Physical Properties of Wood (3) V Prereq.: RNR 2045 or equivalent. 2 hrs. lecture. Standard laboratory testing procedures, basic strength determination, working stresses, and timber design.

4047 Seasoning and Preservation (4) V Prereq.: RNR 2043 or equivalent. 3 hrs. lecture; 3 hrs. lab. Principles of lumber drying and wood preservation; economics of the lumber industry.

4050 Industrial Forestry Operations (2) F Survey of major forest products corporations; upper management personnel; corporate strategies; relationships among employment and personnel trends; wood procurement, land management, environmental concerns.

4051 Wildlife Habitat Management (3) Prereq.: RNR 2011, 2031, and 2032; 2 weekend field trip. Students are responsible for paying for travel expenses associated with this course. Principles of managing landscapes to benefit a diversity of wildlife species, as well as specific management strategies to benefit single species; management scenarios for a variety of forested, open and urban habitats will be discussed.

4061 Problems in Natural Resource Management (1) F, S, Su May be taken for a max. of 6 sem. hrs. credit. Independent or directed study.

4063 Forest Tree Improvement (3) Prereq.: RNR 1002 or permission of instructor. Genetic basis of variation in natural populations of forest trees; principles for using this variation to obtain genetically superior trees; techniques of genetic testing, selection, breeding, and genetic engineering; methods for in situ and ex situ conservation of genetic resources.

4103 Silviculture and Management of Hardwoods (4) V Prereq.: RNR 3002 or consent of instructor. 3 hrs. lecture; 3 hrs. lab. Students are responsible for paying for travel expenses associated with this course. 8-week course. The general University drop/add dates do not apply. The instructor will provide students with drop/add dates established by the Office of the University Registrar. Forest fire control and southern forest silviculture; field trips, one weekend field trip. Ecology, silviculture, and management of hardwood forest ecosystems; improvement, conservation, and use for forest products, wildlife habitats and other amenities.

4104 Quantitative Silviculture (4) F Prereq.: RNR 3040. Techniques in growth-and-yield modeling, density management, and creation of desirable forest attributes.

4105 Aquaculture Production Systems (3) Prereq.: BIOL 1201, 1208 or equivalent. General biology and culture techniques of tilapia, tilapia, koi, catfish, and other fish species.

4106 Techniques in Limnology and Fisheries (2) Prereq.: junior, senior, or graduate standing and permission of instructor. Taught Internship only. 1 hr. lecture; 1 hr. lab. Students are responsible for paying for travel expenses associated with this course. Quantitative techniques in habitat, water quality, and fish population assessment in freshwater ecosystems.

4107 Human Dimensions in Natural Resources (3) F Prereq.: RNR 2018, 6 hrs. social science general education electives. Human behavior as related to management and use of natural resources.

4108 Ichthyology (4) See BIOL 4145.

4115 Hydrology of Natural Landscapes (3) Prereq.: AGRO 2031 and MATH 1431 or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Hydrologic processes and principles of natural landscapes; understanding of characteristics and role of water in environment; concepts for water resources management and water quality protection.

4609 Topics in Marine Zoology (2-6) See BIOL 4600.

4900 Watershed Hydrology (3) F See ENVS 4900.

7001 Research Methodology (3) F Planning, conducting, and reporting of research in the renewable natural resources.

7002 Advanced Silviculture (3) S-O Silvics and silvicultural practices related to the commercially important Southern tree species, especially the pines.

7003 Advanced Forest Soils (3) S-E Prereq.: AGRO 2051 or equivalent. 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for travel expenses associated with this course.

7004 Forest Ecophysiology (3) S-O Prereq.: BIOL 3060 and RNR 3105 or consent of instructor. Whole-plant physiological responses that affect survival, growth, and reproduction of forest trees and other woody plants; effects of various forest site factors on tree growth; business output, employment and personnel trends; wood procurement, land management, environmental concerns.

7011 Mammalian Ecology and Management (2) S-O Prereq.: 3 hrs. lecture; 3 hrs. lab. Students are responsible for paying for travel expenses associated with this course. Management, ecology, and conservation of selected mammals of North America.

7012 Ecology and Management of Waterfowl (4) F-O 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for travel expenses associated with this course. Behavioral and physiological adaptations of waterfowl throughout the annual cycle; population dynamics and habitat management; political and economic aspects of harvest management in North America.
Native speakers of Russian will not receive credit for courses marked with an asterisk (*).

General education courses are marked with stars (★).

4010 Topics in Russian Literature in Translation (3) May not be taken for graduate credit. Selected authors or themes.

4011 Introduction to Russian Literature (3) Also offered as LING 4609. Russian phonetics, morphology, and history of the Russian language.

1915 Independent Work (1-3) May be taken for a max. of 6 hrs. of credit. Permission of department required. Readings in Russian literature directed by a senior faculty member.

5950 Senior Project (3) Prereq.: RUS 2002 or equivalent and senior standing. May be taken for a max. of 6 hrs. of credit. Required of Russian Area Studies majors. May not be taken for graduate credit. Interdisciplinary research project on a topic in Russian literature.

7003 Seminar in Russian Literature (3) May be taken for a max. of 15 hrs. of credit when topics vary.

Additional information concerning the School of Social Work is available from the School of Social Work Bulletin.

2000 Introduction to Social Work (3) The profession of social work; professional values; history, development, and current social and political concerns.

3000 Perspectives in Contemporary Social Welfare (3) Prereq.: SW 2000 or equivalent. Changing concepts of social welfare; issues, policies, and proposals related to meeting economic and developmental needs.

3012 Child and Adolescent Development (3) Common and particular needs of children in the community; social welfare services developed by communities for care and training of children.

3030 Skills in Working with People (3) Basic skills in working with people; understanding attitudes; use of community resources.

3077 Juvenile Delinquency (3) Nature and extent; social, psychological, and political factors in causation and treatment of delinquent children; how communities are organized to help troubled youth and to prevent inception and spread of juvenile problems.

3011 Community Services and the Aged (3) The aged population and their needs; available resources and services in the community; assistance to the aged in obtaining services; implications for the future.

4000 Modern India: Society and Culture (3) Also offered as GEOG 4600. Interdisciplinary analysis of political-cultural issues of contemporary pan-Indian society.

4003 Penology (3) Development of the penitentiary in society; punishment versus rehabilitation; problems in operating adult prison units.

4095 Groups and Social Work (3) Use of groups in social work; types of groups, dynamics, decision making processes and worker roles.

4020 Computers, Crime, and Justice (3) Historical trends, current research issues, emerging technological developments, and alternative theoretical frameworks for studying the impact of computerization on crime and criminal justice.

