

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 permit students to make up deficiencies in previous training or to improve their 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 undergraduate 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.

COURSE DESIGNATIONS AND RUBRICS		
DESIGNATION	RUBRIC	DEPARTMENT
Accounting	ACCT	Accounting
Aerospace Studies	ASST	Aerospace Studies
African & African-American Studies	AAAS	Arts & Sciences (College of)
Agricultural Economics	AGEC	Agricultural Economics & Agribusiness
Agricultural Education	AGED	Human Resource Education & Workforce Development (School of)
Agriculture	AGRI	Agriculture (College of)
Agronomy	AGRO	Agronomy
Animal Science	ANSC	Animal Science
Anthropology	ANTH	Geography & Anthropology
Arabic	ARAB	Foreign Languages & Literatures
Architecture	ARCH	Architecture (School of)
Art	ART	Art (School of)
Astronomy	ASTR	Physics & Astronomy
Audio-Visual Arts	AVA	Arts & Sciences (College of)
Basic Sciences	BASC	Basic Sciences (College of)
Biological Engineering	BE	Biological & Agricultural Engineering
Biological Sciences	BIOL	Biological Sciences
Business Administration	BADM	Business Administration (E. J. Ourso College of)
Business Communication	BCOM	Management (Rucks Department of)
Business Education	BUED	Human Resource Education & Workforce Development (School of)
Business Law	BLAW	Finance
Chemical Engineering	CHE	Chemical Engineering
Chemistry	CHEM	Chemistry
Chinese	CHIN	Foreign Languages & Literatures
Civil Engineering	CE	Civil & Environmental Engineering
Classical Studies	CLST	Foreign Languages & Literatures
Communication Disorders	COMD	Communication Sciences & Disorders
Communication Studies	CMST	Communication Studies
Comparative Biomedical Sciences	CBS	Comparative Biomedical Sciences
Comparative Literature	CPLT	Comparative Literature (Interdepartmental Program in)
Computer Science	CSC	Computer Science
Construction Management	CM	Construction Management
Curriculum & Instruction	EDCI	Curriculum & Instruction
Dairy Science	DARY	Dairy Science
Disaster Science and Management	DSM	Arts & Sciences (College of)
Economics	ECON	Economics
Education	EDUC	College of Education
Educational Leadership, Research, & Counseling	ELRC	Educational Leadership, Research & Counseling
Electrical Engineering	EE	Electrical & Computer Engineering
Engineering	ENGR	Engineering (College of)
English	ENGL	English
Entomology	ENTM	Entomology
Environmental Engineering	EVEG	Civil & Environmental Engineering
Environmental Management Systems	EMS	Agronomy

COURSE DESIGNATIONS AND RUBRICS		
DESIGNATION	RUBRIC	DEPARTMENT
Environmental Studies	ENVS	Environmental Studies (Institute for)
Experimental Statistics	EXST	Experimental Statistics
Extension Education	EXED	Human Resource Education & Workforce Development (School of)
Finance	FIN	Finance
Food Science	FDSC	Food Science
French	FREN	French Studies
Geography	GEOG	Geography & Anthropology
Geology	GEOL	Geology & Geophysics
German	GERM	Foreign Languages & Literatures
Greek	GREK	Foreign Languages & Literatures
Hebrew	HEBR	Foreign Languages & Literatures
History	HIST	History
Home Economics Education	HEED	Human Resource Education & Workforce Development (School of)
Honors	HNRS	Honors College
Horticulture	HORT	Horticulture
Human Ecology	HUEC	Human Ecology (School of)
Industrial Education	INED	Human Resource Education & Workforce Development (School of)
Industrial Engineering	IE	Industrial & Manufacturing Systems Engineering
Information Systems & Decision Sciences	ISDS	Information Systems & Decision Sciences
Interior Design	ID	Interior Design
International Studies	INTL	College of Arts & Sciences
Italian	ITAL	Foreign Languages & Literatures
Japanese	JAPN	Foreign Languages & Literatures
Kinesiology	KIN	Kinesiology
Landscape Architecture	LA	Landscape Architecture (School of)
Latin	LATN	Foreign Languages & Literatures
Liberal Arts	LIBA	Arts & Sciences (College of)
Library & Information Science	LIS	Library & Information Science (School of)
Life Course and Aging	LCA	College of Arts & Sciences
Linguistics	LING	Linguistics (Interdepartmental Program in)
Management	MGT	Management (Rucks Department of)
Marketing	MKT	Marketing
Mass Communication	MC	Mass Communication (Manship School of)
Mathematics	MATH	Mathematics
Mechanical Engineering	ME	Mechanical Engineering
Medical Physics	MEDP	Physics & Astronomy
Military Science	MILS	Military Science
Music	MUS	Music (School of)
Music Education	MUED	Music (School of)
Nuclear Science	NS	Physics & Astronomy
Oceanography & Coastal Sciences	OCS	Oceanography & Coastal Sciences
Pathobiological Sciences	PBS	Pathobiological Sciences
Petroleum Engineering	PETE	Petroleum Engineering

COURSE DESIGNATIONS AND RUBRICS		
DESIGNATION	RUBRIC	DEPARTMENT
Philosophy	PHIL	Philosophy & Religious Studies
Physical Science	PHSC	Physics & Astronomy
Physics	PHYS	Physics & Astronomy
Plant Health	PLHL	Plant Pathology & Crop Physiology
Political Science	POLI	Political Science
Portuguese	PORT	Foreign Languages & Literatures
Poultry Science	PLSC	Poultry Science
Psychology	PSYC	Psychology
Public Administration	PADM	Public Administration (Institute)
Religious Studies	REL	Philosophy & Religious Studies
Renewable Natural Resources	RNR	School of Renewable Natural Resources
Russian	RUSS	Foreign Languages & Literatures
Social Work	SW	Social Work (School of)
Sociology	SOCL	Sociology
Spanish	SPAN	Foreign Languages & Literatures
Swahili	SWAH	Foreign Languages & Literatures
Systems Science	SYSC	Computer Science
Theatre	THTR	Theatre
University	UNIV	Academic Affairs (Office of)
University College	UC	University College
Veterinary Clinical Sciences	VCS	Veterinary Clinical Sciences
Veterinary Medicine	VMED	Veterinary Medicine (School of)
Veterinary Science	VETS	Veterinary Science
Vocational Education	VED	Human Resource Education & Workforce Development (School of)
Vocational Trade & Industrial Education	VTIE	Human Resource Education & Workforce Development (School of)
Women's and Gender Studies	WGS	Arts & Sciences (College of)

KEY TO COURSE INFORMATION	
★	General education course
ACCT	Course rubric
F	Course offered in fall
S	Course offered in spring
Su	Course offered in summer
E	Course offered in even-numbered years (calendar years)
Y	Course offered yearly
O	Course offered in odd-numbered years (calendar years)
V	Course offered irregularly
F,S,Su	Course offered in fall, spring, and summer

ACCOUNTING • ACCT

2000 Survey of Accounting (3) *Credit will not be given for both this course and ACCT 2001. Students in nonbusiness curricula are advised to enroll in ACCT 2000 if they are given the option of ACCT 2000 or ACCT 2001, unless they plan to pursue a business degree at a subsequent date. All students in the E. J. Ourso College of Business Administration are required to take ACCT 2001. Introduction to the meaning of the values presented in financial statements; management accounting concepts and internal decision making; fundamentals of individual income taxes.*

2001 Introductory Financial Accounting (3) *Prereq.: MATH 1021 or equivalent. Credit will not be given for both this course and ACCT 2000. Required of all students in the E. J. Ourso College of Business Administration. Students in nonbusiness curricula are advised to enroll in ACCT 2000 if they are given the option of ACCT 2000 or ACCT 2001, unless they plan to pursue a business degree at a subsequent date. Financial accounting with emphasis on knowledge required for completion of the accounting cycle, including income measurement and financial statement preparation; accounting for current and plant assets, current and long-term liabilities, stockholders' equity, and cash flows.*

2101 Introductory Managerial Accounting (3) *Prereq.: ACCT 2000 or 2001 or equivalent; MATH 1431. Principles and methods of accounting primarily concerned with data gathering and presentation for purposes of internal management evaluation and decision making.*

3001 Intermediate Accounting—Part I (3) *Prereq.: grade of "C" or above in ACCT 2001 or equivalent; MATH 143.1. Credit will not be given for both this course and ACCT 2021. Accounting principles underlying preparation of financial statements; their application in measurement and reporting of selected balance-sheet items and related revenue and expense recognition.*

3021 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 ISDS 1100. Majors only or permission of department. Analysis and design of standard accounting systems; emphasis on computerized systems and internal control issues.*

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 with little or no previous work in accounting. Credit will not be given for both this course and ACCT 3221. General course in taxation; emphasis on aspects of taxation affecting the individual; federal and state income, estate, inheritance, gift, excise, and payroll taxes.*

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 taxation with respect to individuals and other entities, income inclusions and exclusions, and statutory deductions in arriving at tax liability.*

3222 Auditing (3) *Prereq.: ACCT 3021 and 3122. Theoretical and practical development of the independent audit function; generally accepted auditing standards; collection and evaluation of audit evidence; understanding internal control; risk assessment; transaction cycles; and reporting.*

3233 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 3021; 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 procedures.*

4121 Advanced Cost Analysis (3) *Prereq.: ACCT 3121. Measurement, interpretation, planning, and control of manufacturing and distribution costs; budgets and budgetary control; comparison of costs of business alternatives.*

4221 Income Tax Accounting II (3) *Prereq.: ACCT 3221; M.S. in accounting students or permission of department. Credit will not be given for both this course and ACCT 7203. Fundamentals of federal income taxation, with respect to partners, partnerships, corporations, and shareholders.*

4225 Research in Federal Income Taxation (3) *Prereq.: credit or registration in ACCT 3221. M.S. in accounting students or permission of department. Credit will not be given for this course and ACCT 7110. Techniques and procedures involved in tax planning and research.*

4231 Internship in Accounting (3-6) *Prereq.: permission of instructor and department chair required. Only 3 credits may apply as credit toward accounting degree. Pass-fail grading. At least 18 hours per week (3 credits) or 35 hours per week (6 credits) of learning experience in accounting under the general supervision of a faculty 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. Credit will not be given for this course and ACCT 7231.*

4232 Advanced Auditing (3) *Prereq.: ACCT 3222; M.S. in accounting students or permission of department. Independent auditor's legal and ethical obligations to society; responsibility for the detection and reporting of fraud; statistical sampling concepts and applications; extensions of the auditor's 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 audits; organization theory.*

4235 Fraud Auditing and Forensic Accounting (3) *Prereq.: ACCT 3233; 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 reporting of fraud.*

4236 Environmental and Safety Auditing (3) *Prereq.: ACCT 3233. Compliance and legal issues relative to environmental laws and safety regulations; emphasis on current laws and compliance auditing methodology.*

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 (EDP) control, audit applications, 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; accounting for 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 3021 and consent of instructor; or ACCT 4022.*

7023 Development of Accounting Thought and Practice (3) *Prereq.: consent of instructor. Historical roots of modern accounting; organizations and individuals who shaped its development, past and present research, and trends for the future.*

7072 Research Methodology in Accounting (3) *Prereq.: ISDS 7024 and 7025; or equivalent. Research methodologies in accounting and tax research.*

7110 Tax Research (3) *Prereq.: ACCT 3221 or equivalent. Credit will not be given for this course and ACCT 4225. 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.*

7122 Budgeting, Cost Analysis, and Control (3) *Prereq.: ACCT 3121. For accounting majors only.*

7132 Behavioral Impact of Accounting Information (3) *Prereq.: ACCT 3121. Effect of accounting data on users; emphasis on behavioral research methodology.*

7170 Advanced Accounting Analysis for Decision Making (3) *Accounting majors with credit for ACCT 3121 should take 7122.*

7201 Tax Aspects of Business Entities (3) *Prereq.: ACCT 3021 or equivalent. Basic concepts of business entities, including corporations, partnerships, and S corporations; tax consequences of the formation and operation of a business entity, and distributions to the owners.*

7202 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 4221. Basic tax concepts of corporations, including creation, operation, ownership changes, acquisitions, liquidations, reorganizations, and consolidated tax returns.*

7210 Tax Research, Planning and Business Decision Making (3) *Prereq.: ACCT 3221 or equivalent. Development of fundamental tax research skills with research and planning applications in business decision-making.*

7222 Auditing Theory and Standards (3) *Prereq.: ACCT 3222. A comprehensive analysis of the theory and practice of independent auditing.*

7231 Internship in Accounting (3-6) *Prereq.: permission of instructor and department chair required. Only 3 credits may apply as credit toward accounting degree. Pass-fail grading. At least 18 hours per week (3 credits) or 35 hours per week (6 credits) of learning experience in accounting under the general supervision of a faculty 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. Credit will not be given for this course and ACCT 4231.*

7232 Case Studies in Internal Auditing (3) *Prereq.: ACCT 7233. Primarily for M.B.A. and M.S. students. Performance, compliance, prudence, and fraud audits.*

7233 Graduate Internal Auditing (3) *Prereq.: consent of instructor. Primarily for M.B.A. and M.S. students. Theory of internal auditing; efficiency, effectiveness, and economy audits.*

7234 Operational Auditing (3) *Prereq.: ACCT 7233. Primarily for M.B.A. and M.S. students. Operational audit methodology for management audits, functional audits, risk analysis, and auditable unit analysis.*

7235 Fraud Auditing (3) *Prereq.: ACCT 3001 or equivalent. M.S. in accounting students or permission of department. Credit will not be given for this course and ACCT 4235. Study of risk and controls relative to the deterrence, prevention, and detection of beneficial and detrimental fraud.*

7244 Systems Auditing (3) *Prereq.: ACCT 7233. Primarily for M.B.A. and M.S. students. 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 3221 or equivalent. Relationship among statutes, case 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.: M.S. in accounting students or permission of department. Basic knowledge of computers and programming (may be obtained concurrently with course enrollment). Same as ACCT 7371. Financial information systems, with emphasis on those utilizing electronic data processing equipment; nature and design of a system and its use in financial planning and control.*

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.*

7371 Financial Information Systems (3) *Same as ACCT 7301; primarily for Ph.D. candidates.*

7400 Accounting Research Forum (1) *May be repeated for credit. Full-time, resident graduate accounting majors must register for this course each semester. Not for degree credit for accounting majors. Pass-fail grading. Research methodology, reports, and discussion of topics of current interest in accounting.*

7421 Public Sector Accounting and Reporting (3) Prereq.: *ACCT 2001; 2101 or 3121 or equivalent. M.S. in accounting students or permission department. Credit will not be given for this course and ACCT 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.*

7425 Seminar in Advanced Accounting Problems (3) M.S. in accounting students or permission of department. Advanced topics in accounting for business combinations, consolidates financial statements, segment reporting, foreign operations, and Securities and Exchange Commission Procedures.

7554 Seminar in Oil and Gas Taxation (3) Prereq.: *ACCT 3221 or equivalent. M.S. in accounting students or permission of department.* Principles of oil and gas taxation; includes the property unit, conveyances, depletion, IDC, unitization agreements, and the windfall profit tax; tax planning and Louisiana law.

7601 International Accounting (3) M.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.

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

8900 Pre-dissertation Research (1-9) May be repeated for credit. Pass-fail grading.

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

AEROSPACE STUDIES • ASST

1001, 1002 The Foundations of the United States Air Force (1,1) F,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) F,S Coreq.: *ASST 1001, 1002. 2 hrs. lab. Pass-fail grading.* Applied leadership in drill and ceremony, physical fitness, and military protocol.

2001, 2002 The Evolution of U.S.A.F. Aerospace Power (1,1) F,S Coreq.: *ASST 2011, 2012.* Historical changes in the nature of warfare as a result of air power; effective communication skills in the Air Force.

2011, 2012 Leadership Laboratory II (1,1) F,S Coreq.: *ASST 2001, 2002. 2 hrs. lab. Pass-fail grading.* Intermediate leadership training through drill and ceremony, physical fitness, team building, and professional development.

3001, 3002 Air Force Leadership Studies (3,3) F,S 3 hrs. lecture; 1 hr. leadership lab. Skills required by the successful leader; individual motivational and behavioral processes; leadership, communication, and group dynamics; use of analytical aids in planning and organizing; total quality management; ethics, management of change, organizational power, politics, and managerial strategy.

3003, 3004 National Security Affairs/Preparation for Active Duty (3,3) F,S 3 hrs. lecture; 1 hr. 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.

Leadership Lab (0) F,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.

★ 2000 Introduction to African and African-American Studies (3) Dimensions of African and African-American thought and practice in contemporary and historical perspective.

★ 2003 Intermediate Swahili Language and Culture III (4) See SWAH 2003.

★ 2004 Intermediate Swahili Language and Culture IV (4) See SWAH 2004.

★ 2050 Contemporary Africa (3) African social and political institutions in transition; challenges of democratization and development in the current international context.

2511 Race Relations (3) See SOCL 2511.

3901 Directed Readings and Research in African and African-American Studies (1-3) May be taken for a max. of six sem. hrs. credit when topics vary. Student must register with a faculty member in the AAAS discipline before registration to select the area of reading or research. Topic must not substitute for regularly offered courses.

3902 Special Topics in African and African-American Studies (1-3) May be taken for a max. of six semester hrs. credit when topics vary.

AGRICULTURAL ECONOMICS • AGECE

General education courses are marked with stars (★).

1003 Introduction to Agricultural Business (3) F Nature and scope of agribusiness; application of management and marketing concepts to selected agribusiness problems; exploring agribusiness management as a profession.

★ 2003 Introduction to Agricultural Economics (3) S Role of agriculture in the general economy; economic principles applied to agricultural production, marketing, consumption, and policy problems.

3003 Economic Analysis in Agricultural Business (3) F Prereq.: *AGEC 2003 or equivalent; MATH 1431. 2 hrs. lecture; 2 hrs. lab.* Applications of graphical, mathematical, and computer-based microeconomic analysis to problems in the production and marketing of food and agricultural products.

3203 Introduction to Food and Fiber Products Marketing (3) F Prereq.: *AGEC 2003 or equivalent.* Theoretical concepts and empirical demand models relevant to food and fiber product markets; application of consumption theory to food and fiber product marketing; systems approach to analysis of food and fiber product markets; emphasis on structure-conduct-performance, consumer choice, market integration, bargaining, and government intervention.

3213 Agribusiness Marketing (3) S Prereq.: *AGEC 2003 or equivalent.* The food and fiber marketing system and the marketing environment in which agribusiness firms operate; marketing, managerial, and economic principles applied to the formulation and implementation of strategic marketing plans.

3303 Farm Management (3) F-O Prereq.: *AGEC 2003 or equivalent.* Fundamental economic and business principles applied to a farm business; comprehensive and integrated treatment of management concepts for successful operation of a farm business.

3413 Agricultural Business Management Decisions (3) F Prereq.: *AGEC 1003.* Identification of typical decisions of 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.* Economic rationale for collective, public action in allocation of natural resources in agriculture; emphasis on economic efficiency, property rights, resource use, legal concepts, institutions, and project evaluation.

3603 International Trade and Development in Agriculture (3) F Prereq.: *AGEC 2003 or equivalent.* Structure, trade, and practices in exporting and importing regions and nations; policies of major agricultural trading nations and institutions; aid, development relationships, and current development trade policy.

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.* Supervised career-oriented experience with a business or organization in the food and fiber system.

3803 Agricultural Law (3) F Principles of law and their application to agricultural business firms and institutions; legal processes and relationships relevant to agriculture; Louisiana Civil Code and statutes; federal law, including bankruptcy code; analysis and review of cases, documents, and processes.

4103 Programming Procedures in Agriculture (3) F-E Prereq.: *AGEC 2003 or equivalent and AGECE 3104.* Application of linear, integer, quadratic, and dynamic programming procedures to economic problems in agricultural production, marketing, and resource use.

4203 Intermediate Food and Fiber Products Marketing (3) F Prereq.: *AGEC 3203 or equivalent.* Industrial organization analysis applied to the food and fiber system; emphasis on structural problems and their control by competition, antitrust, and government.

4213 Economics of Milk Marketing Systems (3) S Prereq.: *AGEC 2003 or equivalent.* Analysis of the milk production and marketing system; market channels, characteristics, institutions, and government regulations in pricing and marketing milk.

4273 Agricultural Price Analysis (3) S Prereq.: *AGEC 2003 or equivalent and EXST 2201.* Economic processes of price discovery and price determination in agricultural input and output markets; emphasis on methods of price analysis and their application to decision processes; analysis of cyclical, trend, and seasonal movements in prices.

4403 Agricultural Finance (3) S Prereq.: *AGEC 2003 or equivalent.* Capital acquisition and use in the agricultural sector; cost and availability of credit; emphasis on financial management concepts for managing growth, leverage, liquidity, risk, and capital investment in agricultural business.

4413 Agricultural Commodity Exchanges and Futures Trading (3) S Prereq.: *AGEC 2003 or equivalent.* Functions, institutions, economic performance, and procedures involved in utilizing futures trading to minimize marketing risks in producing, processing, storing, buying, selling, and financing agricultural commodities.

4433 Agricultural Business Planning, Management, and Policy (3) S Prereq.: *senior standing.* Integration of management, marketing, and financial concepts for successful planning and implementation of agricultural business decisions; feasibility analysis, marketing policy, personnel policy, marketing mix, pricing decisions, market segmentation, marketing strategy, and financial policy.

4443 Farm and Rural Land Appraisal (3) F Prereq.: *AGEC 2003 or equivalent. Not for graduate AGECE degree credit.* Theory, methods, and procedures of real estate appraisal applied to rural property; trends in rural real estate values; factors influencing rural real estate values; approaches used in rural real estate valuation.

4503 Rural Resource and Community Development (3) S Prereq.: *AGEC 2003 or equivalent.* Characteristics of developed and undeveloped rural areas; analysis of economic and related problems and potential for development; public policy issues concerning rural development.

4603 Agricultural Policy (3) F Prereq.: *AGEC 2003 or equivalent.* Role of agriculture in the national economy; how agricultural policy decisions affect the general public; emphasis on economic impacts of policies on producers and consumers of agricultural products; effects of other nations' policies on American agriculture.

4700 Problems in Agricultural Economics (1-3) Prereq.: *approval of department head. May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Independent study under the direction of a faculty member or faculty committee.

7103 Advanced Statistical Methods in Agriculture (3) S Prereq.: *AGEC 7803 or concurrent registration.* Application of advanced statistical tools to problems in agricultural economics; emphasis on the general linear model, including diagnostics, applications, and interpretation.

7113 Agribusiness Research Applications (3) F Introduction to and overview of agribusiness research strategies; design of agribusiness research projects; preparation for data collection; collection of evidence; analysis of evidence; composition of research reports; applications to agribusiness market analysis, agribusiness planning and management, and agribusiness forecasting.

7123 Operations Research Methods in Agricultural Economics (3) F Application of operations research methods to economic problems in agricultural production, marketing, and resource use; linear and nonlinear programming; integer programming; network analysis; dynamic programming; queuing; simulation.

7203 Advanced Agricultural Marketing Theory (3) F-O Prereq.: *ECON 7700 or concurrent enrollment.* Basic and applied analytical procedures in marketing research emphasizing quantitative methods; firm theory applied to marketing.

7303 Agricultural Production Economics (3) S-O Prereq.: *ECON 7700 or concurrent enrollment.* Production principles applied to use of agricultural resources; analysis and interpretation of research data; theory of the farm firm, including costs, uncertainty, and expectations.

7503 Natural Resource Economics (3) F-E Prereq.: *ECON 7700 or concurrent enrollment.* Economic concepts and institutional factors relating to utilization of natural resources; emphasis on conservation, property rights, resource policy, resource valuations.

7603 Advanced Agricultural Policy (3) S-O Prereq.: *ECON 7700 or concurrent enrollment.* Development of agricultural policy; emphasis on objectives, procedures, accomplishments, and consequences of policy on agriculture and rural areas.

7613 International Agricultural Trade (3) S-O Prereq.: *ECON 7700 or concurrent enrollment.* International economic trade theory; special reference to trade in agricultural products.

7623 Rural Development Economics (3) F-O Prereq.: *ECON 7610.* Theoretical concepts in international and domestic rural development; empirical methods used in analysis of economic structure and growth; modeling public policy issues concerning international and domestic rural development.

7700 Internship in Agribusiness Administration (3) F,S,Su Prereq.: *prior approval of student's graduate committee. Open only to agricultural economics master's students. May be taken for a max. of 3 hrs. credit. 300 hrs. of learning experience. General supervision by a faculty member; direct supervision by an agribusiness professional. Pass/fail grading based on a written evaluation by the professional supervisor, a written report by the student, and the faculty member's evaluation.*

7703 Independent Study (1-3) F,S,Su Prereq.: *graduate committee approval prior to enrollment. May be taken for a max. of 6 sem. hrs. when topics vary.* Independent study of relevant subject matter areas in agricultural economics.

7710 Advanced Topics in Agricultural Economics (1-3) F,S,Su Prereq.: *consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary.* New and specialized topics in agricultural economics.

7803 Agricultural Economic Applications (3) S Prereq.: *ECON 7700.* Applications of economic theory to issues in agricultural production, consumption of agricultural goods, and natural resource management.

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

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

AGRICULTURAL EDUCATION • AGED

4077 Development of Agriculture in America (3) V Organization and development of agriculture in America from colonial times to the present.

4819 Special Topics in Agricultural Education (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.

7016 Foundations of Agricultural Education (3) V Events and organizations that contributed to the development of agricultural 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.

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.

7414 Androgyny in Agricultural Education (3) V Principles and practices in conducting the adult agricultural education program.

7716 Organization, Administration, and Supervision of Agricultural Education (3) V Theory, principles, and practices of organization and supervision of vocational teaching.

7812 Technological Advances in Agricultural Education (3) V Scientific developments in agriculture; their impact on programs in agricultural education.

7816 Advanced Agricultural Education Seminar (1) V May be taken for a max. of 3 hrs. of credit. A minimum of 1 sem. hr. required at master's level; minimum of 2 sem. hrs. required at the doctoral level. Current professional educational problems in vocational agriculture.

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

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

AGRICULTURE • AGRI

General education courses are marked with stars (★).

1001 Introduction to Agriculture (1) F,S,Su Opportunities and educational requirements in all fields of 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 nonscience 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 breeding for improved food and fiber; biotechnology and its role in modern agriculture.

1051 Soils and the Environment (3) F,S Also offered as *ENVS 1051.* Complexity and diversity of the earth's land surface; soils and soil management, reclamation of mismanaged soils, and use of recyclable waste materials as soil amendments.

2051 Soil Science (4) Prereq.: *CHEM 1002 or 1212 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.

3000 Principles of Crop Production (3) F Prereq.: *BIOL 1402 or equivalent.* Crop production practices relative 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.

3010 Research Problems (3) F,S,Su Prereq.: *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 3000.* 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 3000.* Field laboratory research designed to provide an understanding of the growth and practices involved in the production of winter small grains.

3013 Summer Crop Production Laboratory (1) Su Prereq.: *AGRO 3000.* Field and laboratory research 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 EMS 3045.* Causes and effects of soil erosion and sedimentation; their effects on the quality of the environment; methods of reducing erosion and soil environmental pollution.

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. of credit.* Work experience in crop, soil, or environmental quality related areas culminating in acceptable written reports and a seminar presentation.

4005 Forage Ecology and Management (3) S Forage crop physiology, adaptation, production, utilization, and management; impact on people, animals, and the environment.

4052 Soil Fertility and Soil Management (4) S Prereq.: *AGRO 2051. 3 hrs. lecture; 2 hrs. lab.* Factors affecting plant growth and utilization of essential elements; mechanisms of nutrient uptake; diagnosis of deficiencies; use of lime and fertilizers; potential nutrient losses.

4055 Chemical Properties of Soil (4) F Prereq.: *AGRO 2051 and CHEM 2002. 3 hrs. lecture; 3 hrs. lab. Also offered as EMS 4055.* Chemical and mineralogical properties of soils; their effect on nonpoint source pollution from agriculture; effects of nonhazardous amendments on soil properties.

4056 Microbial Ecology and Nutrient Cycling in Soils (4) S Prereq.: *AGRO 2051 and BIOL 2051. 3 hrs. lecture; 3 hrs. lab. Also offered as BIOL 4256 and EMS 4056.* Microorganisms in terrestrial environments and biogenic processes influencing C, N, S, and P cycling; role of microorganisms in biological nitrogen fixation, plant nutrient availability, formation of soil humus, and decomposition of organic and inorganic materials; impact of microbial processes on environmental quality.

4058 Soil Morphology and Classification (4) F 2 hrs. lecture; 4 hrs. lab (field and mapping). Genesis, profile morphology, processes related to classification and soil taxonomy; relationships of soil process and classification to environmental quality.

4064 Principles of Plant Breeding (4) F Prereq.: *AGRI 2072 or equivalent. 3 hrs. lecture; 2 hrs. lab. Also offered as HORT 4064.* Methods of plant genetic improvement;

hybridization, genetic manipulation, and variety development; selection for insect, disease, and environmental stress resistance; genetic engineering and biotechnology.

4070 Weed Science and the Environment (3) F Prereq.: *BIOL 1001, 1002, CHEM 1001, 1002; or equivalent. 2 hrs. lecture; 2 hrs. lab.* Weed biology and economic importance of weeds in the diverse agriculture of Louisiana; weed management programs, characteristics of important herbicides, mechanisms of herbicidal action, fate of herbicides in the environment, and pesticide application, labeling, and safety.

4071 Weed Biology and Ecology (3) F-O Prereq.: *BIOL 1402 or equivalent. 2 hrs. lecture; 2 hrs. lab.* Study of general plant ecological principles, reproduction, dormancy, interference, allelopathy, competition, herbicide resistance, and the impact of weed control mechanisms on weed and crop communities.

4078 Land Use Planning and Land Management (3) F-E Prereq.: *consent of instructor. 2 hrs. lecture; 2 hrs. lab.* Land use planning and management based on chemical, mineralogical, and physical properties of soils; includes soils, plants, data bases, hydrology, and remote sensing; areas of use and management include crops, pasture, forest and woodland, metropolitan, transportation, waste disposal, wetlands, and disturbed lands.

4080 Advanced Crop Production and Management (3) S-O Prereq.: *AGRO 1021 and BIOL 3060 or equivalent.* Effect of cultural practices on physiological/ecological interactions affecting crop growth, development, and yield.

4086 Turfgrass Management (3) See HORT 4086.

4090 Agronomic Problem Solving (3) S-E Prereq.: *AGRO 2051 or equivalent; BIOL 3060 or AGRO 4080; AGRO 3000 or equivalent.* Analysis and solution of specific agronomic problems; emphasis on researching literature, group discussion, and development of answers to hypothetical management questions.

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 4092 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 4092 combined.*

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

7040 Research Methods in Plant Science (3) S-E Prereq.: *EXST 7005; or equivalent; field research experience.* 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 Prereq.: *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.

7041 Plant-Herbicide Physiology (3) F-E Prereq.: *AGRO 4070 or equivalent. 2 hrs. lec.; 3 hrs. lab. 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 each chemical family of herbicides.

7042 Soil-Pesticide Interactions (3) F-E Prereq.: *AGRO 2051 and AGRO 4070 or equivalent.* Chemical, physical, and biological properties of soils as they affect performance and dissipation of pesticides; fate of pesticides in the environment.

7052 Micronutrients in Soils and Crops (4) S-O 3 hrs. lecture; 2 hrs. lab. Theory and current literature on the micronutrients (boron, copper, zinc, manganese, iron, molybdenum, chlorine, cobalt) and their influence on growth of crop plants.

7055 Advanced Soil Chemistry (3) F-O Prereq.: *AGRO 4055, MATH 1552, and one semester of physical chemistry.* Theory of physio-chemical properties of soils; emphasis on soil solution chemistry and soil environmental properties.

7056 Current Topics in Soil Microbiology (3) F-O Prereq.: *AGRO 4056 or equivalent. 2 hrs. lecture; 2 hrs. lab.* 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 3 hrs. lecture; 2 hrs. lab. Also offered as EMS 7057. Physical properties of the soil matrix, soil-water retention, and processes governing water, gas, solute, and heat fluxes in the soil profile.

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

7066 Agronomic Crop Breeding Techniques (1) F,Su
2 hrs. lab. May be repeated in the alternate semester for a max. of 2 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.

7068 Soil Mineralogy (3) F-O Prereq.: 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.

7070 Advanced Plant Breeding (4) S-E Prereq.: AGRO 4064 and EXST 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.

7071 Advanced Plant Genetics (4) S-O See HORT 7071.

7074 Quantitative Genetics in Plant Improvement (3) F-E Prereq.: HORT 7063 or AGRO 7065 and EXST 7022. Also offered as HORT 7074. Genotypic and environmental values, their effects and interactions, homeostasis, stability; variances, covariances, combining ability, genetic advance, selection indices, molecular markers for quantitative trait loci.

7165 Biogeochemistry of Wetland Soils and Sediments S (3) Same as OCS 7165.

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

8901 Research in Crop Science (3-6) Prereq.: consent of department.

8902 Research in Soil Science (3-6) Prereq.: consent of department.

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

ANIMAL SCIENCE • ANSC

1011 Introduction to Animal Science (3) F,S Science and production of beef cattle, sheep, swine, and horses; their role in American agriculture.

2001 Farm Unit Internship (1) F,S,Su 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.

2133 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; control and modification 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 1 hr. lecture; 4 hrs. lab. Basic principles and techniques involved in evaluation of meat animals and their carcasses.

3034 Advanced Live Animal and Carcass Evaluation (3) S Prereq.: ANSC 3033. 1 hr. lecture; 4 hrs. lab.

3051 Animal Science Problems (1-6) F,S,Su Prereq.: consent of department head. May be taken for a max. of 6 sem. hrs. of credit. Directed individual study of a problem in biotechnology, nutrition, meats, reproduction, breeding and genetics, herd health, or marketing of farm animals.

3053 Meats (3) F 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.

4001 Parasite Effects on Animal Performance (2) F Prereq.: ANSC 4009 or equivalent. 1 hr. lecture; 2 hrs. lab. Endo- and ecto-parasites that affect performance of domestic animals and birds.

4009 Animal Nutrition (3) F Prereq.: CHEM 2060 or equivalent. Basic principles of nutrition including chemical composition of feedstuffs, digestion, metabolism, and functions and values of nutrients.

4018 Principles of Animal Genetics (4) F Prereq.: AGRI 2072 and EXST 4001; or equivalent. 3 hrs. lecture; 2 hrs. lab. Concepts of animal breeding and genetics as they relate to farm livestock.

4040 Quality Assurance in the Food Industry (4) S See DARY 4040.

4045 Reproductive Physiology of Farm Animals (3) F See DARY 4045.

4050 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) Prereq.: ANSC 1011 or equivalent. Discussion and evaluation of contemporary issues and policies related to animal biology and agriculture; development of reasoning and interpersonal skills; preparation of subject matter for distribution to the public.

4071 Tropical Livestock Husbandry (3) F See DARY 4071.

4081 Swine Production (3) S-E 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 4088. Management practices of swine; reproduction, nutrition, diseases and other aspects of production.

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 4088. Management practices of beef cattle; reproduction, breeding, feeding, marketing, herd health, and other aspects of production in the south.

4086 Small Ruminant Production (3) S-O 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 4088. Theory and practice of management, breeding, and feeding of sheep and goats for production under southern conditions.

4088 Horse Production (3) S Prereq.: ANSC 1011; 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 4088. Theory and practice of raising horses; conformation and selection; nutrition, reproduction, breeding, and production in the south.

4092 Animal Science Proseminar (1) F,S Nutrition, animal breeding and production, and meat processing and preservation.

4094 Meat Technology (3) S-E Prereq.: ANSC 3053; and BIOL 2083 or equivalent. 2 hrs. lecture; 2 hrs. lab.

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

7001 Experimental Methods (2) F Prereq.: credit or registration in EXST 7004 or equivalent. Scientific methods applied to animal science.

7006 Advanced Animal Genetics (3) F-O Prereq.: DARY 7004 or equivalent. Application of genetic principles and theory to farm livestock populations.

7030 Energy in Nutrition (3) F Prereq.: credit in BIOL 4087 or equivalent. Energy-supplying nutrients and their metabolism; energy balance; measuring food energy needs; dietary density; energy restriction and related topics.

7050 Advanced Animal Physiology and Laboratory Techniques (4) F-E Prereq.: consent of instructor. 3 hrs. lecture; 2 hrs. lab. Physiological processes relating to domestic animal homeostasis and their interaction with production; current laboratory techniques.

7051 Advanced Physiology of Reproduction (3) S-O Prereq.: ANSC 4045 or DARY 4045. Processes of reproduction in farm animals.

7052 Biotechnology of Gamete and Embryo Physiology and Micromanipulation (4) S Prereq.: ANSC 4045 or equivalent. 3 hrs. lecture; 2 hrs. lab. Procedures for manipulation of mammalian gametes *in vitro* and general biotechnology techniques; emphasis on application to biological research.

7061 Research in Animal Science (1-6) F,S,Su Prereq.: consent of department head. May be repeated for credit; max. credit of 6 hrs. for M.S. degree and 9 hrs. for Ph.D. degree. Research in animal nutrition, breeding, and production; physiology of reproduction; meat technology.

7075 Advanced Food Preservation (4) S See FDSC 7075.

7093 Seminar (1) F,S May be taken for a max. of 4 hrs. of credit.

7094 Seminar in Nutrition (1) S Same as DARY 7094, FDSC 7094, HUEC 7094, PLSC 7094. May be taken for a max. of 2 hrs. of credit. Prereq.: DARY 7091, FDSC 7071, HUEC 7010, PLSC 7091 or equivalent or previous slide (not poster) presentation at a professional meeting.

7900 Special Topics in Animal Science (1-6) F,S,Su Prereq.: consent of department head. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Special topics of interest in animal science.

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

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

ANTHROPOLOGY • ANTH

General education courses are marked with stars (★).

★ **1001 Introduction to Physical Anthropology and Prehistory (3)** Origin and evolution of people; evolution and its physiological bases; human prehistory; human diversity; origin and development of human culture through the rise of civilization.

★ **1003 Introduction to Cultural and Social Anthropology (3)** Diversity of human cultures; nature of culture, social organization, subsistence patterns, economics, law, politics, religion, language, and other institutions of culture viewed in cross-cultural perspective.

★ **2015 Introduction to Archaeology (3)** Archaeological goals, methods, techniques, and interpretations; particular prehistoric cultural sequences or projects; relationship of archaeology with other social, life, and earth sciences.

2016 Field Methods in Archaeology (3-6) Prereq.: ANTH 2015 or equivalent. May be taken for a max. of 6 sem. hrs. of credit. Techniques of survey, mapping, excavation, and recording; participation in one or more archaeological excavations.

★ **2050 World Archaeology (3)** Survey of human culture history from the stone age to the present; spread of humanity around the globe; major cultural developments including hunting and gathering, origins of agriculture, discovery and spread of metalworking, rise of ancient civilizations, and development of the modern world.

★ **2051 Introduction to World Ethnography (3)** Sex roles, economic pursuits, values, beliefs, families, and other institutions of selected nonwestern peoples; implications for American culture.

★ **2423 Introduction to Folklore (3)** See ENGL 2423.

3004 Archaeology and the Bible (3) See REL 3004.

3015 The Archaeology of Ancient Greece (3) See CLST 3015.

3060 Introduction to Anthropological Linguistics (3) Cultural variation in language and its uses; problems of language classification and areal linguistics; practice in phonemic and morphemic analysis of nonwestern languages.

3401 The Study of Folklore (3) Also offered as ENGL 3401. History of the study of folklore; methods of collection, interpretation, and analysis of folklore materials; myth, folktale, legend, folk song, ballads, folk humor, festival, and folk speech; psychological, contextual, and structural analysis of oral literature; specific reference to the heritage of Louisiana and the South.

3909 Undergraduate Seminar in Anthropology (3) May be taken for a max. of 9 hrs. of credit when topics vary.

3999 Senior Proseminar (1) For anthropology majors in the senior year. Relationship of subfields of anthropology to the overall objectives of the discipline.

4002 South Asian Society, Polity, and Culture (3) See INTL 4002.

4003 Indian Civilization of Middle and South America (3) Ancient Maya, Aztec, and Inca civilizations; modern Indian groups in Latin America.

4004 The North American Indians (3) Origin, distribution, language, and culture of the aboriginal population.

4006 Museology and Museum Methods in Anthropology (3) Prereq.: 3 sem. hrs. of introductory anthropology or equivalent. Fundamental concepts of museology and museological practices in anthropology; museum in history and ethics, exhibit development, collections management.

4010 Human Osteology (3) Prereq.: ANTH 1001; or BIOL 1001, 1002 or 1502. Examination of the human skeleton including skeletal anatomy, bone growth, bone pathology, and forensic anthropology.

4012 Archaeology of Death (3) Archaeological approaches to the study of historic cemeteries and ancient burials.

4015 North American Archaeology (3)

4016 Old World Archaeology (3) Cultural developments in prehistory ranging from the earliest evidence of humans to the foundations of civilization.

4017 Louisiana Archaeology (3) *Prereq.: ANTH 4015 or equivalent. Two overnight field trips.* Archaeological data relative to the Indian cultures dating from the end of the Pleistocene period to the early historic era.

4018 Historical Archaeology (3) *Also offered as HIST 4151.* Broad range of archaeological goals, methods, and interpretations unique to the study of the historic past; colonial and plantation archaeology in the southeastern U.S.

4020 Method and Theory in Archaeology (3) *Prereq.: ANTH 1001 or 1003, and ANTH 2015; or equivalent.* Empirical method and theory in archaeological research emphasizing the logic of scientific argument; history of American archaeology, survey of modern archaeological interpretations, types of explanation, logic of archaeological classification, and formation of research designs.

4021 Advanced Field Methods in Archaeology (3-6) *Prereq.: ANTH 2015 and 2016 or equivalent and at least one upper-division or graduate course in archaeology. May be taken for a max. of 6 sem. hrs. credit when topics vary.* Advanced techniques of surveying, mapping, excavation, soil sampling, and recording.

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 genres 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 4010 or ENGL 4012 or COMD 2050 or equivalent. Also offered as LING 4060.* Relationships between various aspects of language and culture.

4064 Pidgin and Creole Languages (3) *Prereq.: ANTH 4060 or equivalent. Also offered as FREN 4064 and LING 4064.* Linguistic, sociolinguistic, 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 from the 15th through 18th centuries.

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, society, and language in primitive and complex settings.

4083 Quaternary Paleocology (3) *See GEOG 4083.*

4085 History of Anthropological Theory (3) Major theories in all branches of anthropology; emphasis on cultural and social anthropology.

4086 Cultural Ecology (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 diaspora.

4475 American Folklore (3) *See ENGL 4475.*

4909 Undergraduate Seminar in Anthropology (3) *Prereq.: written consent of instructor. May be taken for a max. of 9 sem. hrs. when topics vary.*

4997 Special Topics in Anthropology (3) *May be taken for a max. of 6 sem. hrs. when topics vary.*

4998 Independent Reading and Research in Anthropology (1-6) *Prereq.: written consent of instructor. May be taken for a max. of 6 sem. hrs. An honors course, ANTH 4999, is also available. Supervised reading or research selected by qualified advanced students.*

4999 HONORS: Independent Reading and Research in Anthropology (1-6) *Same as ANTH 4998, 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.* Major theoretical approaches; analysis of examples from a wide range of languages.