4022 Correctional Administration, Management, and Supervision (3) Current issues in the management and supervision of American and international corrections organizations; role of policy in correctional administration; effects of organizational theory and human resource management practices; personnel supervision and training; program planning; effects of court intervention; current health care issues, including AIDS and drugs; privatization.

4070 Special Topics in Social Work (3) May be taken for a max. of 9 hrs. of credit when topics vary. Selected topics on social work practice and social welfare services.

4075 Comparative Health Care Issues (3) Focus on the British National Health Service (NHS) and the United States managed health care system; comparison of current health care programs and cost-control policies in the United Kingdom with those in the United States.

4080 Special Topics in Applied Correctional Policy (3) May be taken for a max. of 9 hrs. of credit when topics vary.

4090 Corrections Internship (3) Prereq.: 2.50 gpa, 60 hrs. of coursework, three hrs. from SW 4020, 4922, 4800, or consent of instructor. Field study/placement in a corrections institution under the supervision of a faculty member.
4500 Crisis Intervention (3) Prereq.: 2.50 gpa, 60 hrs. of course work, 3 hrs. from SW 4020, 4922, 4980, or consent of instructor. May be taken for a max. of 6 hrs. of credit.

4500 Medical Social Work (3) Prereq.: SW 7004, 7005. Sociobehavioral models of human behavior and their influence on social work processes; application of theory to practice situation.

7001 Human Behavior and the Social Environment I (3) Prereq.: majors only and credit for or concurrent registration in SW 7003, 7004, 7005, and 7007. Development of social work as a profession; evolution of social welfare policies and programs; nature of social policy and policy formulation.

7002 Human Behavior and the Social Environment II (3) Prereq.: SW 7001; majors only and credit for or concurrent registration in SW 7006, 7008, 7009, 7010. Sociobehavioral base of social work practice; relationship of biological, psychological, social, and cultural determinants of human behavior; major biopsychosocial developmental achievements and adaptations of human beings from conception through death.

7003 Social Welfare History and Policy (3) Prereq.: majors only and credit for or concurrent registration in SW 7001, 7004, 7005, and 7007. Development of social work as a profession; evolution of social welfare policies and programs; nature of social policy and policy formulation.

7004 Human Diversity and Oppression (3) Prereq.: majors only and credit for or concurrent registration in SW 7001, 7004, 7005, and 7007. Social dynamics of human behavior; oppression; effects of institutional discrimination, inequality, stigma, and prejudice stemming from racism, sexism, ageism, and classism; implications of human oppression and multiculturalism for human behavior, social work practice, and social policy.

7005 Social Work Practice I (3) Prereq.: majors only and credit for or concurrent registration in SW 7001, 7004, 7005, and 7007. Introduction to social work theory, principles, and social intervention skills common to social work practice with individuals, families, and groups.

7006 Social Work Practice II (3) Prereq.: SW 7005. Majors only and credit for or concurrent registration in SW 7001, 7004, 7005, 7008, 7009, and 7010. Techniques of working with various types of groups including treatment groups and planning action groups; community organization techniques.

7007 Foundation Field Internship I (3) Prereq.: majors only and credit for or concurrent registration in SW 7001, 7004, 7005, and 7007. Pass-fail grading. $100 internship fee. Application of foundation knowledge, skills, values, and ethics to practice in an approved internship agency. 240 clock hours.

7008 Foundation Field Internship II (3) Prereq.: majors only and credit for or concurrent registration in SW 7002, 7006, 7008, and 7010. Pass-fail grading. $100 internship fee. Continuation of SW 7007. Application of knowledge, skills, values, and ethics to practice in an approved internship agency. 240 clock hours.

7009 Social Work Research (3) Prereq.: majors only and credit for or concurrent registration in SW 7002, 7004, 7008, and 7009. Diagnostic and treatment tools for examining the functionality of human behavior in the context of diverse social systems.

7201, 7202 Integrative Colloquium in Social Work I, II (3) Prereq.: admission to the Ph.D. program in social work or consent of instructor. Review of aging analysis and discussion of problems and issues in the social work profession.

7202 Issues and Research Problems in Social Policy (3) Prereq.: admission to the Ph.D. program in social work or consent of instructor. Issues and problems in social welfare policy; research focus on policy formulation.

7203 Advanced Research Methods in Social Work (3) Prereq.: admission to the Ph.D. program in social work or consent of instructor. The present state of knowledge in social work research; assessment of appropriate research methodologies.

7204 Issues and Research Problems in Social Work Intervention (3) Prereq.: admission to the Ph.D. program in social work or consent of instructor. Social work intervention with individuals, families, groups, and communities; formulation and development of problem-solving research agenda.

7205 Pedagogical Issues in Social Work Education (3) Prereq.: admission to the Ph.D. program in social work or consent of instructor. SW 7202 and at least one of EXST 7001, 7013, or SW 7435. No more that 6 hrs. may be taken in one semester. Hands-on supervised research experience; demonstration of collaborative and/or independent research.

7207 Integrative Seminar (3) Prereq.: Foundation courses in Ph.D. program and at least one research methods course, plus consent of instructor. Development of research questions and hypotheses, and initial drafts of the dissertation proposal, including introduction, literature review, and methodology sections.


7307 Direct Practice with Children and Adolescents (3) Prereq.: completion of all foundation courses. Maladaptive patterns of behaviors and problems; intervention strategies with children, parents, families, and groups.

7308 Social Work with Groups: Theory and Practice (3) Prereq.: SW 7006. Dynamics of social work with groups; members’ behavior and corresponding worker roles and responses.

7309 Advanced Methods of Group Treatment (3) Prereq.: consent of instructor. Diagnostic and treatment procedures used in intensive group therapy.

7402 Social Work in Corrections (3) Social work processes in corrections; population served; existing and needed delivery systems for rehabilitative services; influence of the host setting.

7403 Social Work and Aging (3) Demographic characteristics of the aging population; aging as a developmental process with economic, biological, psychological, and socialization impacts; impact of legislative and social service systems.

7404 Social Work Practice in Schools (3) Implementation of social work values, purposes, and methods in a school setting.

7405 Marital and Family Treatment in Social Work (3) Prereq.: completion of all foundation courses. Identification and modification of dysfunctional transactional patterns; facilitating communication; improving the quality of marital and family relations.

7409 Law and Social Work (3) Prereq.: completion of all foundation courses. Relationship of law to social work; statutes, cases, and doctoral materials in personal and family breakdown; programs for income maintenance; Supreme Court cases concerning criminal justice, juvenile courts, and the rights of the confined.

7410 Comparative Social Welfare (3) Prereq.: SW 7003 and/or consent of instructor. Comparative analysis of international social welfare systems; differential cross-national social services; similarities and differences among nations.

7412 Social Work in Medical Care (3) Nature of social work practice in the field of medical care; medical care system and consumer problems; role of medical social workers.

7415 Child/Family I (3) Theories and skills of assessment and communication with children and families.

7416 Child/Family II (3) Prereq.: completion of all foundation courses. Legal and administrative functions in working with children and families.

7435 Data Analysis and Research Management (3) Prereq.: SW 7009 or consent of instructor. Data collection, analysis, and general research management; research strategies and analytical techniques; data collection and execution of selected research instruments; manual and computer processing of data.

7455 Management in Human Services (3) Prereq.: completion of all foundation courses. Management used in the effective provision of social services; techniques of modern management; interdisciplinary and practical approaches; unique aspects of human service management; development of critical attitudes and values, and ethics to practice in an approved agency setting. 240 clock hours.

7501 Program and Practice Evaluation (3) Prereq.: completion of all foundation courses; majors only and credit for or concurrent registration in SW 7002, 7005, 7008, 7010, 7009, 7004, 7006. Types of research, and instruments used in social work; research processes from hypothesis and collection of data to conclusion.

7502 Advanced Field Internship I (3) Prereq.: majors only and credit for or concurrent registration in SW 7001, 7002, 7003, 7004, 7006. Pass-fail grading. $100 internship fee. Supervised internship in an approved agency setting where advanced knowledge, skills, values, and ethics are applied in the practice setting. 240 clock hours.

7503 Advanced Field Internship II (3) Prereq.: majors only and credit for or concurrent registration in SW 7001, 7002, 7003, 7004, 7006. majors only and credit for or concurrent registration in SW 7001, 7002, 7003, 7004, 7006. Advanced methods of effective individual, family, and group treatment of systemic issues in a holistic perspective.

7506 Community and Agency Contexts for Direct Practice (3) Prereq.: majors only and credit for or concurrent registration in SW 7001, 7002, 7003, 7004, 7005, 7006. Community, organizational, and social aspects of social work practice; indirect practice skills associated with effective social work practice in multiple service environments.

7701 Task-forced Group Interaction in Social Work (3) Interaction of small groups in social work practice; emphasis on understanding barriers to goal-directed interaction and on helping groups accomplish tasks.

7801 Family Violence (3) Topics in family violence; their relevance to social work practice; program development and interventional approaches and issues.

7803 Grant and Proposal Writing for Human Service Organizations (3) Prereq.: completion of all foundation courses. Methods of accessing federal, state, and private funds; developing grant and contract proposals.

7804 Addictive Disorders in Contemporary Society (3) Topics related to addictive disorders and addictive behavior in the contemporary society; their relevance to social work practice.

7807 Special Topics in Social Work (3) Prereq.: consent of instructor. May be taken for a max. of 12 sem. hrs. of credit when topics vary. Selected topics on social work and social welfare theory, practice, and policy.

7809 Independent Reading and Research in Social Work Practice (3) Prereq.: consent of instructor. May be repeated once by Ph.D. students if topics vary.

7806 Independent Reading and Research in Social Welfare Policy (3) Prereq.: consent of instructor. May be repeated once by Ph.D. students if topics vary.

7807 Public Policies and the Aging (3) Public policies that affect quality of life for the elderly. Older American’s Act, Social Security Act, Medicare and Medicaid policies.

7808 Social Development: International Perspectives (3) Concepts of social development; extent of social under-development in the modern world; theories and normative perspectives of social and national modernization.

7999 Research Project: Nonthesis (3) Prereq.: completion of foundation courses and consent of instructor. Pass-fail grading. Research project, state of knowledge paper, or position paper.

8000 Thesis Research (1-12 per sem.) Prereq.: completion of all foundation courses and consent of instructor. "S"/"U" grading.

8090 Dissertation Research (1-12 per sem.) Prereq.: successful completion of the General Examination. "S"/"U" grading.
General education courses are marked with stars (★).

★ 1001 Human Societies (3) Comparative and historical analysis of human societies; major patterns of social change.

1005 Social Life in the United States (3) Open only to international students. An orientation course on people, culture, social institutions, and processes.

1481 Introduction to Science, Technology, and Society (5) Sociological analysis of knowledge-generating institutions of science and technology, and public understanding of science.

1701 Population Issues (3) Social demography; interrelationships between population and society.

★ 2001 Introduction to Sociology (3) Major subject areas and principles of sociology.

★ 2002 HONORS: Introductory Sociology (3) Same as SOCL 2001 with a special honors emphasis for qualified students.

2091 Selected Topics in Sociology (3) May be taken for a max. of 6 hrs. of credit when topics vary.

2201 Introduction to Statistical Analysis (4) 1 hr. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. Open to sociology majors; open to others with permission of instructor. Descriptive statistics; inferential statistical methods including confidence interval estimation and hypothesis testing for one and two population means and proportions; one-way analysis of variance; simple linear regression and correlation; analysis of categorical data.

2211 Methods of Sociological Research (3) Prereq.: SOCL 2001 and 2201; or equivalent. Open to sociology majors; open to others with permission of instructor. Scientific methods and their application in sociological research, including problem selection, research design, measurement, data sources, and evaluation of data.

2351 Rural Sociology (3) Not open to students who have credit for or are enrolled in SOCL 4351. Sociological concepts related to rural life; social bases of human behavior, social inequality, social institutions, and social change.

★ 2601 Gender (3) Social organization in industry; relation of industry to community and society.

2501 Current Social Problems (3) Sociological analysis of major social problems in contemporary society; focus on both the institutional and personal causes and consequences.

2505 Marriage and Family (3) Current issues and trends regarding marriage and family.

2511 Race Relations (3) Also offered as AABS 2511. Examines relations among persons of different racial groups in an interdisciplinary setting that includes sociological, psychological, political, anthropological, and historical viewpoints.

2721 The City (3) Comparative study of urban communities and their problems.

2741 Sociological Perspectives on the South (3) Prereq.: SOCL 2001 or equivalent. Society and culture in the South; the region's uniqueness, diversity, and order of change.

3101 Sociological Theory (3) Prereq.: SOCL 2001 or equivalent. Open to sociology majors; open to others with permission of instructor. Dominant theorists and schools of thought in sociology.

3371 Sociology of the Criminal Justice System (3) Prereq.: SOCL 1001 or 2001 or equivalent. The criminal justice system as a social institution.

3501 Deviance of Society (3) Prereq.: SOCL 2001 or equivalent. Sociological theories of deviant behavior; supporting research on mental illness, crime, sexual deviance, drug abuse, and suicide.

3505 Poverty in the United States (3) Prereq.: SOCL 2001 or 2501 or equivalent. Definition of poverty, its meaning, measurement, causes; impact of historical, legal, and social factors on women's and men's employment and career opportunities, pay equity, and occupational experiences.