7032 Comparative Studies in World Costume (3) *See HUEC 7032.*

7060 Conversation and Discourse (3) *Prereq.: completion of one course in linguistics. Also offered as LING 7060.* Analysis of language in use; conversation, narrative, culturally specific genres; emphasis on discourse structures in naturally occurring context.

7074 Poetics of Place (3) *Prereq.: ANTH/GEOG 4074 or permission of instructor. Also offered as GEOG 7074.* Combination of the observational method of social science with the literary insights of poetry and fiction; understanding of how places where 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. Total credit earned in ANTH 4998 and 7999 cannot exceed 9 sem. hrs. Also offered as LING 7999.* Individual supervision of advanced research and field work in anthropology.

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

ARABIC • ARAB

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

General education courses are marked with stars (★).

***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 (4) *Prereq.: ARAB 1102.* Continuation of the study of Arabic. *Supplementary work in language laboratory.* Development of writing, reading, and speaking skills.

★ *2102 Intermediate Arabic (4) *Prereq.: ARAB 2101.* Continuation of the 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 (4) *Prereq.: permission of department; coreq.: ARCH 1003. 9 hrs. studio.* Emphasis on

two-dimensional representation of three-dimensional forms; development of basic skills in architectural design drawing and modeling.

1002 Architectural Design II (4) *Prereq.: ARCH 1001; coreq.: ARCH 1004. 9 hrs. studio.* Emphasis on the organization of spaces, form and process, and development of skills in architectural design drawing and modeling.

1003 Introduction to Architectural Topics and Techniques I (2) *Prereq.: permission of department; coreq.: ARCH 1001.* Profession of architecture and related disciplines; development of the built environment; demonstrations on drawing, modeling, and rendering techniques.

1004 Introduction to Architectural Topics and Techniques II (2) *Prereq.: ARCH 1003; coreq.: ARCH 1002.* Architectural practice and its relationship to other disciplines; processes and elements of design and demonstrations of drawing types and media, including computer applications.

2001 Architectural Design III (6) *Prereq.: ARCH 1002; coreq.: ARCH 2003, 2005. 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 2004, 2006. 12 hrs. studio.* Emphasis on process, materials theory, site inventory, and analysis and impact of regionalism.

2003 Architectural Techniques III (2) *Prereq.: ARCH 1004; coreq.: ARCH 2001, 2005.* Exploration of drawing, modeling, and digital applications to the design process; specific techniques will vary based on projects assigned in ARCH 2001.

2004 Architectural Techniques IV (2) *Prereq.: ARCH 2003; coreq.: ARCH 2002, 2006.* Advanced exploration of drawing, modeling, and digital applications to the design process; specific techniques will vary based on projects assigned in ARCH 2002.

2005 Architectural Topics III (3) *Prereq.: ARCH 1004; coreq.: ARCH 2001, 2003.* Use of case studies to demonstrate the social and environmental contexts affecting the use of materials, building techniques, structural and energy analysis, and relationship to central themes in modern art and social theory.

2006 Architectural Topics IV (3) *Prereq.: ARCH 2005; coreq.: ARCH 2002, 2004.* Use of case studies to contrast the meanings of buildings designed in urban or rural environments.

2173 Automated Graphics for Designers (3) *See CM 2402, LA 2185.*

★ 2401 Appreciation of Architecture (3) *S Not open to architecture majors.* Architectural concepts and principles; architectural vocabulary, style, symbolic form characteristics, spatial character, and refinements.

2402 Introduction to Structural Forms (3) *S Prereq.: enrollment in professional program in architecture or interior design.* Nonmathematical survey of structural elements and systems; their integration in the environmental design study of forces and force systems; state of stress; deformation; properties of shapes.

3000 Supervised Independent Study and Research (1-3) *Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit with consent of school director.* Investigation of areas of interest not covered in other departmental courses.

3001 Architectural Design V (6) *Prereq.: approval for advancement to upper division in architecture. 12 hrs. studio.* 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, environmental controls, lighting, and acoustics.

3003 Architectural Structures I (3) *Prereq.: approval for advancement to upper division in architecture.* Building structural mechanics, statics, strength of materials, and theories of structures.

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 steel and concrete structures.

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 lighting, electrical distributions, acoustics, plumbing, vertical transportation, 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 exclusively) 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. Emphasis on the design of single or multiple buildings in urban environments.

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

4031 Architectural Structures III (3) Prereq.: ARCH 3004. Design and application of concrete structures in architecture.

4032 Advanced Architectural Technology (3) Prereq.: ARCH 3008. Seminar relating to topics of architectural technologies including, but not limited to building structures, environmental concerns, electronic transfer of information.

4033 Fundamentals of Architectural Technology (2) Su 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.

4051 Advanced 20th Century Architectural History (3) Prereq.: ARCH 3005, 3006. Topics in 20th century architectural history and theory; writing component.

4052 Advanced Architectural History (3) Prereq.: ARCH 3005, 3006. Topics on 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; tools 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 Recording 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 will be at the LSU 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 9 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.

4474 Passive Solar Energy Applications for Buildings (3) Design and application of passive solar systems for space heating and cooling of buildings.

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 image processing and information management 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 4002; coreq.: ARCH 5003. 12 hrs. studio. 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; coreq.: ARCH 5004. 12 hrs. studio. Emphasis on architectural problems developed around faculty expertise and emerging opportunities in the profession.

5003 Advanced Architectural Topics (3) Coreq.: ARCH 5001. Seminar relating to various topics in architecture; writing component.

5004 Concentration Seminar (3) Coreq.: ARCH 5002. 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) F Prereq.: ARCH 7002. 12 hrs. studio. Emphasis on architectural programming and the design of buildings incorporating technologies of materials and various architectural systems.

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

7005 Graduate Design Studio V (6) F Prereq.: ARCH 7004. 12 hrs. studio. Introduction to contextual building design in an urban setting with emphasis on site and context analysis and community planning in a collaborative working environment.

7006 Graduate Design Studio VI (6) 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.

7040 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.

7080 Building Energy Systems (3) Prereq.: ARCH 3171 and 3173 or equivalent. Building energy performance and human interaction.

7600 Seminar in Architecture (3) May be taken for a max. of 9 hrs. of credit when topics vary. Selected topics in architecture.

7900 Architectural 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.

★ **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 within the specific medium of faculty members participating in Academic Programs Abroad.

2050 Digital Art I (3) Prereq.: ART 1011 or equivalent. 6 hrs. studio. Primarily for students majoring in art. Introduction to digital applications in art.

2055 Digital Art II (3) Prereq.: ART 2050 or equivalent. 6 hrs. studio. Primarily for students majoring in art. Beginning work in digital animation.

2080 Performance Art (3) Prereq.: completion of studio art fundamental courses. 6 hrs. studio. Multi-disciplinary "live" art studio problems 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.

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 2055 or equivalent. 6 hrs. studio. Primarily for students majoring in art. 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.

7042 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 art.

★ **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 1400-1600.

★ **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 Art 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 12th century Byzantium.

4406 Romanesque Art (3) Architecture, sculpture, manuscripts, and painting 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 Themistocles to the age of Augustus.

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

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

4420 Studies in Art History (3) May be taken for a max. of 6 hrs. of credit when topics vary. Advanced work in a pre-determined 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, and 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.

4423 Early Renaissance Painting in Italy (3) The origins and early development of Italian Renaissance painting in Florence and Siena.

4424 High Renaissance and Mannerist Painting in Italy (3) The climax and aftermath of Italian Renaissance painting in Florence, Rome, and Venice.

4425 Renaissance Sculpture in Italy (3) The origins and development of Italian Renaissance sculpture; its function, patronage, and significance within its social and cultural context.

4427 Northern Baroque Painting (3) Dutch, Flemish, and French painting of the 17th century.

4429 Southern Baroque Art (3) Painting, sculpture, and architecture of the 17th century in Italy and Spain.

4433 18th Century European Art (3) Rococo, romanticism, and neoclassicism in 18th century European art.

4437 History of European and American Sculpture, 1840 to Present (3) European and American sculpture from 1840 to the present.

4441 Chinese Painting (3) History of Chinese painting from prehistoric times through the 20th century.

4442 Japanese Art (3) History of Japanese painting, sculpture, architecture, and ceramics from prehistoric times through the early 20th century.

4443 Indian Art (3) History of Indian painting, sculpture, and architecture from prehistoric times through the 16th century.

4444 Southeast Asian Art (3) History of architecture, sculpture, ceramics, and painting in Burma, Thailand, Cambodia, Indonesia, Vietnam, and Laos from the prehistoric times through the 19th century.

4450 19th Century European Painting (3) History of painting in European countries from the French Revolution (1789) to 1900; emphasis on neoclassicism, romanticism, realism, impressionism, post-impressionism, and symbolism.

4451 Early 20th Century European Art (3) History of painting and sculpture in European countries from 1900 to 1960; emphasis on Fauvism, Cubism, geometric abstraction, Futurism, Dada and Surrealism, German Expressionism, British figurative art, and the School of Paris.

4464 Early American Art to 1900 (3) North American painting, architecture, and sculpture from the colonial beginnings to 1900; emphasis on painting.

4465 American Art: 1900-1960 (3) Study of American painters and sculptors between 1900 and 1960; from the Impressionists to the Abstract Expressionists; emphasis on the artists' connections to social, political, and cultural developments.

4466 Survey of Contemporary Art (3) Major movements in art from World War II through the 1980's; the wane of modernism and the rise of postmodernism; focus on America and Europe, but Latin American and nonwestern art also considered.

4467 Latin American Art (3) Pre-Hispanic, colonial, and contemporary architecture, painting, sculpture, and related arts throughout Latin America.

4468 Issues in Contemporary Art (3) Principal issues confronting contemporary artists and the sources and theories behind the issues.

4469 Art of the American South: 1560-1861 (3) History of architecture, painting, sculpture, and decorative arts made in the states below the Mason-Dixon Line.

4470 History of Photography (3) History of photography from its inception in the 1830's until the present; technological development of the medium and its inherent aesthetics; interrelationships between photography and more traditional media.

4480 Video Art and Theory (3) Sources and origins of artists' video from the late 1960's to the present day; consideration of theoretical, political, and technological aspects; survey of single-channel, projected, installation, and Internet formats for video art display.

4490 Independent Study in Art History (1-3) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary.

7400 Art Theory and Criticism (3) Critics; building of art collections from ancient to modern times.

7420 Special Topics in Art History (3) Prereq.: graduate standing in art or consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Advanced topics in art history.

7441, 7442 Graduate Research Seminar in History of Art (3,3) Each course may be taken for a max. of 6 hrs. of credit with consent of instructor.

7490 Independent Study in Art History (1-3) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary.

CERAMICS

1661 Introduction to Ceramics I (3) 6 hrs. studio. Problems in pottery, glazing, and kiln firing.

1662 Introduction to Ceramics II (3) Prereq.: ART 1661. 6 hrs. studio. Problems in ceramic forming techniques, mixing of clays and glazes, and kiln firing.

2661* Intermediate Ceramics (3,6) Prereq.: ART 1662. 6 or 12 hrs. studio. May be taken for a max. of 6 sem. hrs. of credit. Studio techniques and issues in ceramics; continued investigation of hand-building and wheel-throwing.

4641* Special Studies in Ceramics (3,6,9) Prereq.: 6 sem. hrs. of credit in ART 4661 and permission of instructor. May be taken for a max. of 12 sem. hrs. of credit. 6, 12, 18 hrs. of studio. Advanced studio work in predetermined area of specialization with emphasis on the formulation of clay bodies, glazes, and practice of kiln operation, building, and maintenance.

4661* Advanced Ceramics (3,6) Prereq.: ART 2661 or approval of portfolio by ceramics faculty. 6 or 12 hrs. studio. May be taken for a max. of 24 sem. hrs. of credit. Studio problems in ceramics.

4691 Senior Project (3) Prereq.: 12 sem. hrs. of credit in ART 4661. 6 hrs. studio. May be taken for a max. of 6 hrs. of credit. Proposal and execution of a ceramics project under the direction of a major professor.

7600 Graduate Ceramics (3,6,9,12) 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 36 sem. hrs. of credit.

GRAPHIC DESIGN

1551 Basic Design (3) 6 hrs. studio. Design as a basic problem-solving creative activity; project dealing with mechanical and communicative utility.

2544 Letter Forms (3) Prereq.: ART 1551 and permission of instructor. 6 hrs. studio. Drawn letter form studies; traditional and contemporary variations.

2551 Typography for Visual Communications (3) Prereq.: consent of instructor and ART 1551. 2 hrs. lecture; 2 hrs. lab. Historical overview of type and letter forms; introduction to professional typography in print and digital environment; primary focus will be applications to contemporary communications

2552 Color Design (3) Prereq.: ART 1551 and permission of instructor. Color as a functional design element of perception and visual communication.

2554 Introduction to Graphic Design (3) Prereq.: ART 1551 and permission of instructor. 6 hrs. studio. Agency and studio procedures for solving design problems: from first ideas through finished presentations; emphasis on the integration of letter forms and graphics.

2564 Graphic Abstraction (3) Prereq.: ART 1551 and permission of instructor. 6 hrs. studio. Simplification of pictorial images as graphic elements.

4514 Experimental Design (3) Prereq.: consent of instructor based on review of student's portfolio. 6 hrs. studio. Advanced experimental work in a predetermined area of graphic design.

4526 Prepress Production Techniques (3) Prereq.: consent of instructor. 6 hrs. studio. Studio techniques related to production problems in the graphic design profession; typesetting methods; primary printing processes, mechanical and digital systems.

4527 Applied Typography (3) Prereq.: consent of instructor. 6 hrs. studio. Developing and understanding typographic skills through functional and aesthetic use of type and its application within the digital environment.

4534 Photo-Design Application (3) Prereq.: consent of instructor. 6 hrs. studio. Investigation of photography as an illustration technique through a series of experimental problems; its application to layout and product illustration.

4541 Special Studies in Graphic Design (3) Prereq.: consent of instructor based on review of student's portfolio. 6 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Advanced work in a predetermined area of specialization.

4544 Advanced Production Techniques (3) Prereq.: consent of instructor. 6 hrs. studio. Advanced techniques and practical experience with graphic arts equipment.

4550 Digital Imaging for Visual Communications (3) Prereq.: consent of instructor and ART 2551 or equivalent. 2 hrs. lecture; 2 hrs. lab. Basic exploration of digital photographic technology and its application in communications; topics include: scanning, image processing and manipulation, digital filtering, and imaging peripherals; emphasis on emerging technology and preparing images for multimedia applications.

4551 Problems in Graphic Design (3) Prereq.: consent of instructor. 6 hrs. studio. Problems in design related to the professional design field; methods of reproduction, exhibition techniques, and digital applications.

4552 Product Design (3) Prereq.: consent of instructor. 6 hrs. studio. Technology, needs, and market related to the mass-produced article; materials research; human engineering; prototype construction; presentation methods; field trips.

4554 Applied Illustration (3) Prereq.: consent of instructor. 6 hrs. studio. Techniques of general illustration; product illustration; problems of layout and its application within the digital environment.

4555 Advanced Graphic Design (3) Prereq.: consent of instructor. 6 hrs. studio. Principles of visual communication through graphic design; problems in design theory and application.

4556 Advanced Design (5) Prereq.: 3 sem. hrs. in advanced design course work and consent of instructor based on review of student's portfolio. 10 hrs. studio. Advanced studio work in a predetermined area of design specialization.

4557 Advanced Project in Graphic Design (5) Prereq.: 3 sem. hrs. in advanced design course work and consent of instructor based on student's portfolio evaluation. Advanced studio work in a predetermined area of design specialization.

4560 Interactive Media for Visual Communications (3) Prereq.: consent of instructor and ART 4550 or equivalent. 2 hrs. lecture; 2 hrs. lab. Basic application of interactive digital technology; design and application of Internet-based communications, hypermedia language, virtual reality, sound and visual synchronization, communications standards, emerging technologies, and multimedia; special focus on the study and application of interactive multimedia theory.

4561 Survey of Graphic Design (3) Prereq.: Consent of instructor. Overview of graphic design, covering its development from its inception to the present; its relationship to other arts; and the cultural influences and technological advances that have shaped its present role in the field of visual communications.

4564 Senior Graphic Design (3) Prereq.: ART 4555. 6 hrs. studio. Design projects investigating problems of visual communication; individual and group projects with professional-level presentations.

4567 Interactive Multimedia Design (3) Prereq.: consent of instructor. 6 hrs. studio. May be taken for a max. of 6 hrs. of credit. Application of interactive computer graphics technology for art and design; design and application of CD-ROM, video disks, Internet-based communication, hypermedia language, virtual reality, sound and visual synchronization, communication standards, emerging technologies, and multimedia; emphasis on study and application of interactive multimedia design theory.

4574 Graphic Design Synthesis (3) Prereq.: consent of instructor based on review of student's portfolio. 6 hrs. studio. May be taken for a max. of 6 sem. hrs. of credit. Project or internship approved by graphic design faculty committee.

4576 Digital Imaging Techniques (3) Prereq.: consent of instructor. 6 hrs. studio. May be taken for a max. of 6 sem. hrs. of credit. Digital imaging technology and its application in art and design areas; scanning, image processing, and manipulation, digital filtering, and imaging peripherals; emphasis on digital imaging aesthetics, emerging technology, and preparing images for printed and multimedia applications.

7500* Graduate Design (3,6,9,12) 6, 12, 18, 24 hrs. studio each. May be taken for a max. of 36 hrs. of credit.

7553, 7554, 7555, 7556 Graduate Research in Design (3 each) Prereq.: consent of instructor. 6 hrs. studio each.

JEWELRY/METALSMITHING

2655 Basic Jewelry/Metalsmithing (3) 6 hrs. studio.

Piercing, construction, cold connection, soldering, forming, and stone setting; studio problems in bronze, copper, and sterling silver.

2656* Jewelry/Metalsmithing: Casting (3,6,9) Prereq.: ART 2655 or equivalent. 6, 12, or 18 hrs. studio. May be taken for a max. of 12 hrs. of credit. Intermediate studio work in jewelry/metalsmithing involving sand casting, cuttle bone casting, steam casting, vacuum casting, and centrifugal casting.

4651* Special Studies in Jewelry/Metalsmithing (3,6,9) Prereq.: consent of instructor based on review of student's portfolio. 6, 12, or 18 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Advanced studio work in a predetermined area of specialization with emphasis on a single technique or material.

4655* Advanced Jewelry/Metalsmithing (3,6,9) Prereq.: Consent of instructor based on review of student's portfolio. 6, 12, or 18 hrs. studio. May be taken for a max. of 15 sem.

hrs. of credit. Advanced studio problems in forging, forming, reproduction processes, and advanced construction techniques; emphasis on historical and contemporary jewelry/metalsmithing.

4659 Senior Project: Jewelry/Metalsmithing (3) Prereq.: consent of instructor based on review of student's portfolio. 6 hrs. studio. May be taken for a max. of 6 hrs. of credit. Proposal and execution of an independent jewelry or metalsmithing project under the direction of a major professor.

PAINTING AND DRAWING

1847 Drawing and Composition (3) 6 hrs. studio. Basic principles of observation; emphasis on graphic analysis and delineation of spatial structure.

1848 Drawing and Composition (3) 6 hrs. studio. Studies from the live model; introduction of graphic representation, structure, and form.

1849 Introduction to Painting (3) 6 hrs. studio/lecture. Basic studio practice and theory in painting; traditional and modern materials and terminology; value and color experiences involving simple forms in space.

2879 Intermediate Drawing and Composition (3) Prereq.: ART 1848. 6 hrs. studio. Imaginative composition utilizing the figure, still-life, and landscape forms.

2881 Painting (3) Prereq.: ART 1847 and 1848. 6 hrs. studio. Studio problems in still-life directed toward conceptual attitudes; analysis of structure and color in composition; individual criticism, class discussion.

2882 Painting (3) Prereq.: ART 1847, 1848, and 2881. 6 hrs. studio. Studio approaches to abstraction; thematic problems based on the figure and nature forms, synthesizing form and experience; individual criticism, class discussion.

2883 Water Media Painting (3) Prereq.: ART 1847 and 1848. 6 hrs. studio. Objects and landscape; composition in water-soluble media on paper.

4800 Senior Project (3) Prereq.: ART 4884. 6 hrs. studio. Proposal and execution of a painting project.

4841* Special Studies in Painting (3,6,9) Prereq.: consent of instructor based on review of student's portfolio. 6, 12, or 18 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Advanced studio work in a predetermined area of specialization.

4880* Figure Painting (3,6,9,12) Prereq.: ART 2879, 2881, and 2882. 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Studies from the nude model.

4881* Intermediate Painting (3,6,9,12) Prereq.: ART 2881 or 2883. 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Contemporary concepts in painting; approaches to imagery, symbolism, empathy; individual criticism, class discussion.

4882 Advanced Water Media Painting (3) Prereq.: ART 2883. 6 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Advanced studio work in water-soluble media on paper.

4884* Advanced Painting (3,6) Prereq.: ART 2883. 6, 12 hrs. studio. May be taken for a max. of 12 hrs. studio. Research into advanced visual schema through self-initiated studio problems.

4886 Landscape Painting (3) Prereq.: ART 2882. 6 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. On-location and studio development of the landscape.

4887* Advanced Figure Drawing (3,6,9) Prereq.: ART 2879 or equivalent. 6, 12, 18 hrs. studio. May be taken for a max. of 9 sem. hrs. of credit. Study of the human figure using various media.

4889* Advanced Drawing Workshop (3,6,9,12) Prereq.: 6 sem. 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.

7800* Graduate Painting (3,6,9,12) 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 36 sem. hrs. of credit.

7881 Painting Seminar (3) Prereq.: students currently enrolled in the graduate painting program. 3 hrs. seminar. Pass/fail grading. May be taken for a max. of 18 sem. hrs. of credit. Discussion of formal and conceptual issues related to the medium.

PHOTOGRAPHY

2995 Basic Photography (3) 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.

3994 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.

3996 Color Photography I (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 3994 or 3996, and permission of instructor. 6 hrs. studio. Investigation of experimental camera and darkroom techniques; emphasis on the creative possibilities of photographic manipulations.

4941 Special Studies in Photography (3) Prereq.: ART 3994 and permission of instructor. 6 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Individual creative research in a predetermined area of specialization.

4994 Large Format Photography (3) Prereq.: ART 3994 and permission of instructor. 6 hrs. studio. Fundamentals of the view camera.

4996 Color Photography II (3) Prereq.: ART 3996 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.

4997 Nonsilver Photography (3) Prereq.: ART 3994 and permission of instructor. 6 hrs. studio. Exploration of historical photographic processes; emphasis on nonsilver printmaking techniques.

4998 Senior Project (3) Prereq.: permission of instructor. 6 hrs. studio. Proposal for and execution of an independent photography project under the direction of a major professor.

7900* Graduate Photography (3,6) Prereq.: permission of instructor. May be taken for a max. of 36 sem. hrs. 6 or 12 hrs. of studio. Emphasis on personal vision and contemporary issues in photography.

PRINTMAKING

1361 Introduction to Intaglio (3) Prereq.: ART 1847. 6 hrs. studio. Basic intaglio techniques; work in black and white.

1371 Introduction to Lithography (3) Prereq.: ART 1847. 6 hrs. studio. Planographic printing from stones in black and white.

1381 Introduction to Book Arts (3) Prereq.: ART 1361 or 1371 or consent of instructor. 6 hrs. studio. Basic theory, design, and production in the book arts.

2352 Relief Printmaking (3) Prereq.: ART 1847. 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 and color.

2382 Intermediate Book Arts (3) Prereq.: ART 1381. 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.

4300 Senior Project: Printmaking (3) Prereq.: 9 hrs. of 4000-level printmaking courses and senior status. 6 hrs. studio. May be taken for a max. of 6 hrs. of credit. Proposal and execution of a printmaking project under the direction of a major professor.

4361* Advanced Intaglio (3,6) Prereq.: ART 2362. 6 or 12 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Advanced intaglio techniques.

4366* Special Studies in Printmaking (3,6) 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.

4371* Advanced Lithography (3,6) Prereq.: ART 2372. 6 or 12 hrs. studio. May be taken for a max. of 12 sem. hrs. of credit. Advanced planographic printing from stones and plates.

4381 Advanced Book Arts (3 or 6) Prereq.: ART 2382. 6 or 12 hrs. studio. May be taken for a max. of 6 sem. hrs. of credit. Advanced exploration, design, and production in the book arts; emphasis on self-initiated book art problems.

4391 Alternative Print Media (3) Prereq.: ART 1361 and 1371. 6 hrs. studio. May be taken for a max. of 9 sem. hrs. credit. Exploration of individual imagery in experimental and combined print media.

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

SCULPTURE

1761 Sculpture I (3) 6 hrs. studio. Development of three-dimensional forms; various theories, methods, and materials.

1762 Beginning Sculpture (3) 6 hrs. studio. Studies in sculpture using appropriate materials and processes.

2761* Intermediate 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. Assigned projects on figurative and nonfigurative sculpture, using various materials and methods.

4741* 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.

4762 Senior Project: Sculpture (3) 6 hrs. studio. May be taken for a max. of 6 hrs. of credit. Proposal and execution of independent sculpture project under direction of major professor.

7700* Graduate Sculpture (3,6,9,12) 6, 12, 18, or 24 hrs. studio. May be taken for a max. of 36 sem. hrs. of credit.

ASTRONOMY • ASTR

General education courses are marked with stars (★).

★ **1101 The Solar System (3)** Prereq.: MATH 1021 or an ACT mathematics score of at least 21. Fundamental principles of the solar system.

★ **1102 Stellar Astronomy (3)** Prereq.: ASTR 1101. Fundamental principles of stellar astronomy.

★ **1108 Astronomy Laboratory (1) 2 hrs. lab.** Prereq.: credit or registration in ASTR 1101. Visual observation of positions of celestial bodies with application to star charts and globes; visual and photographic observations will be made using telescopes; provides student with practical observing experience.

★ **1109 Astronomy Laboratory (1) 2 hrs. lab.** Prereq.: ASTR 1108, and credit or registration in ASTR 1102. Analysis of light from terrestrial and celestial sources; visual and photographic observations of stars and nebulae; training in the use of smaller telescopes and larger telescopes with multimedia technologies.

2001 Current Topics in Astronomy and Astrophysics (3) S Prereq.: ASTR 1101, 1102. Primarily for nonscience students. Topics of current interest in astronomy; recent topics include extraterrestrial intelligence, black holes, exploration of the solar system.

4221, 4222 Introductory Astrophysics (3,3) V Prereq.: PHYS 1202 or 2102 or consent of instructor. ASTR 4221 is prerequisite for 4222. Sun, stars, and stellar systems; results and problems of modern astrophysical research.

4261 Modern Observational Techniques (3) V Prereq.: ASTR 1101, 1102 and MATH 1552. 1 hr. lecture; 6 hrs. lab. Modern astronomical observations and reductions; the telescope, astronomical photography, spectroscopic and photoelectric observations and reductions.

4750 Special Topics in Observational Astronomy (3) V Maybe taken twice for credit when topics vary. One topic scheduled each time course is offered; current topics include astronomical spectroscopy and astronomical photometry.

4997 Problems in Astronomy (1-3) 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 Astronomy 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 9 hrs. of credit. 2-6 hrs. lab. Visual observation techniques including the use of star charts

and globe; visual and photographic observation of celestial objects such as the sun, moon, 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 ASTR 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 and Astrophysics (1-6) V *May be taken for a max. of 6 sem. hrs. of credit. Also offered as PHYS 7777.*

7783 Topics in Astronomy and Astrophysics (3) V *May be taken for a max. of 6 hrs. of credit. Also offered as PHYS 7783.*

AUDIO-VISUAL ARTS • AVA

2001 Introduction to Audio-Visual Arts (3) Study of film, television, and video.

3001 Special Topics in the Audio-Visual Arts (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Selected topics relevant to the study of the audio-visual arts.

4001 Special Topics in Audio-Visual Arts (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Selected topics relevant to the study of the audio-visual arts.

BASIC SCIENCES • BASC

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 sem. hrs. of introductory biology. May be taken for a max. of 9 hrs. of credit when topics vary.*

6003 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.

BIOLOGICAL ENGINEERING • BE

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 BIOL 1201. 1 hr. lecture; 3 hrs. lab.* Effect of variability and constraints of biological systems on 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 tape, level, transit, plane table, and compass; principles of area and volume calculations, land slope, drainage grades, legal land descriptions, and topographic mapping.

2350 Experimental Methods for Engineers (3) S *Prereq.: MATH 1552. 2 hrs. lecture; 3 hrs. lab.* Introduction to statistical analysis, experimental methods, technical report writing, and instrumentation for engineering applications; measurement of temperature, pressure, flow, strain, and vibration in biological and agricultural 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 (1-3,1-3) Su only *Prereq.: consent of instructor. Pass-fail grading. A minimum of six weeks of full-time employment in an industry participating in the summer program. Same as ENGR 3049, 3050.* Selected engineering problems in an industrial environment.

3320 Mechanical Design for Biological Engineering (3) *Prereq.: CE 3400; CE 2460 or ME 3133. 2 hrs. lecture; 3 hrs. lab.* Term project in mechanical design. Philosophy of mechanical design for biological engineering; materials for construction; frame design; power transmission.

3340 Process Design in Biological Engineering (3) S *Prereq.: EE 2950, CE 2200, and credit or registration in ME 3333. 2 hrs. lecture; 3 hrs. lab.* Design applications in biological engineering using the engineering sciences of fluid mechanics and thermodynamics; electrical machines and controls.

3361 Soil and Water Technology (3) *Prereq.: AGRO 2051.* For majors in agriculture, general studies, and natural sciences. Cannot be used to fulfill College of Engineering requirements. Soil and water technology, including the hydrological cycle, hydraulics, soil and water conservation, irrigation, drainage, and surface and ground water pollution prevention.

3381 Nonpoint Source Pollution Engineering (3) S *Prereq.: BE 2352 and CE 3110. 2 hrs. lecture; 3 hrs. lab.* Water quality criteria and regulations for the agricultural community; production, treatment, and disposal of agricultural and food processing wastes; management of agricultural nutrients; nonpoint source pollution; bi-product utilization; land application; wetland restoration; stream sampling and analysis; re-aeration studies and modeling.

3400 Environmental Engineering II (3) F,S *Prereq.: CHEM 2060 (2261), EVEG 2000. See EVEG 3400.*

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

4290 Senior Engineering Design 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; economics, product liability and reliability; use of standards and codes; goal setting and time management.

4292 Senior Engineering Design Laboratory (2) S *6 hrs. lab.* Engineering principles used to complete the project set forth in the design outline submitted in BE 4290; design project completion.

4303 Engineering Properties of Biological Materials (3) V *Prereq.: CE 3400. 2 hrs. lecture; 3 hrs. lab.* Engineering properties, including rheology, friction, mechanical damage, texture, and thermal, optical, and electrical properties.

4323 Biomechanics for Engineers (3) V *Prereq.: CE 2450. 2 hrs. lecture; 3 hrs. lab. Also offered as IE 4465.* Mechanical 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.

4340 Food and Bioprocess Engineering (3) V *Prereq.: BE 2352; credit or registration in BE 3340. 2 hrs. lecture; 3 hrs. lab.* Design and analysis of systems for processing biological materials, with emphasis on food; topics include biotechnology, fluid flow, thermodynamics, and transport phenomena in food and bioprocessing; unit operations, including freezing, extraction, drying, and aseptic processing.

4341 Biological Reactor Systems Design (3) S *Prereq.: BIOL 2051 and BE 4352. 2 hrs. lecture; 3 hrs. lab.* Microbial and biochemical principles used in design of biological reactors for biotransformation; metabolic output and cellular production; design of batch and continuous flow reactors utilizing microbial kinetic models; attached and suspended growth systems and eucaryotic and prokaryotic cells.

4342 Sugar Process Engineering (3) *Prereq.: EE 2950, CE 2200 or ME 2833 or CHE 3101, ME 3333 or CHE 3172.* Processes used in the manufacture of raw and refined sugar; application of scientific and engineering principles to unit operations of evaporation, crystallization, extraction, solids handling and drying, centrifuging, clarification, and steam and power generation.

4345 Models, Simulation, and Visualization in Biological Engineering (3) *Prereq.: senior standing in engineering.* Techniques used to model and simulate biological systems; emphasis on evaluating and interpreting current biological models; current visualization techniques used to interpret data and model output.

4347 Sugar Factory Design (3) *Prereq.: credit or registration on BE 4342. 2 hrs. lecture; 3 hrs. lab.* P and I diagrams for sugar processes and instrumentation/control strategies; detailed process design of heat transfer equipment,

fluid flow systems including non-Newtonian flow, prime mover requirements, steam and power use, and reticulation, materials handling systems, utility systems, and materials of construction.

4352 Transport Phenomena in Biological Engineering (3) F *Prereq.: BE 2352; credit or registration in CE 2200 and ME 3333.* Introduction to biological kinetics; time-temperature substrate-dependent growth and death of biological organisms; heat and mass transfer in engineering design and analysis; principles of material and energy balances in reactor design.

4360 Mobile Fluid Power Control (3) F *Prereq.: ME 2833 or equivalent. 2 hrs. lecture; 3 hrs. lab.* Theory and design of hydraulic systems and basic components; power steering, hydrostatic transmissions, electrohydraulic servovalves, manual and automatic control applications.

4361 Irrigation Fundamentals and Management (3) Prereq.: consent of instructor. For majors in agriculture, design, and natural sciences. Cannot be used to fulfill College of Engineering requirements. Turf, landscaping, and other horticultural applications of irrigation; aspects of irrigation from water source to evapotranspiration to the atmosphere; sprinkler irrigation; friction loss in pipe and fittings, relevant soil properties, and timing and amount of irrigation.

4380 Aquacultural Engineering (3) F *Prereq.: senior standing.* Engineering principles applied to aquacultural systems; water chemistry; fluid mechanics; aquacultural pumping plants; fish pond design; recirculating aquacultural systems; water filtration; disinfection; aeration and degassing.

4383 Natural Resource Engineering (3) F *Prereq.: CE 2200.* Engineering analysis and design of natural resource control systems, including open channels, vegetated waterways, terraces, water control structures, spillways, reservoirs, flood control, surface water quality, and wetlands.

4989 Independent Study in Biological Engineering (1-4) F,S,Su *Prereq.: senior standing. Written engineering report required. May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Biological engineering practice; library research, experimental and/or theoretical investigation.

7301 Similitude in Biological Engineering Research (3) V *Prereq.: Graduate standing.* Determination of pertinent quantities in a research project, Buckingham π theorem, theory and systematic calculation of dimensionless numbers, similarity and distortion in model studies, research project design, and prediction equations.

7304 Advanced Natural Resource Engineering (3) V *Prereq.: BE 4383.* Advanced topics in statistical hydrology, flow theory, evapotranspiration, transport of pollutants, drainage, irrigation, erosion, sediment transport, and sedimentation applied to rural fields and watersheds.

7306 Agricultural Systems Engineering (3) V *Prereq.: BE 4292 or equivalent.* Applications of systems approaches to engineering problems in agriculture; queuing theory; modeling and simulation; linear programming; decision support systems and expert systems.

7340 Advanced Food Engineering and Biotechnology (3) V *Prereq.: BE 4340.* Design and modeling of food and bioprocessing systems; application of advanced thermodynamic principles and transport phenomena with emphasis on numerical techniques in the design, analysis, and modeling of food systems; focus on current research topics in food engineering and food biotechnology.

7350 Advanced Instrumentation and Control for Biological Systems (3) V *Prereq.: BE 2350 and MATH 2065. 2 hrs. lecture; 3 hrs. lab.* Theory of measurement and feedback integrated with applied design work with biological systems; focus areas include: aquaculture, precision farming, environmental applications, bioprocess, and biomedical measurement and control concepts.

7352 Advanced Transport Phenomena in Biological Engineering (3) V *Prereq.: BE 4352.* Transient heat and mass transfer in biological materials and systems; mathematics describing active and passive cellular transport; emphasis on numerical solution techniques for heat and mass flow in nonideal, heterogeneous systems, including kinetic and thermodynamic considerations.

7361 Biological Reactor Systems for Agricultural Waste Treatment (3) V *Prereq.: BE 4341.* Design of biological reactor systems for treatment of agricultural wastes; utilizing and developing kinetic models for suspended and attached-growth cultures; characterization of agricultural wastes and wastewaters; consideration of nutrient recovery, pathogen survival, odor reduction, and by-product recovery goals.

7381 Advanced Aquacultural Engineering (3) V *Prereq.: BE 4380.* Advanced topics in aquacultural aeration, oxygenation, disinfection of aquacultural systems, and aquacultural wastewater characterization; integration with traditional agricultural production.

7500 Seminar (1) Prereq.: graduate standing in engineering. Only 1 sem. hr. of credit will be allowed toward the degree. Pass-fail grading.

7909 Advanced Topics in Biological Engineering (1-4) F,S,Su Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. One or more phases of advanced biological engineering practice.

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

BIOLOGICAL SCIENCES • BIOL

General education courses are marked with stars (★).

★ **1001 General Biology (3) F,S,Su** Credit will not be given for this course and BIOL 1201. For nonscience majors. Not for degree credit for a student majoring in a biological science. General concepts in cell biology, genetics, ecology, and evolution.

★ **1002 General Biology (3) F,S,Su** Prereq.: BIOL 1001 or 1201. Credit will not be given for this course and BIOL 1202. For nonscience majors. Not for degree credit for a student majoring in a biological science. Diversity, interactions, and life histories of microorganisms, fungi, plants, and animals.

★ **1005 Introductory Biology Laboratory (2) F,S,Su** Prereq.: credit in BIOL 1001 and credit or registration in BIOL 1002; 1 hr. lecture; 3 hrs. lab. Credit not allowed for students who have had BIOL 1208 or 1209. Basic principles of biology including cell biology, genetics, ecology, evolution, diversity, and systems physiology.

★ **1011 Microorganisms and Man (3)** Credit will not be given for both this course and BIOL 2051. Not open to biological science majors. Microorganisms and their relationship to people; microbial form and function; role of bacteria in health and disease, ecology, and industry from food production to genetic engineering.

★ **1012 Microorganisms and Man Laboratory (1)** Prereq.: credit or registration in BIOL 1011. 3 hrs. lab. Credit will not be given for both this course and BIOL 2051. Not open to biological science majors. Basic laboratory skills for handling and observing microorganisms; demonstration of features of microorganisms discussed in BIOL 1011.

★ **1201 Biology for Science Majors I (3)** Prereq.: minimum ACT composite of 23 or "C" or better in CHEM 1201. Primarily for students in science, agriculture, or education. Credit will not be given for both this course and BIOL 1001. General concepts in cellular structure, cellular metabolism, cellular communication, and genetics.

★ **1202 Biology for Science Majors II (3)** Prereq.: BIOL 1201. Primarily for students in science, agriculture, or education. Credit will not be given for this course and BIOL 1002. General concepts in evolution, ecology, and the function of organisms.

★ **1207 HNRS: Biology Laboratory for Science Majors (1) F** Prereq.: credit or registration in BIOL 1201 and admission to the Honors College. Credit will not be given for this course and BIOL 1005 or 1208. 3 hrs. lab. Topics include biochemistry, enzymes, cell structures, osmosis, cellular respiration, photosynthesis, cell division, genetics, and ecology.

★ **1208 Biology Laboratory for Science Majors I (1)** Prereq.: credit or registration in BIOL 1201. Credit will not be given for this course and BIOL 1005 or 1207. 3 hrs. lab. Primarily for students majoring in science, agriculture, or education.

★ **1209 Biology Laboratory for Science Majors II (1)** Prereq.: Credit in BIOL 1208, credit or registration in BIOL 1202. Credit will not be given for this course and BIOL 1005. Primarily for students majoring in science, agriculture, or education.

★ **1503 HONORS: Introductory Zoology (4) S** Prereq.: BIOL 1201 and consent of instructor. 3 hrs. lecture; 3 hrs. lab. Special honors emphasis for qualified students.

2015 Genetics and Society (3) Prereq.: BIOL 1001 and 1002. Not a prerequisite for other genetics courses. For nonscience majors. Genetics as it affects society; basic, human, and population genetics; testing for mutagenic and carcinogenic agents; genetic engineering; potential dangers and ethical problems.

2046 Plant Ecology (4) Prereq.: BIOL 1201, 1208, and 4 additional hrs. of biological science with laboratory; 3 hrs. lecture; 3 hrs. lab.; two Saturday field trips; field service fee. Ecological principles pertaining to plant populations and communities and their environmental interactions.

2051 General Microbiology (4) F,S,Su Prereq.: BIOL 1202, 1209 and CHEM 1202. 2 hrs. lecture; 4 hrs. lab. Credit will not be given for both this course and BIOL 1011 or 1012. Structure and function of microbial cells and their relationship to people and the environment.

2083 The Elements of Biochemistry (3) F,S Prereq.: CHEM 2060. Not for degree credit for students in the College of Basic Sciences. Nature and physiological uses of natural substances of interest to education, agriculture, and home economics majors.

2084 Elementary Biochemistry Laboratory (1) Prereq.: one semester of chemistry laboratory, CHEM 2060, and credit or registration in BIOL 2083. 3 hrs. lab. Not for degree credit for students in the College of Basic Sciences. Deposit required.

2153 Principles of Genetics (4) F,S Prereq.: BIOL 1202, 1209, and enrollment or credit in CHEM 1202. Fundamental laws of heredity.

2160 Human Physiology (3) F,S,Su May not be taken for credit by a student majoring in a biological science or premedical students. Elements of human physiology; controls and functions of the various organ systems.

2161 Human Physiology Laboratory (1) Prereq.: credit or registration in BIOL 2160 and one year of chemistry. 3 hrs. lab.

2280 Introduction to Research in Biological Sciences (1) Prereq.: 6 sem. hrs. of biological sciences and consent of the instructor. Pass-fail grading. Introduction to research with faculty in the Department of Biological Sciences.

2390 Information Retrieval in the Sciences (1) F,S Prereq.: CHEM 2261 or equivalent. Modern methods of information retrieval from abstracts, scientific research literature, computerized index programs, and key-word citation systems; proper techniques in data presentation.

2500 Natural History of the Vertebrates (4) Prereq.: BIOL 1201, 1208, and 4 hrs. of additional biological sciences with laboratory. 2 hrs. lecture; 6 hrs. lab/field work. Diversity, ecology, and evolution of the fishes, amphibians, reptiles, birds, and mammals; emphasis on Louisiana species.

2510 Introduction to Marine Zoology (4) Su Prereq.: BIOL 1202 and 1209; permission of department. 12 hrs. lab. Five weeks at Louisiana Universities' Marine Consortium (LUMCON). For degrees in biological science this counts only as an approved elective. Field and laboratory survey of marine animals, particularly those of the Louisiana Gulf Coast; classification, morphology, physiology, and ecology.

3001 Science Teaching in Secondary School I: The Learner (1) Prereq.: registration in EDCI 3001 or equivalent and credit in either BIOL 2051 or 2153, or CHEM 2001 or 2261, or PHYS 2203 or 2221. Also offered as CHEM 3001 and PHYS 3001. Monitored and evaluated science tutoring experiences in a local middle school or high school under the guidance of the course instructor and a mentoring teacher.

3002 Science Teaching in Secondary School II: Technology in Science Education (1) Prereq.: registration in EDCI 3002 or equivalent and credit in EDCI 3001 and BIOL 3001, or CHEM 3001, or PHYS 3001. Also offered as CHEM 3002 and PHYS 3002. Introduction to the integration of technology in demonstrations, and small and large group classroom activities, with a focus on inquiry-based approaches.

3040 Evolution (3) Prereq.: BIOL 2153. Principles and processes in evolutionary biology.

3041 Evolution Laboratory (1) Prereq.: credit or concurrent enrollment in BIOL 3040. Lab to accompany lecture BIOL 3040.

3060 Introductory Plant Physiology (4) Prereq.: BIOL 1202 and 1209; CHEM 2060, 2261, or 2461. 3 hrs. lecture; 3 hrs. lab. Also offered as PLHL 3060. Life processes of plants emphasizing growth and development, metabolism, transport, and water relations.

3090 Cell Biology (3) Prereq.: BIOL 2153 and CHEM 2262. Molecular description of cell structure and function.

3115 Advanced General Microbiology (4) Prereq.: BIOL 2051 and organic chemistry. 2 hrs. lecture; 4 hrs. lab. Growth and differentiation of microorganisms; definition, quantitation, regulation, and manipulation of these processes; their importance in basic, applied, and medical research.

3152 Comparative Anatomy of the Vertebrates (4) F,S Prereq.: BIOL 2153. 2 hrs. lecture; 6 hrs. lab.

3156 Developmental Zoology (4) Prereq.: BIOL 2153. 3 hrs. lecture; 3 hrs. lab. Combination of classical descriptive embryology and contemporary experimental theories focusing on the mechanisms of development in vertebrates and invertebrates.

3900 Undergraduate Seminar in Biological Sciences (1) Prereq.: junior standing and consent of the instructor. Oral presentation of independent laboratory or library research on selected topics in biological sciences.

3999 Undergraduate Research in Biological Sciences (1-4) F,S,Su May be taken for a max. of 4 sem. hrs. of credit. Individual research on problems in the biological sciences.

4001 Physical Chemistry (3) S Prereq.: CHEM 2261, PHYS 2002, and MATH 1550. Theoretical chemistry; emphasis on solutions, equilibria, and topics of interest to students in agricultural and biological sciences.

4003 Science Teaching in Secondary School III: Instructional Strategies in the Sciences (1) Prereq.: registration in EDCI 4003 or equivalent and credit in EDCI 3002 and BIOL 3002, or CHEM 3002, or PHYS 3002. Also offered as CHEM 4003 and PHYS 4003. Model whole-classroom instructional strategies that depart from the lecture style (cooperative learning or open-ended problem exploration); design and presentation of a science lesson using such a strategy; laboratory safety program management.

4004 Seminar in Teaching Secondary School Science (3) Prereq.: credit or registration in EDCI 4004 or equivalent, credit or registration in EDCI 4005 or equivalent, and credit in BIOL 4003, or CHEM 4003, or PHYS 4003. Also offered as CHEM 4004 and PHYS 4004

4015 Conservation Biology (3) F-E Prereq.: 11 sem. hrs. of biological sciences; genetics recommended. Also offered as ENTM 4015.

4016 Introduction to Insect Physiology (3) Prereq.: 12 hrs. of entomology or biological sciences; 1 yr. of organic chemistry or biochemistry. 2 hrs. lecture; 3 hrs. lab. Also offered as ENTM 4016.

4020 Taxonomy and Ecology of Wetland Plants (3) 1 hr. lecture; 4 hrs. lab; extended field trips. Also offered as RNR 4020. Field service fee. Taxonomy, ecology, distribution, and economic significance of wetland plants in Louisiana.

4024 Plant Anatomy (4) Prereq.: BIOL 1202 and 1209.

2 hrs. lecture; 4 hrs. lab. Structure and development of vascular plants; emphasis on seed plants.

4034 Morphology of Vascular Plants (4) Prereq.: BIOL 1202 and 1209. 2 hrs. lecture; 4 hrs. lab. Field service fee. Phylogenetic survey of plant form and development among vascular plants from ferns and related forms through gymnosperms and angiosperms.

4041 Plant Taxonomy (4) Prereq.: BIOL 1202 and 1209.

2 hrs. lecture; 4 hrs. lab. Principles of identification, classification, and nomenclature; their application to select groups of vascular plants.

4042 Projects in Plant Taxonomy (3) Prereq.: BIOL 4041 or equivalent. 1 hr. conference; 4 hrs. lab. Individual instruction; student responsible for selecting a plant taxonomy project related to interests.

4052 Phycology (4) Prereq.: one year of biological science. 2 hrs. lecture; 4 hrs. lab. Also offered as OCS 4052. Field service fee. Freshwater and marine algae, including morphology, biology, ecological role, and economic significance.

4054 Introductory Mycology (4) 3 hrs. lecture; 3 hrs. lab. Same as PLHL 4054. Developmental morphology, taxonomy, and adaptive strategies of fungi; interactions of fungi with plants and animals.

4055 Flora of Louisiana (4) Prereq.: BIOL 1202 and 1209. 2 hrs. lecture; 4 hrs. lab. Two Saturday field trips. Major plant groups and communities of Louisiana and the Gulf region; field and laboratory identification, natural history, ecology, environmental issues relating to natural vegetation, and conservation of natural areas.

4056 Lichenology and Bryology (4) Prereq.: BIOL 1202 and 1209. 2 hrs. lecture; 4 hrs. lab. Field service fee. Lichen and bryophyte morphology, physiology, ecology, and systematics; practice in identification.

4087 Basic Biochemistry (4) F,S,Su Prereq.: BIOL 1202, 1209, and CHEM 2262. Credit will be given for only one of the following: BIOL 4087 or 4093 and 4094. Cellular macromolecules; production and utilization of energy by the cell; major metabolic pathways and their control; molecular biology.

4090 Marine Microbiology (3) See OCS 4090.

4093, 4094 General Biochemistry I (3) F, II (3) S Prereq.: BIOL 1202, 1209 and CHEM 2262. Credit will not be given for both BIOL 4087 or 4093 and 4094. Principles of biochemistry; biochemistry of the genetic code; protein chemistry; enzymology; primary, secondary, and tertiary metabolites; energetics; cycles of intermediary metabolism; biosynthesis and biomembranes; chemical structure of amino acids, carbohydrates, lipids, and nucleic acids.

4104 Histology (4) Prereq.: BIOL 3090 or 3156, permission of department. 2 hrs. lecture; 6 hrs. lab. Morphological basis of function in mammalian tissues and organs.

4105 Parasitology (3) F,S Prereq.: BIOL 2153. Biology of animal parasites; emphasis on important human parasites.

4106 Parasitology Laboratory (1) F,S Prereq.: credit or concurrent enrollment in BIOL 4105. 3 hrs. lab. Field and laboratory investigations in parasitology.

- 4110 Introductory Microbial Physiology (3) F,S Prereq.:** *BIOL 2051 and CHEM 2261 or 2461.* Concepts of bacterial nutrition, metabolism, adaptation, and genetics, as related to growth and environment.
- 4111 Microbial Physiology Laboratory (2) 6 hrs. lab.** Laboratory techniques used to study growth, metabolism, and cellular control of microorganisms.
- 4121 Immunology and Serology (4) F Prereq.:** *BIOL 2051.* 2 hrs. lecture; 4 hrs. lab.
- 4122 Pathogenic Biology (4) S Prereq.:** *BIOL 4121 or equivalent.* 2 hrs. lecture; 4 hrs. lab.
- 4125 Prokaryotic Diversity (3) Prereq.:** *BIOL 2051.* Biology of bacteria and archaea; evolution, diversity assessment, systematics, ecology; emphasis on molecular approaches.
- 4132 Eukaryotic Molecular Genetics (3) Prereq.:** *BIOL 2153; BIOL 4094 recommended.* Molecular genetics, primarily in higher eukaryotes; gene structure and packaging in chromosomes; gene transcription and mRNA processing; translation; gene regulation; genetics in development; genetics of cancer; immunogenetics; genetic engineering in eukaryotes.
- 4141 Mammalogy (4) F Prereq.:** *BIOL 1202 and 1209; 2 hrs. lecture; 6 hrs. lab.* Biology of mammals; origins, adaptive radiations, and ecology.
- 4142 Ornithology (4) S Prereq.:** *BIOL 2153; 3 hrs. lecture; 3 hrs. lab and field work.* Permission of department. Field service fee. Biology of birds; emphasis on ecology, behavior, and evolution.
- 4145 Ichthyology (4) F Prereq.:** *BIOL 1202 and 1209.* 2 hrs. lecture; 6 hrs. lab and field work. Field service fee. Also offered as RNR 4145. Biology of fishes; evolution, classification, and ecology.
- 4146 Herpetology (4) S Prereq.:** *BIOL 1202 and 1209; 2 hrs. lecture; 6 hrs. lab and field work.* Field service fee. Taxonomy and natural history of amphibians and reptiles.
- 4147 Biology of Eukaryotic Microorganisms (4) Prereq.:** *BIOL 2051.* 2 hrs. lecture; 4 hrs. lab. Molecular biology, physiology, genetics, morphology, development, and taxonomy of the yeasts, molds, slime molds, algae, and protozoa.
- 4149 Aquatic Invertebrate Ecology (4) Prereq.:** *BIOL 1202 and 1209.* 3 hrs. lecture; 3 hrs. lab. Field service fee. Lecture emphasizes ecology, systematics, and evolution of fresh water invertebrates; lab emphasizes identification and collection methods.
- 4154 Invertebrate Zoology (4) Prereq.:** *BIOL 2153.* 3 hrs. lecture; 3 hrs. lab. Field service fee. Biology of the invertebrates; phylogeny, functional morphology.
- 4155 Environmental Physiology (3) Prereq.:** *BIOL 2153.* Physiological adaptations of animals to physical and chemical parameters of the environment.
- 4156 Environmental Physiology Laboratory (1) Prereq.:** *credit or concurrent enrollment in BIOL 4155 or equivalent.* 3 hrs. lab. Laboratory exercises in environmental physiology.
- 4157 Cellular Physiology (4) Prereq.:** *BIOL 2153 and CHEM 2262.* 3 hrs. lecture; 3 hrs. lab. Physiological systems in cells and tissues.
- 4158 Endocrinology (3) F Prereq.:** *BIOL 2153 and CHEM 2262.* Physiology of neural and hormonal regulation in vertebrates.
- 4160 Vertebrate Physiology (3) F,S Prereq.:** *BIOL 2153 and CHEM 2262.* Principles of vertebrate systems physiology; emphasis on mammalian systems.
- 4161 Vertebrate Physiology Laboratory (1) F,S Prereq.:** *credit or concurrent enrollment in BIOL 4160 or equivalent.* 3 hrs. lab. Laboratory exercises in systems physiology.
- 4162 Food Microbiology (4) See FDSC 4162.**
- 4163 Industrial Microbiology (4) Prereq.:** *BIOL 4110; or equivalent.* 2 hrs. lecture; 4 hrs. lab. Microbes used in industrial processes such as production of chemicals, antibiotics, and vitamins.
- 4172 Plant Microtechnique (3) Prereq.:** *BIOL 4024 or equivalent.* 1 hr. lecture; 4 hrs. lab. Technique and practice in making permanent slides.
- 4177 Neurobiology (3) Prereq.:** *BIOL 2153 and CHEM 2262.* Principles of organization and function in nervous systems; molecular basis of behavior.
- 4190 Introductory Virology (3) V Prereq.:** *BIOL 2051.* Viruses and their host cells; biochemistry and molecular biology of viral infections.
- 4194 History of Biology (2) Prereq.:** *senior standing or consent of instructor.*
- 4200 Microbial Morphogenesis (3) Prereq.:** *BIOL 2051 and 2153.* Cellular morphogenesis in microorganisms and its control by differential gene expression; physiological changes during microbial differentiation; adaptive roles and practical applications.
- 4210 Biological Modeling and Data Analysis (3) Prereq.:** *MATH 1550, 8 sem. hrs. of introductory biology.* 2 hrs. lecture; 2 hrs. lab. Modeling of biological systems; design and analysis of biological experiments; presentation of data.
- 4246 Microbial Genetics (3) Prereq.:** *BIOL 2051 and 2153.* Microbial genetic principles: mutation, conjugation, transformation, recombination, transduction, gene expression; molecular biology of bacteriophage and plasmids; recombinant DNA technology.
- 4253 Principles of Ecology (3) F,S Prereq.:** *8 sem. hrs. introductory biological sciences with lab.* Fundamental ecological principles governing the structure and function of populations, communities, and ecosystems; comparative habitat ecology.
- 4254 Principles of Ecology Laboratory (1) F,S Prereq.:** *credit or registration in BIOL 4253.* 3 hrs. lab. Field service fee. Laboratory exercises in ecology.
- 4256 Microbial Ecology and Nutrient Cycling in Soils (4) See AGRO/EMS 4056.**
- 4261 Microbiology of Water, Sewage, and Industrial Wastes (4) Prereq.:** *BIOL 4110.* 2 hrs. lecture; 4 hrs. lab.
- 4262 Marine Communities (3) Prereq.:** *BIOL 2153.* Marine biology; ecology of benthic, planktonic, nektonic, estuarine, oceanic, coral, and mangrove communities; emphasis on Louisiana's coastal environments.
- 4263 Marine Communities Laboratory (1) Prereq.:** *credit or concurrent enrollment in BIOL 4262 or equivalent.* 3 hrs. lab. Field service fee. Laboratory experiences in marine communities.
- 4270 Animal Behavior (4) S Prereq.:** *BIOL 2153.* 3 hrs. lecture; 3 hrs. lab. Students are responsible for personal expenses associated with mandatory field trips. Introduction to the field of animal behavior with emphasis on how research in this area is performed; topics include physical, environmental, and physiological effects on behavior as well as possible evolutionary causes of present-day behaviors.
- 4299 Genetics of the Evolutionary Process (4) Prereq.:** *BIOL 2153 or equivalent.* 3 hrs. lecture; 3 hrs. discussion/lab. Principles of microevolution; emphasis on genetic and ecological mechanisms relevant to process of evolution.
- 4308 Plants in Coastal Environments (3) See OCS 4308.**
- 4385 Biochemistry Laboratory (3) F,S Prereq.:** *credit or registration in BIOL 4087 or 4093.* 1 hr. lecture; 6 hrs. lab. Techniques including chemistry of amino acids and proteins; purification, immunochemistry, kinetics of enzymes; protein biosynthesis; nucleic acid chemistry; properties and restriction mapping of plasmids and recombinant DNA; spectrophotometry, chromatography, electrophoresis, centrifugation, and radioisotope labeling
- 4400 Molecular Genetics Laboratory (3) S Prereq.:** *BIOL 2153 and 6 hrs. of biological sciences at the 4000 level or BIOL 4246 and 3 hrs. of biological sciences at the 4000 level.* 1 hr. lecture; 4 hrs. lab. Current techniques used to genetically engineer microorganisms, study gene expression and DNA modification, and identify organisms by specific genetic alleles; computer analysis of DNA and protein sequences.
- 4444 Seed Physiology (3) S See PLHL 4444.**
- 4450 Molecular Regulation of Cell Function (3) F Prereq.:** *BIOL 1201, 4094, CHEM 2262.* *BIOL 3090 encouraged.* Molecular organization of eukaryotic cells; gene structure and function; molecular regulation of signal transduction and cell cycle.
- 4595 Physical Chemistry of Macromolecules (3) See CHEM 4595.**
- 4596 Biophysics of Macromolecules (3) Prereq.:** *BIOL 4087 or 4093 and BIOL 4001 or credit or registration in CHEM 3492.* Complements material in BIOL 4595. Theory and application of physical techniques to the study of biological macromolecules; spectroscopy (UV-VIS absorption and fluorescence, circular dichroism, IR, NMR, X-ray diffraction); helix-coil theory; theories of ligand binding.
- 4600 Topics in Marine Zoology (2-6) Su Prereq.:** *16 hrs. of biology or zoology including one laboratory course numbered above 3000. See also RNR 4600.* May be taken for a max. of 9 sem. hrs. of credit when topics vary. Courses to be offered vary from year to year; additional information available from department. Intensive field study of a special topic in marine zoology at the Louisiana Universities' Marine Consortium field stations.
- 4653 Marine Phycology (4) Su Prereq.:** *12 hrs. in biological science, including some plant biology.* Four weeks at Gulf Coast Research Laboratory, Ocean Springs, Mississippi.
- 4800 Selected Topics in Biological Sciences (2-4) Prereq.:** *16 sem. hrs. of biological sciences and permission of department.* May be taken for a max. of 6 sem. hrs. of credit when topics vary.
- 6055 Flora of Louisiana for Teachers (4) Prereq.:** *one year of biological sciences.* 2 hrs. lecture; 4 hrs. lab. Student projects are required. Identification and natural history of native vegetation and plant communities of Louisiana.
- 6147 Selected Topics in Life Science (1-3) Prereq.:** *BIOL 1001, 1002, 1005; or equivalent.* May be taken for a max. of 6 sem. hrs. credit when topics vary. Specific areas of biological sciences; topics offered determined by recent advances in the field, needs of students, and availability of appropriate faculty.
- 7001 Tropical Ecology (3) Prereq.:** *BIOL 4253 or equivalent.* Ecology, natural history, and biodiversity of tropical organisms, communities, and ecosystems, including plants, fungi, insects, reptiles, amphibians, birds, mammals, and fishes of tropical rain forests and tropical savannas.
- 7010 Plant Molecular Biology (3) F Prereq.:** *BIOL 3060, 4093, and 4094 or equivalent.* See PLHL 7010.
- 7013 Coevolution (3) See ENTM 7013.**
- 7014 Plant Stress Physiology (3) See PLHL 7014.**
- 7022 Marine Microbial Ecology (3) See OCS 7020.**
- 7025 Advanced Plant Anatomy (3) Prereq.:** *BIOL 4024 or equivalent.* Analysis of meristematic activity and growth patterns in vascular plants; basis and mechanisms of differentiation and experimental studies of normal growth processes.
- 7032 Advanced Mycology: Ascomycetes and Deuteromycetes (4) See PLHL 7032.**
- 7043 Advanced Plant Taxonomy (4) Prereq.:** *BIOL 2153 or AGRI 2072, and BIOL 4041; or equivalent.* 3 hrs. lecture; 3 hrs. lab. Fundamentals of natural variation and evolution; taxonomic features of plant variation.
- 7044 Agrostology (3) Prereq.:** *BIOL 4041 or equivalent.* 1 hr. lecture; 4 hrs. lab. Morphology, classification, identification, and economic importance of grasses and grasslike plants.
- 7056 Advanced Mycology: Lower Fungi (4) Prereq.:** *BIOL 4054 or equivalent.* 3 hrs. lecture; 3 hrs. lab. Same as PLHL 7056. Taxonomy, biology, and ecology of flagellated fungi and zygomycetes; ultrastructural morphology, genetics, and pathogenicity; collection, isolation, and identification of fungi from a variety of substrates and habitats.
- 7061 Plant Growth and Development (3) See PLHL 7061.**
- 7063 Plant Metabolism (3) See PLHL 7063.**
- 7065 Transport Processes in Plants (3) Prereq.:** *BIOL 3060.* Also offered as PLHL 7065. Principles governing the transport of water, mineral nutrients, organic compounds and gases in plants; cellular through whole-plant levels of organization and physiological response.
- 7067 Selected Topics in Plant Physiology (2) Prereq.:** *consent of instructor.* May be repeated for credit. Same as PLHL 7067. Mineral nutrition, metabolism, growth and development, and herbicides.
- 7068 Current Literature in Plant Physiology (1) See PLHL 7068.**
- 7080 Population Ecology (3) Prereq.:** *BIOL 4253 or equivalent.* Also offered as ENTM 7080. Advanced topics emphasizing animals in population growth and regulation; life histories; foraging behavior; agonism and territoriality; and group behavior.
- 7083 Community Ecology (3) Prereq.:** *BIOL 4253 or equivalent.* Ecological processes of communities; predation, competition, mutualism, disturbance, succession, island biogeography, and diversity.
- 7093 Plant Population Biology (3) Prereq.:** *BIOL 4253 or equivalent.* Plant population dynamics, reproductive systems, life histories, competition, niche theory, and interactions between plants and predators, pathogens, and symbionts.
- 7111 Systematic Biology (4) Prereq.:** *8 sem. hrs. of 4000-level biological science courses or equivalent; introductory statistics recommended.* 3 hrs. lecture; 2 hrs. lab. Theoretical and empirical aspects of systematics and evolutionary biology.
- 7118 Ethology (4) Prereq.:** *consent of instructor.* 2 hrs. lecture; 6 hrs. lab. and field work. Evolutionary basis of animal behavior.

7120 Marine Ecology (3) Prereq.: consent of instructor. 2 hrs. lecture; 3 hrs. lab. and field work. Also offered as OCS 7317. Physical, chemical, and biological environmental factors affecting distribution of marine fauna; communities representative of each of the ecological subdivisions of the world's oceans treated with respect to species composition, food webs, and seasonal changes; human impact on the marine environment.

7125 Invertebrate-Microbial Interactions in Aquatic Environments (3) Prereq.: consent of instructor. 2 hrs. lecture; 3 hrs. lab. Invertebrate-microbial interactions in aquatic food webs; ecological significance of mutualistic, parasitic, and commensal relationships.

7130 Environmental Physiology of Estuarine Animals (4) Prereq.: consent of instructor. 3 hrs. lecture; 3 hrs. lab. Effects of salinity, temperature, and dissolved oxygen on the physiology of estuarine fauna.

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

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

7153 Mutagenesis (3) Prereq.: 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) Prereq.: consent of instructor. 1 hr. lecture; 6 hrs. lab. Experiments with *Drosophila melanogaster*; study of genetic and cytological variations due to deficiencies, duplications, inversions, rings, translocations, transpositions, compound chromosomes, and Y derivatives; classical genetic loci and loci controlling electrophoretic mobility of enzymes and other proteins used; stocks synthesized to meet specific requirements for mutational and biochemical research.

7155 Energy Transducing Membrane Proteins (3) Prereq.: BIOL 4110 and 4087 or 4093, 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 antennae pigment protein complexes.

7156 Experimental Embryology (4) Prereq.: 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) Prereq.: consent of instructor. 3 hrs. 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 Histochemistry and Cytochemistry (4) Prereq.: 3 sem. hrs. of biochemistry or equivalent. 2 hrs. lecture; 6 hrs. lab.

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

7162 Molecular Biology of Microorganisms (3) Prereq.: BIOL 4246, and either BIOL 4110 or 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 Prereq.: credit or registration in BIOL 7280 or BIOL 7162. 1 hr. lecture; 6 hrs. lab. Methods in recombinant DNA procedures; isolation of DNA from prokaryotic or eukaryotic sources; DNA cloning; restriction mapping and DNA sequencing.

7164 Advanced Technology of Molecular Biology II (3) V Prereq.: credit or equivalent in BIOL 7163. 1 hr. lecture; 6 hrs. lab. Special projects in experimental molecular biology.

7171 Physiological Rhythms (3) Prereq.: consent of instructor. 1 hr. lecture; 4 hrs. lab. Role of exogenous and endogenous rhythms in regulation of physiological systems.

7177 Neurosensory Physiology (4) Prereq.: BIOL 4155 or 4157 or 4160. 2 hrs. lecture; 6 hrs. lab. Physiology of nerve and sensory receptors; vertebrate systems and independent laboratory investigation.

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

7253 Molecular Population Genetics (4) Prereq.: BIOL 2153 or equivalent. 3 hrs. lecture; 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.

7250 Organelle Genetics (3) Prereq.: BIOL 4094 and BIOL 2153; or equivalent. Organelle biogenesis, structure and packaging of organelle genomes, segregation and transmission patterns of organelle genes, mapping, and molecular mechanisms of transmission.

7280 Nucleic Acids (3) V Prereq.: 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 Prereq.: CHEM 4491 or BIOL 4001; and BIOL 4093 or equivalent. Conformations of fibrous and globular proteins; their interactions with small and large molecules.

7285 Advanced Enzymology (3) V Prereq.: 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) F,S May be repeated for a max. of 6 sem. hrs. of credit. Reports on topics of current interest in biological sciences.

7288 Lipids and Membranes (3) V Prereq.: 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 Prereq.: BIOL 4094 or equivalent. Also offered as PBS 7410. Biochemistry and molecular biology of representative bacterial, animal, and plant viruses; virus attachment to and penetration of host cells; replication, transcription, and translation of viral genes; virion morphogenesis and assembly; virus-induced host cell modifications; emphasis on structure-function relationships.

7290 Complex Carbohydrates (3) V Prereq.: 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, glycoproteins, and glycolipids; immunology and receptorology.

7622 Fundamentals of Chemical Carcinogenesis (3) S-E Prereq.: CBS 7604 or consent of instructor. Same as CBS 7622 and ENVS 7622.

7624 Toxicology II (2) See CBS 7624.

7626 Toxicology IV: Genetic Toxicology (3) S-E See ENVS 7626.

7648 Museum Field Expedition (6) Prereq.: consent of instructor. One semester in the field under direction of the Museum of Natural Science staff.

7699 Toxicology Seminar (1) See CBS 7699.

7800 Special Topics in Biological Sciences (2-4) Prereq.: consent of instructor. May be taken for a max. of 12 sem. hrs. when topics vary. Specialized 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. Pass/fail grading Presentations of individual research projects in the biological sciences.

7946 Seminar: Current Topics in Molecular Evolution (1) Prereq.: course in evolution, genetics, BIOL 4087 or equivalent. Also offered as ENTM 7946. May be taken for 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 ENTM 7979. Complexities of tropical plants and animals and their interactions.

7990 Independent Research in Biological Sciences (2-8) Prereq.: consent of instructor. May be repeated for a max. of 9 sem. hrs. credit. Directed research under the guidance of a graduate faculty member.

7995 Independent Readings in Biological Sciences (1-3) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. of credit. Directed individual readings under the guidance of a graduate faculty member.

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

8903 Microbiology for Teachers (4) Su 2 hrs. lecture; 4 hrs. lab. Relation of microorganisms to everyday living; how knowledge of these forms is used in effective teaching of high school science and home economics.

8904 Methods of Research in Microbiology (3) 1 hr. conference; 6 hrs. lab. May be taken for a max. of 6 hrs. of credit when topics vary. Pass-fail grading.

8910 Research Participation (3) Su For high school science teachers.

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

BUSINESS ADMINISTRATION • BADM

1001 Introduction to Business (3) May not be taken by students in the E. J. Ourso College of Business Administration. Operation of the business firm; function of the businessman; nature of economic system and private enterprise; orientation to collegiate business education.

3000 Family Business Management (3) Prereq.: ACCT 2001, 2101; ECON 2010, 2020; ISDS 1100; MKT 3401. Family business culture; entrepreneurial influences; key issues and conflicts; career planning; counseling and consulting; professional support relationships; survival skills as a son or daughter in a family business.

4000 Innovation and Creativity (3) Prereq.: ACCT 2001, 2101; ECON 2010, 2020; ISDS 1100; MKT 3401. Role of creativity and innovation in product, service, or idea generation that may eventually lead to business formation and commercialization; barriers to creativity and innovation; alternative problem-solving approaches.

4010 Special Topics in Entrepreneurship (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary. In-depth coverage of special topics.

4020 Internship in Entrepreneurship (3) Prereq.: approval of department; May be repeated for a max. of 6 sem. hrs. when topics vary. Gaining first-hand knowledge of the business start-up process; practical hands-on experience in business-plan formation.

4030 Independent Study in Entrepreneurship (3) Prereq.: approval of department May be repeated for a max. of 6 sem. hrs. credit when topics vary. Detailed study of a specific aspect of entrepreneurship.

7000 Internship in Business Administration (3) Prereq.: prior approval of M.B.A. director. Open only to full-time M.B.A. students. May be taken once for credit. 10 hrs. of learning experience (fall/spring); 20 hrs. (summer). General supervision by a faculty member; direct supervision by a business professional. Pass-fail grading based on a written evaluation by the professional supervisor, a written report by the student, and the faculty member's evaluation.

7010 The Practice of Business (1) F,S Open only to students in the M.B.A. program. Taken each semester of the M.B.A. program. Course must be successfully completed four times prior to graduation. Exposure to the practice of business; a series of visits to area businesses, in conjunction with classroom experiences, to learn how managers and operations specialists in various industries cultivate, shape, and exploit their companies' resources to meet current and future market needs.

7020 Managerial Statistics (3) Open only to students in the M.B.A. program. An introduction to statistical thinking and overview of statistical methods used to analyze and interpret data, draw inferences, and make decisions; topics include descriptive statistics, probability, sampling and sampling distributions, estimation, confidence intervals, hypothesis testing, linear regression, forecasting, and control charting; emphasis on how to use spreadsheets to analyze data and how to interpret the results.

7030 Understanding Financial Information (3) Composition of financial statements; information processing and reporting for the purpose of understanding accounting information; legal and ethical obligations of the accounting profession.

7040 Managerial Economics (3) Practical applications of microeconomic theory; demand forecasting techniques, cost estimation, and analysis of market structures.

7050 Information Systems (3) Prereq.: ISDS 1100 or equivalent. Contemporary topics in information systems; a survey of information system analysis and design; introduction to business data communication, database management systems, and knowledge based systems; enterprise-wide systems and information system control.

7060 Elements of Cost Management (3) Prereq.: BADM 7030. Open only to students in the M.B.A. program. Understanding and applying cost management practices used

in business today; development of costing and budgeting systems used for cost management; applications of analysis used in management decision making and control; cost-profit-volume analysis; analysis of variances between budgeted and actual cost; methods of evaluating responsibility centers based upon profitability measures.

7070 Understanding Behavior in Organizations (3) F *Open only to students in the M.B.A. program.* Broad understanding of factors influencing the behavior of individuals in organizations; topics include the individual and contextual determinants of behavior and the tools managers use to influence and direct employee behavior; emphasis on managerial applications of behavioral science theories.

7080 Macroeconomic Analysis & Issues (3) Open only to students in the M.B.A. program. Examining forces determining the magnitude of such variables as the aggregate volume of an economy's output, the volume of resource employment, the size of national income, and the general price level; international variables of trade and financial flows; international trade agreements and other foreign variables that affect exchange rates, domestic income, output, prices, and employment.

7090 Financial Management (3) Prereq.: BADM 7030. *Credit will not be given for this course and FIN 7717.* Investment and financing decisions within the firm; role of capital markets; usefulness and limitations of financial data; cash flow projections; working capital management.

7100 Marketing Administration (3) Marketing decision making and planning, including marketing research, product development and management, distribution, demand estimation, market structure analysis, pricing, promotion, advertising, and direct marketing.

7120 Operations Management (3) Prereq.: BADM 7020. *Open only to students in the M.B.A. program.* Major problems and decision processes of operations management; operations strategy; process and capacity planning; facilities planning; aggregate planning; materials planning; quality planning.

7140 Legal Environment of Business (3) Open only to students in the M.B.A. program. The structure of the legal environment of business; sources of law affecting business; constitutional issues in the legal environment of business; contracts and sales; torts; products liability; corporations; securities; bankruptcy; antitrust; discrimination; labor relations; environmental law; criminal law; its impact negotiation strategies; associated ethical and international issues.

7160 Negotiation, Persuasion, and Influence (1.5) F Experiential-based course designed to provide managers with the basic concepts and techniques necessary for effective negotiation and conflict resolution in a variety of business contexts.

7170 Understanding International Management Challenges (3) F *Open only to students in the M.B.A. program.* Theories and management of international operations; development of environmental, operational, strategic, and decision making perspectives.

7190 Managing Sources of Competitive Advantage (3) S Contemporary approaches to developing and sustaining a competitive advantage in global competition; topics include: competition for competence, strategy and technology, managing home and host government relations, cooperative strategy, strategic alliances, organizational innovation, and managing global strategic change.

7210 Understanding Ethical Issues in Business (1.5) S Designed to help future managers confront and successfully manage ethical issues and their economic, legal, political, social, and cultural aspects.

7270 Seminar in New Developments in Business Administration (3)

7420 Financing New Ventures I (1.5) Insight into financing new ventures and investing in companies in early stages; sourcing, qualifying, and analyzing deals; negotiating, structuring, and pricing; creating value; realizing value through various kinds of exit from the business.

7421 Financing New Ventures II (1.5) Prereq.: BADM 7420. Focus on cases and projects taken from actual financing situations; structuring of venture capital; the process of making investments in emerging companies.

7430 Family Business Management (1.5) Key issues and conflicts facing individuals and families involved in business relationships; family business culture; entrepreneurial influences; career planning; professional support relationship; survival skills as a son or daughter in a family business.

7432 Innovation and Creativity (1.5) Role of creativity and innovation in product, service, or idea generation that may eventually lead to business formation and commercialization; barriers to creativity and innovation; alternative problem-solving approaches.

7440 Franchise Development (1.5) Important factors in starting and managing a new franchise; characteristics of franchiser and franchisee; evaluation of franchising opportunities; legal concerns of franchising; development of appropriate strategies.

7441 Franchise Planning (1.5) Prereq.: BADM 7440. Development of franchising business plan to include marketing, management, financial projections, and operations manual outline.

7460 Special Topics in Entrepreneurship (1.5) *May be repeated for a max. of 6 sem. hrs. credit when topics vary.* In-depth coverage in special topics such as women-owned business, home-based business, exporting for small business, and team-building for start-ups.

7470 Internship in Entrepreneurship (1.5) *May be repeated for a max. of 6 sem. hrs. of credit when topics vary.* Understanding actual entrepreneurial situations; creating an integrated, cross-functional strategy; implementing and managing projects.

7480 Independent Study in Entrepreneurship (1.5) *Prereq.: departmental approval. May be repeated for a max. of 6 sem. hrs. credit when topics vary.* Detailed study of a specific aspect of entrepreneurship.

7900 Human Factors in Business and Industry: Current Topics (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Human factors related to business problems.

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

8900 Pre-dissertation Research (1-9) *May be repeated for credit.*

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

BUSINESS COMMUNICATION • BCOM

5200 Executive Communication (3) Developing and applying communication strategies; analysis of business situations and development of appropriate strategies; written, oral, and interpersonal applications; impact of technologically mediated communication.

BUSINESS EDUCATION • BUED

1001 Keyboarding (1) 2 hrs. lab. *For those with no previous instruction in typewriting.* Development of touch system of typing.

1003 Keyboarding Applications (2) Prereq.: BUED 1001 or equivalent. 1 hr. lecture; 2 hrs. lab. Improving speed and accuracy in the basic formatting of business documents, letters, tables, and reports.

2001 Document Production (3) Prereq.: BUED 1003 or equivalent. 2 hrs. lecture; 2 hrs. lab. Introduction to word processing concepts and applications; formatting advanced and complex business documents.

2071 Business Communication (3) Prereq.: ENGL 1002. Communication theory and its application to business; basic forms of business communication.

2100 Beginning Shorthand (3) 2 hrs. lecture; 3 hrs. lab. Basic principles of reading and writing shorthand; dictation of practiced material.

2101 Intermediate Shorthand (3) 2 hrs. lecture; 3 hrs. lab. Building dictation speed; shorthand principles.

2620 Practicum in Business and Office Education (2) One-hour weekly seminar with instructor to discuss topics relative to student's job. Actual office experience of at least 10 hrs. per week providing on-the-job training in a clerical, secretarial, or bookkeeping position.

2621 Practicum in Distributive Education (2) One-hour weekly seminar with instructor to discuss topics relative to student's job. Students work at least 10 hrs. per week in a selling position in an approved retail establishment.

3000 Word Processing (3) Prereq.: BUED 2001 or equivalent. 2 hrs. lecture; 2 hrs. lab. Word processing concepts and skills, systems, procedures, equipment, and careers.

3100 Advanced Shorthand (3) 2 hrs. lecture; 3 hrs. lab. *Continuation of BUED 2101.* Emphasis on development of speed in dictation and transcription.

3200 Records Management (3) Principles of records creation, retention, transfer, and disposal; organization and management of stored records; coding, microfilming, and retrieval of information; manual, mechanical, and computer means of storing and retrieving information.

3400 Office Management (3) Facilitating office work through management of environment, organization, communication, personnel, systems, productivity, and cost factors.

3500 Administrative Assistant Procedures (3) Prereq.: BUED 2001 or equivalent. Responsibilities of administrative support personnel; skills needed for supervision, decision making, and human relations; planning, organizing, and disseminating information.

4150 Teaching Cooperative Education (3) V Organization and administration of cooperative education programs in public secondary education; historical foundations; relevant federal legislation.

4252 Teaching Information Processing (3) V Prereq.: BUED 2000 and 2001; EXST 2000. 2 hrs. lecture; 2 hrs. lab. Teaching basic concepts of information processing; use of microcomputers to process information and produce documents.

4859 Special Topics in Business Education (1-3) V *May be taken for a max. of 6 sem. hrs. of credit.* Current practices and technological advances in business education; individual or group study under the direction of a faculty member.

7056 Foundations of Business Education (3) V Historical foundations; relevant state and federal legislation; organization and administration of business education in public secondary education.

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.

BUSINESS LAW • BLAW

3200 Introduction to Law (3) *Not open to students in the E. J. Ourso College of Business Administration. Credit will not be given for both this course and BLAW 3201 and 4203.* Fundamentals of the American legal system; basic principles of the law of contracts, commercial paper, agency, partnerships, corporations, torts, and crimes; case materials used to demonstrate legal analysis and reasoning.

3201 Business Law (3) *Credit will not be given for this course and BLAW 3200, FIN 3200, or 3201.* Development of Anglo-American common law, the American constitutional system, and the Louisiana civil law system; law of contracts, torts, and agency; business aspects of criminal law; ethical facets of the legal environment; case materials used to demonstrate problem analysis.

3202 Commercial Transactions (3) Prereq.: BLAW 3201. *Credit will not be given for this course and BLAW 3200, or 4203 or FIN 3200, or 3202, or 3203.* Louisiana law and Federal legislation in the following areas: employment law, workers' compensation, business entities, intellectual property, agency, insurance, sales, donations, leases, security devices, bankruptcy, and commercial paper.

3230 Sports Law (3) *Credit will not be given for both this course and FIN 3230.* Business and legal sports aspects, particularly professional and collegiate level; antitrust laws; labor law and collective bargaining; contract law and player agents; professional franchise location; college athletics and the NCAA; equal opportunities and Title IX; licensing and trademark rights; tort issues.

4203 Commercial Transactions for Accountants (3) Prereq.: FIN 3201. *Credit will not be given for this course and BLAW 3200, 3202, FIN 3202, 3203.* Specifically for accounting majors. Legal concepts underlying sale of goods; commercial paper; security interests, securities regulation, accountants' malpractice, negotiable instruments, and bankruptcy; application of the Uniform Commercial Code and preparation for the CPA examination.

CHEMICAL ENGINEERING • CHE

2160 Computer Technology for Chemical Engineering Systems (1) F,S Prereq.: MATH 1550. Introduction to operating systems, programming techniques, and software packages used in the solution of chemical engineering problems.

2171 Chemical Engineering Fundamentals: Material and Energy Balances (3) F,S Prereq.: MATH 1550 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) F Prereq.:** CHE 3172 or ME 3333 or equivalent. *Not open to chemical engineering majors. Credit will not be given for both this course and CHE 4190.* Introductory chemical thermodynamic concepts extended to heterogeneous equilibrium, dilute solutions, surfaces and colloids of significance in 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 momentum transfer; applications 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 Measurements Laboratory (3) F,S Prereq.:** CHE 2176 and credit or registration in CHE 3102. 2 hrs. lecture; 3 hrs. lab. Laboratory work to accompany CHE 3101 and 3102.
- 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 vapor-liquid, liquid-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. A minimum of 6 weeks of full-time employment by an industry participating in the summer program. Same as ENGR 3049, 3050. Selected engineering problems in an industrial environment.
- 3271, 3272 Senior Projects (1-2, 1-2) Prereq.:** consent of department. Pass-fail grading. Experimental and theoretical investigations including library research.
- 4151 Unit Operations Design (4) F Prereq.:** CHE 3102 and 3173. 3 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 (2) F,S Prereq.:** CHE 3104 and credit or registration in CHE 4151. 6 hrs. lab. Obtaining and interpreting data needed to solve typical problems in design or operation of chemical engineering equipment.
- 4171 Process Economics and Optimization (3) F Prereq.:** credit or registration in CHE 4151. Application of optimization principles to the economic design of chemical engineering unit operations.
- 4172 Process Design (4) S Prereq.:** CHE 4151, 4171, 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; selection of best design alternatives; achievement of optimum reactor operation.
- 4198 Process Dynamics (3) S Prereq.:** CHE 4151; or equivalent. Principles and practices of process dynamics and automatic control; mathematical modeling of process dynamics, feedback control, and feed forward control.
- 4204 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 in processes such as catalytic cracking, reforming, coking, alkylation, isomerization, and hydroprocessing; emphasis on applied catalysis and its impact on engineering design.
- 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 complexes.
- 4210 Industrial Catalysis (3) Prereq.:** credit or registration in CHE 4190. Principles of the industrial utilization of heterogeneous catalysis; topics include absorption phenomena, methodology in catalyst preparation, characterization and evaluation of catalysts, diffusion and reaction in porous catalysts, and a survey of major industrial processes.
- 4221, 4222 Senior Research (1,2) Prereq.:** CHE 3102, 3104, and 3173. gpa of at least 2.8 (in CHE) and consent of instructor. CHE 4221 is prerequisite for 4222. Project chosen in consultation with instructor. Formal proposal and final presentation required. *Not open to graduate students.* Comprehensive research or development project of a theoretical or experimental nature, involving a team effort over two semesters (fall and spring period).
- 4253 Introduction to Industrial Pollution Control (3) Prereq.:** CHE 3102 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 microbiological and biochemical systems; problems peculiar to industrial operations involving microbial processes; growth conditions and requirements, metabolisms, product separations, enzyme catalysis, sterilization, and aseptic operations.
- 4263 Environmental Chemodynamics (3) Prereq.:** CHE 3102 or equivalent introductory course in transport science. Environmental chemodynamics: interphase equilibrium, reactions, transport processes and related models for anthropogenic substances across natural interfaces (air-water-sediment-soil) and associated boundary regions.
- 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 electrochemistry applied to engineering problems; potential distribution theory, kinetics, mass transport, and thermodynamic principles; quantification of controlling factors in microfabrication, 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 polymer chains and effect on macromolecular physical properties of the final plastics.
- 4296 Development of Mathematical Models (3) Prereq.:** CHE 2176 and 3102; or equivalent. Mathematical descriptions of systems encountered in chemical engineering developed from basic principles; lumped parameter systems, distributed parameter systems, formulation of ordinary 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 phases of current chemical engineering design.
- 4420 Special Topics in Chemical Engineering Science (3) May be taken for a max. of 6 sem. hrs. when topics vary.** One or more phases of current chemical engineering science.
- 7110 Mathematical Methods in Chemical Engineering (3) F Review of physicochemical 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, and 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 continua; laminar flow; boundary layer theory; turbulence; buoyancy-induced flows; 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 solid-gas catalytic reactions.**
- 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, phase equilibria, and calculation procedures related to design and behavior of distillation columns, absorbers, extractor-settlers, etc.; emphasis on computer techniques.**
- 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 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.* Thermodynamics 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 flow processes, such as turbulence, boundary layer theory, hydrodynamic stability, compressible flow, multiphase flow, chemically reacting flows, and nonNewtonian and viscoelastic 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 7140 or equivalent. Heterogeneous catalysis; adsorption phenomena, physical methods, solid state spectroscopies, and reaction mechanisms as applicable to fundamental and industrially significant processes.
- 7544 Chemical Kinetics and Reaction Mechanisms (3) Prereq.:** CHE 7140 or equivalent. Gas-phase reactions and modern approach to deduction of reaction mechanism; collision, transition state, RRK, and RRKM theories, bond energy correlations, kinetics of complex reaction systems, fast reactions, computer modeling, and sensitivity analysis.
- 7572 Advanced Automatic Process Control (3) Prereq.:** CHE 4198 or equivalent. Recent developments in control theory applied to control schemes in industrial processes; techniques of state space analysis, nonlinear stability criteria, multivariable control, and system identification.
- 7574 Digital Control of Processes (3) Prereq.:** CHE 4198 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 Polymerization and Polycondensation Processes (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 faculty member 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 process 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 (1-12 per sem.) "S"/"U" grading.**
- 9000 Dissertation Research (1-12 per sem.) "S"/"U" grading.**

CHEMISTRY • CHEM

Laboratory Expenses • Students registering for laboratory courses in chemistry are charged a laboratory usage deposit on their fee bill.