4401 Politics and Society (3) Prereq.: SOCL 2001 or equivalent. Comparison of social movements and political parties.

4431 Sociology of Education (3) Prereq.: SOCL 2001 or equivalent. Education as an institution of society; the school as a social system and its role in education.

4441 Sociology of Religion (3) Prereq.: SOCL 2001 or equivalent. Nature of religion; societal and cultural factors in religion; role of religion in social change and in contemporary society.

4451 Sociology of Medicine (3) Prereq.: SOCL 2001 or equivalent. Sociological analysis of the structure and functions of health agencies and occupations; social and cultural factors in the cause and treatment of illness.

4461 Criminology (3) Prereq.: SOCL 2001 or equivalent. Crime, the criminal justice system, and penology.

4462 Sociology of Youth & Crime (3) Prereq.: SOCL 2001 or equivalent. The sociological study of adolescent deviance and crime; the socio-demographic correlates and social psychological causes of youthful offending and the juvenile justice system.

4471 Sociology of Law (3) Prereq.: SOCL 2001 or equivalent. Law and social change; evolution of legal institutions; group conflict and law; influence of legal controls and sanctions on human behavior.

4481 Science, Technology, and Society (3) Prereq.: SOCL 2001 or equivalent. Scientific institutions and development; nature of technological decision making; reciprocal effects of scientific and societal change.

4511 Minority Peoples in the United States (3) Prereq.: SOCL 2001 or equivalent. Analysis of past and present contributions of ethnic and racial minority groups in the U.S.

4521 Sex Roles in Contemporary Society (3) Prereq.: SOCL 2001 or equivalent. Changes in sex roles and sex-related behavior of males and females, including institutional and structural changes.

4531 The Aged in Contemporary Society (3) Prereq.: SOCL 2001 or equivalent. Social, demographic, psychological, cultural, and social factors related to the aging process in contemporary society.

4551 Sociology of Development (3) Prereq.: SOCL 2001 or equivalent. Central concepts, perspectives, and research themes in sociocultural developmental change.

4601 Personality and Social Structure (3) Prereq.: SOCL 3601 or PSYC 3140 or equivalent. Social structure of the personality; cultural factors related to its formation and change.

4611 Attitudes and Attitude Change (3) Prereq.: SOCL 3601 or PSYC 3140 or equivalent. Analysis of groups, their structure and functions.

4631 Social Networks and Society (3) Prereq.: SOCL 2001 or equivalent. Processes of network formation and their consequences for people, groups, and organizations.

4701 Population (3) Prereq.: SOCL 2001 or equivalent. Processes that influence size and composition of human populations; determinants and consequences of demographic trends.

4711 Human Ecology (3) Prereq.: SOCL 2001 or equivalent. Explores the relationship of human organizations to the environment, emphasizing interdependence of population, technology, and organization in adaptation to a population to its environment.

7121 Seminar: Classical Sociological Theory (3) Prereq.: consent of instructor. Historical survey of sociology with primary emphasis on European (Marx, Weber, and Durkheim) and early American (Mead and Park) sociologists.

7131 Seminar: Contemporary Sociological Theory (3) Prereq.: SOCL 7121 or equivalent. Current theoretical perspectives in sociology, with an emphasis on structural functionalism and ethnomethodology.

7201 Research Methods in Sociology (3) Prereq.: SOCL 2201 or equivalent. Introduction to inferential methods in sociological research; emphasis on interpretation and current research.
7203 Advanced Research Methods in Social Science (3) Prereq.: SOCI 7201 or equivalent. Also offered as POLI 7983. Survey of advanced methodology in the social sciences; emphasis on general linear model and causal models.

7211 Seminar: Methods of Social Investigation (3) Prereq.: EDPC 2101 or equivalent. Research methods in the social sciences; interplay of theory and methods of research; formulation of research problems and design; measurement and scaling; the ethics in research; and critiques of social science research.

7213 Specialized Topics in Social Science Methods (2-3) Prereq.: SOCI 7203 or POLI 7965 or equivalent. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Also offered as POLI 7964.

7351 Seminar: Topics in Rural Sociology (3) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. credit if topics vary. Specialized areas in rural sociology.

7391 Seminar: Topics in Social Organization (3) Prereq.: consent of instructor. May be taken for a max. of 12 sem. hrs. credit if topics vary. Specialized areas in social organization.

7491 Seminar: Topics in Social Institutions (3) Prereq.: consent of instructor. May be taken for a max. of 12 sem. hrs. credit if topics vary. Specialized areas in social institutions.

7591 Seminar: Topics in Social Issues (3) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. credit if topics vary. Specialized areas in social issues.

7691 Seminar: Topics in Social Interaction (3) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. credit if topics vary. Specialized areas in social interaction.

7791 Seminar: Topics in Population and Ecology (3) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. credit if topics vary. Specialized areas in population and ecology.

7901, 7902 Independent Reading and Research (1.3) Prereq.: successful completion of at least one year of graduate work.

7903 Seminario in Sociology (1) Required twice of both master's and Ph.D. candidates. Pass-fail grading. Contempory research strategies in sociological issues in sociology.

8000 Thesis Research (1-12 per sem.) “S”/“U” grading.

8900 Research in Sociology (1-4) Open only to students engaged in a specific, organized research project under faculty supervision. Student must be engaged in design and implementation of research and analysis and interpretation of data.

9000 Dissertation Research (1-12 per sem.) “S”/“U” grading.

SPANISH • SPAN

Native speakers of Spanish will not receive credit for courses marked with an asterisk (*)

General education courses are marked with stars (★).

★ 2102 Intermediate Spanish (3) F,S,Su Prereq.: SPAN 2101 or equivalent. An honors course, SPAN 2104, is also available. Continuation of SPAN 2101.

★ 2103 HONORS: Intermediate Spanish (3) F,S,Su Same as SPAN 2102, with special honors emphasis for qualified students.

★ 2104 HONORS: Intermediate Spanish (3) F,S,Su Same as SPAN 2102, with special honors emphasis for qualified students.

★ 2154 Intermediate Oral Communication (3) V Prereq.: SPAN 2102 or equivalent. Development of listening and speaking competency.

★ 2155 Spanish Textual Commentary (3) F,S,Su Prereq.: SPAN 2102 or equivalent. Oral and written commentary on a variety of genres and nonprint media in Spanish.

2156 Advanced Oral Communication (3) Prereq.: SPAN 2154 or equivalent, and credit or registration in SPAN 2153, or consent of instructor.