Corequisites • A student may not continue in a course if the corequisite course is dropped prior to the last day of the midsemester examination period.

General education courses are marked with stars (★).

★ **1001 Chemical Fundamentals (3)** Prereq.: ACT mathematics score of at least 21 or eligibility for MATH 1021. For those students whose curricula require only one year of chemistry or physical science. Also may be taken as a preparatory course for CHEM 1201. An overview of chemical theory and principles with emphasis on the role of chemistry in the modern world.

★ **1002 Chemistry of Life and the Environment (3)** Prereq.: CHEM 1001 or 1201 or 1421. An overview of organic chemistry and biochemistry; emphasis on the molecular basis for the biological, materials, and environmental sciences.

★ **1201 General Chemistry (3)** Prereq.: ACT mathematics score of at least 23 or eligibility for MATH 1021 or a more advanced math course. Credit will not be given for both this course and CHEM 1421. For science/engineering curricula. Modern chemical theories and principles; quantitative approach and problem solving; descriptive chemistry of selected elements and compounds.

★ **1202 General Chemistry (3)** Prereq.: CHEM 1201 or 1421. Credit will not be given for both this course and CHEM 1422. For science/engineering curricula. Continuation of CHEM 1201. Additional theory with emphasis on solution chemistry and a quantitative approach; descriptive chemistry of selected elements and compounds from the main groups and the first transition series.

★ **1212 General Chemistry Laboratory (2)** Prereq.: credit or registration in CHEM 1002, 1202, or 1422. 6 hrs. lab. Credit will not be given for both this course and CHEM 1431. Laboratory usage deposit. Basic laboratory operations including selected experiments and introductory inorganic qualitative analysis.

★ **1421 HONORS: General Chemistry (3)** Prereq.: ACT mathematics score of at least 27 or eligibility for MATH 1550. Credit will not be given for both this course and CHEM 1201. Chemistry majors who qualify should take this course. For well-prepared students with a special interest in chemistry.

★ **1422 HONORS: General Chemistry (3)** Prereq.: CHEM 1421, or CHEM 1201 with consent of department chair. Chemistry majors who qualify should take this course. Credit will not be given for both this course and CHEM 1202. Continuation of CHEM 1421.

1431 HONORS: General Chemistry Laboratory (2) S Prereq.: credit or registration in CHEM 1422, or credit or registration in CHEM 1202. 6 hrs. lab/demonstration. Credit will not be given for both this course and CHEM 1212. For chemistry majors and other well-prepared students with special interest in chemistry. Laboratory usage deposit. Fundamental chemical operations, a selection of experiments, and elementary quantitative techniques.

2001 Analytical Chemistry (2) Prereq.: CHEM 1202 or 1422. Basic principles and practices of modern methods of analysis.

2002 Analytical Chemistry Laboratory (2) Prereq.: CHEM 2001 and 1212 or 1431. 6 hrs. lab. Credit will not be given for both this course and CHEM 2003. 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 2002. 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 both this course and CHEM 2261. 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 2060. Representative classes of organic compounds; emphasis on varied professional goals of students, e.g., life sciences, physical sciences, engineering.

2262 Organic Chemistry (3) Prereq.: CHEM 2261. Continuation of CHEM 2261.

2364 Organic Chemistry Laboratory (2) Prereq.: CHEM 1212; 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.

2461 HONORS: Organic Chemistry I (3) F Prereq.: a grade of "A" or "B" in CHEM 1202 or CHEM 1422. Chemistry majors who qualify should take this course. For well-prepared students with a special interest in chemistry. Credit will not be given for this course and CHEM 2060 or 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.

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. May be taken 6 times for 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. 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 three courses with a grade of "C" or better. CHEM 3491 is prerequisite for CHEM 3492. Principles of theoretical chemistry.

3493 Physical Chemistry Laboratory (3) S Prereq.: PHYS 1209 or 2109; CHEM 1212 or 1432; 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 research problem is required. Introduction to chemical research methods.

4003 Science Teaching in Secondary School III: Instructional Strategies in Science (1) See BIOL 4003.

4004 Seminar in Teaching Secondary School Science (3) See BIOL 4004.

4010 Macromolecular Systems I (4) Prereq.: CHEM 2262 and 3491 or equivalent. 3 hrs. lecture; 2 hrs. lab. Principles of large molecules and polymeric materials: physical states, morphology, strength, processing; synthesis and biosynthesis; characterization.

4011 Macromolecular Systems II (4) Prereq.: CHEM 4010. 3 hrs. lecture; 2 hrs. lab. Behavior of large molecules, emphasizing theory and practice of modern and classical methods for molecular characterization.

4150 Environmental Chemistry (3) F Prereq.: CHEM 2001 and 2261 or 2461 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.

4160 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.

4553 Instrumental Characterization of Organic Compounds (2) Prereq.: CHEM 2001 and 2002 or 2003, and 4552. 6 hrs. lab. Laboratory usage deposit. Applications of molecular analysis.

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 3492. For advanced undergraduates and beginning graduate students. Principles in advanced inorganic chemistry; modern interpretations.

4571 Organometallic Chemistry (3) Prereq.: CHEM 2262 or 2462 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.

4581 Introduction to Mathematical Chemistry (3) V Prereq.: MATH 2057 and credit or registration in CHEM 3491. Mathematical methods of chemistry, with application to selected chemical problems.

4594 Introduction to Quantum Chemistry (3) V Prereq.: CHEM 3492 and MATH 2057. Basic ideas of quantum mechanics; application to atomic and molecular structure.

4595 Physical Chemistry of Macromolecules (3) V Prereq.: CHEM 2262 or 2462 and 3492. Also offered as BIOL 4595. Physical behavior of synthetic and natural polymers; theory and analytical methods appropriate for macromolecules and colloids; physical states and characteristics of large molecules.

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

4597 Introduction to Statistical Thermodynamics (3) V Prereq.: CHEM 3492 and MATH 2057. Introductory quantum and classical statistical thermodynamics of some simple systems of chemical relevance.

4695 Physical Methods in Polymer Science (3) Prereq.: CHEM 4595. 1 hr. lecture; 4 hrs. lab. Laboratory training in physical characterization of high polymers. Modern methods for molecular weight determination; physical size and size distribution; aggregation and thermal behavior; phase behavior; rheological and morphological properties.

6001 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.

6002 Chemical Principles for Teachers (3) Su-V 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 curricular development projects.

6003 Laboratory Methods for Teachers (3) Su-V 1 hr. 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.

6691 Seminar in Current Developments in Chemistry (1-3) Su only, V Prereq.: CHEM 1202 or 1422 or equivalent. For high school and junior 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.

7010 Macromolecular Systems III (3) F Prereq.: CHEM 4010. 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.

7011 Macromolecular Systems IV (3) S Prereq.: CHEM 4011. Structure property relationships for materials such as liquid crystals, polymer blends, and block copolymers; polymer nanocomposites and nanotechnology related materials.

7221 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; applications of kinetics and chemical dynamics to mechanistic studies; modern experimental techniques.

7251 Elemental Analysis (2) V Modern analytical methods for elemental analysis including atomic absorption; atomic emission including plasma; X-ray emission; ESCA-Auger; neutron activation analysis.

7253 Molecular Analysis (2) V Modern analytical methods for molecular characterization including infra-red, Fourier transform infra-red, ultraviolet, nuclear magnetic resonance,

mass spectroscopy, chromatography, gas chromatography coupled with mass spectroscopy, thermal analysis, and X-ray diffraction.

7261 Polymerization and Polycondensation Processes (4) V See CHE 7582.

7272 Inorganic Chemistry of Transitional Elements (2) V Prereq.: CHEM 4570 or equivalent. Chemistry of transitional 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) V Methods of 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, pi-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.

7699 Toxicology Seminar (1) See CBS 7699.

7750 Special Topics in Analytical Chemistry (2-3) May be taken 4 times for credit. Modern methods and techniques of analytical chemistry.

7760 Special Topics in Organic Chemistry (2-3) May be taken 4 times for credit. Specialized areas of current interest in organic chemistry.

7770 Special Topics in Inorganic Chemistry (2-3) May be taken 4 times for credit. Advanced treatment of areas of current interest in modern inorganic chemistry.

7780 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.

8900 Procedures and Problems in Chemical Research (1-12) Open only to students of proven ability or exceptional potential. Students who receive 6 hrs. of credit for CHEM 8000 cannot obtain more than 9 hrs. of credit in this course. Pass-fail grading. Experimental research methods, design and execution of experiments, and analysis and correlation of experimental data.

9000 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 2001. 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 of 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 3101 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 CE 2450. Statics and dynamics of continuous liquids and gases; control volume laws; conservation of mass, momentum, and energy; dimensional analysis and similitude; applications to pipe flows.

2250 Fluid Mechanics Laboratory (1) Prereq.: CE 2200 and 2720. 3 hrs. lab. Measurement and calibration of hydraulic machinery; pump and turbine efficiency; flow in pipelines; viscosity; discharge coefficients.

2450 Statics (3) Prereq.: grade of "C" or better in MATH 1550, 1552 and PHYS 2101. Vectorial treatment of resultants and equilibrium of force systems, centroids and centers of gravity, fluid statics, friction.

2460 Dynamics and Vibrations (3) Prereq.: grade of "C" or better in CE 2450 and credit or registration in MATH 2065. Credit will not be given for this course and ME 3133. Treatment of kinematics and kinetics of particles and rigid bodies; force, movement, velocity, acceleration; impulse and momentum; work and energy; dynamics and vibration; concepts applied to structural and machine components.

2710 Introduction to Civil Engineering (1) Designed for civil engineering majors; open to nonmajors by consent of department. Basic technical and professional aspects of civil engineering education and practice.

2720 Computational Methods in Civil and Environmental Engineering I (3) Prereq.: MATH 1550. Fundamental computational numerical and statistical techniques; 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 2720. 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 computer methods.

3300 Geotechnical Engineering I (3) Prereq.: GEOL 1001, CE 2200, CHEM 1202, and credit or registration in CE 3350. Introduction to properties and engineering behavior of soil as a native earth material, an engineering material, and an environmental 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.: CE 2720 and credit or registration in CE 3300. 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 gravity, Atterberg limits, moisture-density relationships, shear strength testing, 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, torsion, bending, deflections of beams, columns, statically indeterminate problems, combined stress.

3410 Mechanics of Materials Laboratory (1) Prereq.: CE 3400. 3 hrs. lab. Mechanical properties and strengths of engineering materials and structural and machine elements.

3415 Structural Analysis I (3) Prereq.: CE 3400. 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.: 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 (1) Prereq.: credit or registration in CM 3502 or CE 3400 or equivalent. 3 hrs. lab. Design and properties of concrete and bituminous mixes.

3740 Independent Studies in Civil Engineering (3) Prereq.: senior standing, English proficiency, and ENGL 3002 (unless ROTC is elected); gpa of at least 2.30 (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 from arrival on land surface 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 "safe yield;" legal doctrines, side effects of aquifer development, and the economics of ground water.

4260 Design of Hydrologic Systems (3) Prereq.: CE 3200 and 4200 or equivalent. Hydrologic design of water resources projects; maximization of benefits; analysis techniques, and design parameters.

4300 Geotechnical Engineering II: Shallow Foundations (3) Prereq.: CE 3300, 3350, and credit or registration in CE 4410. 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, 3350, and 4300. 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; environmental forces due to waves, currents, 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 theory.

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 prestressed concrete structural elements; full and partial prestressing; service ability and strength requirements; code 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 wood; design methods and specifications governing the design of sawn lumber, plywood, and glulam timber structures and structural components.

4430 Structural Engineering (3) Prereq.: CE 4400 and 4410, or consent of instructor. Fundamental principles applied to planning, analysis, and design of structures; introduction to computer-aided design approach to solving structural engineering problems using mainframe and microcomputer software.

- 4435 Indeterminate Structural Analysis (3)** *Prereq.: CE 3415.* Analysis of statically indeterminate structures; methods of consistent deformations, elastic energy, virtual work, slope deflection, moment distribution, and matrix formulations.
- 4440 Advanced Mechanics of Materials (3)** *Prereq.: CE 3400 and MATH 2065.* Mechanics of materials; emphasis on needs of students interested in structural and machine design.
- 4445 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 MATH 2065 or 2090 or 2070.* Basic theory of finite element methods with applications to 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 algorithms, and solutions of physical problems by using existing finite element computer programs.
- 4500 Geodetic and Photogrammetric Surveying (3)** *Prereq.: CE 3500 or equivalent. 2 hrs. lecture; 3 hrs. lab.* Geodetic surveying for control surveys; photogrammetry and photointerpretation; calculation and field procedures used in ground control surveys and photogrammetry.
- 4520 Advanced Surveying (3)** *Prereq.: CE 3500 or equivalent. 2 hrs. lecture; 3 hrs. lab.* Electronic surveying, simultaneous conveyances, subdivision surveys, flood plain management, state plane coordinates, solar azimuths, horizontal and vertical curves, and earthwork.
- 4530 Control Surveying with GPS (3)** *Prereq.: CE 3500 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 geodetic methods, geometric geodesy, GPS receivers, static and kinematic GPS surveys, GPS computations, GPS mapping, vertical GPS, and gravimetric geodesy; lab includes demonstration and hands-on use of GPS equipment and software.
- 4550 Boundary Surveying (3)** *Prereq.: CE 3500 or equivalent. 2 hrs. lecture; 3 hrs. lab.* Designed to prepare engineers to complete Land Surveyor Registration requirements in Louisiana. Procedures and laws governing surveying of boundaries; emphasis on U. S. Land Survey System and Louisiana surveying laws and grids.
- 4560 Engineering Applications of Remote Sensing (3)** *Prereq.: consent of instructor. 2 hrs. lecture; 3 hrs. lab.* Photographic and digital image processes related to 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 3600 or equivalent. 2 hrs. lecture; 3 hrs. lab.* Principles of design and practice 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 3600 or equivalent.* History, economics, and traffic characteristics of transportation systems; planning, design, construction, 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 3400 and 3700 or equivalent.* Principles of design and practice of hot mix asphalt mixture design; fundamental properties and analysis of binder rheology, aggregates, and mixture design.
- 4651 Concrete Materials and Mixtures (3) F,E** *Prereq.: CE 3700 or equivalent.* Composition and properties of concrete, including types and basic constituents of cements; structure and hydration reactions of cement pastes; selection and grading of aggregates; admixtures; 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 3600 or equivalent.* Flexible and rigid pavement design procedures; subgrade, base, and surfacing characteristics; loads; stresses in pavement systems; material characterization; pavement response models; pavement performance models; structural design systems; 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; reliability analysis and estimation; risk analysis and estimation; model selection; and reliability-based civil and/or environmental engineering design.
- 4745 Natural Hazards and the Built Environment (3)** *Prereq.: junior standing. Credit will not be given for both this course and CE 4445.* Engineering impacts and implications of hurricanes, floods, earthquakes, and other natural hazards on the built environment; effects of hazards on buildings and infrastructure systems; damage mechanisms; principles of wind, flood, and seismic resistant design; hurricane evacuation and sheltering; engineering preparedness, response and recovery issues; design strategies for life safety and damage mitigation; building codes, land use zoning, floodplain management, and insurance as mitigation tools.
- 4760 Civil Engineering Design (3)** *Prereq.: credit in IE 3710, CE 3100, 3300, 3600, 4410, and credit in at least one of the following courses: CE 4200, 4300, 4400, 4600, or 4670. 2 hrs. lecture; 3 hrs. lab.* Design of civil engineering facilities; feasibility studies for subdivisions, airports, shopping centers, interchanges.
- 4770 Professionalism and Ethical Practice of Civil Engineering (1)** *Prereq.: senior standing in civil engineering.* Role of professionalism in engineering education and practice; the civil engineer's responsibility in preserving the environment and protecting the safety, health, and welfare of the public.
- 4780 Special Topics in Civil Engineering Science (3)** *Prereq.: senior standing and departmental approval. May be taken for a max. of 6 hrs. of credit. More than one section may be taken concurrently for credit if topics differ.* Topics in specialized civil engineering technical or analysis areas.
- 4781 Special Topics in Civil Engineering Design (3)** *Prereq.: senior standing and departmental approval. May be taken for a maximum of 6 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 civil engineering design.
- 7100 Theory and Operation of Wastewater Treatment Facilities (3)** *Prereq.: EVEC 3110; or equivalent undergraduate preparation, or consent of instructor.* Theoretical principles, design criteria, and analysis of treatment systems for domestic and industrial wastewaters and sludges; includes modeling of ideal biochemical reactors and design criteria for suspended-growth and biofilm processes applicable to wastewater treatment.
- 7110 Operations and Processes in Sanitary Engineering II (3)** *Prereq.: CE 3100 and 3110; or equivalent undergraduate preparation.* Theory and design of water and wastewater treatment processes.
- 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, 7100, and credit or 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 Biodegradation (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 bio filtration 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 reliability; emphasis on model calibration and verification procedures and methodologies for quantifying uncertainties associated with model predictions.
- 7200 Free Surface Flow (3)** *Prereq.: CE 2200.* 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 2200.* Transportation of sediment, mixing current, and other phenomena.
- 7260 Advanced Hydrology (3)** *Prereq.: CE 4200 or 4250 or equivalent.* Hydrologic cycle, including interrelationships between classical and statistical methods of hydrology and new problems caused by waste-resource development; factual and conceptual hydrological evaluation of present practices in public and local development of water resources.
- 7265 Advanced Subsurface Hydrology and Hydraulics (3)** *Prereq.: CE 4250.* Properties of porous media and fluid mixtures; dynamics of flow in single phase and multiphase flow systems; 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 control in subsurface environments.
- 7270 Hydrologic Systems (3)** *Prereq.: CE 4200.* Techniques of systems analysis and synthesis; application to hydrologic processes including runoff, stream flow routing, infiltration, evapotranspiration, and watershed yield; development of watershed models using these techniques and their application to engineering design.
- 7275 Modeling for Management of Groundwater (3)** *Prereq.: CE 4250.* Identification of management problems; applications of systems theory to develop modeling techniques; analytical and numerical techniques of groundwater modeling; development and application of models and computer codes for simulation and optimization management of surface and groundwater systems.
- 7280 Modeling in Physical Hydrology (3)** *Prereq.: CE 4200.* Principles of mathematical physics applied to hydrologic processes; methods of solution and model building; application to water resource problems.
- 7300 Advanced Geotechnical Engineering I: Stress Distribution, Seepage, Compressibility (3)** *Prereq.: CE 3300 and 3350.* Advanced theories of soil mechanics including stress distribution, seepage through soils, consolidation, and settlement analysis; their applications in foundation engineering.
- 7305 Numerical Methods in Geotechnical Engineering (3)** *Prereq.: CE 4450.* Numerical analysis of problems of seepage, consolidation, stress-deformation, slope stability, and wave equation for piles.
- 7310 Advanced Geotechnical Engineering II: 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, strength stress-strain-time behavior in soils; soil composition, mineralogy, soil-water electrolyte systems in identification of influencing 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, retaining walls, bridge abutments, cofferdams, earth dams, and other pertinent soil structures.
- 7325 Marine Geotechnics (3)** *Prereq.: CE 7310 or equivalent.* Sea floor soil geotechnical properties; in situ stress environment; analysis of foundations.
- 7335 Soil Improvement and Stabilization (3)** *Prereq.: CE 4300.* Methodology and analysis of soil placement and improvement techniques; properties of mineral and organic salts, principles of soil compaction; methods of soil placement and improvement, 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 stabilization.
- 7340 Theory and Practice of Geotechnical Laboratory Experiments (3)** *Prereq.: CE 3300, 3350, and 4300; or equivalent. 2 hrs. lecture; 3 hrs. lab.* Theory and practice of laboratory experimental techniques used in geotechnical design and analyses.
- 7345 In-Situ Soil Testing and Evaluation (3)** *Prereq.: CE 7340.* Theory and practice of new and 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 liners, slope stability/settlement considerations, remediation techniques.

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

7405 Statically Indeterminate Structures (3) *Prereq.: CE 4435.* Analysis of statically indeterminate structures by modern methods.

7409 Advanced Concrete Theory (3) Analysis and design of reinforced concrete structural elements according to ultimate strength and limit design theories; prestressed indeterminate structures, shrinkage, and creep.

7420 Limit Analysis and Design (3) *Prereq.: credit or registration in CE 4435.* Analysis of steel structural behavior beyond elastic limit; design for ultimate load and use of load factors; application of linear programming and other computational techniques to optimization of structures designed by aid of concepts of limit analysis.

7430 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.

7440 Applied Elasticity (3) *Prereq.: MATH 4016 or ME 4563; and CE 3400.* May be 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.

7450 Energy Principles in Engineering Mechanics (3) *Prereq.: CE 4400 and credit or registration in MATH 4016 or ME 4563.* Principle of virtual work; principle of complementary energy; Castigliano's theorem, Lagrange's equations, and Hamilton's principle; applications to stress and deflection analysis of beams, trusses, frames, plates, and rings; problems in elastic stability and vibrations.

7455 Finite Element Method in Engineering (3) *Prereq.: CE 4450.* Finite element method as an extended Ritz technique based on variational concepts for continua with applications to heat transfer, flow through porous media, fluid dynamics, elasticity, plasticity, and stability and vibrations of elastic systems.

7460 Theory of Plates (3) *Prereq.: credit or registration in CE 4440.* Laterally loaded plates with various boundary conditions; approximate methods of plate analysis; large deflections of plates; elastic stability of plates.

7465 Design of Plate and Shell Structures (3) Theory of folded plate and thin shell behavior; structural design of plate and shell elements.

7470 Theory of Elastic and Plastic Stability (3) *Prereq.: credit or registration in 4435.* Beam columns, elastic and plastic buckling of bars and frames, torsional buckling, lateral buckling of beams, elastic and plastic stability of frames, plate and shell buckling, approximate and special methods, and high speed computation.

7475 Solid Mechanics (3) *Prereq.: CE 4440 and credit or registration in MATH 4016 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.

7480 Plasticity and Viscoelasticity: Theory and Applications (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 the boundary value problems of viscoelasticity.

7485 Mechanics of Composite Materials (3) *Prereq.: CE 3400.* Modeling of the mechanical behavior of fibrous composites for application to structural components; emphasis on interlaminar stresses, strength and failure theories, thermal effects, nonlinear material response, test methods, and micromechanics.

7490 Damage Mechanics in Metals and Matrix Composites (3) *Prereq.: CE 7480 and 7485 or equivalent.* 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 Sensing in Engineering Research (3) *Prereq.: CE 4560.* Physical measurements, characteristics of present and future sensors, and laboratory and field instrumentation; computer analysis of spectra data to include classification algorithms, enhancement, calibration, georeferencing, overlay, and data base development; image processing; environmental applications.

7580 Expert Systems in Civil Engineering (3) *Prereq.: IE 4470 or equivalent.* Artificial intelligence and knowledge-based expert systems; their applications to geotechnical, structural, water resources, environmental, and transportation engineering.

7600 Transportation Engineering Data Collection Methods (3) *Prereq.: EXST 7003, or CE 3600, or equivalent.* Applications of sampling theory to data collections for transportation studies; determination of sample sizes; calculation of sampling error; expansion of sample survey data; survey methodologies, including interviews, counting programs, moving observer surveys, self-administered surveys, Simple panel surveys, etc.; design of survey instruments; conduct of data collection activities; data reduction techniques.

7605 Transportation and Environment (3) *Prereq.: CE 3600 or equivalent.* The laws relating to environmental impact of transportation actions and preparation of environmental documents on energy consumption and traffic impacts; public participation; methods of estimating impacts of transportation projects.

7610 Traffic Engineering Operations and Control (3) *F-O Prereq.: CE 3600 or equivalent.* Traffic regulations, operational problems, and engineering organization; theory and practice of application, design, operation, and maintenance of traffic control devices; methods and devices studied include signing, markings, delineation and illumination, signals and signal systems, one-way street and unbalanced-flow street operations, speed zoning, and freeway monitoring and control.

7612 Traffic Flow and Analysis (3) *S-O Prereq.: CE 4600 or consent of instructor.* Traffic flow theory and the techniques used to analyze traffic operations and highway capacity; theoretical aspects of traffic flow, including current research in the field; application of analytical procedures used to assess the efficiency of highway operations.

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 cross-sections.

7621 Mass Transit Systems (3) *Prereq.: CE 3600 or equivalent.* Historical development, role in society, federal participation, and institutional and legislative development of transit; description of conventional and innovative forms, and characteristics of users; planning, vehicle scheduling, environmental impact and energy consumption; system 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 basis and methodological construct of transportation demand analysis; explanation 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.

7638 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.

7639 Air Transportation Economics (3) *F-O Prereq.: ECON 4710, EXST 7003, CE 4620 or equivalent.* The role of air transportation in the economy; comprehensive economic analysis of airline systems, basic operation models, and neoclassical models; market system and models; pricing theory; regulated and unregulated domestic and international markets.

7640 Urban Transportation Policy and Planning (3) *Prereq.: CE 3600 or equivalent.* Introduction to and definition of transportation planning; transportation planning context; characteristics of travel; politics, decision making and models of decision makers; systems analytic approaches to transportation planning; inventory, data management, and spatial representation of data; land use and transportation; inputs to travel forecasting.

7641 Urban Transportation Planning Models (4) *S-E Prereq.: CE 7640, ECON 5600, EXST 7003, or equivalent. 3 hrs. lecture; 2 hrs. lab.* Theories of travel demand 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.

7650 Bituminous Materials and Mixtures (3) *S-O Prereq.: CE 3700 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.

7652 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; unsealed roads.

7655 Pavement Materials Characterization (4) *F-O Prereq.: CE 3700 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.

7672 Pavement Management Systems (3) *S-O 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.

7673 Pavement Maintenance and Rehabilitation (3) *S-E Prereq.: CE 3700 or equivalent.* Concepts of pavement maintenance and rehabilitation; pavement evaluation techniques; maintenance versus rehabilitation versus replacement alternatives.

7700, 7701 Special Topics in Civil Engineering (3,3) *Prereq.: permission of department. Each course may be taken for a max. of 6 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.*

7750 Seminar (1) *All graduate students are expected to enroll every semester. Only one semester hour of credit will be allowed toward degree. Pass-fail grading.*

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

9000 Dissertation Research (1-12 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.

2080 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.

2090 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 HNRS 1001-1003.* 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.

3015 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 (Mycenaean-Minoan), Classical Age, and the Age of Alexander the Great.

★ 3020 Classical Epic in Translation (3) *Knowledge of Greek and Latin languages not required.* Growth and development of the Greek and Latin epic; basic themes, the nature of a hero, and relevance to modern reader.

★ **3032 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.

★ **3040 Greek and Roman Comedy in English Translation (3)** Knowledge of Greek or Latin languages not required. Masters of stage comedy from the ancient world, with special attention to Aristophanes, Menander, Plautus, and Terence; origins and growth of comedy as an art form; problems in staging; social nature of comedy in the ancient world.

3090 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, public speaking.

1080 Survey of Communication Science and Disorders (3) For students interested in the study/teaching of language. Anatomical, physiological, and behavioral 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 phonetics; description and classification of sounds; transcription at different levels of detail; production and perception.

4153 Acoustics of Speech and Hearing (3) Prereq.: COMD 2050 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.

4250 Anatomy and Physiology of Speech and Hearing (3) Prereq.: BIOL 2160I; COMD 2050. Functional anatomy of structures associated with speech production, and reception.

4380 Speech and Language Development (4) 3 hrs. lecture; 1 hr. lab. Language acquisition and behavior, language and cognitive development, verbal learning, and structural properties of speech; theories of language development in the normal child.

4381 Basic Articulation Disorders (3) Prereq.: COMD 2081, 4150. Introduction to articulatory physiology, development, etiology, evaluation and treatment of disorders.

4382 Basic Language Disorders of Children (3) Prereq.: COMD 4380 or equivalent and consent of instructor. Differential diagnosis and remediation of major language disorders of children.

4383 Basic Fluency Disorders (3) Prereq.: COMD 4381 or equivalent. For clinical practicum take COMD 4683, 4684, or 4685. Stuttering and allied disorders; emphasis on symptomatology, testing, rehabilitation and prevention.

4384 Basic Voice Disorders (3) Introduction to vocal physiology, dynamic characteristics and measurement of fundamental frequency, and differential diagnosis and management of voice disorders of functional and abuse etiologies.

4490 Audiologic Assessment (3) Prereq.: COMD 4250, 4190. Practice and application in pure-tone and speech audiometry; middle-ear measurements, differential diagnosis; physiological tests including auditory evoked potentials.

4590 Auditory Rehabilitation in Children (3) Prereq.: COMD 4153, 4190. Methods of management including modes of communication, auditory and speech-reading training, amplification issues, early identification and intervention, and educational placement.

4681 Clinical Preparation and Observation Laboratory (1) S 2 hrs. lab. For majors in communication sciences and disorders. Study of clinic rules and procedures, codes of ethics; observation of various types of therapy and evaluation.

4682 Introduction to Clinical Practicum (2) F,S For majors in communication sciences and disorders. Techniques for test administration, therapeutic methods, report writing, counseling/conferencing, behavior management.

4683, 4684, 4685 Clinical Practice: Therapeutic Techniques (1-4 each) Prereq.: COMD 4381. May be taken for a max. of 8 sem. hrs. of credit each. On- and off-campus practicum in specific disorders (articulation, language, fluency, voice, hearing, etc.).

4694 Clinical Practicum in a Medical Environment (1-4) Prereq.: consent of instructor. Speech and/or audiology practicum in a hospital or medical practitioner's office.

4750 Independent Research in Speech Science or Linguistics (1-3) May be taken for a max. of 3 hrs. of credit. 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 6 hrs. undergraduate or graduate credit when topics vary.

7151 Speech Science (3) Motor and articulatory phonetics, including palatography, acoustic phonetics, and aspects of signal detection and perception.

7152 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.

7153 Research Design in Communication Science and Disorders (3) Prereq.: EXST 4001, 4006 or equivalent. Empirical research design problems in speech and hearing; emphasis on measurement validity and reliability.

7191 Hearing Science (3) Prereq.: COMD 4250. Auditory transmission and processing from the outer ear to the cortical area; psychophysical phenomena germane to human audition.

7192 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.

7280 Neuroanatomical Bases of Speech and Hearing (3) Prereq.: BIOL 2160 and COMD 4250 or equivalent. Study of neuroanatomy and physiology of the central 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.

7381 Language and Learning Disorders (3) Prereq.: COMD 4382. Language disorders and the communicative aspect of language; current research and treatment models for language intervention; relationship between language and learning; emphasis on school-aged child.

7382 Voice Disorders (3) Prereq.: COMD 4384. Incidence, etiology, concomitant problems; assessment and management of vocal dysphonias, aphonias, and laryngectomies.

7383 Cleft Palate/Orofacial Disorders (3) Prereq.: COMD 4250, 4380. Orofacial anatomy, physiology, and embryology; etiology and classification of orofacial cleft; surgical, dental, speech, hearing, and psychosocial concomitants and their management.

7384 Early Communicative Intervention (3) Prereq.: COMD 4382 or equivalent. For clinical practicum, take COMD 7684 or 7685. 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).

7385 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 neuropathology in the adult population; emphasis on diagnosis, description, and clinical management.

7386 Introduction to Augmentative/Alternative Communication (3) Current issues, terminology, and technological developments; augmentative systems and system components, including various sign and symbol systems; augmentative communication assessment; intervention guidelines and procedures.

7387 Aphasia in Adults (3) Prereq.: COMD 7280 or equivalent and consent of instructor. Neurological bases of aphasia and related disorders; appropriate therapeutic methodologies.

7388 Fluency Disorders II (3) Prereq.: COMD 4383 or equivalent. Etiology and nature of speech fluency disorders.

7389 Communicative Rehabilitation of Severely/Multiply Handicapped Individuals (3) Medical bases of severely handicapping conditions; alternate communication systems; assessment and intervention processes; pragmatics of interpersonal communication involving individuals who use nonspeech modalities.

7390 Industrial Audiology and Hearing Conservation (3) Prereq.: COMD 7490. Audiological practices in industry and hearing conservation program; professional, technical, business, and legal issues.

7391 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.

7393 Pathology of the Auditory System (3) Prereq.: COMD 4250, 7191, 7490. Medical aspects of hearing loss including conductive, sensory, neural, and central auditory dysfunction; diseases, abnormalities, and methods of medical intervention.

7480 Measurement and Diagnosis of Communication Disorders (3) Psychological and behavioral measurement of communicative functioning and treatment planning for common speech/language disorders.

7490 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.

7491 Diagnostic Audiology II (3) Prereq.: COMD 7490 or consent of instructor. Auditory evoked potentials and electronystagmography examined in relation to purpose, scientific basis, assessment strategies, procedures, and interpretation using cross-check principles.

7590 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.

7683, 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 in order to obtain the clock hours necessary for certification by the American Speech, Language, Hearing Association. Only 6 sem. hrs. of academic credit may be counted toward the degree, although all practicum hours count for professional certification. 2-8 hrs. clinic. On- and off-campus graduate practicum in specific areas (articulation, language, fluency, voice, aural rehabilitation, early intervention, diagnostic audiology, oral-facial anomalies, neurological disorders).

7741 Quantitative Measurement of Speech (3) Prereq.: completion of 12 hrs. of graduate work in communication disorders. Rationale for and clinical utility of objective measures of speech and language function; emphasis on use of types of electronic instrumentation.

7750 Special Topics in Linguistics (3) May be taken two times 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 and LING 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 foundations, second language acquisition, and development of a teaching syllabus; work with international students.

7756 Independent Research: 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 Communication Disorders (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.*

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.

7790 Seminar in Hearing Disorders (3) *Prereq.: consent of instructor. May be repeated for credit.* Exploration of current professional/scientific topics in clinical practice/research.

7791 Independent Research: Audiology (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.* Current 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.

7880 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.

7882 Advanced Individual Research in Communication Science and Disorders (1-6) *Prereq.: admission to Ph.D. program and consent of instructor. May be taken for a max. of 6 hrs. of credit.* Research topics ancillary or extraneous to dissertation research.

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 2060. An honors course, CMST 1062, is also available.* Selection of subjects; gathering 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, 2010, 2040, 2060, or 2064.* 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.

2012 Introduction to Film (3) Nature and function of film as a mode of communication; film theory and criticism; historical and technological development of the film industry; selected films screened and studied.

★ **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 1061.* Theory and skills needed by the effective communicator and critical consumer of speech; analysis of other speakers and practice in speaking.

2061 Speech Communication for Business and the Professions (3) *For students in the professional colleges, particularly the E. J. Ourso College of Business Administration.* Speech communication used in business and professional organizations; proposal presentations, group decision making, parliamentary procedure, and interviewing.

★ **2063 Argumentation and Debate (3)** *Prereq.: CMST 1061 or 2060.* Principles of argumentation and debate; analysis, briefing, evidence, reasoning, and refutation; debating on vital questions.

2064 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 3 sem. hrs.; however, no more than a total of 3 sem. hrs. in CMST 2200 and CMST 4200 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 on free speech; influence of mass 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) S 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 and subvert power in dyads, groups, organizations, and communities.

3107 Rhetoric of the Contemporary Media (3) Various forms of media (television, pulp novels, pop music); their promotion of cultural values and modes of conduct; 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.

3115 Communication and Gender (3) *Prereq.: CMST 2010 or equivalent.* Gender differences, sex roles, and sexual stereo types in communication.

3167 Rhetoric and Civilization (3) Role of oratory in the formation, mobilization, and destruction of human communities from ancient to modern times.

3810 Independent Study (1-3) *May be taken for a max. of 3 hrs. of credit on a communication topic not duplicated in regular course offerings. Course may be taken for a max. of 6 hrs. of credit in the major.*

3900 Selected Topics in Speech (3) *Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Consult Schedule of Classes for current offering.*

4012 Communication and Relationships (3) *Prereq.: CMST 2010 or equivalent.* Survey of theories of interpersonal communication and misunderstandings in relational development and deterioration; more effective communication.

4100 Political Communication (3) Factors and strategies in contemporary political communication in the U.S.; emphasis on electronic communication, candidates and images, campaign management, speech making, and advertising; study of recent and current elections.

4101 Communication in Organizations (3) *Not a performance course.* Speech communication theory and practice in organizations; research used to identify and solve communication problems; analyses of organizational communication.

4107 Communication and Cultural Studies (3) *Prereq.: at least three of the following—CMST 2010, 2040, 2063, 2064, 3012, 3040, 3107, 3900.* Critical studies of contemporary culture; emphasis on popular culture and media texts, audiences, and institutions.

4113 Advanced Discussion (3) *For teachers and directors of discussion, people in industry, and other advanced students.*

4114 Contemporary Theories of Communication (3) Current methods and theories of human communication; research literature; behavioral antecedents and consequences of messages and their variations; how messages interact with communicators to produce behavioral outcomes.

4118 Modeling Communication Within Marital and Family Relationships (3) *Prereq.: CMST 2010. Also offered as SOCL 4402.* Role of communication within marriages and other family arrangements.

4119 Nonverbal Communication (3) *Prereq.: CMST 2010 or equivalent.* Nonverbal message systems such as kinesics and proxemics; relationship between nonverbal and verbal communication.

4140 Analysis and Performance of Poetry (3) *Prereq.: CMST 2040.* Advanced study of selected forms, styles, and genres of oral and written poetry through solo and group performance.

4141 Analysis and Performance of Narrative (3) *Prereq.: CMST 2040.* Advanced study of selected novels, short stories, and oral narratives through solo and group performance; stylistic and rhetorical analyses.

4142 Selected Topics in Performance Studies (3) *Prereq.: CMST 2040 and 3040 or equivalent. May be taken for a max. of 6 hrs. of credit when topics vary.*

4143 Performance of Southern Fiction (3) *Prereq.: CMST 2040 or equivalent.* Study of selected texts of contemporary southern fiction through solo and group performance; literary criticism of texts performed; relevant narrative and performance theory.

4144 Performance Art (3) *Prereq.: CMST 2040 and 3040 or equivalent. Also offered as THTR 4144.* History, theory, criticism, and practice of 20th century avant-garde performance and performance art.

4145 Group Performance (3) *Prereq.: CMST 2040 and 3040 or equivalent.* Theory and techniques of adapting and staging nondramatic literature and other materials for group performance; directing for Reader's Theatre, Chamber Theatre, Story Theatre, and other forms.

4160 Persuasive Communication (3) *Prereq.: CMST 1061, 2060, 2063, or equivalent.* Nature of persuasive speaking.

4164 Advanced Argumentation (3) *Prereq.: CMST 2063 or 4160 or equivalent.* Argumentation in different types of speaking situations; trends in argumentation theory; argumentation in practice.

4165 History and Criticism of American Public Address (3) *Prereq.: CMST 2060 or 2063 or 4160.* American public address from colonial times to the present; speeches of outstanding American statesmen, lawyers, and clergymen and sources of their effectiveness.

4166 History and Criticism of British Public Address (3) *Prereq.: CMST 1061 or 2060, 2063, or 4160.* British public address from the 18th century to the present; speeches of outstanding British statesmen from Pitt to Churchill.

4167 Contemporary Rhetorical Theory (3) *Prereq.: CMST 1061 or 2060 or 4160 or equivalent.* Developments in rhetoric from contemporary theoretical and critical perspectives; key concepts in the philosophy of rhetoric.

4200 Practicum in Speech Communication (1) *Prereq.: consent of instructor. May be taken for a max. of 3 sem. hrs. credit; however, no more than a total of 3 sem. hrs. of CMST 2200 and CMST 4200 may be taken for undergraduate credit. May not be used to satisfy an area requirement for undergraduate majors; may not satisfy minimum course requirements for graduate degrees. Pass-fail grading.* Practical experience in major departmental activities outside the classroom under direct faculty supervision.

4971 Special Topics in Mass Communication (3) *Prereq.: consent of instructor. See MC 4971.*

7900 Introduction to Graduate Study in Speech (3) *Required of all master's students and of doctoral students on advice of their major professors.*

7902 Independent Research: Speech Education (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.*

7910 Seminar in Interpersonal Communication Theory (3) *Prereq.: CMST 4012 or equivalent. May be taken for a max. of 12 hrs. credit when topic vary.* Current theoretical approaches to interpersonal communication, including developmental approaches, cognitive and relational theories.

7913 Seminar: Contemporary Theories of Speech Communication (3) *Prereq.: CMST 4114 or equivalent. May be taken for a max. of 6 hrs. of credit when topics vary.* Criticism, interpretation, and validation of specific theories in speech communication; different theoretical perspectives.

7915 Seminar: Research in Communication Theory (3) Prereq.: CMST 4114 or equivalent. May be taken for a max. of 9 sem. hrs. credit. Research literature on advanced topics in communication theory.

7916 Independent Research: Communication Theory and Research (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.

7941 Seminar: Studies in the History of Performance (3) Historical development of select Western performance practices outside the institution of theatre; methods of historical research in performance studies.

7942 Independent Research: Performance Studies (1-3) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. credit. For advanced graduate students who wish to pursue research on special problems exclusive of thesis or dissertation.