3001 Tutoring Learners of Spanish as a Second Language (1) Prereq.: SPAN 2155 or equivalent, EDCC 2001 and concurrent enrollment in EDCC 2001. 3 hrs. lab/field experiences in multicultural settings. A carefully monitored and evaluated Spanish tutoring experience in a local middle or high school under the guidance of the course instructor and a mentoring teacher.

3002 Developing Language Lessons for Spanish as a Second Language (1) Prereq.: EDCC 3001, SPAN 3001, and concurrent enrollment in EDCC 3001. Lab/field experiences in multicultural settings. Under the supervision of a Spanish faculty member and a teacher mentor, teacher candidates in this course will prepare and deliver second language Spanish lessons that incorporate audiovisual materials and technology-enhanced language learning activities.

3010 Advanced Spanish Grammar and Composition (3) F,S,FPrereq.: Credit or registration in SPAN 2155.

3020 Literary Analysis (3) F,S,F Prereq.: SPAN 2155, 2156, and 3010. Literary genres and their characteristics; critical reading and analytical writing.

★ 3034 Introduction to Latin American Literature I (3) Prereq.: SPAN 3020. Reading and analysis of representative selections from pre-Columbian period through independence. Topics in colonial Latin American literature in SPAN 3020.

★ 3044 Introduction to Latin American Literature II (3) Prereq.: SPAN 3020. Reading and analysis of representative literature from independence to the present.

3070 Spanish for Professionals (3) F,S,F Prereq.: SPAN 2155 or equivalent and consent of instructor. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Development of language skills for functioning in various professional contexts such as business, medicine, or law.

★ 3071 Survey of Spanish Literature (3) F Prereq.: SPAN 3020. Spanish literature from its beginning to the 18th century.

★ 3072 Survey of Spanish Literature (3) S Prereq.: SPAN 3020. Main authors and literary movements from the 18th century to the present.

3073 Advanced Readings on Spanish Civilization (3) F Prereq.: SPAN 3020. Geographical, historical, political, economic and sociological factors necessary for understanding Spanish culture.

3074 Advanced Readings on Hispanic-American Civilization (3) S Prereq.: SPAN 3010, Parallels SPAN 3073, but focuses on the Hispanic-American countries.

3990 Special Topics in Spanish (3) Prereq.: either SPAN 3043 or 3044 or 3071 or 3072. May be taken for a max. of 6 hrs. of credit when topics vary.

4001 History of the Spanish Language (3) V Development of Spanish from its beginnings to the present.

4002 Spanish for Reading Knowledge (5) S Specialized course intended to satisfy departmental foreign language reading requirement for graduate students. This course will not count toward a graduate degree. Undergraduates may enroll on a pass/fail basis only. Does not count toward satisfying foreign language requirements for undergraduate students.

4003 Instructional Strategies for the Second Language Spanish Classroom (3) Prereq.: EDCC 3002, SPAN 3001 and concurrent enrollment in EDCC 4003. 3 hrs. lab/field experiences in multicultural settings. Teacher candidates will study and participate in activities that incorporate different classroom instructional structures, including teacher-to-whole class, task-based group activities, and student-to-student (pair) work; candidates will design and conduct Spanish language lessons using learner-centered activities.

4004 Critical Issues in Teaching Spanish as a Second Language: Capstone Course (3) Prereq.: SPAN 4003, and concurrent enrollment in EDCC 4004. Teacher candidates should be in the last two semesters in completion of all requirements of EDCC 4004. Taught in Spanish. Focus on the consolidation of knowledge about the Spanish language, literature, and culture with respect to the teaching of subject content to middle or high school learners.

4005 Structure of the Spanish Language (3) Prereq.: SPAN 1010 or equivalent. Spanish morphology and syntax; structural analysis, and generative-Transformational analyses and applications.

4007 Spanish Medieval Literature (3) Spanish literature from its beginnings to the end of the 14th century; emphasis on the mester de juliaria, mester de clericia, and masterpieces of prose and poetry of the 14th century.

4034 Special Topics in 18th and 19th Century Literature (3) V May be taken for a max. of 6 sem. hrs. of credit when topics vary.

4035 Special Topics in Golden Age Prose (3) V May be taken for a max. of 6 sem. hrs. of credit when topics vary. Spanish Renaissance and Baroque literature.

4034 Special Topics in Golden Age Lyric and Dramatic Poetry (3) V May be taken for a max. of 6 sem. hrs. of credit when topics vary. Spanish drama and lyric poetry of the 16th and 17th centuries.

4035 Spanish Literature from 1898 to 1936 (3) Prereq.: SPAN 3071 or 3072. Literature in all genres from the early Modernism to the Avant Garde.

4036 Spanish Literature Since 1936 (3) Prereq.: SPAN 3071 or 3072. Literature in all genres since the Spanish Civil War.

4081 Modern Spanish Prose Fiction in Translation (3) Taught in English; knowledge of Spanish not required. Selected outstanding novels and short stories of modern Spanish literature from the 16th and 17th century Golden Age to the present; includes The Life of Lazarillo de Tormes and works by Cervantes, Pérez Galdós, Unamuno, Valle-Inclán, Pérez de Ayala, Cela, Lafuente, and González.

4082 Modern Spanish-American Prose Fiction in Translation (3) Taught in English; knowledge of Spanish not required. Selected outstanding Spanish-American prose works by García Márquez, Cortázar, Fuentes, Carpentier, and Borges.

4109 Women Writers in the Hispanic World (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary. Examination of selected periods, themes, and genres.

4144 Latin American Literature: 1492-1810 (3) Prereq.: one literature course in Spanish at the 3000 level or consent of instructor. Topics in colonial Latin American literature from 1492-1810.

4154 Latin American Literature: 1810-1915 (3) Prereq.: one literature course in Spanish at the 3000 level or consent of instructor. Topics in Latin American literature from independence through modernismo (1810-1915).

4156 Latin American Literature: 1915-1960 (3) Prereq.: one literature course in Spanish at the 3000 level or consent of instructor. Topics in Latin American literature from the historical avant garde to 1960.

4157 Latin American Literature: 1960-Present (3) Prereq.: one literature course in Spanish at the 3000 level or consent of instructor. Topics in Latin American literature from 1960 to the present.

4209 Literature and Culture of Hispanics in the United States (3) Texts may be in English or Spanish. Selected periods, themes, and genres.

4209 Cinema in Spanish (3) F,S,F Prereq.: consent of instructor. Screening and analysis of representative films from Spain and Latin America and their interrelations with literature.

4408 Topics in Hispanic Cultural Studies (3) V May be taken for a max. of 6 sem. hrs. of credit when topics vary. Hispanic literary text in relation to both domains as the arts, politics, religion, and society.

4602 Spanish Phonetics (3) Spanish phonetic systems; corrective and fluency drills in the language laboratory; problems of teaching Spanish pronunciation to English-speaking students.
**THEATRE • THTR**

General education courses are marked with stars (★).

★ 1001 Practical Elements of Stagecraft (3) Introduction to the skills and techniques used by artists and craftsmen in the realization of the technological elements of all areas of live production, including training and discussions in each of the main areas and departmental productions.

★ 1020 Introduction to Theatre (3) The arts of the theatre and its artistic; acting, directing, costume and scenic design; playwriting, and architecture.

★ 1021 Honors: Introduction to Theatre (3) Same as THTR 1020, with special emphasis for qualified students.

1025 Acting: Improvisation (3) Exploration, through theatre games and movement training, of the actor's problems of intention, listening, physical expression of emotion, concentration, and mime.

1029 Stage Movement I (3) 2 hrs. lecture; 2 hrs. lab. Beginning stage movement for the actor, including flexibility, realignment, spatial awareness, gesture and body composition, and physical characterization.

1127 Beginning Modern Dance I (3) 1 hr. lab. May be taken for a max. of 2 hrs. of credit.

1131 Beginning Ballet (1) 2 hrs. lab. May be taken for a max. of 2 hrs. of credit.

1153 Beginning Jazz Dance (1) 3 hrs. lab. May be taken for a max. of 2 hrs. of credit.

1227 Intermediate Modern Dance I (3) 1 hr. lab. May be taken for a max. of 2 hrs. of credit.

1231 Intermediate Ballet (1) 3 hrs. lab. May be taken for a max. of 2 hrs. of credit.

1253 Intermediate Jazz Dance I (3) 1 hr. lab. May be taken for a max. of 2 hrs. of credit.

1800 Introduction to Dance (3) As a performing art.

1804 Dance Theatre (2) 6 hrs. lab. May be taken for a max. of 4 hrs. of credit. Admission by audition. Participation in dance theatre.

2008 Introduction to Writing Drama (3) See ENGL 2008.

2020 Introduction to Stage Management (1) Prereq.: THTR 1001. 2 hrs. lab. Introduction to the duties and responsibilities of the stage manager's place in the theatrical organization and how he/she interacts with other members of the production team.

2022 Introduction to Theatrical Design (3) Prereq.: concurrent registration in THTR 2026. Basic principles in designing lighting, costumes, scenery, and sound.

2023 Stage Makeup (1) Fundamentals of straight and character makeup; laws governing line, color, light, and shade; practical experience in makeup through various productions.

2024 Introduction to Theatre Technology (3) Introduction to all areas of theatre technology and how they affect production; areas to be covered include: production/stage management, scenery, costumes, stage properties, lighting, and sound.

2025 Fundamentals of Acting (3) Prereq.: THTR 1025; and concurrent registration in THTR 2026. Principles involved in a workable theory of acting and their application through development of technical skill.

**SYSTEMS SCIENCE • SYSC**

7090 Systems Science Design Project I (9) Prereq.: SYSC 5030. Also offered as AAS 5030. Further development of skills in reading and analyzing contemporary texts and more difficult forms of expressions, such as Swahili poetry and traditional literary texts.

**SWAHILI • SWA**

Native speakers of Swahili will not receive credit for courses marked with an asterisk (*). General education courses are marked with stars (★).

★ 2004 Intermediate Swahili Language and Culture IV (4) Prereq.: SWA 1002. Also offered as AAS 2004. Further mastery of grammar; development of reading skills and analysis of contemporary texts.

2026 Theatre Practicum I (4) May be taken for a max. of 3 sem. hrs. of credit. No more than a total of 3 sem. hrs. of THTR 2026 and THTR 2027 may be taken for undergraduate credit. Participation in performance or production of a play produced by the Department of Theatre.

2027 Stage Voice: Development of the speaking voice through physical awareness, breath release, phonation, resonance, and articulation to meet theatre performance needs.

★ 2082 Introduction to Dramatic Literature (3) A study of representative plays from the Greek era to the present.

2300 Intermediate Acting: Realism and Personalization (3) Prereq.: THTR 2025. 2 hrs. lecture; 3 hrs. lab. Study of the skills needed to portray realistic characterizations; exploration of the Stanislavski's work, including examination of predominant acting philosophies.

2128 Research in Nonprofit Dramatic Literature: Same as THTR 2128, with special emphasis for qualified students.

3020 American Musical Theatre (3) Also offered as MUS 3020. Development of the American musical in its cultural, theatrical, and social contexts from its beginnings to the present day; elements of musical theatre focusing on the works of composers, lyricists, directors, choreographers, and performers.

3025 Advanced Acting (3) Prereq.: THTR 2030. Open only to theatre performance majors. 2 hrs. lecture; 3 hrs. lab. Characterization and role analysis.

3027 Stage Voice: Advanced Techniques (3) Prereq.: THTR 2027. Continued development of the actor's vocal craft.

3029 Stage Movement II (3) Prereq.: THTR 1029. Continuation of THTR 1029. Specialized activities in character types, rhythm and tempo, mask work, and basic study of stage movement.

3121 Development of Theatre and Drama I (3) Historical survey of the development of theatre and drama from ancient Greek to French neoclassicism.

3122 Development of Theatre and Drama II (3) Historical survey of the development of theatre and drama from the 18th century to the present.

3123 Costume Construction Techniques for the Stage (3) Prereq.: THTR 2024. 6 hrs. lab. Study of the skills and techniques unique to the construction of costumes for the stage; emphasis on historical construction, cutting, finishing, design analysis, and adaptations for stage performance.

3130 Script Analysis (3) Prereq.: THTR 2028. Methods of studying playscripts in preparation for their production on stage through an examination of modernist scripts.

3134 Scenery and Properties Construction (3) Prereq.: THTR 2022 and 2024. 2 hrs. lecture; 2 hrs. lab. Examination and application of construction techniques and methodology as they apply to theatre productions.

3320 Introduction to Nonprofit Arts Management (3) Overview of the organizational structure and operations of arts and cultural institutions, specifically those organized as non-profits.

3340 Marketing the Arts (3) Lecture and discussion, case analysis, service learning application of marketing concepts to not-for-profit arts organizations.

3435 Scene Painting I (3) Prereq.: THTR 2022, 2024. 4 hrs. lecture; 4 hrs. lab. Contemporary scene painting for the stage; emphasis on tools, materials, basic techniques, and color theory.

3530 Stage Sound Technology (3) Prereq.: THTR 2022, 2024. 2 hrs. lecture; 2 hrs. lab. Introduction to the equipment, techniques, and methods used in stage and sound; includes work in the areas of computer control and editing of sound, live sound reinforcement, and recording techniques in both the analog and digital formats.