7945 Seminar: Contemporary Theories and Research in Performance Studies (3) May be taken for a max. of 12 hrs. of credit when topics vary. Topics related to solo and group performance of literature; performance theory and criticism; interrelationships of performance and culture; experimental performance forms; qualitative research methods.

7946 Theory and Performance of Narrative Discourse (3) Prereq.: CMST 4141, 4142, or equivalent. Narrative theory in literature and performance; rhetoric of narrative discourse.

7961 Seminar: Evolution of Rhetorical Theory, Classical Period (3)

7962 Seminar: Rhetorical Criticism (3) Prereq.: consent of instructor. Types of speech criticism, criteria, and measures of effectiveness of public address.

7963 Seminar on Southern Oratory (3) Prereq.: CMST 4165 and 7962. Oratory of the South from about 1860 to the present; significant speakers of a given historical period (students select period studied).

7964 Seminar: Evolution of Rhetorical Theory, British and American (3) Developments in rhetorical theory in Britain and America from about 1529 to the present; discussion of major works by Campbell, Blair, Whately, and Kenneth Burke.

7965 Independent Research: Topics in Rhetoric and Public Address (1-3) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. when topics vary. For advanced graduate students who wish to pursue research on problems exclusive of thesis or dissertation.

7966 Problems in Rhetorical Theory, Criticism, and History (3) Prereq.: at least 12 hrs. (four courses) in public address. May be taken for a max. of 12 sem. hrs. of credit when content varies. Selected problem that goes beyond present advanced course offerings in public address; topic to be announced.

7967 Development of Contemporary Rhetorical Theory (3) Pivotal questions in contemporary theory from I. A. Richards through postmodernism; future of rhetorical theory and its relationship to the humanities.

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

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

COMPARATIVE BIOMEDICAL SCIENCES • CBS

4145 Introduction to Medical Neurobiology (3) F Correlated structure and function of the brain and spinal cord.

7001 Seminar: Veterinary Anatomy and Cell Biology (1) May be taken for a max. of 8 hrs. of credit. Reports and discussions on topics of current interest in various disciplines of veterinary anatomy and/or cell biology.

7002 Research Techniques in Anatomy and Cell Biology (1-4) May be taken for a max. of 8 hrs. of credit when topics vary. Specialized research techniques related to a specific subdiscipline of anatomy and/or cell biology.

7003 Special Topics in Anatomy and Cell Biology (1-4) May be taken for a max. of 8 hrs. of credit when topics vary. Specialized coverage of a variety of topics of current interest in anatomy and cell biology.

7105 Ultrastructural Cytology (3) S Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab. Fine structure of animal cells and cell products; relationships of ultrastructure to function; interpretation of cytochemical reactions.

7106 Electron Microscopy: Veterinary Medical Applications (3) Su Prereq.: consent of instructor. 1 hr. lecture; 6 hrs. lab. Preparation of companion, food, laboratory, and exotic animal tissues including biopsies for transmission and scanning electron microscopy; operation of S-150 SEM, EM-10, and EM-109 TEMs, and ancillary equipment.

7109 Advanced Macroscopic Anatomy (1-3) Prereq.: consent of instructor. May be repeated for credit when topics vary. Specialized dissection of one or more of the following: dog, horse, ruminants, laboratory, exotic, or avian species.

7112 Advanced Microscopic Anatomy (1-3) Prereq.: consent of instructor. May be repeated for credit when topics vary. Comparative or systemic microscopic anatomy of selected organs or organ systems of domestic, laboratory, or exotic species.

7121 Orthopedic Anatomy (3) V Prereq.: D.V.M. degree. 2 hrs. lecture; 3 hrs. lab. Basic and applied principles of the anatomy of the musculoskeletal system.

7122 Veterinary Neuroscience (3) S See CBS 7631.

7603 Clinical Toxicology (3) S Prereq.: CBS 7623 and consent of instructor. Pathophysiology of various clinically important toxicants; prevention, diagnosis, and treatment of common intoxications in domestic animals.

7605 Circulatory Transport and Control (3) V Prereq.: BIOL 4160 or equivalent. 3 hrs. lecture/demonstration. Biophysical approach to structure and function of the circulatory system in health and disease; fluid dynamics, solute transport, regional hemodynamics, neurohumoral controls, and analysis of circulatory function in specific cardiovascular disease conditions.

7607 Advanced Respiratory Physiology (3) V Prereq.: BIOL 4160 or equivalent. 2 hrs. lecture; 3 hrs. lab. Biophysical phenomena of pulmonary functions and structure; gas transport and exchange; neurohumoral, chemical states; special consideration to experimental procedures and techniques.

7614 Central Nervous System (3) V Prereq.: CBS 7612 or equivalent. Neurotransmitter mechanisms, chemistry, and anatomical distribution; neuropharmacology; synaptic physiology and anatomy of selected brain regions; central nervous system diseases.

7615 Pulmonary Pharmacology (3) V Prereq.: CBS 7602. Mechanisms of action and applications of various drugs used in respiratory disorders.

7616 Methods in Neuroscience Research (2) V Prereq.: CBS 7612 or consent of instructor. 1 hr. lecture; 3 hrs. lab. Theory and practice of electroencephalography, electromyography, averaged evoked potentials, electrode construction, stereotaxic surgery, lesioning, intracerebral stimulation and infusion, and other current techniques in neuroscience research.

7617 Autonomic Nervous System (3) Prereq.: CBS 7612 or equivalent. Structure, physiology, pharmacology, and diseases of the autonomic nervous system.

7620 Comparative Metabolism of Environmental Pollutants (3) F Prereq.: BIOL 4094 or consent of instructor. Same as ENVS 7200. Biochemical systems from various invertebrate, vertebrate, and plant species involved in the metabolic activation and detoxification of xenobiotic substances; use of these systems as biomonitors of pollution impact.

7622 Fundamentals of Chemical Carcinogenesis (3) S-E Prereq.: CBS 7604 or consent of instructor. Same as BIOL 7622 and ENVS 7622. Identification and structural features of carcinogens; role of free radicals in biology and pathology; molecular mechanisms in chemical carcinogenesis, including pathways for metabolic activation, DNA adduction, somatic cell mutagenesis, and oncogene activation.

7623 Toxicology I (3) F Prereq.: One yr. organic chemistry, BIOL 4087 or equivalent; mammalian physiology recommended. Also offered as ENVS 7623. Fundamental principles of toxicology, dose response relationship, design and conduct of acute and chronic toxicity tests, basic analytical toxicology, biochemical markers, basic principles of hazard evaluation and risk assessment, industrial toxicology, principles of toxicology applied to the environment and ecosystems.

7624 Toxicology II (3) S Prereq.: CBS 7623 or equivalent. Continuation of CBS 7623 (ENVS 7623). Also offered as BIOL 7624, ENVS 7624. Xenobiotic transport, distribution, toxicokinetics, metabolism, excretion, and principles of receptor interaction.

7625 Toxicology III (3) F-E Also offered as ENVS 7625, FDSC 7625, and PBS 7528. Toxicology of major organ systems, to include dermal, pulmonary, hepatic, renal, neural, immune, gastrointestinal, reproductive, cardiovascular, and special sense organs; target organ toxicology with mechanistic study of the pathophysiology of classic toxicants.

7626 Toxicology IV: Genetic Toxicology (3) S-E See ENVS 7626.

7627 Methods in Aquatic Toxicology (4) S-O Prereq.: organic chemistry, CBS 7623 or equivalent. 2 hrs. lec.; 6 hrs. lab. Laboratory and field investigations in modern aquatic toxicology; bio-accumulation, acute and chronic toxicity

testing, metabolism of xenobiotic chemicals, mutagenesis testing using aquatic organisms; the application of both inorganic and organic trace analytical methodologies applied to various media including water, sediments, and aquatic organism tissues.

7628 Veterinary Physiology I (3) F Prereq.: consent of instructor. Physiological mechanisms underlying basic nerve/muscle membrane dynamics and the cardiovascular system of domestic species; emphasis on system control.

7629 Veterinary Physiology II (3) S Prereq.: consent of instructor. Physiological mechanisms underlying the respiratory and renal systems of domestic species; emphasis on system control.

7630 Veterinary Pharmacology (4) S Prereq.: vertebrate physiology, biochemistry, or equivalent; consent of instructor. 3.5 hrs. lecture; 0.5 hrs. lab. Comparative study of the pharmacodynamics, disposition, kinetics, and therapeutic utility of drugs in animals.

7631 Veterinary Neuroscience (3) S Prereq.: consent of instructor. 2.5 hrs. lecture; 0.5 hrs. lab. Also offered as CBS 7122. Physiological and anatomical mechanisms underlying the nervous system.

7699 Toxicology Seminar (1) Also offered as BIOL 7699, FDSC 7699, CHEM 7699, and ENVS 7699. May be taken for a max. of 4 hrs. credit when topics vary. Reports and discussions on topics of current interest in the discipline of toxicology.

COMPARATIVE LITERATURE • CPLT

7010 Research Methods and Bibliography (3) Instruction in methods of research; specific projects in bibliography geared toward scholarship in comparative literature.

7020 History and Theory of Criticism (3) Historical survey of major works in literary theory from the classical through the modern period designed to ground subsequent work in criticism.

7120 Topics in Theory of Criticism (3) May be taken for a max. of 9 hrs. of credit when topics vary. Study of a particular school of critical thought as it applies to specifically comparative literary scholarship.

7130 Topics in Comparative Literature (3) May be taken for a max. of 9 hrs. of credit when topics vary. Basic techniques of studying a literary topic through the comparative method; examples taken from different national literary traditions.

7140 Topics in the Interdisciplinary Study of Literature (3) May be taken for a max. of 9 hrs. of credit when topics vary. Relationship between literature and other domains, such as art, religion, and film.

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

8900 Independent Study (1-3) May be taken for a max. of 3 hrs. in the master's program and 9 hrs. in the doctoral program.

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

COMPUTER SCIENCE • CSC

General education courses are marked with stars (★).

1100 Computers in Society (3) Prereq.: credit in MATH 1021 or registration in MATH 1023. 2 hrs. lecture; 2 hrs. lab. Introduction to computers, their applications, and impact on people and social institutions; the Internet, E-mail, news groups, ftp, telnet, World Wide Web, multimedia, word processing, spreadsheets, databases.

★ **1248 Introduction to Programming With Applications in Statistics (3) Prereq.:** MATH 1021 or sufficiently high score on the mathematics placement examination to qualify for MATH 1022 or 1431. Credit will not be given for both this course and CSC 1250. Not for degree credit for computer science majors. Computer programming using the Pascal language with applications in elementary statistics.

1250 Introduction to Computer Science I (3) Prereq.: credit or registration in MATH 1022 or 1023. Credit will not be given for this course and CSC 1248 or 1253. Fundamentals of problem solving, program design, algorithms, and programming using a high-level language.

1251 Introduction to Computer Science II (3) Prereq.: CSC 1250 and credit or registration in MATH 1550. Fundamentals of programming and programming design using a high-level structured language; introduction of dynamic memory allocation, multi-dimensional arrays, logical records, searching and sorting

1253 Introduction to Computer Science with C-I (3)

Prereq.: credit or registration in MATH 1550 or credit in MATH 1431. Credit will not be given for both this course and CSC 1250 and 2290. Fundamentals of programming, program design, and algorithms using a high-level block-structured language.

1254 Introduction to Computer Science with C-II (3)

Prereq.: CSC 1253, MATH 1550 or registration in MATH 1435. Credit will not be given for both this course and CSC 1251 and 2290. Basic concepts of data types (strings, arrays, records, sets, files); data structures (linked lists, stacks, queues, trees); searching and sorting algorithms.

1970 Introduction to the UNIX Operating System (2) 1 hr. lecture; 2 hrs. lab. Laboratory projects are assigned.

Features of the UNIX Operating system kernel, shell commands and scripts, text processing, electronic mail, and the INTERNET.

2230 Programming Techniques With Ada (3) Prereq.: CSC 1251.

Advanced programming techniques using data abstraction, exception handling, generics, and tasking.

2252 Assembly Language Programming (3) Prereq.: credit or registration in CSC 1251, or equivalent background.

Fundamentals of machine function; basic concepts of programming at the machine level; assembly language; machine representation of information, machine language, addressing techniques, program linkage, macroprogramming, and assembler construction.

2259 Introduction to Discrete Structures (3) Prereq.: MATH 1552 and CSC 1251.

Set algebra including mappings and relations; algebraic structures including semigroups and groups; elements of the theory of directed and undirected graphs; Boolean algebra and propositional logic; these structures applied to various areas of computer science.

2260 Introduction to the Use of Computers (1) Prereq.: MATH 1550.

Credit will be given for only one of the following: CSC 2260, 2262, or IE 2060. Basic principles of digital programming in symbolic languages; application of electronic computers to typical scientific problems.

2262 Numerical Methods and FORTRAN (3) Prereq.: MATH 1552.

Credit will be given for only one of the following: CSC 2260, 2262, or IE 2060. Computer-oriented methods for solving numerical problems in science and engineering; elements of FORTRAN programming language; numerical solutions to systems of simultaneous linear equations, nonlinear algebraic equations (root solving), 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 computing.

Primarily for students in computer science and related disciplines. COBOL programming; its use in business data processing systems.

2280 Computer Organization (4) Prereq.: CSC 2252. 3 hrs. lecture; 2 hrs. lab.

Basic digital circuits; Boolean algebra and combinational logic, data representation and transfer, and digital arithmetic; digital storage and accessing, 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.: CSC 1251.

Advanced programming techniques and basic concepts of data types, data structures, and advanced programming languages.

2533 Introduction to Engineering Computation (3)

Prereq.: MATH 1550. 2 hrs. lecture; 3 hrs. lab. Also offered as ME 2533. Problem solving techniques and structured programming tools for engineering synthesis and analysis; application of symbolic solvers and technical computing toolkits.

3102 Advanced Data Structures and Algorithm Analysis (3) Prereq.: CSC 2290 or CSC 1254 and CSC 2252 or EE 3770 or credit or concurrent enrollment in CSC 2259 or EE 2720.

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.

3370 Introduction to Object Oriented Programming Using JAVA (3) Prereq.: CSC 1254 or 2290.

Introduction to OOP concepts using the JAVA programming language.

3380 Object Oriented Design Patterns (3) Prereq.: CSC 3370 or 3390.

Introduction to object design patterns and developing software using the unified modeling language as a design tool.

3390 Object Oriented Programming and C++ (3) Prereq.: credit in either CSC 1254 or 2290.

Introduction to the object oriented programming paradigm, including encapsulation, inheritance, and polymorphism; implementation of these concepts using C++.

3999 Independent Undergraduate Research (1-3) Prereq.: consent of department chair.

May be taken for a max. of 4 hrs. of credit. Individual readings, conferences, and program development in computer science.

4101 Programming Languages (3) Prereq.: CSC 3102.

Credit will not be given for both this course and CSC 7001. Principles of programming language design; specification of syntax and semantics; underlying implementation of block structured languages; dynamic memory allocation for strings, lists, and arrays; imperative versus applicative programming; logic programming; modern programming languages.

4103 Operating Systems (3) Prereq.: CSC 3102.

Design techniques, process management, processor scheduling; deadlocks, memory management, secondary memory management, file management; I/O systems, Unix systems.

4304 Systems Programming (3) Prereq.: CSC 4103.

Batch process systems programs, their components, operating characteristics, user services and limitations; implementation techniques for parallel processing of input-output and interrupt handling; overall structure of multiprogramming systems on multiprocessor hardware configurations; addressing techniques, core management, file system design and management, system accounting, and other user-related services; traffic control, interprocess communication, design of system modules, and interfaces; system updating, documentation, and operation.

4330 Software Systems Development (3) Prereq.: CSC 3102.

Software requirements analysis; design representation, programming methodologies; verification, validation, maintenance, and software planning.

4351 Compiler Construction (3) Prereq.: CSC 3102 or equivalent.

Credit will not be given for both this course and CSC 7001. Program 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, lexical scan, syntax scan, object code generation, error diagnostics, object code optimization techniques, and overall design; use of compiler writing languages and bootstrapping.

4356 Interactive Computer Graphics (3) See ME 4573.**4357 Applied Interactive Graphics and Computer-Aided Design (3) See ME 4583.**

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 3370 or 3390 or 4330.

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.

Network, hierarchical, and relational, and entity-relationship models; data definition, manipulation languages, and conversion among these models; relational database design theory, efficient query evaluation, elementary query optimization techniques.

4444 Artificial Intelligence (3) Prereq.: CSC 3102.

Theorem proving and inferencing techniques, production systems, knowledge representation, approximate reasoning, nonmonotonic reasoning, natural language understanding, scene analysis, planning, game playing, and learning.

4446 Fuzzy Sets and Applications (3) Prereq.: permission of instructor.

Basic 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 simulations tools in solving real-world problems using fuzzy-set techniques.

4602 Fundamental Computer Science for Teachers (3) Prereq.: ELRC 4507 (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, graphics, and other topics to prepare students to teach computer science in secondary schools.

4890 Introduction to Theory of Computation (3) Prereq.: CSC 2259.

Introduction to finite automata, regular expressions and languages; push-down automata and context-free languages; selected advanced language theoretical topics; emphasis on technique.

4999 Advanced Independent Undergraduate Research (1-3) Prereq.: consent of department chair.

May be taken for a max. of 4 hrs. of credit. Individual readings, conferences, and program development in computer science.

6100 Advanced Elements of Computer Science for Teachers (3) Prereq.: computer science programming course or knowledge of a programming language required.

Advanced programming techniques using a high-level, structured language; data structures and computer systems software.

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 programming language concepts, semantics, data types, control structures, functional languages, compilers, and compiler 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 arithmetic/logic and control units, microprogramming, input/output facilities, real-time systems microprocessors, multiprocessors, distributed processing, and digital logic; comparative study, including unix, CP/M, OS/MVS, and VM/370.

7080 Computer Architecture (3) Prereq.: CSC 7002 or equivalent.

Background in electronics not required. Functional architecture of modern digital computer systems; detailed description of instruction set implementation with monoproccessor and multiprocessor structures; design and analysis of instruction sets and control structures.

7101 Programming Language Structures (3) Prereq.: CSC 4101.

Advanced study of data specification, storage management, and control in programming languages; includes coverage of formal specification languages; languages for concurrent processing; languages that support program verification techniques; and in-depth study of applicative languages.

7103 Advanced Operating Systems (3) Prereq.: CSC 4103.

Concurrent programming: shared memory, communication, and operation-oriented models; concurrent, distributed, and network programming; distributed operating systems; synchronization and deadlock detection in distributed systems.

7120 Performance Evaluation of Computer and Communication Systems (3) Prereq.: CSC 4103.

Modeling techniques, specification of queuing systems, product form networks, algorithms for performance networks, operational analysis, performance bound techniques, blocking and priority networks.

7135 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 4890.

Algorithms, computability, decidability, enumerability; formal replacements and Church's thesis; Turing machines, primitive recursive functions, u-recursive functions; undecidable predicates.

7201 Theory of Computation II (3) Prereq.: CSC 7200.

Theory of computation; problems for complexity classes, NP, P, PSPACE, and Nlog; 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 7135.

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) F Prereq.: CSC 4444. Fundamental principles of machine learning; inductive learning; explanation-based learning; computational approach to Boolean function learning; learning formal languages and recursive theories; neural network learning and genetic algorithms; applications of machine learning.

7351 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 control structures, error recovery, optimization of branching, local code optimization using directed acyclic graphs, loop optimization, global data flow analysis, and object-code optimization.

7370 Graph Algorithms (3) V Prereq.: MATH 4171 or equivalent.

Graph layout algorithms; networks; application of network flow techniques; polynomial time algorithms and NP-completeness; dynamic graph drawing.

7373 Algorithms for Parallel and Distributed Computing (3) Prereq.: CSC 7300 or equivalent.

Parallel algorithms for searching, sorting, matrix processing, network optimization, and other problems; implementation and efficiency measures of the algorithms on different machines, and VLSI systolic arrays.

7374 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, path planning, autonomous navigation and sensor-fusion problems for mobile robots.

7375 Robot Vision (3) Prereq.: CSC 3102 or equivalent, and CSC 7300. Computational aspects of vision; utilization of techniques from computational geometry, combinatorics, probability theory, and artificial intelligence; visual recognition and classification.

7380 Computational Geometry (3) Prereq.: CSC 7300 or equivalent. Data structures and algorithm design techniques for geometric problems; geometric searching; convex hulls; Voronoi diagrams; proximity; intersections of geometric objects; applications of computational geometry.

7381 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.

7402 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.

7420 Parallel and VLSI Computation (3) F Prereq.: CSC 3102. Theoretical aspects of the design and analysis of algorithms for parallel computation; physical implementation of VLSI chips.

7442 Data Mining and Knowledge Discovery (3) 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.

7443 Scientific Information Visualization (3) Prereq.: CSC 7300 or equivalent. Study of computer visualization principles, techniques, and tools used for explaining and understanding information; includes visualization algorithms, techniques, and applications.

7444 Advanced 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.

7446 Soft Computing (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.

7450 Programming and Performance Evaluation of Parallel Computers (3) Prereq.: CSC 3102 or equivalent and CSC 7300. Parallel programming techniques; message passing and process synchronization performance evaluation; prediction of parallel architectures and algorithms, scalability analysis.

7481 Information Retrieval Systems (3) Prereq.: CSC 3102 or equivalent. Also offered as LIS 7610. Topics include commercially available retrieval systems, text content analysis, query processing models and current research problems.

7500 System Modeling and Computer Simulation (3) Prereq.: CSC 2263 or equivalent. Construction and use of mathematical and computer models; parameter estimation; compartmental models; simulation techniques; applications of simulations; examples and case studies from physical, social, and life sciences, engineering, business, and information sciences.

7540 Distributed Systems (3) Prereq.: CSC 4103. Networking and inter-networking; client-server model; remote procedure calls; processes and processors in distributed systems; distributed file systems; transaction-processing techniques; and distributed systems for high performance computing.

7560 Computational Methods (3) Prereq.: CSC 4362 or equivalent. Synthesis, implementation, and analysis of numerical algorithms; algorithm concept introduced in context of abstract schema.

7600 High Performance Computing I (3) V Prereq.: CSC 4362 or consent of instructor. Fundamental computational techniques required for scientific computing; important algorithms for parallel computation; high performance computing.

7610 High Performance Computing II (3) V Prereq.: CSC 7600 or equivalent. Finite difference schemes for molecular dynamics; classical deterministic simulations; combinatorial optimization; algorithms for quantum molecular dynamics; scientific applications in high performance computing.

7620 High Performance Computing III (3) V Prereq.: CSC 7600 or equivalent. Basic stochastic simulation techniques for massively parallel computers; simulated annealing and routing algorithms.

7700 Special Topics in Computer Science (3) May be taken for a max. of 12 hrs. of credit when topics vary. Specialized areas of current interest in computer science.

7800 Computer Science Research Seminar (1) V May be taken for a max. of 2 hrs. of credit when topics vary.

Pass-fail grading. Student presentations and discussions on research topics in computer science.

7999 Selected Readings in Computer Science (1-3) Prereq.: consent of department chair. May be taken for a max. of 6 sem. hrs. of credit.

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

CONSTRUCTION MANAGEMENT • CM

1010 Construction Graphics and Nomenclature (3) 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. Conception, 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.

1400 Microcomputer Applications in Construction (3) Utilization of construction software for estimating, planning and scheduling, financial analysis, and construction processes.

2012 Plan and Cost Analysis for Residential Construction (3) Prereq.: CM 1010 and MATH 1022. 2 hrs. lecture; 2 hrs. lab. Interpretation of working drawings and specifications; cost estimation; bidding; materials, methods, and equipment for residential construction.

2121 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 2121. Continuation of CM 2121. Emphasis on both heavy and industrial equipment.

2402 Automated Graphics for Designers (3) Prereq.: CM 1030 or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Also offered as ARCH 2173 and LA 2185. Use of automated graphical techniques in design and design communications.

2502 Structural Technology (3) Prereq.: MATH 1 1441 and PHYS 2001. Analysis of the actions of loads on structures such as beams, cables, arches, trusses, frames, retaining walls, and diaphragm structures, which concern construction professionals.

3000 Construction Safety (3) Construction safety relating to accident causation; contractual obligations; project management and coordination.

3002 Construction Planning and Scheduling (3) Prereq.: CM 1400 or approved computer elective, and CM 2121. Fundamentals of planning and scheduling techniques used in the construction industry to manage construction projects.

3121 Commercial Construction Estimating (3) Prereq.: CM 2121. 2 hrs. lecture; 2 hrs. lab. Principles of estimating quantity surveys, pricing analysis, and bid package preparation for commercial construction.

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 2121. Basic fundamentals of highway construction; earthmoving, drainage, and paving; interpretation of plans; materials, methods, equipment, estimating, and bidding.

3301 Mechanical Equipment of Buildings (3) Prereq.: PHYS 2001. Type, design, installation, and performance of mechanical equipment used in buildings, including plumbing and air conditioning.

3302 Electrical Installations (3) Prereq.: PHYS 2002. Wiring systems for residential, commercial, and industrial buildings; illumination.

3400 Construction Materials (3) Prereq.: CM 2121.

Fundamentals involved in design, evaluation, testing, and construction of asphalt, concrete, soils, aggregates, steel, timber, and composites.

3501 Strength of Materials (3) Prereq.: CM 2502. Analysis of the stresses and deformations induced in materials of construction through the individual and/or combined effect of axial, shear, flexural, and torsional loads; topics include: temperature effects, effects of stress combinations, and buckling of slender compressive elements.

3502 Structural Design (3) Prereq.: CM 3501. Economic use of steel, reinforced concrete, and wood in building and engineered structures; design of beams, columns, and connections; elastic and ultimate strength design concepts.

3504 Soils and Foundations (3) Prereq.: CM 3501. Overview of basic topics of soil mechanics and design of soil structures; emphasis on soil classification, soil compaction, the design of shallow and deep foundations, retaining walls and slope stability.

4200 Construction Administration (3) Prereq.: CM 3000 and 3002. Principles and theory of ownership, organization, contracts, insurance, bonding, and labor relations pertaining to the construction industry.

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

4202 Construction Enterprise (3) Prereq.: CM 4200. Open to Construction Management majors only. A comprehensive study of construction 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. Advanced topics, current issues, or recent developments in the construction industry.

4207 Independent Study (3) Prereq.: consent of a faculty member. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Research on a construction topic as chosen by the student under direct supervision of a chosen faculty member.

4400 Advanced Computer Applications for Construction Management (3) Prereq.: CM 1400 or approved computer elective. Application of software programs currently being used in the construction industry.

CURRICULUM AND INSTRUCTION • EDCI

1000 Introduction to the Study of Education (3) Field experience in multicultural settings in secondary schools. Historical foundations, organization, and administration of American public education.

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 history, 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-3 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 pedagogy; discussions of teaching in the historical and philosophical dimensions of discourse/practice.

2040 Principles and Practices in Secondary Education (3) Prereq.: EDCI 1000.

2045 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/field experience in multicultural settings. Managerial aspects of instruction; application of learning principles to the classroom setting.

2081 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 (3,3) ART 2271 is prerequisite for 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 in Louisiana; art materials, techniques, and activities recommended for elementary school grades.

2400 Education and Diverse Populations (3) Prereq.: Admission to 1-6 teacher education certification program. 2 hrs. lecture; 2 hrs. lab/field 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,Su 2 hrs. lecture; 2 hrs. lab/field experience. Requires field experience in a school 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 time, genres, and media; focus on wide reading in children's literature and an appreciation of the value of literature for children.

3001 Student Development and Diversity (3) Prereq.: credit or registration in EDCI 2001 and concurrent enrollment in one of the following: BIOL 3001, CHEM 3001, ENGL 3201, FREN 3401, MATH 3001, PHYS 3001, SPAN 3001. 2 hrs. lecture; 3 hrs. lab/field experience in multicultural settings. Differences among secondary student (grades 7-12) associated with their developmental levels, cultural, and ethnic 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.

3112 Reading Instruction in the Elementary School (6) Prereq.: EDCI 2025; concurrent registration in EDCI 3113 for elementary grades majors. 3 hrs. lecture; 6 hrs. field experience in multicultural settings. Current instructional materials and methods in teaching reading at the elementary school level; understandings and skills in a laboratory situation in the public schools.

3113 Materials and Methods in Teaching Communicative Skills in the Elementary School (2) Prereq.: EDCI 2025; concurrent registration in EDCI 3112 for 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 I; 12 sem. hrs. of mathematics, including MATH 1201 and 1202; 11 sem. hrs. of natural science; and concurrent enrollment in EDCI 3125 and MATH 2203. 3 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 I, 11 sem. hrs. of natural science, 12 sem. hrs. mathematics, and concurrent enrollment in EDCI 3124 and MATH 2203. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural, multi-level settings. Structures of 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 settings. Structures of mathematical disciplines for teaching in lower/upper elementary school; strategies, techniques, basic rationales, and materials.

3127 Curriculum Disciplines: Social Studies (3) Prereq.: EDCI 2400, 3000 and concurrent enrollment in EDCI 3137 and 3200. 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 2040 or 2045 or equivalent. Approaches for teaching reading; general review of reading approaches and materials.

3136 Reading in the Content Areas (3) Prereq.: EDCI 3135 or equivalent. Content area 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 2040 and credit for or registration in 21 of the 24 sem. hrs. of English 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 2040 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 2040 and credit for or registration in 21 sem. hrs. of the social studies courses required for a teaching minor in secondary school social studies. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings. Techniques, strategies, and materials for teaching secondary school social studies.

3145 Materials and Methods in Secondary School Latin (3) Prereq.: EDCI 2040 and credit for or registration in the Latin courses required for a teaching minor in secondary school Latin. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3146 Materials and Methods in Secondary School Mathematics (3) Prereq.: EDCI 2040 and credit for or registration in 17 of the 20 sem. hrs. of mathematics courses required for a teaching minor in secondary school mathematics. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings. Techniques, strategies, and materials for teaching secondary school mathematics.

3147 Materials and Methods in Secondary School Science (3) Prereq.: EDCI 2040; 8 sem. hrs. of biology (BIOL 1001, 1002, 1003, 1004 or BIOL 1201, 1208, and either BIOL 1402 or 1502; 8 sem. hrs. of chemistry (CHEM 1201, 1202, 1212); 8 sem. hrs. of physics (PHYS 2001, 2002, 2009, 2108 or PHYS 2101, 2102, 2108, 2109); and credit for or registration in at least 8 additional 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 the student. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3148 Materials and Methods in Secondary School Speech (3) Prereq.: EDCI 2040 and credit for or registration in the speech courses required for a teaching minor in secondary school speech. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3149 Materials and Methods in Secondary School Spanish (3) Prereq.: EDCI 2040 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 2045 and credit for or registration in 25 of the 31 sem. hrs. of art courses required for a teaching minor in art. 2 hrs. lecture; 2 hrs. lab/field experience in multicultural settings.

3170 Principles of Teaching Elementary School Music (3) Materials, methods, and current trends.

3171 Principles of Teaching Secondary School Music (3) Materials, methods, and current trends.

3181 Materials and Methods in Communicative Disorders in the Elementary and Secondary Schools (3) Prereq.: EDCI 2025, completion of all speech courses required in curriculum, and concurrent enrollment in EDCI 3641. Speech, language, and hearing services in the public schools; organization and implementation.

3200 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 in reading, writing, and the oral language arts in grades 1-6.

3223 Adolescent Literature (3) See ENGL 3223.

3400 Educational Principles, Policies, and Practices for Special Populations (3) Prereq.: cohort membership or consent of instructor. 2 hrs. lecture; 2 hrs. lab/field experience. Current issues in identification, assessment, and instruction in the mainstream classroom for diverse students, such as different racial/ethnic groups.

3481 Curriculum in Grades 1-3 (3) Prereq.: HUEC 3381, 3382, 3383; membership in PK-3 teacher education program; and concurrent enrollment in HUEC 3056, EDCI 3482, and 3483. Comprehensive, integrated curriculum content for children in grades 1-3; reading/language arts, mathematics, social studies, science, and the arts.

3482 Pedagogy in Grades 1-3 (3) Prereq.: HUEC 3055; HUEC 3381, 3383; membership in PK-3 teacher education program; and concurrent enrollment in HUEC 3056, EDCI 3481, and 3483. 2 hrs. lecture; 3 hrs. lab/field experience in multi-level, multicultural settings. Instructional strategies and materials for children in grades 1-3.

3483 Assessment and Planning for Reflective Instruction: Grades 1-3 Prereq.: HUEC 3055; HUEC 3381, 3382, 3383; membership in PK-3 teacher education program; and concurrent enrollment in HUEC 3056, EDCI 3481, and 3482. 1 hr. lecture; 6 hrs. lab/field experience in multi-level, multicultural settings. The process of building the teaching and learning cycle (assessing, planning, teaching, reflecting) into integrated instruction of children in grades 1-3.

3625 Student Teaching in the Elementary Grades (12) Prereq.: see "Requirements for Student Teaching." 2 hrs. lecture; 30 hrs. lab. Pass-fail grading.

3630 Student Teaching in the Elementary and Secondary Grades (12) Prereq.: see "Requirements for Student Teaching." 2 hrs. lecture; 30 hrs. lab. Pass-fail grading.

3635 Student Teaching in the Secondary Grades (12) Prereq.: see "Requirements for Student Teaching." 2 hrs. lecture; 30 hrs. lab. Pass-fail grading.

3641 Student Teaching in Communicative Disorders in the Elementary and Secondary Schools (12) Prereq.: concurrent enrollment in EDCI 3181. See "Requirements for Student Teaching." 1 hr. lecture; 30 hrs. lab. Pass-fail grading.

3701 Assessment for Special Education Instructional Practice (3) F Prereq.: EDCI 2700 and admission to the Teacher Education Program. 2 hrs. lecture; 2 hrs. lab/field experience. Requires practical field experience with student(s) with disabilities in a school environment. Does not satisfy the Louisiana requirements for certification as an Exceptional Diagnostician. Assessing performance of students with disabilities; interpreting standardized test results; designing and using assessment in the classroom; instructional design based on assessment data.

3702 Instructional Practice for Students with Disabilities I (3) S Prereq.: EDCI 3701. 2 hrs. lecture; 2 hrs. lab. Instructional methods, procedures, and materials for teaching students with mild to moderate learning and behavior problems; overview of various methods and introductory procedures for explicit instruction and ongoing assessment.

3703 Instructional Practice for Students with Disabilities II (3) F Prereq.: EDCI 3702. 2 hrs. lecture; 2 hrs. lab. Advanced instructional methods, procedures, and materials for teaching students with mild to moderate learning and behavior problems; includes the use of explicit instruction in academic subjects and ongoing assessment techniques; emphasis on reflective practice and making informed instructional decisions.

3712 Secondary Methods and Transition Planning in Special Education (3) S Prereq.: EDCI 3702. 2 hrs. lecture; 2 hrs. lab. Application of foundational knowledge in secondary programs for students with mild to moderate disabilities; focus on the design, delivery, and evaluation of transition services to post-school environments.

4003 Curriculum and Pedagogy in Secondary Disciplines (3) Prereq.: EDCI 3002 and concurrent enrollment in one of the following: BIOL 4003, CHEM 4003, ENGL 4203, FREN 4403, MATH 4003, PHYS 4003, or SPAN 4003, or permission of instructor. May be repeated for credit in a second subject area. 2 hrs. lecture; 3 hrs. lab/field experience in multicultural settings. Credit will not be given for both this course and EDCI 4466. Applying instructional approaches in particular subject areas for middle and high school students.

4004 Critical Issues in Secondary School Content Area Teaching (3) Prereq.: EDCI 4003 or permission of instructor. May be repeated for credit in a second subject area. 2 hrs. lecture; 3 hrs. lab/field experience in multicultural settings. Credit will not be given for both this course and EDCI 4466. Critical issues in the nature of knowledge and inquiry in specific school subjects.

4005 Student Teaching in Grades 7-12 (9) Prereq.: EDCI 4003 and concurrent enrollment in EDCI 4004 and in one of the following: BIOL 4004, CHEM 4004, ENGL 4204, FREN 4404, MATH 4004, PHYS 4004, SPAN 4004. 1 hr. lecture; 24 hrs. lab/field experience in diverse multicultural settings. All day, all semester student teaching experiences, including observation, participation, and a minimum of 180 actual clock hours of teaching (with a substantial portion of the 180 hrs. in a full day teaching) under the supervision of an assigned public school mentor teacher.

- 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 practices of middle grades education with emphasis on reflective practice and middle grades students.
- 4040 Principles of Secondary Education (3)** *Prereq.: consent of instructor.* Analysis of criticisms of secondary education; functions of schools and institutions in a complex political, social, and economic matrix; current theories and relevant research.
- 4055 Principles and Practices in Kindergarten Education (3)** *Prereq.: HUEC 3055 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.
- 4057 Methods of Teaching Nursery School and Kindergarten (3)** *Prereq.: HUEC3055 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 under six.
- 4058 Student Teaching in the Kindergarten (5)** *See HUEC 4058.*
- 4113 Language Acquisition and Development of Communication Skills in the Young Child (3)** *Prereq.: EDCI 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.
- 4269, 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 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.: cohort membership or 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.: cohort membership or 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. 2 hrs. lecture; 2 hrs. lab.* Exploration and observation 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)** *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. Class observation is required.* Current theories 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, speaking, writing 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 4482. 4 hrs. lecture; 24 hrs. lab/field experience in multi-level, multicultural settings.* Designed to partially fulfill student teaching requirements and to prepare student to be effective classroom teachers in grades 1-3.
- 4482 Capstone Seminar in Early Childhood Education (3)** *Prereq.: HUED 4381 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 equivalent. 3 hrs. lecture plus field experience.* Materials and methods for planning instruction in computer science.
- 4635 Internship in Curriculum and Instruction (3-12)** *Prereq.: permission of the College of Education Office of Clinical Experiences. Pass-fail grading.* Specific teaching or practicum experience in a public school setting; periodic evening seminars.
- 4701 Trends and Issues in Educating Learners with Exceptionalities (3)** *Su Requires field experience with student(s) with exceptionalities in a school environment.* Exceptionality and special education; characteristics, educational needs, and instructional practice; current trends and issues in service provision.
- 4704 Contingency Management with Exceptional Children (3)** *Prereq.: EDCI 2700 or 2701 or equivalent.* Skills for behavior management of children in public school programs; theoretical and historical foundations; practical application of techniques.
- 4705 Learning and Behavior Principles Applied to Students with Exceptionalities (3)** *F,S Prereq.: EDCI 2700 and 4460. 2 hrs. lecture; 2 hrs. lab/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)** *O Prereq.: EDCI 2700 or 4701.* Professional roles; models and practices in building cooperative and inclusive environments for education; emphasis on consulting teacher, collaborative consultation, co-teaching, and building effective communications among educators, parents, and other professionals in providing education and other services to children with exceptionalities.
- 4749 Student Teaching in Special Education: Mid/Moderate Disabilities (9)** *F,S Prereq.: Credit or registration in EDCI 4705 1 hr. seminar; 30 hrs. lab. Pass-fail grading.* Laboratory teaching experience to accompany the minor in special education.
- 4800 Teaching in the Multicultural Classroom (3)** Strategies and resources for teaching students of cultural diversity in the classroom; development of units and activities of cultural variety.
- 4900 Special Topics in Curriculum and Instruction (1-3)** *Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. of credit.* Methods, trends, and issues in curriculum and instruction.
- 5880 Special Topics in Education (1-3)** *Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. of credit.* New methods, trends, and techniques.
- 7002 Trends and Issues in Mental Retardation (3)** An in-depth examination of issues in mental retardation including diagnosis, etiology, current theory, and delivery systems.
- 7005 Trends and Issues in Learning Disabilities (3)** *F-E* An in-depth study of the meaning and concepts associated with the field of learning disabilities and the divergent characteristics of children with language, academic, and cognitive impairments.
- 7008 Trends and Issues in Emotional and Behavioral Disturbance (3)** *F-O* An in-depth examination of issues and trends in emotional and behavioral disturbance including diagnosis, etiology, current theory, and delivery systems.
- 7009 Advanced Evaluation and Assessment for Students at-Risk (3)** *F Prereq.: EDCI 3701 or equivalent. Requires practical field experience with students with disabilities in a school environment.* Identification and diagnosis of learning and behavior problems; IDEA and Section 504 legal requirements; administration and interpretation of individually administered standardized tests, design of classroom-based assessments and methods of comparative analysis; instructional and service recommendations based on multifaceted assessment.
- 7010 Advanced Practicum in Evaluation and Assessment (3)** *S Prereq.: EDCI 7009.* Supervised experience in educational evaluation and assessment; practical and in-depth approach; procedures for prereferral screening, for conducting individual assessments, including evaluating for eligibility, interpreting data for instructional decision-making, and for designing ongoing data collection systems.
- 7011 Administration and Supervision in Special Education (3)** *Su* Study of the policies and procedures; organization, administration, and supervision of special education programs; specific emphasis on legal, financial, programmatic, and professional responsibilities, including the CEC and CASE standards for professional practice.
- 7014 Advocacy for Individuals with Disabilities (3)** *F* Family/caregiver issues, responsibilities, and participation; the individual with disabilities as a member of the community; and legal issues specific to a free appropriate education in the least restrictive environment.
- 7017 Explicit Instructional Models for Students with Disabilities (3)** *F Prereq.: ELRC 4249. 2 hrs. lecture; 2 hrs. lab.* Evaluating the research base and theories supporting the use of instructional and assessment models, including Direct Instruction Model and curriculum-based assessment.
- 7018 Strategic Instructional Models for Students with Disabilities (3)** *S Prereq.: ELRC 4249. 2 hrs. lecture; 2 hrs. lab.* Evaluating the research base and theories supporting the use of strategic instructional and assessment models; emphasis on the use of strategic instruction with students with mild to moderate disabilities.
- 7019 Teaching Social and Functional Skills to Students with Disabilities (3)** *Su Prereq.: EDCI 4701, 4704, or equivalent.* Instructional planning and methods for teaching functional and social behavior to students with disabilities.
- 7021 Legal and Ethical Issues in Special Education (3)** *Su* 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.
- 7024 Seminar on Transition for Students with Disabilities (3)** *S* An in-depth examination of the secondary/postsecondary transition of students with mild disabilities.
- 7033 Quality Assurance in Special Education (3)** *Prereq.: EDCI 7021, 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.
- 7105 Teaching Reading in the Elementary School (3)** Current instructional procedures and research in reading instruction in the elementary school; approaches and ideas for teaching reading to culturally different students.
- 7106 Teaching Reading to Students with Diverse Cultural Backgrounds (3)** *Prereq.: EDCI 7105 or 7135 or consent of instructor.* Characteristics of learners from different cultural settings; analysis of methods and materials that support reading instruction for these students.
- 7107 Topics in Reading Education (3)** *Prereq.: EDCI 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.
- 7108 Studies in the Teaching of Elementary School Science (3)** *Prereq.: EDCI 3125 or equivalent.* Theoretical foundations, instructional skills, and materials for teaching elementary school science.
- 7109 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.
- 7110 Studies in the Teaching of Elementary School Social Studies (3)** Methods and materials for teaching elementary-level social studies.
- 7111 Studies in the Teaching of Elementary School Language Arts (3)** Practices and curricula in the teaching of elementary school language arts.
- 7125 Teaching Reading to the Adult Learner (3)** Theory, research, and practical application.
- 7130 Techniques and Resources for Reading Instruction (3)** *Prereq.: EDCI 7105 or 7135 or equivalent.* Methods and materials in all areas of reading; demonstration and student production; application of materials and methods for effective reading instruction.
- 7131 Developing Learning Skills Through Content Reading (3)** Relationships between learning skills and content areas; the reading process; materials and research related to reading.
- 7135 Techniques for Teaching Reading in the Middle and Secondary School (3)** Reading skills appropriate for the upper levels; approaches for teaching reading; techniques for improving the school reading program.
- 7140 Studies in the Teaching of Social Studies in Secondary Schools (3)** Theory and research with practical application to areas of study needed to teach social studies in the secondary school.