3531 Stage Lighting Technology (3) Prereq.: THTR 2022, 2024. 2 hrs. lecture; 2 hrs. lab. Production of lighting effects using contemporary and mechanical elements of stage lighting technology in both analog and digital formats.

3580 Dance Composition (3) Fundamental elements and principles of choreography.

3803 Improvisation (3) Structural problems and exploration in dance improvisation.

3800 Theatre or Film Internship (3) Prereq.: consent of instructor. May be repeated for a max. of 6 hrs. sem. hrs. credit. Pass/fail grading. Study with an approved theatre or film company; emphasis may be in one or all of the following areas: performance, directing, design, technology, dramaturgy, stage management, administration, box office, or casting.
4530 Lighting Design I (3) Lighting design for the theatre; emphasis on script analysis, production concepts, and visual ideals.

4801 Dance History (3) Prereq.: THTR 1800 or consent of instructor. Development of dance from primitive cultures to the present.

4804 Dance Theatre (6) hrs. Lab. May be repeated for 6 hrs. of credit every semester. Admission by audition. Experienced modern dancers participate in modern dance theatre as lead dancers and as chorus.

4820 Advanced Stage Management (3) Prereq.: THTR 2020 or equivalent. Advanced training in stage management techniques, including professional experience component with departmental approval.

4831 CAD Drafting for the Theatre (3) Prereq.: THTR 3830 or equivalent; 2 hrs. lab. 2 hrs. Lab. Introduction to the fundamentals of AutoCAD drafting and its use in the theatre industry.

4901 Special Projects in Theatre Design (1-3) Prereq.: consent of instructor. 2-6 hrs. Lab. Approval of projects required by instructor prior to registration. Execution of practical production projects in theatrical design.

4902 Special Projects in Theatrical Technology (1-3) Prereq.: consent of instructor. 2-6 hrs. Lab. Approval of projects required by instructor prior to registration. Execution of practical production projects in theatrical technology.

4903 Independent Projects in Performance Training (1-6) Prereq.: consent of instructor. May be repeated for a max. of 6 sem. hrs. of credit. Individual projects in performance training include faculty supervision; emphasis may be in one or all of the following areas: acting, movement, voice, directing, or dance.

7008 Drama Writing (3-6) See ENGL 7008.

7130 Script Analysis and Dramaturgy (3) Methods of studying playscripts in preparation for their production on stage, through Aristotelian, modern, and postmodern approaches.

7122, 7123 Acting Studio IA, IB (5,5) Prereq.: admission to M.F.A. acting program, 4 hrs. lecture; 2 hrs. lab. (IA) Intensive work in actor's basic tools; text analysis; comprehensive Stanislavskian technique and characterization. (IB) Emphasis on scene work from the modern repertoire; auditioning.

7222, 7223 Acting Studio IIA, IIB (4,4) Prereq.: THTR 7221; (IIA) Acting demands of Greek and Shakespearean drama; scene work with selected texts. (IB) Acting demands of comedia dell’arte, comedy of manners, and farce; scene work with selected plays.

7224, 7225 Acting Studio IIB, IIA (2,2) Prereq.: THTR 7223. (IIIA) Special acting problems and stress roles. (IIIB) Problems in audition techniques and building a career as a professional actor.

7227 Voice for the Actor I (3) Prereq.: admission to the M.F.A. program, 2 hrs. lecture; 2 hrs. lab. (II) Dynamics of vocal range in more complex texts; work on major periods of dramatic literature; emphasis on verse plays. (IV) Dialects and special problems in vocal characterization. (V) Individual coaching in scene study from THTR 7224 and in support of performance projects.

7233 Stage Movement III (4) Prereq.: admission to M.F.A. design technology program or consent of instructor. 3 hrs. lecture; 2 hrs. lab. (I) Preparation of advanced costume design projects; emphasis on script analysis, characterization, and problem solving. (II) Emphasis on designing entire production projects to achieve unity, coherence, and style. (III) Emphasis on design, planning, and construction of historical costumes for the theatre, with emphasis on pattern drafting and draping.

7255, 7256, 7257 Advanced Costume Technology I, II, III (3,3,3) Prereq.: admission to M.F.A. design technology program or consent of instructor. 1 hr. lecture; 4 hrs. lab. (I) Advanced planning and construction of costumes for the theatre; emphasis on historical construction, cutting, and tailoring. (II) Emphasis on selection, modification, and preparation of fabrics for stage costumes. (IV) Emphasis on costuming in historical costumes. (IIIA) Emphasis on apparel, millinery, footwear, and jewelry.

7260, 7261 Theatre Technology Seminar I, II (1,1) Prereq.: admission to M.F.A. design technology program or consent of instructor. (I) Advanced techniques used on stage, and in the scenic shop. (II) Practical applications of technology in theatre design.

7327, 7328 Stage Movement VI, VII, VIII (3,3,3) Prereq.: THTR 7228 or equivalent; 2 hrs. lecture; 2 hrs. lab. (VII) Continued movement workshops; focus on Greek, commedia dell’arte, and the present day. (VIII) Emphasis on movement in historical moments and on the use of movement in other design areas. (I) Advanced level workshop for the stage movement program.
7721 Lighting Design II (3) Prereq.: admission to M.F.A. design technology program or consent of instructor. Process of lighting design, lighting equipment, and assistant designer skills.

7722, 7723 Lighting Design III, IV (4,4) Prereq.: THTR 7721 or equivalent: 3 hrs. lecture; 2 hrs. lab. (III) Elements of lighting design explored through use of the light lab. (IV) Complete presentations of lighting designs for various types of productions.

7900 Introduction to Graduate Study in Theatre (3) Prereq.: admission to the M.A./Ph.D. program in theatre. Research and bibliographic skills for students of theatre history, dramatic literature, theory, and criticism.

7901, 7902, 7903, 7904 History of the Theatre I, II, III, IV (3,3,3,3) Survey of historical development in the theatre in ancient Greece, Rome, and Asia (7901); the medieval and renaissance periods (7902); the 17th to 19th centuries (7903); and the 19th century to the present (7904).

7910 Seminar in Drama: Classical to Renaissance (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7911 Seminar in Drama: Renaissance to Realism (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7912 Seminar in Drama: American Drama: 18th Century to the Present (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7920 Seminar in Black Drama and Theatre (3) May be taken for a max. of 6 hrs. of credit when topics vary. Comparative study of the dramatic and theatrical expressions of dramatists in African and New World black cultures.

7921 Practicum in Theatre Directing (3) 2 hrs. lecture; 3 hrs. lab. May be taken for a max. of 6 hrs. of credit when topics vary. A specific theatrical form and style studied through research, direction, of a one-act play, and participation in a specific Department of Theatre production.

7922 Seminar: Performance Theories and Criticism (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7924 Seminar: Evolution of Dramatic Theory (3) May be taken for a max. of 6 hrs. of credit when topics vary. Major concepts of dramatic theory and practice in classical, medieval, and Renaissance periods.

7925 Seminar: Evolution of Dramatic Theory (3) May be taken for a max. of 6 hrs. of credit when topics vary. Major concepts of dramatic theory and practice in the European and American modern period.

7927, 7928 Problems in Theatre History (3,3) Each course may be taken for a max. of 6 hrs. of credit. Study of a selected figure, period, or trend in the history of the theatrical arts.

7929 Independent Research: Theatre (1-3) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. credit. For advanced graduate students who wish to pursue research on special problems exclusive of thesis or dissertation.

7930 Theatrical Production (1-12) Prereq.: admission to M.F.A. theatre program, 2-24 hrs. lab. Major acting, directing, design, or technical responsibility for one or more LSU productions.

8000 Thesis Research (1-2 per sem.) "S"/"U" grading.

9000 Dissertation Research (1-12 per sem.) "S"/"U" grading.

Academic Affairs and the course must be approved by the Faculty Senate Courses and Curricula Committee. University courses may not be offered more than twice (with the exception of The Boyd Professor Lecture Series). Each course carries undergraduate credit of one to three semester hours. Acceptance of such credit toward fulfillment of degree requirements is decided by the faculty of each college or school within the University. The topic, credit, and class time of each University course are announced by the Office of Academic Affairs prior to the beginning of the semester in which the course is to be taught.

University courses have been offered on such topics as The Constitution: Then and Now (1987), The Age of the French Revolution (1989), Diversity in America (1990), The Holocaust (1992), Political Communication (1993), Race Relations (1995), and The Boyd Professor Lecture Series (2000).

UNIVERSITY COLLEGE • UC

0006 Study Skills (2) For students in Student Support Services Program only. Not for degree credit. Pass-no credit grading. Permission of instructor. Basic learning principles; includes time management, goal setting, note-taking, listening skills, reading, theme and report writing, memory, and analyzing study problems.

0050 Introduction to Mentoring, Education, and Research (2) F For students in HHMI Professors Program or LA-STEM Research Scholars Program only. Not for degree credit. Pass-no credit grading. Students will be mentored as they prepare to become mentors and researchers. Introduction to college success tools, including learning strategies, time management, and organization.

0060 Pursuing Mentoring, Education, and Research (2) S Prereq.: UC 0050. For students in the HHMI Professors Program or LA-STEM Research Scholars Program only. Not for degree credit. Pass-no credit grading. Students continue to implement the college success tools gained in UC 0050 and learn about research; students begin a service-learning project mentoring high school students and continue to be mentored.

0070 Success in Mentoring, Education, and Research (2) F For students in HHMI Professors Program or LA-STEM Research Scholars Program only. Not for degree credit. Pass-no credit grading. Students expand their mentoring projects, continuing to meet with high school mentees and also engaging in peer mentoring.

0080 Advancing in Mentoring, Education, and Research (1) F & Prereq. UC 0070. For students in HHMI Professors Program or LA-STEM Research Scholars Program. Not for degree credit. Pass-no credit grading May be taken for a max. of 3 sem. hrs. credit. Advanced independent mentoring, research presentation skills, and focused graduate school preparation.

VETERINARY MEDICINE • VMED

Courses in the professional curriculum are designated as Veterinary Medicine (VMED) courses, rather than departmental courses, because of the integration of the disciplines. These courses, all at the 3000 level, are described in the School of Veterinary Medicine Bulletin. Prerequisite for enrollment in these courses is formal admission to the professional curriculum in the School of Veterinary Medicine. All courses must be taken in the proper sequence, as each is a prerequisite for the succeeding course. The following courses are utilized by all concentrations in the Veterinary Medical Sciences graduate program.
7004 Introduction to Research (2) Prereq.: consent of instructor. Concepts and methodology in developing research programs; selection of a research problem; planning, execution, and publication of original research.
8000 Thesis Research (1-12 per sem.) “S”/”U” grading.
8900 Pre-dissertation Research (1-9) May be taken for a max. of 9 sem. hrs. of credit.
9000 Dissertation Research (1-12 per sem.) “S”/”U” grading.

VETERINARY SCIENCE • VETS

2000 Anatomy and Physiology of Farm Animals (3) F Anatomy and physiology of farm animals; important species differences.
2020 Herd Health and Disease Management of Domestic Farm Animals (3) S Herd health program of preventive medicine for farm livestock; disease processes, epidemiology, and rational approaches to therapeutic principles and control of diseases.
3002 Practical Work with Livestock (1) S 3 hrs. lab Dehorning, castration, branding, methods of restraint, and methods for control of parasites.

WOMEN’S AND GENDER STUDIES • WGS

General education courses are marked with stars (★).

1001 Evolution of Sex and Gender (3) Interdisciplinary course, team-taught by faculty in the physical and social sciences. Covers evolution as differential reproduction; reproduction-related earth history highlights; genetics of sex; animal reproduction strategies; anatomy and physiology of human reproductive systems; evolutionary trajectories in primates; sex and gender in human prehistory and in culture.
★ 2500 Introduction to Women’s and Gender Studies (3) Interdisciplinary study of women’s lives: work, family, sexuality, economic development, political and social change; variance in sex roles among cultural groups and in different historical periods.
★ 2900 Gender, Race, and Nation (3) The constructs of gender and sexuality across diverse racial, ethnic, cultural, and class boundaries.
3150 Survey of Feminist Theory (3) Interdisciplinary study of a range of feminist theories through which to consider the roles of women, gender, and sexuality.

3600 Women, Gender, and Leadership (3) Also offered as ELRC 3600. Interdisciplinary study of gender and leadership; with emphasis on women as leaders in a range of settings in education and society.
4028 Gender and American Politics (3) See POLI 4028.
4500 Special Topics in Women’s and Gender Studies (3) Prereq.: WGS 2500. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Issues central to contemporary feminist inquiry.
4800 Independent Reading and Research in Women’s and Gender Studies (3) Prereq.: WGS 2500 and permission of instructor and department. May be taken for a max. of 6 sem. hrs. when topics vary. Reading and research on selected topics that emphasize feminist interdisciplinary approaches.
7150 Seminar in Feminist and Gender Theory (3) Topics in recent and contemporary theory in a range of disciplines including the humanities, social sciences, natural and physical sciences, design, and education; students are encouraged to develop research projects relevant to their primary disciplines and to their research interests.
7800 Independent Reading and Research in Women’s and Gender Studies (3) S May be taken for a max. of 6 sem. hrs. of credit.