- 7141 Studies in the Teaching of Mathematics in Secondary Schools (3)** Practices and issues in techniques and materials for teaching mathematics in secondary schools; relationship between learning theories and acquisition of mathematical skills and concepts.
- 7142 Studies in the Teaching of English in Secondary Schools (3)**
- 7143 The Teaching of Literature in Secondary Schools (3)**
- 7147 Studies in the Teaching of Secondary School Science (3)** Prereq.: EDCI 3147 or equivalent; and science teaching experience. Instructional materials, evaluation practices, and science teaching skills for grades 7-12.
- 7149 Studies in the Teaching of Foreign Languages (3)** Prereq.: completion of an undergraduate foreign language methods course and/or teaching experience; or consent of instructor. Principles and current research related to the teaching of foreign languages.
- 7205 Critical Analysis of Current Research in Reading (3)** Prereq.: 12 hours of graduate reading courses or equivalent. Evaluation of current and needed research; application of research findings in the instructional program.
- 7247 Teaching in the Science Laboratory (3)** Prereq.: EDCI 3147 or equivalent. 2 hrs. lecture; 2 hrs. lab. Interpreting research in laboratory science instruction; use of results to generate creative laboratory activities.
- 7269 Foundations of Art Education (3)** Prereq.: graduate standing in art education or consent of instructor. Development of theory and philosophy leading to contemporary practices in art education.
- 7271, 7272 Development and Administration of an Art Education Curriculum (3,3)**
- 7307 Topics in Curriculum and Instruction (3)** May be taken for a max. of 6 hrs. of credit when topics vary.
- 7308 Topics in Science Education (3)** Prereq.: EDCI 3147 or 7108; or equivalent. May be taken for a max. of 6 hrs. of credit when topics vary.
- 7309 Topics in Mathematics Education (3)** Prereq.: EDCI 7109 or 7141 or consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary.
- 7310 Topics in Social Education (3)** Prereq.: EDCI 7110 or 7140; or equivalent. May be taken for a max. of 6 hrs. of credit when topics vary.
- 7311 Topics in Language Arts Education (3)** Prereq.: EDCI 7111 or 7142; or equivalent. May be taken for a max. of 6 hrs. of credit when topics vary. Selected topic in a specific subject matter, level of instruction, or a methodological problem in teaching English language arts.
- 7312 Diagnostic and Prescriptive Teaching in Mathematics (3)** Prereq.: EDCI 7109 or EDCI 7141. Techniques for assessing students' skill levels and understanding in K-12 mathematics and for tailoring instruction to individual needs.
- 7313 Teaching Literature in the Elementary School (3)** Role of literature in elementary education; relevant teaching issues and strategies; integration of literature into the elementary curriculum.
- 7314 Teaching Written Composition in the Elementary School (3)** Prereq.: EDCI 3113 or equivalent. Practices and curricula in the teaching of written composition in the elementary school; its relationship to language arts instruction.
- 7315 Teaching Multicultural Children's Literature (3)** Multicultural literature for children from elementary through junior high school; historical and contemporary perspectives; implications for the classroom.
- 7450 Designing and Delivering the Secondary or K-12 Curriculum (3)** Prereq.: EDCI 4450 or 4455. Principles of education applied to vital aspects of teaching practice in all content areas: language, literacy, and reading; student needs and characteristics; multicultural and global education; uses of technology; assessment and evaluation.
- 7455 Foundations of Secondary or K-12 Educational Theory, Policy, and Practice (3)** Prereq.: cohort membership and completion of EDCI 7460, 7461, or consent of instructor. Social contexts, history, and philosophy of current and perennial issues in education; conflicting purposes and functions of public schooling; economic and political analysis of educational policy; implications of conflicting approaches to teaching and learning; current theory and research.
- 7460 Fall Practicum in Secondary or K-12 Schools (5)** Prereq.: cohort membership or consent of instructor. 1 hr. lecture; 8 hrs. lab. Pass-fail grading. First of two practica in local schools.
- 7461 Spring Practicum in Secondary or K-12 Schools (5)** Prereq.: cohort membership or consent of instructor. 1 hr. lecture; 8 hrs. lab. Pass-fail grading. Second of two practica in local schools.
- 7465 Seminar: The Teacher-Researcher in Secondary School Subjects (3)** Prereq.: cohort membership or consent of instructor. May be taken for a max. of 6 sem. hrs. when topics vary. Study of teacher-researcher literature; its application to secondary teaching and curriculum in the subject area (English, mathematics, science, or social studies).
- 7467 Teaching Culture in the Foreign Language Class: K-12 (3)** Prereq.: cohort membership or consent of instructor. Class observation is required. Development of an awareness of cultures; techniques for presenting the foreign culture; integration of the four skills in daily lessons; use of authentic cultural materials.
- 7468 The Teacher-Researcher in Art Education (3)** Prereq.: cohort membership or consent of instructor. Study of teacher-researcher literature and its application to art education.
- 7475 Research Project in Secondary or K-12 Teacher Education (3)** Prereq.: cohort membership and completion of EDCI 7460 and 7461 or consent of instructor. May be taken for a max. of 6 sem. hrs. of credit when topics vary. 2 hrs. lecture; 2 hrs. lab. Development, completion, and presentation of a research problem in curriculum and instruction that grows out of fifth-year clinical experiences and precedes course work.
- 7480 Teaching Practicum I (6)** Prereq.: cohort membership or consent of instructor and concurrent enrollment in EDCI 7482, 7484, 20 hrs. lab. Pass-fail grading. Along with the Seminar in Teaching Research and the Master's Project, this course is designed to partially fulfill student teaching requirements and to prepare students to be effective classroom teachers.
- 7481 Teaching Practicum II (6)** Prereq.: cohort membership or consent of instructor and concurrent enrollment in EDCI 7483, 7485, 20 hrs. lab. Pass-fail grading. Along with the Seminar in Teaching Research and the Master's Project, this course is designed to partially fulfill student teaching requirements and to prepare students to be effective classroom teachers.
- 7482 Seminar in Teaching Research I (3)** Prereq.: cohort membership or consent of instructor and concurrent enrollment in EDCI 7480, 7484, 2 hrs. lecture; 2 hrs. lab. An integral part of the fifth-year teaching research project; along with the Teaching Practicum and the Master's Project, this course partially fulfills student teaching requirements.
- 7483 Seminar in Teaching Research II (3)** Prereq.: cohort membership or consent of instructor and concurrent enrollment in EDCI 7481, 7485, 2 hrs. lecture; 2 hrs. lab. An integral part of the fifth-year teaching research project; along with the Teaching Practicum and the Master's Project, this course partially fulfills student teaching requirements.
- 7484 Master's Project I (3)** Prereq.: cohort membership or consent of instructor and concurrent enrollment in EDCI 7480, 7482. Development and completion of a research problem in curriculum and instruction that grows out of the first semester's clinical experience.
- 7485 Master's Project II (3)** Prereq.: cohort membership or consent of instructor and concurrent enrollment in EDCI 7481, 7483. Development and completion of a research problem in curriculum and instruction that grows out of the second and culminating semester's clinical experience.
- 7610 Advanced Seminar and Practicum in Curriculum and Instruction (3-6)** The student, major professor, and a committee will structure experiences around the student's needs and interests.
- 7682 Assessment Techniques and Practicum in Reading (3)** Prereq.: EDCI 7105, 7135, or equivalent. 2 hrs. lecture; 2 hrs. lab. Mastery level skills for evaluating reading strengths and weaknesses of elementary and secondary school students; theoretical models and a practicum for applying techniques.
- 7683 Guiding Classroom Instruction and Practicum in Reading (3)** Prereq.: EDCI 7105 and 7682; or equivalent. 2 hrs. lecture; 2 hrs. lab. Procedures for guiding instruction in reading; theory and practice.
- 7684 Advanced Internship in Reading (6)** Prereq.: advanced standing in the specialist or doctoral program or equivalent. 1 hr. lecture; 10 hrs. lab. Field experiences in various job-related settings. Teaching experiences at the local school and university levels; administrative experience at the parish level, and consultant experience at the state level.
- 7685 Applied Research in Reading (3)** Prereq.: enrollment in advanced graduate program and ELRC 4249; or equivalent. Individual research projects.
- 7701 Advanced Seminar in Special Education I (3) F** Prereq.: ELRC 4249. Current trends and issues in special education, including legal/ethical considerations, history, theory, and seminal research.
- 7702 Advanced Seminar in Special Education II (3) S** Prereq.: EDCI 7701. Current trends and issues in special education, including seminal research and instructional methodology; builds upon primary concepts presented in EDCI 7701, with emphasis on the further development of oral and written expression skills.
- 7713 Individual Study in Special Education (3)**
- 7727 Behavior Analysis in Special Education (3) F-E** Prereq.: EDCI 4705 or PSYC 4030. Requires intermediate understanding of research and applied behavior. Advanced course the understanding and application of single case experimental designs in special education and related disciplines.
- 7760 Nature and Needs of the Gifted and Talented (3) V** Historical perspective, social, emotional, and educational characteristics; administrative considerations; sociological and psychological studies; special populations.
- 7761 Curricular Theories and Methods for Teaching the Gifted and Talented (3) V** Prereq.: EDCI 7760 or equivalent. Curricular theories, materials, and strategies for teaching the gifted and talented; emphasis on development and evaluation of educational plans for individuals and groups.
- 7762 Creative Behavior (3) V** Nature and analysis of creative behavior; appraisal and implementation of specific processes designed to encourage creative productivity.
- 7768 Practicum in Education for the Gifted (3-6) V** Prereq.: EDCI 7760, 7761, and 7762. Planning, implementing, and evaluating teaching strategies, materials, and counseling techniques in a school program.
- 7810 Current Trends in Secondary School Instruction (3)** Contemporary patterns in organization, administration, curriculum, and governance of the modern secondary school.
- 7811 Seminar in Current Trends in Education Literature (3)** Seminar for beginning doctoral students in curriculum and instruction. May be taken for a max. of 6 hrs. of credit when topics vary.
- 7821, 7822 Problems in Curriculum and Instruction (2-4, 2-4)** For advanced graduate students who are qualified to undertake individual problems.
- 7824 Elementary School Curriculum (3)** Content, organization, and evaluation of the elementary school curriculum.
- 7825 Secondary School Curriculum (3)** Content, organization, and evaluation of the secondary school curriculum.
- 7830 Advanced Seminar in Junior High/Middle School Instruction (3)** For advanced students in elementary and secondary education with special interest in the instructional program for early adolescents.
- 7843 Early Childhood Education (3)** See HUEC 7843. Historical, theoretical, philosophical, and programmatic issues that effect contemporary early childhood education.
- 7844 Creativity in Early Childhood Education (3)** Role of creativity in designing the educational environment for young children; philosophy, teaching techniques, and instructional planning; role of parents, teachers, and today's multicultural society in the development of creativity.
- 7845 Teaching Concepts in Early Childhood (3)** Methods and materials for the teaching of mathematics, science, and social studies concepts in the early childhood curriculum.
- 7846 Diagnostic Teaching in Early Education (3)** Prereq.: EDCI 4055 or equivalent. Using age-level competency skills for developing diagnostic strategies for young children to be used as the basis for instructional planning.
- 7880 Seminar in Reading (2)** May be taken for a max. of 8 sem. hrs. credit when topics vary; a minimum of 4 sem. hrs. is required for each doctoral student in reading. Special topics not covered in other reading courses.
- 7900 Doctoral Orientation Seminar (1)** Orientation to the doctoral program for new and resident doctoral students. Pass-fail grading.
- 7901 Curriculum Theory (3)** Means for strengthening the curriculum; links between past and current concepts of curriculum.
- 7902 Analysis of Research on Teaching (3)** Prereq.: ELRC 7006 or equivalent. Theory of design and application of research related to systematized instruction.
- 7903 Curriculum Planning (3)** Prereq.: EDCI 7901 or equivalent. Principles of curriculum needs assessment, design, implementation, and evaluation.
- 7904 Education and Cognition (3) S** Understanding human cognition and cognitive change; implications for educational theory, practice, and research.
- 7910 Traditions of Inquiry in Curriculum and Instruction (3)** Theoretical and methodological issues related to research traditions in curriculum and instruction; development of major traditions.

7920, 7921 Analysis of Research in Curriculum and Instruction (3) Prereq.: ELRC 7241 or equivalent. A max. of 6 sem. hrs. may be earned in this series; only 3 sem. hrs. may be earned in any one area. Factors influencing research and critical analysis of selected research in one of the following areas: curriculum, mathematics, science, language arts, social, or early childhood education.

7930, 7931 Seminar: Curriculum and Instruction (1-6) A max. of 6 sem. hrs. may be earned in this series when topics vary. Trends and issues in one of the following areas: curriculum, mathematics, science, language arts, social, or early childhood education.

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

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

DAIRY SCIENCE • DARY

1048 Elements of Dairying (3) F,S Fundamentals of dairy production and manufacturing.

2040 Techniques of Judging and Evaluating Dairy Cattle (2) F Development of live animal evaluation techniques in a clinical setting; emphasis on visual evaluation, decision making, oral communication.

2049 Dairy Cattle Production Practices (3) S Prereq.: DARY 1048. 2 hrs. lecture; 2 hrs. lab. Dairy cattle production practices; care, fitting, showing dairy cattle.

2072 Introductory Agricultural Genetics (3) S Prereq.: BIOL 1002 or equivalent. Introduction to classical and modern genetic methodology used in agriculture including Mendelian principles, successful breeding techniques, assisted reproductive technology, genetic engineering and other biotechnological methods.

2075 Milk and Dairy Foods (3) F Product processing techniques and related principles involved in market preparation of milk and dairy foods; emphasis on consumer and processor viewpoints relative to product composition, processing, marketing, sanitation, and related environmental aspects.

2085 Milk Quality Control Laboratory (2) S 4 hrs. lab. Public Health Service laboratory and inspection procedures for quality control on dairy farms and in milk plants.

2093 Dairy Products Judging (2) S Development of sensory evaluation techniques in a clinical setting; emphasis on sensory evaluation, decision making, oral communication.

3010 Applied Animal Feed Formulation (3) S Prereq.: ANSC 1011 or DARY 1048 or PLSC 1049 and MATH 1021 or equivalent. Formulation of feed for agricultural animals, including feed laws, feed stuffs, and requirements.

3049 Topics in Dairy Science (1-3) F,S,Su Prereq.: consent of department head. May be taken for a max. of 6 hrs. credit. Topics from dairy production or dairy food manufacturing areas.

3050 Dairy Science Internship (3) Su Prereq.: junior standing with an overall gpa of 2.20 and consent of department head. May be taken for a max. of 6 hrs. of credit. Forty hours of supervised work in the dairy industry.

4020 Dairy Foods Technology: Frozen and Cultured Dairy Products (4) S-O 3 hrs. lecture; 3 hrs. lab. Principles and processes in the manufacture of ice cream and other frozen dairy products; concentrated milk products; cheese and fermented milk products.

4040 Quality Assurance in the Food Industry (4) F-E Prereq.: BIOL 2051. 3 hrs. lecture; 2 hrs. lab. Also offered as ANSC 4040, FDSC 4040, and PLSC 4040. Laboratory functions, manufacturing processes, and microbiological, chemical, and statistical techniques used to provide complete quality assurance for the modern dairy food plant.

4043 Dairy Cattle Endocrinology (3) F Relation of endocrine system to reproduction, growth, and function of domestic animals and physiology of milk secretion.

4045 Reproductive Physiology of Farm Animals (3) F Also offered as ANSC 4045. Reproductive anatomy and physiology of farm animals; factors affecting reproductive performance.

4046 Physiology of Lactation (2) S-E Prereq.: BIOL 1002 and 1005; or equivalent. Anatomy and development of the mammary gland; physiological and biochemical regulation of mammary growth and milk secretion; emphasis on farm animals.

4047 Reproductive Management and Artificial Insemination (1) F Prereq.: credit or registration in ANSC/DARY 4045. 3 hrs. lab. Management techniques and principles necessary for artificial insemination in cattle.

4051 Dairy Seminar (1) F May be taken for a max. of 2 hrs. of credit. Required for all seniors in the Department of Dairy Science. Reports on current scientific investigations.

4054 Dairy Farm Management (3) S-O 2 hrs. lecture; 2 hrs. lab. Principles of managing dairy cattle; recommended farm practices for economical milk production.

4071 Tropical Livestock Husbandry (3) F Also offered as ANSC 4071. Breeding, feeding, and management of livestock in the tropics; human, environmental, and economic factors influencing livestock production in tropical areas; role of livestock in the total agricultural development.

4081 Dairy Microbiology (3) F Prereq.: BIOL 2051. 1 hr. lecture; 4 hrs. lab. Application of specific bacteriological procedures used in quality control and processing of dairy products.

4118 Applied Animal Breeding and Genetics (3) F-E Prereq.: ANSC 4018 or equivalent. Mating systems and methods of breeding for genetic improvement in farm livestock.

7001 Advanced Dairy Physiology (3) S Prereq.: DARY 4043, VETS 4041, and consent of instructor. Organ systems of metabolism; emphasis on dairy cattle.

7002 Minerals in Nutrition (2) F Prereq.: ANSC 4009 or equivalent. History, function, evaluation of nutritional status, requirements for various species, assay methods, and interrelationships.

7003 Advanced Dairy Nutrition (3) F Prereq.: consent of instructor. Nutrition principles and recent research.

7004 Population Genetics in Animal and Plant Breeding (4) S Prereq.: DARY 4118 and EXST 7004; or equivalent. 3 hrs. lecture; 2 hrs. lab. Genetic concepts concerning characteristics of populations.

7018 Rumen Physiology and Metabolism (3) F-O Comparison of ruminants to other herbivora and nonruminant animals; factors associated with obtaining and utilizing feeds; fermentation products; symbiotic relationship between microflora and the host animal; host animal metabolism.

7019 Laboratory Techniques in Feed Evaluation (2) F Prereq.: consent of instructor. 6 hrs. lab. Laboratory techniques in nutritive evaluation of feedstuffs for livestock.

7020 Andrology (3) S-E Prereq.: DARY/ANSC 4045 or equivalent. Male reproductive physiology and anatomy of avian, aquatic, and mammalian species.

7091 Advanced Dairy Seminar (1) F,S Maybe taken 4 times for credit.

7094 Seminar in Nutrition (1) S Same as ANSC 7094, FDSC 7094, HUEC 7094, PLSC 7094. May be taken for a max. of 2 hrs. of credit. Prereq.: ANSC 7093, FDSC 7071, HUEC 7010, PLSC 7091 or equivalent or previous slide (not poster) presentation at a professional meeting.

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

8900 Research Procedure in Dairy Science (1-6) Prereq.: consent of department. May be taken for a max. of 9 sem. hrs. credit. Research in dairy breeding and genetics, management, nutrition, and physiology; dairy manufacturing.

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

DISASTER SCIENCE AND MANAGEMENT • DSM

2000 Hazards, Disasters, and the Environment (3) Exploration of the interaction processes between natural/technical hazards and society that cause disasters; introduction to the natural and technological 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, and recovery; critical 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; special 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) F,S 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 issues, problems, and topics related to disasters and emergency management.

4600 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.

4996 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.

ECONOMICS • ECON

General education courses are marked with stars (★).

★ 2010 Economic Principles and Problems (3) Credit will not be given for both this course and ECON 2030. Nature of economics, concepts and problems; economic systems and the role of government; accounting, analytical, and policy aspects of national income and product; the money and banking system.

★ 2020 Economic Principles and Problems (Continued) (3) Prereq.: ECON 2010. Credit will not be given for both this course and ECON 2030. Continuation of basic economics; theories of production, determination of prices in regulated and unregulated industries, functional distribution, international economics, and problems of economic development.

★ 2030 Economic Principles (3) An honors course, ECON 2031, is also available. Credit will not be given for both this course and ECON 2010 and 2020. Economic understanding of both micro- and macroeconomic principles; problems associated with monetary policy, fiscal policy, public finance, government and business, labor, international trade, economic growth, and comparative economic systems.

★ 2031 HONORS: Economic Principles (3) Same as ECON 2030, with special honors emphasis for qualified students.

2035 Money, Banking, and Macroeconomic Activity (3) Prereq.: ECON 2010 and 2020; or 2030. Role of commercial banks, other financial institutions, and the central bank in affecting the performance of the economy; relationships of money and fiscal policy to prices, production, and employment; internal and external effects of U.S. fiscal and monetary policy.

3715 Business Finance (3) See FIN 3715.

3900 Selected Topics in Economics (3) Prereq.: ECON 2010 and 2020; or 2030. May be taken for a max. of 6 hrs. of credit when topics vary.

3999 Independent Study: Economic Problems (1-3) May be taken for credit for a max. of 6 sem. hrs. For undergraduate students with a grade-point average of 3.00 or above. Independent economic research and study under the direction of a faculty member.

4010 The United States—Its Economic Growth (3) Prereq.: ECON 2010 and 2020; or 2030; or equivalent. Credit will not be given for both this course and ECON 1010. The American economy; modern problems dealing with money and banking, taxation, labor, international trade, and American position in world affairs.

4020 Comparative Economic Systems (3) Prereq.: ECON 2010 and 2020; or 2030. Theory and practice of economic systems: capitalism, socialism, and centrally planned economies.

4025 The Russian Economy in the 20th Century (3) Prereq.: ECON 2010 and 2020; or 2030. Also offered as HIST 4126. Operation, growth, and performance of the Russian economy under the tsarist and Soviet regimes; perestroika (restructuring) under Gorbachev; current economic trends.

4030 Development Economics (3) Prereq.: ECON 2010 and 2020; or 2030. Political, social, and technological factors affecting development of the third world.

- 4040 Economic Development Policy (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Role of U.S. and other advanced industrialized countries in the economic development of Third World countries.
- 4050 Economic Development of Europe (3)** Prereq.: *ECON 2010 and 2020; or 2030; or equivalent*. Major elements in the economic development of resources, transportation, marketing, finance, labor, and economic policy.
- 4070 Economic Growth (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Analysis of the determinants of economic growth through development of theoretical and empirical models of economic growth; discussion of both old and new growth theory and convergence of income levels across countries.
- 4075 American Economic History to 1860 (3)** See *HIST 4075*.
- 4076 American Economic History, 1860 to the Present (3)** See *HIST 4076*.
- 4110 Public Finance (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Economic theory applied to the private market and to the public sector; public goods, efficiency, voting, externalities, principles of taxation, benefit-cost analysis, and policy analyses of current issues.
- 4120 Federal, State, and Local Taxation (3)** Prereq.: *ECON 2010 and 2020; 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 individuals and the nation.
- 4130 Urban and Regional Economics (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Economic analysis of the location and growth of urban and regional areas; emphasis on public policy issues; land-use patterns, measurement and change in regional economic activity, and urban problems such as transportation, housing, and poverty.
- 4210 Labor Economics (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Causes of economic problems of American wage earners; attempts of wage earners and society to alleviate and solve these problems through organization and legislation.
- 4220 Wage and Employment Analysis (3)** Prereq.: *ECON 2010 and 2020; or 2030*. The labor market; labor supply and demand, human capital, racial and sex discrimination, effects of minimum wage laws, causes of various wage and employment differentials.
- 4230 Economics of Human Resources (3)** Prereq.: *ECON 2020 or 2030*. Application of empirical research and economic theory to human resource management and internal labor market; topics include hiring, training, pay, promotion, evaluation, layoffs, and termination from an economic perspective.
- 4320 Environmental Economics (3)** Prereq.: *ECON 2010 and 2020; 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.
- 4325 Applied Resource Economics (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Analysis of environmental and resource problems; cost-benefit and other empirical techniques used to examine these problems.
- 4400 Industrial Organization and Public Policy (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Theory of the firm, perfect competition, monopoly, collusion and collusive strategies, strategic interaction, auctions, durable goods, predation, antitrust, and experimental economics.
- 4421 Health Care Economics (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Economics of health care with particular emphasis on hospitals, physicians, and other health care providers, as well as government programs.
- 4440 The Economics of Government Regulations (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Economic bases, policies, and consequences of government regulation of economic activity.
- 4445 Internship in Economics (3)** Prereq.: *consent of instructor. Pass-fail grading*. On-the-job experience in approved positions with economic content.
- 4520 International Economics (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Theory and policy of international trade and finance.
- 4540 Economic Forecasting (3)** Prereq.: *ECON 2010 and 2020; or 2030; and ISDS 2000; or equivalent*. Applications of methods used in business and economic forecasting; trend analysis, time-series modeling, regression analysis and combination forecasting.
- 4550 International Finance (3)** Prereq.: *ECON 2035 or equivalent*. International trade theory and practice; foreign exchange rates, instruments, and markets; alternative international currency systems and proposals for reform; the economics of currency and financial instrument futures markets.
- 4560 Central Banking and Monetary Policy (3)** Prereq.: *ECON 2035 or 3500*. History, economic functions, operating techniques, and policies of central banks; the role of monetary policy in promoting economic stability and growth; the Federal Reserve System and current problems of monetary policy and control.
- 4610 Introduction to Mathematical Economics (3)** Prereq.: *ECON 2010 and 2020, or 2030; and college algebra; or equivalent. Not normally open to students who have had differential calculus*. Mathematical techniques used by economists; their application to economic analysis.
- 4630 Introduction to Econometrics (3)** Prereq.: *ECON 2010 and 2020, or 2030; MATH 1431 or equivalent; and ISDS 2000 or equivalent. Not open to students with credit in ECON 7630. For students interested in a basic knowledge of econometrics*. Techniques of econometrics; estimating the basic linear model and hypothesis testing; empirical illustrations by reference to contemporary economic questions.
- 4632 Financial Econometrics (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Econometric methods used to examine financial data; tests of market efficiency, forecasting volatility of financial markets, estimating value at risk.
- 4710 Aggregate Economic Analysis (3)** Prereq.: *ECON 2035 or equivalent*. Factors determining aggregate level of national income, employment, and prices; static Keynesian, monetarist, and supply-side models developed and compared.
- 4720 Intermediate Microeconomic Theory (3)** Prereq.: *ECON 2010 and 2020; or 2030*. Price determination, resource allocation, and pricing in a market economy.
- 4730 The Evolution of Economic Thought (3)** Cultural and historical factors influencing different types of economic thought from the ancient world to the present.
- 5600 Microeconomic Theory for Policy Analysis (3)** Also offered as *PADM 5600*.
- 6500 Workshop on Economic Education (3)** Su only For teachers with little or no previous training in economics. Basic economic principles and their application to the nation's current economic 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.
- 7130 Public Finance Theory (3)** Foundations of welfare economics for evaluating efficiency and 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 trade unions and other labor organizations on individuals, firms, government policies, and the economy.
- 7250 Wage and Employment Analysis (3)** Neoclassical wage and employment theory and its application to the labor market; labor force participation rates; discrimination; labor markets, human capital, the inflation-unemployment trade-off.
- 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; topical policy issues in energy, materials, food, and air and water pollution.
- 7325 Applied Resource Economics (3)** Application of property rights, externalities, and benefit-cost analysis to resource management; measurement problems; intertemporal allocation, technical changes and resources substitution; and utilization of environmental resources.
- 7420 Health Care Economics (3)** Prereq.: *ECON 3720 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 philosophy of regulation, rate theories, earnings control, coordination, and national policy.
- 7480 Seminar in Industrial Organization (3)** Organization of industry in the American economy; empirical and analytical techniques used to investigate structure and performance in the manufacturing sector of the economy.
- 7570 Seminar in International Finance (3)**
- 7575 Seminar in International Trade (3)** Prereq.: *ECON 4520 or equivalent*. Topics in pure theory of international trade; causes and effects of international trade, gains from trade, theory of tariff and effective protection, economic growth and trade, intermediate products, optimal 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, neomarxist, and neomalthusian perspectives.
- 7585 Advanced Topics in Financial Economics (3)** See *FIN 7585*.
- 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, differentials, 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 7610 or calculus and linear algebra*. Mathematical analysis of dynamic systems with applications to economics; integral calculus, differential equations, difference equations and optimal control theory.
- 7630 Econometric Methods (3)** Prereq.: *calculus and linear algebra, or concurrent enrollment in economics 7610. For students interested in developing research skills in econometrics*. Empirical research methods in economics; statistical inference; regression techniques applied to a general linear model; problems involved in regression analysis; extensions of the general linear model.
- 7631 Econometric Methods II (3)** Prereq.: *Econ 7630 or equivalent*. Econometric techniques for heteroskedasticity, autocorrelation, simultaneous equations, pooling time series and cross-sectional data; model specification techniques.
- 7632 Econometric Theory III (3)** Prereq.: *ECON 7631 and either ECON 7610 or differential calculus and linear algebra*. Emphasis on the pure theory of econometrics; properties of estimators, small sample properties of ordinary least squares, asymptotic distribution theory, generalized least squares and simultaneous equations.
- 7633 Dynamic Econometric Theory (3)** Prereq.: *ECON 7631*. Time-series analysis; testing and model selection; distributed lags; dynamic properties of simultaneous equation model; autoregressive and moving average process; nonstationarity; autoregressive conditional heteroskedasticity; causality and exogeneity; unit root, co-integration, and error correction.
- 7700 Price Theory I (3)** Development of microeconomic models of the individual firm, including a nonmathematical approach.
- 7710 Macroeconomics I (3)** Prereq.: *ECON 7610 or equivalent*. Static models of income, employment, and prices; models include classical, neo-Keynesian, and monetarist; models focus on demand and supply sectors.
- 7715 Macroeconomics II (3)** Prereq.: *ECON 7710*. Dynamic models of the economy; includes growth models, business cycle dynamics, and wage-price dynamics.
- 7720 Price Theory II (3)** Prereq.: *ECON 7610 or equivalent*. Theories of utility, demand, cost, production, factor pricing, and welfare using an advanced mathematical approach.
- 7725 Advanced Microeconomic Theory (3)** Prereq.: *ECON 7610, 7700, and 7720; or equivalent*. Advanced price theory; capital theory, general equilibrium, distribution theory, market structures.
- 7740 History of Economic Thought: The Classical Period (3)** Development of economics as an autonomous science; Greek, Judeo-Christian, and enlightenment approaches to economic phenomena; special attention to Adam Smith.
- 7750 History of Economic Thought: Modern Period (3)** Development of economics from 1800 to 1900; emphasis on classical followers of Smith, Marx, 19th century positivism and socialism, the marginal revolution.
- 7799 Seminar in Advanced Economic Problems (3)** May be taken for a max. of 6 hrs. of credit.
- 8000 Thesis Research (1-12 per sem.)** "S"/"U" grading.
- 8900 Pre-dissertation Research (1-9)** May be repeated for credit. Pass-fail grading.
- 9000 Dissertation Research (1-12 per sem.)** "S"/"U" grading.

EDUCATION • EDUC

2000 Special Topics in Education (1-3) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. of credit. Methods, trends, and issues in education.

EDUCATIONAL LEADERSHIP, RESEARCH, AND COUNSELING • ELRC**GENERAL COURSES**

5880 Special Topics in Education (1-3) V Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. of credit when topics vary. Direction and assistance for the practitioner in solving special problems in the school organization.

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,S 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 disablement and impaired functioning.

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

5300 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 VED 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. Dynamics of small group behavior; emphasis on classroom consultation and demonstration procedures.

7330 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.

7332 Educational and Occupational Information (3) V See VED 7332.

7333 Analysis of the Individual (3) Su 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 VED 7334. Materials and techniques in vocational counseling of adolescents and adults.

7360 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.

7362 Practicum in School Counseling (3-6) F,S Prereq.: ELRC 4360, 4365, 7330, 7331, 7395, and consent of instructor.; 6-18 hrs. lab in work setting. Supervised experience in elementary, middle, or high school settings.

7364 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).

7365 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) Su Prereq.: ELRC 7331 or equivalent. Theoretical approaches to individual counseling.

7392 Advanced Vocational Counseling (3) V Prereq.: ELRC 7334 or equivalent. Also offered as VED 7392. Life career planning through vocational assessment and counseling; vocational counseling theory, research, and practice.

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

7394 Advanced Group Counseling (3) S Prereq.: ELRC 7330 or equivalent. Small group counseling approaches.

7395 Family Counseling (3) F,S Introduction to family system principles and their application to problem 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 VED 7398.

7399 Supervised Counseling Internship (3-6) F,S Prereq.: ELRC 7360, 7362, or 7364 and consent of instructor. 2 hrs. conf.; 20-40 hrs. per week at a clinical setting, serving children, adolescents, adults, or families. May be taken for a max. of 6 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.

7400 Problems of Educational Finance (3) F,Su Financing public elementary and secondary schools in terms of federal, state, and local sources of revenue, tax structures, budget preparation, and cost analysis.

7401 Administration of School Personnel (3) S,Su Role of the school administrator in personnel planning, staff development, and employee relationships.

7402 Organizational Research in 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 Principals 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; action 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) S Prereq.: ELRC 7422. Students refine and administer an action research project at a selected school site. Students will assess the success of their interventions through multiple measures and write a research report that reflects their experiences throughout the semester. In class discussions focusing on methodological difficulties that students encounter and how to overcome them.

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.

7450 Supervision of Instruction in Elementary and Secondary Schools (3) F,S,Su Theories, principles, and practices concerning the role of the supervisor in today's multicultural school settings.

7451 Supervision of Student Teaching (3) F,S,Su Principles of planning, observing, and evaluating student teaching; participation in student conferences.

7602 Organization and Administration of Higher Education (3) S Organization and administration of postsecondary education in the United States and abroad; organizational theory; organization and governance structure of American higher education; patterns of institutional administration.

7800 Economics of Education (3) Prereq.: ELRC 7400 or equivalent. Introduction to human capital theory; emphasis on costs and benefits of education, benefit-cost analysis; educational productivity; education and economic growth; and educational planning.

7802 Theory Development in Educational Administration (3) Prereq.: ELRC 7006, 7402, and 7407; or equivalent; and consent of instructor. Primarily for doctoral students in educational administration. Critical analysis of approaches to inquiry; development of theory in educational administration.

7840 Educational Facility Planning (3) F,S,Su For school administrators. Problems in school construction.

7870 Legal Aspects of Education (3) F,S,Su Prereq.: ELRC 4400 and 7450. Case law and its implications for teachers and administrators.

7890 Seminar: Educational Administration (1-3) Prereq.: master's degree. May be taken for a max. of 9 sem. hrs. of credit when topics vary. Advanced topics in educational administration.

EDUCATIONAL FOUNDATIONS

3600 Women, Gender, and Leadership (3) Also offered as WGS 3600.

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 Survey of 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) Basic features 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) Su Prereq.: ELRC 4002. Theories of education and schooling with special focus on the context of pluralistic societies.

7001 Ethics and Educational Leadership (3) S,Su Study of 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-based, and other forms of classroom assessment; applications of technology in classroom assessment.

4006 Introduction to Applied Statistics in Educational Research (3) F,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 multicultural settings.

4249 Understanding and Applying Research in Education (3) F,S,Su For the specialist or nonthesis master's degree student. Instructing teachers and administrators to become intelligent consumers of 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; correlation and regression; normal, t, chi-square, and F distributions; hypotheses testing and interval estimation; analysis of variance, nonparametric chi-square test.

7010 Principles of Testing and Measurement (3) Prereq.: ELRC 7006. Construction of measurement instruments for research purposes; utilization of standardized tests and inventories in research; measurement in multicultural and cross-cultural contexts; implications of measurement reliability and validity for research design and statistical analysis.

7016 Advanced Educational Statistics (4) Prereq.: ELRC 7006 or equivalent. 3 hrs. lecture; 2 hrs. lab. Advanced statistical procedures and computerized data analysis using SPSS or SAS; analysis of variance and covariance; application of multiple regression techniques in educational research.

7018 Advanced Computerized Data Analysis for Research (3) Prereq.: ELRC 7016 or equivalent. Utilization of standard statistical packages such as SPSS and SAS for analysis of research data with complex structure; preparation and analysis of multi-level, nested, and repeated measures data; hands-on training in design, statistical analysis and interpretation of complex data files; review and application of specialized data analysis programs in educational research.

7201 Theory of Educational Measurement (3) F Prereq.: ELRC 4200. Principles of psychometric theory as applied in the educational setting; classical measurement theory and recent psychometric techniques such as item-response theory and criterion-referenced measurement.

7202 Seminar in Educational Measurement (3) Su 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 Education Program Evaluation (3) F Prereq.: ELRC 4249 and either ELRC 4006 or 7006. Current models and issues in educational evaluation as a professional practice; design and development of a comprehensive evaluation plan that includes specification of theoretical framework, problem identification, data collection/analysis procedures, report writing format, and dissemination plans.

7221 Performance Evaluation in Education (3) S Prereq.: ELRC 4200 and 4249; or equivalent. Current procedures and research concerning performance evaluation of students, teachers, and administrators; methodological, professional, and legal issues.

7241 Educational Research Methodology (3) F,S Prereq.: ELRC 4006 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 Prereq.: ELRC 7016 and 7241. Experimental and quasi-experimental designs in educational research, including nested 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 (4) S Prereq.: ELRC 7241. 3 hrs. lecture; 2 hrs. lab. Qualitative methodology; quasi-ethnographic and ecological research; analysis of representative studies. Lab and fieldwork; participant and nonparticipant observation; interviewing data collection; content analysis.

7248 Introductory Research Practicum (3) F By arrangement with a state agency, a local school system, or other educational agency, students assist in the conduct of a variety of research methodologies under the supervision of the course instructor and the professional practice supervisor at the site.

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. Construction of a case study of an educational institution or an individual's life; single- and multiple-case designs; analyzing case study evidence; report writing.

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) 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) Applications of computers in instruction; educational data processing, computer-assisted and computer-managed instruction; information storage and retrieval; use of micro/mini computers.

4512 Fundamental Computer Science for Teachers (3) Prereq.: ELRC 4507 (or prior programming experience) and credit in an education methods course numbered 3000 or above. See CSC 4602.

4535 Educational Telecommunications and the Internet (3) S Prereq.: ELRC 4507 or equivalent. 2 hrs. lecture; 2 hrs. lab. Use of telecommunication 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) Instructional graphics production techniques; principles of visual design and instructional message design.

7240 Critical Analysis of Current Research in Educational Media (3) Su Prereq.: ELRC 4501, 4507, or equivalent. Analysis of current literature in the field; evaluation of current and needed research; systems approach to solving instructional problems.

7420 Administration of Technology Programs (3) S Prereq.: ELRC 4501 or 4507 or consent of instructor. Primarily for personnel responsible for planning, implementing, and evaluating educational technology programs. Topics include applications, facilities, finances, acquisitions, and staff development.

7500 Technology in Educational Leadership (3) F,S,Su Overview of salient advances in theory, research, and practice in educational technology; examining leadership roles in regard to emerging trends and issues in educational technology; analyzing current technology integration models.

7502 Principles of Distance Education (3) F,S,Su Prereq.: ELRC 4507 or consent of instructor. Applications of the principles of distance education to teaching and learning in educational and training contexts.

7503 Instructional Design (3) F Prereq.: ELRC 4507 or approved equivalent. Instructional design theories and models and their application in solving real world instructional/learning problems.

7504 Educational Technology and the Law (3) Legal issues concerning educational technology.

7505 Design and Development of Multimedia Instructional Units (3) 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.

7509 Authoring Systems for Educators (3) Prereq.: ELRC 4507 and 7505; or equivalent. 2 hrs. lecture; 2 hrs. lab. Authoring systems, with emphasis on Super PLOOT and LOGO for individualized learning; system variables, transfer and portability parameters, student involvement, alternative systems, and formative and summative evaluation procedures.

7516 Practicum in Educational Media (3-6) F,S,Su Prereq.: ELRC 7420 or 7505; or consent of instructor. 9-18 hrs. lab. Practical experience in teaching, producing, utilizing, and administering educational media.

7517 Seminar in Educational Media (3) Prereq.: ELRC 7240 and 7420; or consent of instructor. Advanced topics in instructional technology.

7520 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 governmental agencies.

7525 Professional Development for K-12: Technology Integration (3) F Analyze effective professional development strategies; plan, design and implement, and evaluate technology staff development activities.

7535 Advanced Telecommunications and Electronic Learning (3) F,S,Su Prereq.: ELRC 4507 or consent of instructor. Scope and elements of the online environment; technologies and strategies for online teaching and learning; design, development, or conversion of courses for online delivery; course management, assessment, and evaluation; policy issues.

7550 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.

7791 Educational System Analysis (3) V Prereq.: completion of 3 sem. hrs. in educational administration or equivalent. Same as EDCI 7791. Basic techniques for designing instructional systems; emphasis on instructional objectives; design and selection of instructional alternatives; and evaluation of instructional systems.

HIGHER EDUCATION

4364 Student Affairs in Higher Education (3) V Basic concepts and issues in the college student affairs field.

7600 Issues of Race and Gender in Higher Education (3) Historical and socio-political perspectives on the higher education experiences of women, African-Americans, Asian-Americans, and Hispanics, focusing primarily on the period from the 1960s to the present.

7601 Foundations of Higher Education (3) History of the sociological and philosophical foundations for higher education in the United States.

7603 Leadership in Higher Education (3) S Analysis of leadership issues and theory relating to postsecondary education, including the college presidency and academic governance; institutional culture; student diversity, curricular change, and new providers of higher education.

7604 Politics and Policy of Higher Education (3) Political and policy issues surrounding higher education; issues of race and gender, politics, and policy of student loans; policies toward unprepared college students; collective bargaining; the accreditation process.

7605 Higher Education and the Law (3) Legal issues concerning higher education, including tenure, academic freedom, campus crime, sexual harassment, laws against discrimination, student discipline, and liability for accidents and injuries.

7606 Curriculum and College Teaching (3) Critical analysis of college curriculum and approaches to teaching; historical development of curricular models; introduction to teaching and learning theories.

7607 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 2090 or consent of department. Time-domain analysis of electrical networks.

2130 Circuits II (3) Prereq.: EE 2120 and MATH 2090. Frequency-domain analysis of electrical networks.

2230 Electronics I (3) Prereq.: EE 2120. Terminal behavior of semiconductor devices and basic circuits.

2231 Electronics Laboratory I (2) Prereq.: concurrent registration in EE 2230. 1 hr. lecture; 2 hrs. lab.

2720 Digital Logic I (2) Prereq.: Admission to the College of Engineering. Boolean algebra; logic gates; minimization methods; analysis and synthesis of combinational logic networks; design examples.

2730 Digital Logic II (2) Prereq.: EE 2720 and credit or registration in EE 2230. Analysis and design of sequential circuits; practical impact of design choices.

2731 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.

2950 Comprehensive Electrical Engineering (3) Prereq.: MATH 1552 or equivalent. For nonelectrical 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 and either completion of one co-op session or six 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 2130, 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 3220. 1 hr. lecture; 2 hrs. lab.

3232 Solid State Devices I (3) Prereq.: EE 2230 and 2130. Physics and analysis of basic semiconductor devices; principles of integrated circuit fabrication.

3320 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 electromechanical energy conversion and power system analysis.

3431 Electric Power Laboratory (2) Prereq.: concurrent registration or credit in EE 3410; 1 hr. lecture; 2 hrs. lab.

3530 Introduction to Control Engineering (3) Prereq.: EE 3120. Modeling, realization, computer simulation, analysis, and feedback control design of dynamic systems.

3750 Microprocessor Systems (2) Prereq.: CSC 1253 and EE 2730. Theory and design of microprocessors; semiconductor 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 2730 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 electrical and electronics laboratory.

4000 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.

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: 1 hr. design; 2 hrs. engineering science. Selected topics of current interest.

4002 Special Topics in Electrical Engineering (3) May be taken for a max. of 9 hrs. of credit when topics vary. Students in curricula other than electrical engineering should consult the instructor. ABET category: 2 hrs. design; 1 hr. engineering science. Selected topics of current interest.

4120 Network Analysis (3) Prereq.: EE 3120 and MATH 2057. 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 electric networks; Kirchoff'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 3220 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 2730, 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. Analysis and design of digital integrated 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. 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. 2 hrs. lecture; 2 hrs. lab. Interaction of optical radiation with various media; theory of laser oscillations and specific laser systems; modulation and detection of optical radiation; fiber optic applications.

4320 Microwave Engineering (4) Prereq.: EE 3320 or equivalent. 3 hrs. lecture; 3 hrs. lab. Waveguides, cavities, signal sources, and other microwave devices.

4330 Antenna Theory and Design (4) Prereq.: EE 3320 or equivalent. 3 hrs. lecture; 3 hrs. lab. Antennas and antenna arrays; measurement of impedances and far-zone radiation patterns.

4340 Fiber Optic and Microwave Propagation (3) Prereq.: EE 3120 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 machinery; 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 faults.

4450 Distribution System Design (3) Prereq.: EE 3410 or equivalent. ABET category: 2 hrs. design; 1 hr. engineering science. Power distribution systems; emphasis on design and applications.

4460 Power Electronics (3) Prereq.: EE 3220 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.

4480 Nonsinusoidal Power System Analysis (3) Prereq.: EE 3120 or equivalent. Analysis of nonsinusoidal systems, harmonic generation, compensation, and filtering.

4560 Introduction to Modern Control (3) Prereq.: EE 3530. 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 3530. 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.

4585 Discrete Control System Design (3) Prereq.: EE 3530. ABET category: 2 hrs. design; 1 hr. engineering science. Sampling and reconstruction of signals; analysis and design of sampled data systems; discrete time systems and controllers.

4610 Analog Communication (3) Prereq.: EE 3120 and 3140. Amplitude, frequency, phase and pulse modulation, noise in analog modulation, applications.

4625 Digital Communication and Networking (3) Prereq.: EE 3120 and 3140. Digital coding of analog information, baseband transmission, decision theory, modulation, design considerations, applications.

4660 Random Processes I (3) Prereq.: EE 3140 or equivalent. Probability spaces; random variables and processes; second order processes; spectral analysis; filtering.

4700 Special Topics in Computer Engineering (3) May be taken for a max. of 6 hrs. of credit when topics vary. Students in curricula other than computer engineering should consult the instructor. ABET category: 3 hrs. engineering science. Selected topics of current interest.

4701 Special Topics in Computer Engineering (3) May be taken for a max. of 6 hrs. of credit when topics vary. 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.

4702 Special Topics in Computer Engineering (3) May be taken for a max. of 6 hrs. of credit when topics vary. Students in curricula other than computer engineering should consult the instructor. ABET category: 2 hrs. design; 1 hr. engineering science. Selected topics of current interest.

4710 Communications in Computing (3) Prereq.: EE 2730 and 3140 or equivalent. Theoretical and practical factors in designing computer communications networks; communication principles and codes; network topology and architecture; protocol layers; current and advanced applications.

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 2730 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 1253. 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. Theory and design techniques of microprocessor interfaces to memory and input/output devices.

4760 Introduction to Compiler Optimization (3) Prereq.: EE 3755 and CSC 3102. 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 multitasking.

- 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 software.
- 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 I (3)** Prereq.: CSC 3102 and EE 3755. Hardware and software complexity analyses; structures of both computers and computations.
- 7000 Advanced Topics in Electrical Engineering (3)** May be taken for a max. of 9 hrs. of credit when topics vary.
- 7091, 7092 Electrical Engineering Research (3,3)** Prereq.: permission of department and completion of 12 sem. hrs. in the graduate program. Pass-fail grading. Individual study.
- 7110 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.
- 7120 Linear Active Network Analysis and Synthesis (3)** Prereq.: EE 3120 or equivalent. Active network analysis and design, multiport networks, pathological elements, inductorless filter theory.
- 7130 Computer-Aided Network Analysis (3)** Prereq.: EE 3120 or equivalent. Computer-aided circuit analysis; Gaussian elimination, LU factorization, sparse matrices, Newton-Raphson iteration, Gauss-Jacobi and Gauss-Seidel method, numerical integration; AC, DC, and transient analysis.
- 7150 Theory and Application of Digital Signal Processing (3)** Prereq.: EE 4150 or equivalent. Digital filter design, spectrum analysis, digital hardware implementations, and applications.
- 7210 Semiconductor Device Modeling (3)** Systematic modeling of active and passive solid-state devices; modeling theory to relate device physics to circuit performance; selected circuit applications.
- 7220 Semiconductor Devices I: Bipolar (3)** Prereq.: EE 3232 or equivalent. Semiconductor material properties, equilibrium and nonequilibrium processes, physical principles of p-n junctions, and quasi-neutral material; modeling of diodes and bipolar transistors.
- 7222 Semiconductor Devices II: Field Effect (3)** Prereq.: EE 3232 or equivalent. Surface effects; metal-insulator-semiconductor structure; modeling of MOS capacitors and IGFETs.
- 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 of solids, and semiconductor junctions.
- 7232 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 heterojunction boundaries, heterostructure devices, tunneling devices, ballistic transport devices, and surfaces and interfaces in heterostructures.
- 7240 Integrated Circuit Engineering (3)** Fabrication processes and device design for monolithic integrated circuits; relation to circuit performance; thin- and thick-film circuits.
- 7242 VLSI Systems (3)** Prereq.: consent of instructor. Design and implementation of very large scale integrated systems; structured design methodology using MOS technology.
- 7244 Advanced Lithography and Metrology (3)** Prereq.: EE 7240 or consent of instructor. Physical principles used in state-of-the-art microlithography; optical systems, x-rays, e-beams, resists, measurement and inspection techniques.
- 7246 Integrated Sensors and Actuators (3)** Prereq.: EE 7240 and EE 4242 or consent of instructor. Sensor principles and design considerations; bulk and surface micromachining fabrication technologies including LIGA; microactuators and microelectromechanical devices; integration of sensors/actuators and electrical circuitry on the same chip.
- 7248 Mixed-Signal Integrated Circuit Design (3)** Prereq.: EE 4240 and 4242 or consent of instructor. Design and technology of analog and mixed analog-digital integrated circuits for signal processing including applications; mixed-signal integrated circuit testing and measurements.
- 7250 Semiconductor Power Devices (3)** Prereq.: EE 3232 or equivalent. Operation and characteristics of semiconductor energy conversion devices with emphasis on physical mechanisms involved; fabrication of energy conversion devices.
- 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.
- 7270 Magnetic Materials and Devices (3)** Prereq.: EE 3320 or equivalent. Theory of magnetism, domain structures, and 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.
- 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 and dynamic 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 stability analysis of dc transmission; misoperation of converters; protection, harmonics, and filters.
- 7450 Power System Protection (3)** Identification of conditions requiring protection; special problems associated with protection of various system components; protection devices, and their application.
- 7460 Static Power Converters (3)** Prereq.: EE 4460 or equivalent. Design of power converters and ac drives, including voltage controllers, PWM inverters, cycloconverter and switched-mode power supplies.
- 7470 Power Generation and Control (3)** Prereq.: EE 4430 or equivalent. Economic dispatch for thermal and hydroelectric power generation systems; control of power generation.
- 7480 Harmonics in Power Systems (3)** Prereq.: EE 4480 or equivalent. Power flow in nonsinusoidal systems, measurements, compensation, symmetrization, and harmonic suppression.
- 7510 Advanced Linear Systems (3)** Prereq.: EE 4560 or equivalent. Modern approaches for the analysis and identification of linear, discrete and continuous time, control systems; state variable and fractional description techniques, functional analytic methods.
- 7520 Optimal 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.
- 7525 Robust Control (3)** Prereq.: EE 4560 and 4580. Internal stability, model uncertainty, robust stability, robust performance, controller parameterizations, design limitations, loop shaping H^∞ control and other optimal robust control design techniques.
- 7530 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.
- 7540 Optimization of Stochastic Dynamic Systems (3)** Prereq.: EE 4560 and 4660 or equivalent. Optimal estimation problem, optimal control problem, and the separation principle of optimal stochastic control theory; Kalman filters, diffusion models, nonlinear filtering, optimal control discrete-time and continuous-time stochastic systems.
- 7560 Topics in Modern System Science (3)** Prereq.: EE 4560 or equivalent. Research literature, operator theory and functional analysis applied to control engineering problems.
- 7570 Nonlinear System Analysis (3)** Prereq.: EE 4560. Systems approach to study of nonlinear systems; includes limit cycles, analytical approximation methods, singular perturbations, describing functions, Liapunov's stability, Lure's problem, 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.
- 7610 Analog Communication (3)** Prereq.: EE 4660 or equivalent. Random waveforms, receiver design, linear and nonlinear modulation; pulse modulation.
- 7620 Digital Communication (3)** Prereq.: EE 4660 or equivalent. Optimal receiver principles and design; modulation schemes; digital coding of information; transmission requirements; channel capacity and cutoff rate; intersymbol interference; fading, spread-spectrum 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, channel capacity, Shannon and Huffman coding, rate-distortion theory, linear codes, cyclic codes, BCH and Goppa codes, convolutional codes, problems of data security, probabilistic ciphers, computational complexity ciphers.
- 7660 Random Processes II (3)** Prereq.: EE 4660 or equivalent. Sequences of random variables, renewal processes, Markov chains, and queuing 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 Broadband Networks (3)** Prereq.: EE 7660. Theory, implementation, and performance analysis of switch architectures and broadband integrated networks; traffic and congestion control.
- 7674 Wireless Communication Networks (3)** Prereq.: EE 7620. Theory, implementation, standards, and security issues in mobile wireless communication networks.
- 7700 Advanced Topics in Computer Engineering (3)** May be taken for a max. of 9 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, multipliers, dividers; floating-point arithmetic; residue number systems; hardware implementation.
- 7720 Advanced 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, 2 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 deterministic, stochastic, and fuzzy classifiers; unsupervised learning; feature selection.
- 7760 Logic Testing and Testable Design (3)** Prereq.: EE 3755 and EE 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 4720 or equivalent. Reliability measures, standards, evaluation, and bounds; multimode and

statistical dependent failure analysis; distributed and parallel system reliability and availability, graceful degradation, performability; software reliability.

7770 Internetworking Principles (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 3102 or equivalent. Engineering approach to computer software development; structured and modular programming concepts; software design and management; program testing and correctness proofs; diagnostic tools; 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; impact on architectural design.

7790 Structure of Computers and Computations II (3) Prereq.: EE 4790 or consent of instructor. Mathematical treatment of space and time complexity of computations; formal models of computers and computations.

7795 Models and Methods for Parallel Computation (3) Prereq.: EE 4740 or consent of instructor. Abstract models of parallel computation; algorithms, complexity, and simulations.

8000 Thesis Research (1-12 per sem.) Prereq.: permission of department. "S"/"U" grading.

9000 Dissertation Research (1-12 per sem.) Prereq.: permission of department. "S"/"U" grading.

ENGINEERING • ENGR

1050 Introduction to Engineering (2) Introduction to engineering history, disciplines, and principles of design.

3049, 3050 Engineering Practice (1-3, 1-3) Prereq.: consent of instructor. Pass-fail grading. Minimum of 6 weeks of full-time employment by an industry participating in the summer program. Same as BE 3249, 3250, CHE 3249, 3250, and ME 3249, 3250. Selected engineering problems in an industrial environment.

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

ENGLISH • ENGL

Students who are not exempt will be required to pass one, two, or three freshman composition courses. Placement level depends on ACT scores, a diagnostic theme, and any prior college credit. Required courses must be taken progressively. The completion of English 1002 or its equivalent (English 1003 for honors students, English 1005 for international students, or approved transfer credit) is required of all students.

The satisfactory completion of English 1002, 1003, 1005, or equivalent credit is prerequisite for all English courses numbered 2001 and higher.

General education courses are marked with stars (★).

0004 English Composition (5) For international students whose diagnostic tests indicate the need for intensive work in basic writing skills. Pass-no credit grading. Not for degree credit. Required during the first semester of residence for all international students (graduates, undergraduates, and transfer students) who are not excused on the basis of the placement examination required of every new international student.

★ **1000 English Composition (3)** For students whose diagnostic tests indicate intensive writing instruction is needed. Meets five hours per week. Credit will not be given for both ENGL 1000 and 1001. Introduction to writing in forms of expressive and informative discourse.

★ **1001 English Composition (3)** Placement by department. Credit will not be given for both this course and ENGL 1000. Introduction to writing in forms of expressive and informative discourse.

★ **1002 English Composition (3)** Prereq.: ENGL 1000/1001 or placement by department. An honors course, ENGL 1003, is also available. Introduction to writing persuasive, evaluative, and other forms of argumentative discourse.

★ **1003 HONORS: English Composition (3)** Same as ENGL 1002, with special honors emphasis for qualified students.

★ **1004 English Composition (3)** Prereq.: ENGL 0004 or placement by department. For international students. Same as ENGL 1000/1001, with emphasis on usage and idiom problems specific to international students. Required during the first semester of residence for all international students (graduates, undergraduates, and transfer students) who demonstrate on the placement examination need for work in English, but not at the intensive level of ENGL 0004. Graduate students graded pass-no credit.

★ **1005 English Composition (3)** Prereq.: ENGL 1004 or placement by department. For international students. Same as ENGL 1002, with continued work on problems specific to international students. Graduate students graded pass-no credit.

1051 Spoken English for International Graduate Assistants (3) Prereq.: oral interview and permission of program coordinator. For current and potential international graduate assistants only. Pass/no credit grading. May be taken for a max. of 9 sem. hrs. of credit. Developing spoken English skills (pronunciation, stress, intonation, rhythm); improving overall comprehensibility through tasks/activities, drills, and videotaped oral presentations.

2001 Advanced English Composition (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Credit will not be given for both ENGL 2001 and ENGL 3101. Theory and practice of exposition, description, and narration.

2002 Business Writing (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Credit will not be given for both ENGL 2002 and 2102. Preparing business documents such as reports, articles, and letters.

2005 Introduction to Writing Short Stories (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent; consent of instructor. Writing short stories for workshop criticism; practice in techniques of using point of view, dialogue, setting, and characterization.

2007 Introduction to Writing Poetry (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Writing poems for workshop criticism; practice in both open and closed forms; emphasis on contemporary techniques and prosody.

2008 Introduction to Writing Drama (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Also offered as THTR 2008. Writing plays for workshop criticism; practice in techniques of exposition, characterization, and dramatization.

2009 Introduction to Writing Screenplays (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Writing screenplays for workshop criticism; techniques of exposition, characterization, and dramatization.

2012 Practical Grammar and Usage (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Practical grammar, usage, and punctuation; effective word choices and sentences; elimination of common errors; use of dictionaries; current language controversies, regional and social language variation.

★ **2024 Critical Strategies (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Skills for reading and writing about literature from a variety of critical perspectives; approaches such as reader response, psychoanalysis, myth, new historicism, and feminism applied to a range of literary texts.

★ **2025 Fiction (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Skills for reading and writing about fiction; attention to generic conventions and critical perspectives; section emphasis may vary, consult departmental handout.

★ **2027 Poetry (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Skills for reading and writing about poetry; attention to generic conventions and critical perspectives; section emphasis may vary, consult departmental handout.

★ **2029 Drama (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Skills for reading, watching, and writing about drama; attention to generic conventions and critical perspectives; section emphasis may vary, consult departmental handout.

2085 Science Fiction Studies (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Science fiction literature, particularly that of the 20th century.

2086 Fantasy Literature (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Variety of literary types employing conventions of the fantastic; uses of older literatures in modern fantasy novels; themes such as quest for identity, ideal of the hero, and nature of good and evil.

2102 Business Writing for International Students (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Credit will not be given for both ENGL 2002 and 2102. Preparing business documents such as reports, articles, and letters; oral presentation of reports.

★ **2123 Studies in Literary Traditions and Themes (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Skills for reading and writing about literature; attention to historical

development, context, and critical perspectives; topics such as "The Epic," "Imagining the Family," "Literature and the City"; section emphasis will vary, consult departmental handout.

★ **2148 Shakespeare (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. The more popular plays.

2173 Louisiana Literature (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Fiction, poetry, essays, and drama of Louisiana.

2175 The Civil War in Literature (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Portrayal of the Civil War in fiction, poetry, drama, diaries, and letters.

★ **2220 Major British Authors (3)** Selected major British authors from the Anglo-Saxon period to the present.

2222 Popular Fictions (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Critical analysis of popular literature, television programs, films, and advertisements; emphasis on development of textual interpretative skills.

2231 Reading Film as Literature (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Introduction to film as literature; mastery of film language and literary bases; fictional narrative and drama; film classics.

★ **2270 Major American Authors (3)** Selected major American authors from the Colonial period to the present.

★ **2300 Interpreting Discourse (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Study of and writing about discourse forms (fiction, popular and critical texts, technical and legal documents), using linguistic, rhetorical, and cultural analysis.

★ **2423 Introduction to Folklore (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Also offered as ANTH 2423. Folklore genres of the world; sources of folklore; literary, psychological, sociological, anthropological, and historical approaches to folk material; relationships between folklore and written literature.

★ **2593 Images of Women: An Introduction (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Critical analysis of women's representations, addressing a range of traditional and/or popular genres, historical periods, and/or critical approaches; emphasis on developing textual and interpretive skills; section emphasis may vary, consult departmental handout.

★ **2673 Literature and Ethnicity (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Literature of America's ethnic cultures.

★ **2674 Introduction to African-American Literature (3)** Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Major figures and popular texts of black American literature, including writers of fiction, poetry, drama, and essays; influence of genre on the articulation of common political and social themes.

2710 Descriptive Grammar of English (3) Examination of what every English speaker has internalized about English, including sentence structure, sound patterns, and word formation.

★ **2823 HONORS: Studies in Literary Traditions and Themes (3)** Prereq.: ENGL 1002 or 1003 or 1005 or equivalent. Honors equivalent of ENGL 2123.

★ **2824 HONORS: Critical Analysis of Literature (3)** Prereq.: ENGL 1002 or 1003 or 1005 or equivalent. Honors equivalent of ENGL 2024. Study and writing about literary forms.

2920, 2921, 2922 Independent Work (1,1,1) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent; sophomore standing and an average of not less than 2.00 in all previous English courses. Consult department before registering. Reading, conferences, and reports under departmental faculty direction.

3000 HONORS: Honors Thesis (3) Conclusion of the English honors program; for details, consult the department.

3001 Writing Professionally in the Arts and Social Sciences (3) Credit will be given for only one of the following: ENGL 3001, 3002, and 3102. Practice in writing common to the arts and social sciences; includes proposals, research studies, and reports.

3002 Technical Writing (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Credit will be given for only one of the following: ENGL 3001, 3002, and 3102. Training in skills required of practicing scientists, engineers, and technical managers.

3003 Technical Writing for Nontechnical Majors (3) Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Credit will not be given for both ENGL 3002 and 3003. This course will not substitute for 3002 requirement. Formats and processes of writing found in business, science, government, and industry.

3004 Writing with Style: Advanced Expository Prose (3) Experimentation with different styles of writing in a workshop format.

- 3015 Composition Tutoring (3)** *Prereq.: consent of instructor. 1 hr. lecture; 6 hrs. lab.* Composition theory as applicable to undergraduate tutoring.
- 3020 British Literature I: The Middle Ages, Renaissance, and 18th Century (3)** Survey of English literature from the Anglo-Saxon period through Chaucer, Shakespeare, the 17th and 18th centuries.
- 3022 British Literature II: Romantics, Victorians, and Moderns (3)** Survey of British literature from the French Revolution through the Industrial Revolution into the 20th century.
- 3024 Criticism (3)** Influential works of literary criticism from the classical to the modern period.
- 3070 American Literature I: Forging a Nation (3)** Emergence of an American literature and national consciousness in major writings from the Colonial era to the Civil War.
- 3072 American Literature II: Coming of Age (3)** American literature from the Civil War to the present; realism, naturalism, modernism; effects of industrialization, immigration, the women's movement, the civil rights struggle, the world wars.
- 3084 Modern Criticism (3)** Influential works of literary criticism and theory written in the 20th century.
- 3086 Contemporary Fiction (3)** Survey of contemporary fiction from a comparative perspective; authors such as Achebe, Bellow, Garcia Marquez, Lessing, Morrison, Pynchon, Updike; developments in magical realism, minimalism, cyberpunk.
- 3101 Legal Writing (3)** *Credit will not be given for both this course and ENGL 2001.* Discussions and writing assignments tailored to forms of writing common in law and in law-related fields; emphasis on writing clear, precise, effective prose.
- 3102 Technical Writing for International Students (3)** *Prereq.: ENGL 1002 or 1003 or 1005, or equivalent. Credit will not be given for both this course and ENGL 3001, 3002.* Training in skills required of practicing scientists, engineers, and technical managers.
- 3124 The Literature of the English Bible (3)** *Also offered as REL 3124.* Literary themes and forms in the King James version; particular reference to the literary influence of the Bible on later literature.
- 3201 Language Development and Diversity (1)** *Prereq.: EDCI 2001. Concurrent enrollment in EDCI 3001. 3 hrs. lab/field experience in multicultural settings.* Language development and diversity of adolescent speakers, writers, and readers of English.
- 3202 Dynamics of Learning in the English Classroom (1)** *Prereq.: EDCI 3001 and ENGL 3201. Concurrent enrollment in EDCI 3002. 3 hrs. lab/field experience in multicultural settings.* Dynamics of learning in middle school and high school English classes, including methods of small group and whole class interaction and instruction, including integration of technology.
- 3220 Major Themes in Literature (3)** *May be taken for a max. of 6 hrs. of credit. Consult department for topic to be offered.* Examination of a particular theme (e.g., revolution, quest, or spiritual crisis) in the works of several authors crossing historical and cultural boundaries.
- 3222 Survey of Popular Genres (3)** Survey of such genres as ballads, miracle and morality plays, broadsides, melodrama, romance, detective fiction, science fiction, westerns, situation comedies.
- 3223 Adolescent Literature (3)** *See also EDCI 3223.* Critical analysis and survey of literatures with adolescents as main characters and written for adolescent and adult audiences.
- 3236 Literature and Religion: an Overview (3)** *Also offered as REL 3236.* Comparative analysis of world views in representative works of Western literature; theory and practice of the religious interpretation of literary texts; writers studied may include Aeschylus, Dante, Shakespeare, Melville, and Walker Percy.
- 3300 Rhetoric: Texts and Historical Contexts (3)** Development of rhetoric and writing within their cultural contexts; modes of writing and rhetoric particular to historical periods, classical to modern.
- 3301 Writing: Practice, Pedagogy, and History (3)** Cultural, technological, and historical influences on writing, the teaching of writing, and today's teaching practices.
- 3310 Historical Perspectives on Language Issues (3)** *A writing intensive course.* Survey of major issues in the history of language study.
- 3384 Cultural and Textual Studies (3)** Introduction to the theory and practice of cultural studies; reading of theoretical statements; analysis of exemplary texts (films, videos, literary works, autobiographies, historical and legal documents).
- 3401 The Study of Folklore (3)** *See ANTH 3401.*
- 3593 Survey of Women and Literature (3)** Significance of gender for the author, the reader, and the work itself; connections between texts and society; literary influences and relations between mainstream and nontraditional literature.
- 3674 Survey of African-American Literature (3)** Literature of the black experience in the U.S. from slave narratives to the present.
- 3716 Dialects of English (3)** Regional and/or social variation in pronunciation, grammar, and vocabulary.
- 3820, 3821, 3822, 3823, 3824, 3825 HONORS: Seminar (3 each)** *Normally open only to juniors and seniors. Topics vary. consult departmental handout.*
- 3920 Independent Study (1-3)** *May be taken for a max. of 3 hrs. of credit.* Readings, reports, and conferences under departmental faculty direction.
- 3925, 3927, 3929 HONORS: Independent Work (1,1,1)** *Prereq.: gpa of at least 3.00 in all work taken. May not be taken by students who have already completed ENGL 2920, 2921, 2922. Consult department before scheduling course.* Reading, conferences, and reports under departmental faculty direction.
- 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 Writing Essays and Reviews (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)** *Individual instruction. Students must 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 of nonacademic writing.
- 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 3001 or 3002 or equivalent.* Practical experience in editing and preparing technical manuscripts; general instruction in functions of the technical editor.
- 4023 Studies in Life Writing (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as St. Augustine, Margery Kempe, Montaigne, Rousseau, Franklin, Douglass, Adams, Stein, Malcolm X; topics such as "Autobiography, Memoir, and Diary," "Biography," "Slave Narrative," "Autobiographical Fiction."
- 4027 Studies in Lyric, Epic, and Other Poetic Forms (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Poets such as Sidney, Spenser, Milton, Wordsworth, Keats, Dickinson, Whitman, Yeats, Stevens, Wheatley, Rich; topics such as "Development of the English Epic," "Love Lyrics and the Representation of Women."
- 4028 Studies in Drama (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Marlowe, Jonson, Congreve, Sheridan, Shaw, Synge, O'Neill, Miller; topics such as "The Beginnings of English Drama," "Shakespeare's Contemporaries," "Irish Drama," "Women in the Theatre."
- 4029 Studies in Comedy and Tragedy (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Sophocles, Aristophanes, Shakespeare, Ibsen, Wilde, O'Neill, Beckett, Pinter; topics such as "The Tragic Vision," "Comic and Tragic Drama," "Renaissance Fools and Folly."
- 4030 Studies in the Middle Ages (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Chaucer, Langland, the Gawain poet, Juliana of Norwich; topics such as "Love and Chivalry in Middle English Lyric and Romance," "Dream Vision and Allegory," "Reading Anglo-Saxon Literature."
- 4033 Studies in Satire and Irony (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Jonson, Dryden, Swift, Pope, Twain, Waugh, West, Vonnegut, Atwood; topics such as "Satire on the Jacobean Stage," "Political Satire," "The Tropes of Satire."
- 4040 Studies in the Age of Elizabeth (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Sidney, Spenser, Marlowe, Shakespeare; developments in romantic epic, lyric, comedy, tragedy, devotional literature; topics such as "Quest for Utopia," "Psychology of Love," "Theatre and Court."
- 4041 Studies in the 17th Century (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Donne, Jonson, Middleton, Webster, Milton; developments in metaphysical poetry, revenge tragedy, urban comedy, courtly masque; topics such as "Public Playhouse and Courtly Stage," "Poetry and Politics."
- 4050 Studies in the Restoration and 18th Century (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Dryden, Behn, Swift, Pope, Equiano, Fielding, Richardson, Austen; developments in satire, comedy of manners, the novel; topics such as "The Line of Wit," "Literature and Empire."
- 4055 Studies in the Novel and the Idea of Narrative (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Novels such as *Tristram Shandy*, *Madame Bovary*, *The Trial*, *To the Lighthouse*, *Beloved*; theorists such as Booth, Bakhtin, Kermodé, Girard, Barthes, Kristeva, Said; topics such as time, structure, voicing, self-reflexivity.
- 4060 Studies in the Romantic Movement (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Blake, Coleridge, Byron, Percy and Mary Shelley, Keats; topics such as "Romanticism and the French Revolution," "The Poetic Imagination," "The Romantic Novel."
- 4062 Studies in the Victorian Age (3)** *May be taken for a max. of 6 hrs. of credit when topics vary.* Authors such as Dickens, the Brontës, Thackeray, Eliot, Tennyson, Browning, Arnold, Ruskin, Wilde; topics such as "The Bildungsroman," "London, Crime, and Victorian Literature," "The Victorian Heroine."
- 4070 Studies in American Literature to 1865 (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Franklin, Poe, Emerson, Hawthorne, Douglass, Melville, Whitman, Dickinson; themes such as American identity, nature and culture; topics such as "The Puritan Imagination," "Rethinking the American Renaissance."
- 4071 Studies in American Literature since 1865 (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Twain, James, Wharton, Eliot, Moore, Hughes, Cather, Ellison, Faulkner; developments in the novel, poetry, nonfiction prose; topics such as "The American Self," "Naturalism," "Postmodernism."
- 4080 Studies in Modernism (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Pound, Eliot, Stein, Joyce, Woolf, and Faulkner; topics such as "The Avant-Garde Movements in the Arts," "Nationalism and Literature," "War Poetry," "The Expatriates."
- 4086 Studies in the Short Story (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Authors such as Chekhov, Joyce, Hemingway, Cather, Wright, Garcia Marquez, Flannery O'Connor; theorists such as Poe, Frank O'Connor, Friedman, Pratt; problems such as short story sequences, beginnings and endings, compression, conflict.
- 4120 Studies in Major Authors (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Detailed study of works by one or two authors from Spenser and Donne to Joyce and Morrison; attention to the author's life and times, predecessors and influence.
- 4121 Studies in Literary History (3)** *May be taken for a max. of 6 hrs. of credit when topics vary.* Topics such as "Literature and the King's Peace," "The Development of the Pastoral," "From Romantic to Victorian: A Study of Influence," "Self and Society."
- 4122 Topics in Interdisciplinary Studies (3)** *May be taken for a max. of 6 hrs. of credit when topics vary.* Literature in cultural contexts and/or in relation to other academic disciplines; topics such as "Fictions of the Working Class," "Race in Literature and Culture," "Modernism in Fiction and Painting."
- 4124 Studies in Critical Traditions and Problems (3)** *May be taken for a max. of 6 hrs. of credit when topics vary.* Topics such as "History and Representation," "From

Neoclassic to Romantic," "Imitation and Creation,"

"Feminist Literary Theory," "Philosophy and Literature," "Constructing Subjectivity."

4137 Studies in Chaucer (3) Attention to *The Canterbury Tales*, their literary and cultural significance; topics such as "Chaucer, Boccaccio, and Framed Tales," "'The olde daunce': Chaucer on Love, Sex, and Marriage."

4147 Studies in Milton (3) Attention to *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*; their literary and cultural significance; topics such as "*Paradise Lost* and the Christianization of the Epic," "Milton and Women," "Milton and Revolution."

4148 Studies in Shakespeare (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Attention to poetry and plays, literary and cultural significance; topics such as "The Comedies and Histories," "The Tragedies," "Shakespeare and Film," "Shakespeare and Gender."

4173 Studies in Southern Literature (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Authors such as Chopin, Faulkner, Wright, Welty, Tennessee Williams; topics such as "Survey of Southern Literature," "Civil Rights Literature," "Historical Fiction," "Southern Women Writers."

4203 Curricula, Pedagogy, and Assessment in the English Classroom (1) *Prereq.: EDCI 3002 and ENGL 3202. Concurrent enrollment in EDCI 4003. 3 hrs. lab/field experience in multicultural settings.* Current methods of course design, pedagogy, and assessment for teaching English in middle school and high school classrooms.

4204 Capstone Seminar in English Education (3) *Prereq.: EDCI 4003 and ENGL 4203. Concurrent enrollment in EDCI 4004. Independent research project. Course topics will vary.* Advanced seminar in which students consolidate their knowledge in English and obtain a perspective on the significance of the knowledge.

4220 Black Drama and Theatre (3) *See THTR 4220.*

4222 Studies in Popular Fictions (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Topics such as "Louisiana Popular Fictions," "Images of Women and Minorities in Popular Texts," "Popular Culture and Folklore," "The Literature of Horror."

4231 Studies in Literature and Film (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Comparative study of literature and film as art forms; literary bases of film; topics such as "Film Authors," "Film and Ideology," "Adaptations of Literary Classics," "Film Genres," "Film and Gender."

4232 Studies in Literature and Psychology (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Psychoanalytic readings of literature such as *Hamlet*; literary readings of psychoanalytic authors such as Freud, Jung, Lacan; topics such as "Feminism and Psychoanalysis."

4234 Studies in Literature and Politics (3) *Also offered as POLI 4234. May be taken for a max. of 6 hrs. of credit when topics vary.* Literary representations of politics; historical role of literature in politics; topics such as "Literature and Politics of the Modern American South," "Revolution and the Avante-Garde."

4236 Studies in Literature and Religion (3) *Also offered as REL 4236. May be taken for a max. of 6 hrs. of credit when topics vary.* Authors such as Sophocles, Dante, Shakespeare, Donne, Hawthorne, Eliot, O'Connor, Morrison; topics such as "Major Religious Novelists," "Literature of Illness and Death," "Moral Universes of Greek and Christian Tragedy," "Creation Stories."

4300 Studies in Rhetorical Theory (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Topics such as "Rhetoric of/in Literary Studies," "Rhetoric of Political Discourse."

4301 Studies in Composition Theory (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Modern composition theory as it relates to the teaching of writing; topics such as "Social Theories of Composition."

4302 Studies in Literacy (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Varied perspectives on literacy, especially written literacy; issues raised by its complex and problematic nature.

4310 Studies in Language (3) *Also offered as LING 4310. May be taken for a max. of 6 hrs. of credit when topics vary. A writing intensive course.* Devoted to special topics, such as "African-American English," "English-based Pidgins and Creoles," "Current Trends in Linguistic Theory," "Issues in Applied Linguistics and Language Learning."

4316 Introduction to Literary Style (3) Stylistic analysis of the language of literature; emphasis on the major rhetorical, literary, and linguistic theories of style and their concerns with author, reader, text, and context.

4475 American Folklore (3) *Also offered as ANTH 4475.* Folklore of the U.S., including regional, racial, ethnic, 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; use of folklore by writers; similarities and differences between "oral literature" and "written literature."

4493 Women and Folklore (3) Examination of folk materials, including oral genres, music, art and artifacts, and rituals; focus on how and why information about women in folklore is communicated.

4593 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, Cliff; 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, Hurston, 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 LING 4710.* Introduction to the major fields of linguistic study: phonology, morphology, syntax, semantics.

4711 History of the English Language (3) *Also offered as LING 4711.* Survey of the development of the English language from its Germanic roots to the present day.

4712 Roots of English (3) *Also offered as LING 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 LING 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 LING 4714.* Introduction to phonology, concentrating on the English language; phonetic and phonemic inventories; feature analysis and rules; examination of linear, non-linear, and metrical paradigm.

4715 Semantics (3) *Also offered as LING 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 LING 4716.* Survey of the field of sociolinguistics; issues relating to language variation and change; class, gender, and ethnicity; language planning and public policy.

7001 Literary Nonfiction Workshop (3) *Prereq.: admission to the M.F.A. program or consent of instructor. May be taken for a max. of 6 sem. hrs. of credit.* Creative writing of nonfiction essays.

7004 Translation Workshop (3) *Prereq.: command of a foreign language. May be taken for a max. of 6 sem. hrs. of credit.* Literary translations from foreign languages into English; consideration of translation theory.

7006 Fiction Writing (3-6) *May be taken for a max. of 12 hrs. of credit.* Intensive composition and critical evaluation of fiction; fictional techniques and forms.

7007 Poetry Writing (3-6) *May be taken for a max. of 12 sem. hrs. of credit.* Composition and critical evaluation of poetry; poetic forms and problems of poetry writing.

7008 Drama Writing (3-6) *Also offered as THTR 7008. May be taken for a max. of 12 sem. hrs. of credit.* Composition and critical evaluation of drama; techniques of dramatic composition and dialogue.

7009 Advanced Screenwriting Workshop (3-6) *Prereq.: permission of instructor. May be taken for a max. of 12 sem. hrs. of credit.* Composition and critical evaluation of screen and teleplays; screenwriting composition and dialogue.

7030 Middle English Literature (3) Survey of major Middle English works (exclusive of Chaucer) in lyrical, poetic narrative, dramatic, and prose genres.

7034 Western Literary Heritage: The Medieval Phase (3) Relationship of classical and Christian texts to medieval English literature.

7040 16th Century Literature (3) Survey of major 16th century works of English literature, including More's *Utopia*, the major poets, and representative prose fiction.

7041 17th Century Literature (3) Representative prose and poems by major authors; the great issues of the age.

7047, 7048 Renaissance Poetry and Drama (3,3) Poetry from Wyatt through Milton and Marvell (7047); survey of most notable Renaissance plays, excluding Shakespeare's (7048).

7050, 7051 Restoration and 18th Century Literature (3,3) (7050) Comprehensive survey of major authors, contexts, and genres from Dryden to the early Pope and Swift; (7051) from Pope's later work to Blake.

7055, 7065 The British Novel I, II (3,3) (7055) Development of the British novel as a narrative and representational form in the 18th century; and (7065) from Austin to Hardy.

7058 Restoration and 18th Century Drama (3) Drama from Dryden to Sheridan; social, literary, and intellectual contexts.

7060, 7061 Major Texts of the Romantics (3,3) (7060) Wordsworth, Coleridge, Blake, and Scott; attention to the intellectual climate; (7061) poetry and poetics of Shelley, Byron, Keats; prose fiction and criticism by Mary Shelley, Scott, and Peacock.

7063 Victorian Prose (3) Social, political, religious, and philosophical works of major essayists and other prose writers.

7067 Victorian Poetry (3) Study of the major poets of the period, including Tennyson, Browning, Arnold, and Hopkins.

7070, 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.

7075, 7076 The American Novel I, II (3,3) (7075) Survey of major American novels from the beginnings to 1900; and (7076) from 1900 to the present.

7085 Modern Fiction (3) Development of the modern novel written in English, with attention also to Continental fiction.

7087 Modern Poetry (3) Major figures of modern British and American poetry.

7106 Forms of Prose Fiction (3) *Prereq.: admission to M.F.A. program. May be taken for a max. of 6 sem. hrs. credit when topics vary.* Fictional techniques in conventional and experimental short stories, novellas, and novels; elements of plot, characterization, theme, setting, and tone; formal analysis of literary texts related to specific problems of writing.

7107 Prosody and Poetic Forms (3) *Prereq.: admission to M.F.A. program.* Representative forms of poetry from early sagas to contemporary free verse; relationship to principles of versification; some concurrent practice in writing poetry in specific forms.

7109 Forms of Film Writing (3) *Prereq.: permission of instructor.* Examination of screenplays and teleplays; techniques of exposition, characterization, and dramatization.

7123 The Autobiography (3) Classical and modern selections.

7124 Feminist Literary Theory (3) Introduction to major issues and methodologies.

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.

7173 Literature of the American South (3) Southern writing from colonial times to the present.

7174 Afro-American Literature (3) Writings of black Americans, from the colonial/slavery experience through the contemporary period.

7180, 7181 Modern Literary Critical Theory I, II (3,3) (7180) Introduction to major modern approaches to analysis of a literary text; and (7181) to major schools of critical thought on the contexts of literature.

7420 Folklore (3) *A field research project is required.* Major folklore genres and approaches to their study; relationships between folklore and other disciplines, such as literary study and anthropology.

7423 Studies in Folklore (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Examination of particular folk genres, issues, or methods in the study of folklore.

7724 Studies in Feminist Theory and Criticism (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Analysis of a particular aspect of feminist theory, such as feminist psychology, feminist film theory, gender and popular culture.

7783 Studies in Film (3) *May be taken for a max. of 6 hrs. of credit when topics vary.* Intensive examination of a topic in the history or theory of film, or in the relation of film to literature.

7910, 7911 Language (3,3) *Each course may be taken for a max. of 6 hrs. of credit when topics vary.*

7912 Old English (3)

7913 Middle English (3)

7915 Practicum: Analysis and Evaluation of Expository Writing (3) *Prereq.: Students must be graduate teaching assistants in the English Department. Course is designed for graduate students teaching in the Freshman English program.* Study of writing as process and product; problems of composition instruction.

7916 Composition Theory and Practice (3) Modern rhetorical theory as it relates to the teaching of written composition.

7917 Technical Writing Methodology (3) Prereq.: a course in composition research or technical writing. Methods of teaching technical writing; structure and content of the technical writing course; issues of concern to technical writing teachers.

7918 Theory and Research in Scientific and Technical Communication (3) Prereq.: a course in composition research or technical writing. Theoretical approaches and empirical research in scientific and technical communication.

7919 Research Methods in Composition (3) Prereq.: ENGL 7915 or 7916.

7920 English Seminar (1-3) May be taken twice for credit when topics vary.

7923 Practical Criticism (3) Literary analysis for teachers of literature; methods of interpretation and evaluation of poetry, drama, and fiction.

7924 Bibliography and Methods of Research (3)

7925 History and Theories of Composition (3) Historical developments in the western rhetorical tradition as they affect written discourse, theories of discourse, and our understanding of writing and composing.

7934 Studies in Middle English (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7937 Beowulf (3)

7940 Studies in Nondramatic 16th Century Literature (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7941 Studies in Nondramatic 17th Century Literature (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7943 Studies in Shakespeare (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7948 Studies in Pre-Shakespearean Drama (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7949 Studies in Jacobean Drama (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7950 Studies in the Nondramatic Literature of the Neoclassical Period (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7960 Studies in the Romantic Period (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7962 Studies in the Victorian Period (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7974 Special Studies in American Literature (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary.

7975 Studies in African-American Literature (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary.

7980 Studies in Modern Literature of the British Isles (3) Special topics related to the period from 1890 to 1945.

7982 Studies in Contemporary Literature (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary. Studies in literature after 1945.

7984 Seminar in Modern Criticism (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7985 Seminar in Modern Fiction (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7986 Studies in the Short Story (3) May be taken for a max. of 6 hrs. of credit when topics vary. History, theory, and development.

7987 Seminar in Modern Poetry (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7988 Seminar in Modern Drama (3) May be taken for a max. of 6 hrs. of credit when topics vary.

7989 Studies in Prose Genres (3) May be taken for a max. of 6 hrs. of credit when topics vary. Nonfiction prose; the essay, history, travel biography, or scientific writing.

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

8900 Independent Study (1-3) May be taken for a max. of 3 sem. hrs. in an M.A. program, 6 sem. hrs. in an M.F.A. program, and 9 sem. hrs. in a Ph.D. program. Directed individual readings guided by the graduate faculty.

9000 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 recognition, classification, and life cycles; factors affecting insect diversity and abundance; interactions between insects and the natural environment.

2050 Introduction to Pest Management (4) See PLHL 2050.

3000 Pest Management Internship (3) Su See PLHL 3000.

3002 Pest Management Seminar (3) F See PLHL 3002.

4001 Household and Structural Pests (3) F-E Prereq.: ENTM 2001. 2 hrs. lecture; 2 hrs. lab. Recognition, biology, and management of pests found in structures.

4005 Insect Taxonomy (4) S-O Prereq.: ENTM 2001. 2 hrs. lecture; 4 hrs. lab. A collection is required. Identification, nomenclature, phylogenetic relationships, and life histories of insects at the family level.

4006 Fundamentals of Applied Entomology (3) S Prereq.: ENTM 2001 or ENTM/PLHL 2050 or consent of instructor. 2 hrs. lecture; 2 hrs. lab. Principles and methodology of managing insect pests; emphasis on field crops insect pest management; interdisciplinary perspective.

4007 Forensic Entomology (3) S-O 2hrs. lecture; 2 hrs. lab. No entomology training necessary. Determining the succession and species composition of necrophilous insects and other arthropods on carcasses; estimate time of death using insects; learning investigative procedures used by police and wildlife officers in human and animal deaths; review of case studies from crime scene to courtroom.

4011 Biology and Management of the Honey Bee (3) S-E Prereq.: BIOL 1201, 1208 and either BIOL 1402 or BIOL 1502; or BIOL 1001, 1002, 1003, 1004 or consent of instructor. 2 hrs. lecture; 2 hrs. lab. Behavior, genetics, pollination, pathology, and practical management of honey bees for agricultural and scientific purposes.

4012 Fundamentals of Horticultural Entomology (3) S Prereq.: ENTM 2001. 2 hrs. lecture; 2 hrs. lab. Principles of insect control; recognition of major pest species of insects and mites and their injury to horticultural plants; economic and aesthetic injury thresholds; methods of control, including identification and utilization of beneficial species.

4015 Conservation Biology (3) F Prereq.: 11 sem. hrs. biological sciences; genetics recommended. Same as BIOL 4015. Evolutionary ecology principles relevant to conservation; origin and threats to biodiversity; conservation biology theory and practice.

4016 Introduction to Insect Physiology (3) S-E Prereq.: 12 hrs. of ENTM or biological sciences; 1 yr. of organic chemistry or biochemistry. 2 hrs. lecture; 3 hrs. lab. Also offered as BIOL 4016. Basic functions of insects; principles of physiology, including metabolism, growth, development, and chemical communication systems.

4018 Forest Insects and Diseases (4) F Prereq.: BIOL 1502, 1509; or BIOL 1402; or BIOL 1201, 1208. Also offered as PLHL 4018. 3 hrs. lecture; 2 hrs. lab. One day-long field trip. Identification, ecology, epidemiology, and control of forest insects and diseases.

4099 Undergraduate Entomological Research (1-3) F,S,Su Prereq.: ENTM 2001 or 2050 or 4018 or equivalent. Not for graduate credit. May be taken for a max. of 4 hrs. of credit. Supervised entomological research in a laboratory or field setting; data collection and interpretation of results.

4100 Insect Behavior (3) F-O Prereq.: ENTM 2001, 2050, or consent of instructor. Current and classical concepts in behavioral theory; communication systems; stimuli orientation, social interaction; aspects of insect control using behavior modification.

4199 Special Topics in Entomology (1-3) V Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Lab/field trip may be required. Subjects not covered in other entomology courses.

7002 Plant Resistance to Arthropods (4) F-O Prereq.: consent of instructor. 3 hrs. lecture; 3 hrs. lab. Detailed examination of the mechanistic basis of plant-insect interactions, with special reference to host-plant resistance in agricultural systems; integrates relevant concepts from diverse fields including insect physiology, plant physiology, plant biochemistry, and ecology; evaluation of the current theoretical basis for research in plant-insect interactions; laboratory demonstrations and exercises emphasize the techniques used in host-plant resistance research.

7003 Medical/Veterinary Entomology (4) F-E Prereq.: ENTM 2001 or equivalent. 3 hrs. lecture; 3 hrs. lab. Relationship of insects and other arthropods to human and animal health.

7005 Classification of Immature Forms of Insects (3) S-O Prereq.: ENTM 4005 or equivalent. 2 hrs. lecture; 2 hrs. lab.

7007 Seminar in Entomology (1) F,S May be repeated for credit. 1 sem. hr. of credit required for each graduate degree in entomology.

7008 Special Topics in Entomology (1-3) F,S,Su Prereq.: consent of department head. May be taken for a max. of 6 sem. hrs. credit when topics vary. Lectures and/or labs on advanced topics in entomology not covered in other entomology courses.

7014 Insect Morphology and Phylogeny (3) F-O Prereq.: 6 sem. hrs. of 4000-level entomology courses or equivalent, or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Comparative morphology of insects with a conceptual emphasis on understanding the evolutionary relationships among major lineages.

7015 Biological Control (4) S-E Prereq.: ENTM 2001 or equivalent. 3 hrs. lecture; 3 hrs. lab. Practice and theory of biological control of insect pests and weeds; noninfectious and infectious diseases of insects; etiology, infection processes, pathogenesis, and host responses.

7017 Introduction to Insecticide Toxicology (3) F-E Prereq.: organic chemistry or equivalent. 2 hrs. lecture; 3 hrs. lab. Principles of toxicology as they relate to insecticides; bioassays, risk assessment, mode of action, pharmacokinetics, insecticide resistance and selectivity.

7080 Population Ecology (3) See BIOL 7080.

7946 Seminar: Current Topics in Molecular Evolution (1) See BIOL 7946.

7979 Tropical Biology: An Ecological Approach (1-8) See BIOL 7979.

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

8900 Research Problems (1-4 per sem.) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. credit.

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

ENVIRONMENTAL ENGINEERING • EVEG

2000 Introduction to Environmental Engineering (3) Prereq.: CHEM 1202 and MATH 1550. Basic principles of calculations in environmental engineering; overview of professional ethics; regulations and multimedia aspects of environmental problem solving with emphasis on fundamental concepts and definitions.

3100 Water Distribution and Wastewater Collection (3) Prereq.: CE 2200. Principles and practices used in analysis and design of water supply systems and storm and wastewater collection systems.

3110 Water and Wastewater Treatment (3) Prereq.: CE 2200. Physical, chemical, and biological characteristics of water and wastewater; water quality regulation; basic reactor engineering; operation and simple design of physical, chemical, and biological unit processes in water and wastewater treatment.

3271 Senior Project I: Consulting Format (3) Prereq.: EVEG 3100, 3110. Student project teams tackle selected design projects within a designated time allocation. Project management (proposals, flow charts, technical content) mimicking methodologies utilized by professional consulting firms; findings presented using professional format, i.e., final reports address rationale, process treatment trains, and/or process sizing.

3272 Senior Project II: Consulting Format (3) Prereq.: EVEG 3271. Student project teams finalize design effort initiated in EVEG 3271. Construction of prototypes and bench scale demonstrations; extension of designs; simulation analysis.

3273 Independent Undergraduate Research Project (1-4) Prereq.: EVEG 4135 and consent of department. Independent research project under the direction of a faculty member. Students develop 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 based upon hydraulic, 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 formal reports.

4120 Design of Solid and Hazardous Waste Management Systems (3) Prereq.: EVEG 3110 and CHE 3102. Design of solid and hazardous waste system; 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, storm water quality, and storm water treatment as impacted by anthropogenic activities within our constructed environment; design of hydrologic 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 3002. 3 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 2200.*

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 management and solution development.

4140 Design of Wastewater Management Facilities (3)

Prereq.: *EVEG 3100 and 3110. 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 requirements in initial preliminary design of environmental systems incorporating 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 4150; minimization, destruction, treatment, and disposal technologies in all media.

4153 Hazardous Waste Management (3) Prereq.: *consent of instructor.*

Identification and classification of wastes; regulations; treatment, storage, and disposal techniques; facilities parameters.

4157 Design of In-Situ Waste Site Remediation Processes (3) F

Prereq.: *EVEG 3110 and CHE 3102.* Design of systems for in-situ remediation of hazardous and industrial waste sites; unit processes for containment and recovery integrated into design of treatment trains for control of sources and attainment of cleanup goals; emerging technologies for vapor extraction, soil washing, bioremediation, and natural recovery employed to minimize cost and risk.

4159 Design of Natural Systems for Wastewater Treatment (3) F

Prereq.: *EVEG 3110.* Design of constructed wetlands, lagoons, 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 Science (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 science.

ENVIRONMENTAL MANAGEMENT SYSTEMS

• EMS

1011 Environment and Technology: Perspective on Environmental Problems (3) See *ENVS 1000.*

2051 Soil Science (4) See *AGRO 2051.*

3040 Applied Environmental Management (4) F,S

Prereq.: *EMS 1011, ENGL 3002 or 3101. 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 3040.*

3050 Environmental Regulations and Compliance (3) F,S

Prereq.: *EMS 1011, ECON 2030 or AGECE 2003.* Local, state, and federal environmental regulations; enforcement of and compliance with regulations; roles of regulatory agencies.

3090 Environmental Internship (3) F,S 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) See *ENVS 4010.*

4020 Quantitative Risk Assessment (3) F,S Prereq.: *six hours of chemistry and six hours of biological sciences, MATH 1431 or equivalent.* Assessment of environmental risks; interactions of pollution/toxins with the human body; managing and predicting risks.

4030 Environmental Permit Writing (3) S Prereq.: *ENGL 3002 or 3101, EMS 3040.*

May not be taken for graduate credit. Permit writing; permitting process; environmental assessment; environmental impact statements; communicating technical information.

4040 Environmental Instrumental Analysis (3) S Prereq.:

CHEM 1201, 1202, 1212, 2001. 2 hrs. lecture; 2 hrs. lab. *May not be taken for graduate credit.* Analysis of pollutants in the environment; development of analytical technique; sampling of different media including soil and water.

4055 Chemical Properties of Soil (4) See *AGRO 4055.*

4056 Microbial Ecology and Nutrient Cycling in Soils (4) See *AGRO 4056 or BIOL 4256.*

4999 Senior Project in Environmental Management (1-3)

F,S,Su Prereq.: *Permission of department, senior standing, and a minimum GPA of 3.00 on all course work taken in the major. This course may be repeated for up to 6 hrs. of credit. Course may not be taken for graduate credit.* Student will develop and submit a research proposal to the faculty; student will work on a specific project under the supervision of a faculty member. This course is intended to prepare students for graduate work in some area of environmental management.

7057 Advanced Soil Physics (4) F See *AGRO 7057*

ENVIRONMENTAL STUDIES

• ENVS

1000 Environment and Technology: Perspective on Environmental Problems (3)

Also offered as EMS 1011. Environmental quality problems involving water, air, and land, and society's response to such problems; analysis of the interrelationships and nature of ecological stresses.

1051 Soils and the Environment (3) F,S See *AGRO 1051.*

2144 Environmental Issues in Economics and Water Resources (3)

Economic principles and control mechanisms governing man's interaction with the biosphere; engineering principles and technologies that transform the environment into commodities and unwanted waste; 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 correcting environmental pollution; environmental risk assessment analysis and management.

4101 Environmental Chemistry (3) See *CHEM 4150.*

4141 Radioecology (3) F 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; pollution related to fuel production, transportation, and use; energy use and pollution problems related to transportation; energy resources, regulatory aspects, and control technology 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 planning and zoning authority.

4477 Environmental Toxicology: Introduction and Applications (3)

Prereq.: *6 hrs. of chemistry, 6 hrs. of life sciences, and 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 classes of toxic agents, routes of exposure, target tissues (human mammalian), and toxicological testing.

4500 Health Effects of Environmental 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 and quality of life.

4900 Watershed Hydrology (3) Prereq.: *An introductory statistics course. 1½ hrs. lecture; 1½ hrs. lab.*

Also offered as RNR 4900. The principles of hydrology with emphasis on how natural systems are analyzed, modeled, and used in management decisions; laboratory exercises involve hands-on experience with hydrologic data analysis, use of geographic information systems (GIS), and spatial modeling.

6010 Topics in Environmental Science for Teachers (2-4)

May be taken for a max. of 8 sem. hrs. credit when topics vary. Topics in environmental science with an emphasis on inquiry-based scientific learning and on issues of importance to Louisiana; hands-on activities and field trips will be major components of the class.

7010 Mathematical Modeling in Energy and Environmental Management (3) S Prereq.: *OCS 4410 or equivalent.*

Advanced studies in the development of models of energy and environmental systems.

7040 Environmental Planning and Management (3)

Prereq.: *ENVS 4149.* Environmental systems planning and management at local, state, and federal government levels using problem identification; design of alternative solutions, evaluation of alternatives, political action decision processes, and implementation and monitoring.

7041 Environmental Policy Analysis (3) Prereq.: *EXST 7003 or 7004 or 7005; ENVS 7040.*

Management-oriented approach to major phases of environmental policy; formulation, implementation, evaluation; theoretical bases and analytical techniques.

7042 Environmental Conflict Resolution (3)

Practical approaches and techniques commonly used to mediate environmental conflicts and facilitate participatory group decision making among stakeholders.

7043 Environmental Law and Regulation (3)

Introduction to basic principles of federal and state laws, regulations, and court decisions involving pollution of the environment, including the National Environmental Policy Act, Clean Water Act, Clean Air Act, Resource Conservation and Recovery Act, Oil Pollution Act; current topical legal developments.

7044 Regulation of Toxic Substances (3)

Federal laws, regulations, judicial decisions, and policies regarding the development, production, use and disposal of toxic substances, including the Toxic Substances Control Act, Federal Insecticide, Rodenticide, and Fungicide Act, and the Food, Drug, and Cosmetic Act; toxic tort lawsuits will be reviewed.

7045 Land Use Law and Regulation (3)

Federal, state, and local laws, regulations, judicial decisions, and policies regarding land use, land use planning, and environmental regulation of land use, including: zoning; subdivision regulation; planned unit development (PUD); comprehensive land use plans; limits on growth and urban sprawl; and regulatory "takings."

7046 International Environmental Law (3)

International and multilateral agreements and practices for controlling pollution and depletion of natural resources; relationship between international trade agreements and environmental quality; other international environmental issues.

7047 Environmental Economics and Policy (3) S Prereq.:

ECON 4720 or equivalent or consent of instructor. Economic concepts applied to the development of appropriate policies to achieve environmental protection goals; emphasis given to linkages between economics and the environment, the role of market failure, and economic instruments that can be used to address environmental concerns.

7050 Spatial Modeling of Environmental Data (3) Prereq.:

EXST 7003 or 7004 or 7005. Development of an approach to analyze spatial and temporal processes for environmental data modeling.

7061 Water Quality Management and Policy (3)

Types, sources, and effects of water pollutants; water quality standards and criteria; approaches to water quality

management; application of mathematical models to water quality management; federal regulations: the Federal Water Pollution Control Act and the Safe Drinking Water Act; policy analysis for water quality management planning.

7100 Environmental Toxicology (3) Prereq.: CBS 4001. Technical, ecological, and economic considerations relating to air, water, and soil contamination; classification and detection of environmental toxicants; their biological effects on current and future trends in agribusiness and the chemical, transport, and power industries.

7110 Toxicology of Aquatic Environments (3) Prereq.: ENVS 7100. Aquatic pollution and toxicology of industrial materials related to environmental risk assessment in coastal areas; physical, chemical, and biological factors affecting the fate of toxicants in marine and freshwater coastal areas.

7112 Concepts in Marine Ecotoxicology (3) Prereq.: ENVS 7100 and 7110 or permission of instructor. Also offered as OCS 7112. Marine pollution and toxicology of industrial and non-point sources materials related to ecological risk assessment in coastal and marine areas; biological processes and wastes in the ocean; physicochemical processes and wastes in the ocean; laboratory and field techniques in epibiotic, endobiotic and fecal-sediment habitats; benthic habitats and metals/chemical specification/geoavailability; fish as a biological model; microcosm theory and design for littoral and neritic habitats; approaches to ecological risk assessment in marine habitats.

7200 Comparative Metabolism of Environmental Pollutants (3) Prereq.: BIOL 4094 or consent of instructor. Same as CBS 7620. Biochemical systems from various invertebrate, vertebrate, and plant species involved in metabolic activation and detoxification of xenobiotic substances; use of these systems as biomonitors of pollution impact.

7220 Biochemistry and Toxicology of Metals (3) Prereq.: BIOL 4093, 4094; CHEM 2262. Also offered as BIOL 7220. Integration of metals and metal complexes with biochemical processes; adaptations of the coordination sphere of metal complexes to life function; metalloenzymes and metalloproteins; properties and modifications of metals that impart specialized biochemical function, as well as toxicity, mutagenicity, carcinogenicity.

7335 Water Quality Modeling for Management (3) Prereq.: ENVS 7061 or permission of instructor. Problems and approaches in water quality modeling, with particular attention to model uncertainty, model choice, and applications for management; basic modeling concepts, mechanistic models, empirical models, modern statistical methods and uncertainty analysis applied to problems of eutrophication, toxic substances, and trend assessment.

7385 Decision Theory and Environmental Risk Analysis (3) Prereq.: EXST 7003, 7004, or 7005 or equivalent. Applications of Bayesian decision theory in natural resource and environmental policy making.

7622 Fundamentals of Chemical Carcinogenesis (3) S-E Prereq.: CBS 7604 or consent of instructor. Same as CBS 7622 and BIOL 7622.

7623 Toxicology I (3) See CBS 7623.

7624 Toxicology II (3) See CBS 7624.

7625 Toxicology III (3) See CBS 7625.

7626 Toxicology IV: Genetic Toxicology (3) S-E Prereq.: ENVS 4500 or ENVS 7623 and 7624 or approval of instructor. Also offered as CBS 7626; BIOL 7626. Evaluation of induced heritable and/or phenotypic changes in the organism and individual cell; emphasis on human and mammalian species; reproductive toxicology and teratogenesis; testing and screening agents for genotoxic activities; molecular genetic approaches to human and environmental biomonitoring.

7699 Toxicology Seminar (1) See CBS 7699.

7900 Special Problems in Environmental Sciences (1-4) May be taken for a max. of 4 hrs. credit. Individual study of a specific environmental problem.

7950 Special Topics in Environmental Sciences (1-6) F,S,Su Research and methodological review of current topics.

7995 Environmental Seminar (1) F,S Reports and discussions of student/faculty activities in environmental sciences.

7998 Environmental Colloquium (2) Non-thesis students only. May only be taken during semester of graduation. Written and oral presentation of a literature review on a selected environmental issue, as approved by the departmental non-thesis committee.

8000 Thesis Research (1-12 per sem.) "S"/"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. A user-oriented introduction to microcomputers and applications software; terminology; hardware; software: the operating system, word processing, spreadsheets, data management, graphics, communications.

★ 2201 Introduction to Statistical Analysis (4) F,S 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. 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.

3001 Exploratory Statistical Data Analysis (3) V Prereq.: EXST 2201 or equivalent. 2 hrs. lecture; 2 hrs. lab. Graphical analysis, perception, and construction rules; descriptive statistics; graphs for data exploration and decision making.

3201 Statistical Analysis II (4) S Prereq.: EXST 2201 or equivalent. 3 hrs. lecture; 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.

4012 Introduction to Sampling Techniques (3) Su Prereq.: EXST 2201 or equivalent. Simple random, stratified random, cluster, systematic, multistage, multiphase, and unequal probability sampling procedures methods and applications; ratio and regression estimation; non-response and non-sampling errors.

4050 Principles and Theory of Statistics (4) F Prereq.: EXST 2201 or equivalent and MATH 1550 or equivalent. 3 hrs. lecture; 2 hrs. lab. Probability distributions as models for real-world processes; sampling distributions and the central limit theorem; estimation and confidence region methods; principles of hypothesis testing; modeling; emphasis on links between theory, methodology, and application.

4085 Seminar in Statistics (1) V Prereq.: consent of instructor. May be repeated for credit when topics vary. Topics not covered in other experimental statistics courses.

4087 Special Topics in Applied Statistics (3) V Prereq.: EXST 2201 or equivalent. May be taken for a max. of 6 sem. hrs. of credit when topics vary.

7003 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 7003, 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, correlation, regression, analysis of categorical data; emphasis on social and behavioral sciences research problems; computer software applications.

7004 Experimental Statistics 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 7003, 7004, 7005. Basic concepts of statistical models and use of samples; measures of variation and central tendency; normal, t, chi-square, and F distributions; test of hypothesis, analysis of variance, regression, and correlation; emphasis on laboratory-oriented sciences research problems; computer software applications.

7005 Statistical Techniques 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 7003, 7004, 7005. Basic concepts of statistical models and sampling methods, descriptive statistical measures, distributions, tests of significance, analysis of variance, regression, correlation, and chi-square; emphasis on field-oriented life sciences research problems; computer software applications.

7011 Nonparametric Statistics (3) Su Prereq.: EXST 7003 or 7004 or 7005 or equivalent. Nonparametric one- and two-sample location and distribution tests, including binomial, chi-square, Kolmogorov-Smirnov, Mann-Whitney U, Wilcoxon; analyses of variance, including Cochran's Q, Kruskal-Wallis, Friedman; correlation and regression, including Kendall's tau, Spearman's rho, and point biserial.

7012 Fundamental Sampling Techniques (3) Su Prereq.: EXST 7003 or 7004 or 7005 or equivalent. Sample and stratified random sampling; ratio and regression estimation; cluster, multistage, and multiphase sampling procedures; systematic sampling; nonresponse and nonsampling errors; links between methodology and application emphasized.

7013 Statistical Inference II (4) S Prereq.: EXST 7003 or equivalent. 3 hrs. lecture; 2 hrs. lab. Credit will be given for only one of the following: EXST 7013, 7014, 7015. Analyses of variance and experimental designs; completely randomized and complete 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 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 analyses of variance and covariance, sampling designs, parameter estimation, multiple regression and correlation, tests of specific hypothesis, and factorial experiments; emphasis on field-oriented life sciences research problems.

7022 Statistical Aspects of Quantitative Genetics (3) V Prereq.: EXST 7014 or equivalent and AGRI 2072 or equivalent. Statistical aspects of quantitative inheritance; partitioning of variance; covariance among relatives; theory of inbreeding; estimation and testing of genetic parameters; best linear prediction of genetic merit; mixed model application; selection theory.

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, survival, recruitment, space-use, and spatial pattern; methods used include quadrants, 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 confounding 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. Fundamentals of regression analysis, stressing an understanding 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) F Prereq.: EXST 7014 or equivalent. Statistical techniques used in analyzing data from discrete distributions; contingency tables, loglinear and logit models, logistic regression, and repeated measures for 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. Comparison of multivariate techniques and analyses; 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.

7051 Applied Bayesian Inference (3) V Prereq.: EXST 7003 or 7004 or 7005; or equivalent. Basic decision theory applications, useful sampling distributions and convenient priors, Bayesian statistical inference, and Bayesian analysis of multiple decision problems.

7060 Probability and Statistics (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 of 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; mock-consulting sessions; participation in real-life statistical consulting sessions under faculty supervision.

7084 Practicum in Statistical Consulting II (2) F,S,Su Prereq.: EXST 7083 and permission of instructor. 4 hrs. independent study. Pass-fail grading. 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.: permission of department. Pass-fail grading. A technical paper on an advanced topic in statistics is required. Development of a topic in advanced statistics under faculty supervision.

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.

7999 Independent Study (1-3) 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 graduate faculty.

EXTENSION EDUCATION • EXED

3010 Internship in Cooperative Extension Service (6) Su only Open to selected students completing their junior year who are considering a career with the cooperative extension service. Seven-week period of study, observation, and practicum in a parish Louisiana Cooperative Extension Service office plus a 2-week period of classes in extension education. Registration with special permission only.

4010 Cooperative Extension Work (3) V History, objectives, organization, relationships, and teaching processes in cooperative extension.

4011 Communications in Extension Education (3) F Synthesis and application of concepts and principles of communication in the extension educational program.

4025 Principles of Adult Education (3) S Nature and importance of adult education; social and psychological factors affecting adult motivation and learning; techniques for providing adult learning experiences.

4026 Informal Education Programs for Youth (3) S Organization, leadership, and evaluation of informal youth education programs.

4039 Topics in International Development (3) May be taken for a max. of 6 hrs. credit when topics vary. Issues related to international development; emphasis on extension and nonformal education programs in third world countries.

7024 Comparative Extension Education (3) S Prereq.: EXED 7222 or equivalent. Comparative analysis of systems of extension education on a world-wide basis.

7122 Program Development (3) F Concepts relating educational planning, planned change, and social change to development of effective extension education programs.

7222 Principles and Practices of Extension Education (3) S Prereq.: EXED 7122 or equivalent. Learning and teaching concepts applied in the execution of an extension educational program.

7622 Evaluation Methods (3) F Concepts and principles of evaluation applied to programs in extension education.

7723 Leadership and Organization (3) S Application of relevant principles from leadership theory, group dynamics, social organization, and organizational administration to problems of organizing extension education programs.

7822 Advanced Extension Education (3) S Integration of relevant concepts, principles, and research findings in program development, leadership and organization, learning and teaching, and evaluation.

7824 Independent Study in Extension Education (3) M May be taken for a max. of 6 hrs. of credit. Independent study under the guidance of the graduate faculty.

7826 Seminar in Extension Education (1) V May be taken for a max. of 2 hrs. of credit. Pass-fail grading. Student-faculty exchange of ideas on research and issues.

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

8900 Research Problems (1-6) Prereq.: EXED 7622 and a basic graduate-level statistics course. May be taken for a max. of 6 sem. hrs. of credit. Research problems in programming, teaching, leadership, organization, or evaluation of extension programs.

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

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 (financial 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 interests, title search, unitization, and pooling; mineral law of other states and of hard materials.

3351 Principles of Real Estate (3) Prereq.: FIN 3201. Purchasing, owning, and operating 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 equivalent. Principles of valuation 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 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.: FIN 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.: FIN 3201. Nature of non-speculative 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 through premature 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.

3460 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, re-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.

3636 Financial Markets and Institutions (3) Prereq.: ECON 2020 or 2030; and ISDS 2000; and concurrent registration in ACCT 2021 or 2101. Characteristics and functions of financial markets and institutions; process of financial intermediation and allocation of financial resources; analysis of current developments in financial institutions and in money and capital markets; factors in interest rate determination; management of credit risk, interest rate risk, and operating risk.

3715 Business Finance (3) Prereq.: ECON 2020 or 2030; and concurrent registration in ACCT 2021 or 2101. Also offered as ECON 3715. Finance function within the business enterprise; techniques of financial management, concepts of capital structure and dividend policy, working capital management, capital budgeting, institutional and international environment of the firm.

3717 Advanced Business Finance (3) Prereq.: FIN 3715. Material presented in real-world cases. Hands on applications of financial tools introduced in FIN 3715; financial analysis, forecasting, capital budgeting, and business evaluation.

3718 Multinational Managerial Finance (3) Prereq.: FIN 3715. Multinational financial management; nature of international finance system; financing, investment, and risk management of the multinational corporation.

3826 Investments (3) Prereq.: FIN 3715. Open only to finance majors; open to others with permission of the department. Characteristics and valuation of common stocks, bonds, options, function and efficiency of U.S. securities markets; theory and practice of portfolio selection.

3900 Directed Study and Research (1-6) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. Research under direction of faculty member; written proposal must be approved by faculty member and department chair prior to registration.

3910 Topics in Finance (1-3) Prereq.: FIN 3715 and 3826, or consent of instructor. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Topics of current interest.

4240 Cyberlaw and Intellectual Property (3) Prereq.: FIN 3201 or BADM 7140, and consent of instructor. Fundamentals of patent, trademark and copyright law; legal principles applied to the regulation of the Internet and electronic commerce, including intellectual property, torts, contracts, constitutional principles, and crimes.

4440 Group Insurance and Pensions (3) Prereq.: FIN 3440. Life and health insurance in various areas involving mortality and morbidity contingencies; types of health risk bearers and contracts offered; employee benefit plans with emphasis on the private pension function, including contractual arrangements, benefit formulas, and approaches to financing.

4828 Security Analysis and Portfolio Management (3) Prereq.: FIN 3826 or equivalent. Security selection and portfolio diversification in an efficient market; portfolio theory and management; portfolio building and selection; portfolio performance evaluations.

4830 Analysis of Corporate Financial Statements (3) Prereq.: FIN 3715 or equivalent. Evaluation of financial statements; emphasis on their use in credit analysis and in evaluation of security risks and returns; recent research in accounting and finance; predictive ability of financial statement data.

4850 Speculative Financial Markets (3) Prereq.: FIN 3826 or equivalent. Financial and money markets, financial futures markets, and options markets; valuation models for the instruments in these markets; strategies for hedging and speculation; applications for individual investors, institutional investors, corporate treasurers, and financial institutions.

7300 Seminar in Real Estate (3) Questions facing participants in the real estate market, including equity investors, lenders, tenants, and government; purchasing, owning, and operating real estate relative to interest in realty contracts; deeds, title, leases, brokerage, and management.

7310 Real Estate Financial Decisions (3) Questions concerning real estate finance and valuation; risk-return trade-offs under varying conditions of financial leverage;

refinancing; selecting between alternative financing methods; mortgage design, sale-leaseback, construction lending, secondary mortgage markets, and the pricing of financing instruments.

7320 Advanced Topics in Real Estate (3) Prereq.: FIN 7300 or 7310 or consent of instructor. May be taken for a max. of 6 hrs. of credit if topics vary.

7350 Theory of Real Estate Markets (3) Prereq.: FIN 7750. Primarily for doctoral students. Emphasis on theoretical treatment of real estate equity and mortgage markets; real estate as a security; pricing of fixed- and adjustable-rate mortgages; secondary mortgage markets and the securitization of mortgages; development of derivative securities; models of housing markets.

7400 Risk Management and Insurance (3) Risk management from the business manager's viewpoint and as a possible alternative to insurance; risk identification and measurement; risk retention, self-insurance, and risk transfer; loss funding and risk financing; access to insurance markets (including bid specifications and company selection); loss prevention; claims administration; risk management audits and insurance surveys.

7520 Seminar in Financial Research Methods (3) Primarily for doctoral students. Financial economics; empirical behavior of financial markets; topics including trading rules and the efficient market hypothesis; market microstructure; event studies.

7550 Theory of Finance (3) Prereq.: ECON 7610 or equivalent. Theory of choice under certainty and uncertainty; time-state preference models of risk allocation; mean-variance asset pricing models; arbitrage pricing models; option pricing models; discrete and continuous time models.

7585 Advanced Topics in Financial Economics (3) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. of credit. Also offered as ECON 7585. Specific areas in finance and financial economics; emphasis on rigorous empirical methodologies and theory.

7632 Seminar in Commercial Banking (3) Commercial banking theory and history, quantitative techniques applied to bank asset and liability management, banking structure, markets and competition, capital adequacy and profitability.

7633 Financial Markets (3) Prereq.: BADM 7020 and 7080. Theoretical and empirical exposition of financial markets and institutions; their role in the economy; determination of the general level, risk structure, and the transaction structure of security returns; emphasis on U.S. financial markets.

7650 Seminar in Financial Markets and Intermediaries (3) Prereq.: FIN 7550. Primarily for doctoral students. Markets and intermediaries as alternative institutional mechanisms for structuring financial transactions; transaction services provided by these institutions; benefits and costs of these transaction services as determinants of the structure and extent of the financial sector.

7710 Financial Management for Governments (3) Also offered as PADM 7710. Role of finance in government, impacts on financial markets; role of financial management; government accounts, essential concepts of financial management; sources of government funds; allocation of funds; debt management and management of financial assets.

7718 Multinational Financial Management (3) Prereq.: BADM 7090 or equivalent. Cross border investment, investment analysis, capital planning, foreign currency exposure, and cash management; concepts of political risk assessment; techniques in transactional trade; alternative financial sources; issues in international financial controls.

7719 Advanced Financial Management (3) Prereq.: BADM 7090. Theory of business finance and evaluation of its usefulness to financial managers; capital expenditure, capital structure, and dividend decisions; legitimacy of alternative decision criteria; implications of uncertainty and imperfect capital markets on firm financial decisions.

7720 Topics in Business Finance (3) Prereq.: BADM 7090 or equivalent. Detailed treatment of topics not covered in depth in BADM 7090 or FIN 7719; prospectus usually available before registration.

7750 Seminar in Corporate Finance (3) Prereq.: FIN 7550. Primarily for doctoral students. Theory of choice under certainty and uncertainty; investment and financing decisions of the firm; the agency problem and agency costs; capital structure and dividend models related to corporate control.

7826 Investment Analysis and Portfolio Theory (3) Prereq.: BADM 7020 and 7030. Institutional elements of capital markets, mechanics of securities trading; analytic techniques for evaluating investment management; behavior of security prices, efficient diversification, techniques for measuring performance of securities and portfolios, security valuation, portfolio selection.

7849 Normative Portfolio Analysis Theory (3) Prereq.: FIN 7719 and FIN 7550 or equivalent. Theoretical and practical problems of normative portfolio selection

techniques and analysis; positive implications of normative models; their contribution to understanding operation of capital markets and market participants.

7850 Seminar in Investments (3) Prereq.: FIN 7550. Primarily for doctoral students. Speculative price as a stochastic process; information revelation in and through speculative price; normative and positive models of investment theory; applications of contingent-claims/derivative securities pricing; theory and empiricism of fixed income securities.

7855 Seminar in Options, Futures, and Other Derivatives (3) Prereq.: FIN 7826 and ECON 7610 or equivalent; consent of instructor; mathematical maturity required. Arbitrage and equilibrium models of derivative pricing; models derived via continuous time Ito processes; binomial, finite difference, Monte Carlo and other numerical approaches; review of mathematical statistics, stochastic processes, and Ito calculus.

7900 Individual Study in Finance (3) Masters and doctoral students may take the course for credit 3 and 6 times, respectively. For students who wish in-depth study of a selected finance problem. Proposal outlining nature and objectives of a research project must be approved by department faculty prior to registration; written report of semester's activities and findings required for credit.

7950 Seminar in Research (1) Required of all doctoral students in business administration concentrating in finance during each semester of full-time residence; only 3 sem. hrs. may be applied toward the degree. Advance research in finance; current research of doctoral candidates, faculty, and invited guests.

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

8900 Pre-dissertation Research (1-9) May be repeated for credit. Pass-fail grading.

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

FOOD SCIENCE • FDSC

1049 Science of Foods (2) F Concepts and principles related to selection, preparation, processing, preservation, distribution, and use of foods.

2000 Fundamentals of Food Science (3) F Prereq.: BIOL 1201 and CHEM 1201 or permission of instructor. Introduction to scientific principles in chemistry of food constituents, new product development, food preservation, processing, packaging, and safety.

2014 Food Fundamentals (4) F,S See HUEC 2014.

3000 Food Safety (3) F Prereq.: BIOL 1201 and CHEM 1201 or permission of instructor. Basic concepts of food safety including: introduction into food safety; extensive examination of causative agents responsible for food borne illness; and food borne illness case studies.

3015 Food Theory and Experimentation (3) S See HUEC 3015.

3900 Food Science Research (1-3) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. Pass-fail grading. Student outlines and executes project and prepares a written report; problems related to processing, quality control, safety, and nutritional evaluation of food-stuffs.

3999 Food Science and Technology Seminar (1) F May be taken for a max. of 2 sem. hrs. credit. Scientific seminar preparation and presentations on selected topics in food science and technology.

4005 Food Engineering Systems (3) S-O Prereq.: PHYS 2001 and MATH 1441 or equivalent. 2 hrs. lecture; 3 hrs. lab. Application of engineering principles to various unit operations in food processing.

4040 Quality Assurance in the Food Industry (4) F See DARY 4040.

4050 Food Composition and Analysis (4) S Prereq.: either CHEM 2060 or 2262; or equivalent. 2 hrs. lecture; 6 hrs. lab. Principles of official and acceptable chemical and physical methods used in food analysis; application of these methods to examination of raw and processed foods.

4060 Food Chemistry (4) F Prereq.: BIOL 4087 and either CHEM 2060 or CHEM 2262; or equivalent. 3 hrs. lecture; 3 hrs. lab. Chemistry of food components; reactions occurring during processing and storage.

4070 Food and Drug Laws, Standards, and Regulations (2) F Prereq.: consent of instructor. Federal, state, and city food and drug laws, and how they regulate manufacture, distribution, and use of foods and regulated products.

4075 Food Preservation (3) F Prereq.: CHEM 2060 or 2262 or equivalent, BIOL 2051, and at least 3 sem. hrs. in any food science course; or consent of instructor. 2 hrs. lecture;

3 hrs. lab. Microbiology and biochemistry of food spoilage; engineering techniques of food preservation and food plant sanitation; methods of food preservation.

4076 Food Product Development (3) S Prereq.: FDSC 3015 or 4060 or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Development of new food products; marketing, package design, and other aspects of product development.

4086 Seafood Processing (3) S Prereq.: BIOL 1021 and CHEM 1201 or permission of instructor. Examination of all aspects of seafood processing including: history and economic importance of the seafood processing industry; resources; processing techniques (freezing, canning, drying, salting, and pickling); processing by species; storage and distribution; and regulatory and food safety considerations.

4095 Principles of Sensory Evaluation of Foods (4) F Prereq.: EXST 2201 or equivalent. 3 hrs. lecture; 3 hrs. lab. Theory and current practices used to evoke, measure, analyze, and interpret reactions to those characteristics of foods and materials as they are perceived by the human senses of sight, smell, taste, touch, and hearing.

4162 Food Microbiology (4) S Prereq.: BIOL 2051; either BIOL 3115 or 4110; or consent of instructor. 2 hrs. lecture; 2 hrs. lab. Also offered as BIOL 4162. Microbiological principles as applied to food and food products; emphasis on rapid detection of food borne microorganisms.

7000 Perspectives in Nutrition (1) F Development of nutrition as a science; current trends in nutritional research.

7010 Food Toxicology (3) S-O Prereq.: BIOL 2051 and 4162 or equivalent; introductory food science course; and consent of instructor. Principles of food safety and toxicology; food-borne infections and poisonings; natural food toxicants; toxicants of marine microbial origin; etiology of food-borne diseases; microbiological examination of foods, food additives; and food protection criteria.

7016 Current Topics Related to Nutrients in Processed Foods (3) V Effects of processing on nutrient retention in food.

7030 Advanced Food Research (1-6) Prereq.: consent of instructor. May be taken for a max. of 9 sem. hrs. of credit. Individual problems in pertinent areas.

7040 Flavor and Colors of Foods (3) V Prereq.: CHEM 2262, FDSC 4000, and 4060; or equivalent. 2 hrs. lecture; 3 hrs. lab. Methods of chemical, physical, and instrumental analysis in food colors and flavors; natural and synthetic flavorings and colorings.

7050 Food Protein Biotechnology (3) F-E Prereq.: FDSC 4060, 4050 or permission of instructor. Overview of contemporary principles and applications of protein and enzyme technology, genetic engineering, and immunology for the production of safe foods and food ingredients; proteins as functional food ingredients; applications and regulations of protein biotechnology in the food industry as well as ethical and legal issues; career opportunities in protein and enzyme biotechnology.

7060 Advanced Concepts in Food Science (3) V Prereq.: FDSC 4060 and BIOL 4087. Analysis of new and progressive concepts in food science.

7071 Seminar in Food Science (1) F,S May be taken for a max. of 3 hrs. of credit. Selected topics in food science and technology.

7075 Advanced Food Preservation (4) V Prereq.: FDSC 4075 or equivalent. 3 hrs. lecture; 3 hrs. lab including field trips to local food processors. Also offered as ANSC 7075 and HORT 7075. Preservation technologies of various food processing operations from raw ingredients to final product.

7094 Seminar in Nutrition (1) Same as ANSC 7094, DARY 7094, HUEC 7094, PLSC 7094. May be taken for a max. of 2 hrs. of credit. Prereq.: ANSC 7093, DARY 7091, FDSC 7071, HUEC 7010, PLSC 7091 or equivalent or previous slide (not poster) presentation at a professional meeting.

7625 Toxicology III (3) See CBS 7625.

7699 Toxicology Seminar (1) See CBS 7699.

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

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

FRENCH • FREN

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

General education courses are marked with stars (★).

*1001, ★1002 Elementary French (4.4) F,S,Su 1001 is only for students with no previous study of French. Students with previous study of French should take the French placement exam. Students who do not place in FREN 1002 or

higher through the placement exam should enroll in FREN 1001. Credit will not be given for FREN 1001 and FREN 1050. FREN 1001 or 1050 or equivalent prior study is prerequisite for FREN 1002. Basic lexicon and structure of French; emphasis on communicative language use; supplementary work in language laboratory.

***1020 French for Reading Knowledge (5) Su** Specialized course to satisfy departmental reading requirement for graduate students, but carrying no graduate credit. Undergraduates may enroll on pass-fail basis only. Does not count toward satisfying foreign language requirement for undergraduates, although hours may count toward baccalaureate. Credit will not be given for both this course and introductory French courses.

***1050 Elementary French (4) F,S,Su** For students with previous study of French who did not place in FREN 1002 through the French placement exam. Credit will not be given for this course and FREN 1001. Material covered in FREN 1001 is covered in 1050. FREN 1050 or equivalent prior study is prerequisite for FREN 1002. Work with the basic lexicon and structures of French; emphasis on communicative language use; supplementary work in language laboratory.

1201, ★ 1202 Elementary Cajun French (4,4) F,S Credit will not be given for both FREN 1001/1050 and FREN 1201 nor for both FREN 1002 and FREN 1202. Students with previous background in French or French 1001/1050 may be admitted to FREN 1201, 1201 with permission of the instructor. Basic lexicon and structure of Cajun French; emphasis on communicative language use; supplementary work in language laboratory.

***2001 French for Travelers I (3) F,S** Credit not applicable toward a major in French. Does not count toward satisfying foreign language requirement for undergraduates. Basic communication patterns; practical everyday vocabulary, with exercises in comprehension and conversation.

***2002 French for Travelers II (3) S** Prereq.: FREN 2001. Credit not applicable toward a major in French. Does not count toward satisfying foreign language requirement for undergraduates. Intermediate level structures with emphasis on communication, comprehension, and conversation.

2028 French for Music (3) Prereq.: music majors are expected to have taken MUS 2018 and 2019 before enrolling in this course. Study of French language with emphasis on opera libretti and song texts.

2057 Introduction to French Phonetics (2) F Phonetic system of French; intensive oral practice with individual sounds; analysis of basic theoretical principles involved in French pronunciation.

★ *2101, 2102 Intermediate French (3,3) F,S Honors courses, French 2103 and 2104 are also available. FREN 1002 or equivalent prior study is prerequisite for FREN 2101. FREN 2101 or equivalent prior study is prerequisite for FREN 2102. Continuation of elementary French. Structures and lexicon of French; additional emphasis on reading and writing; supplementary work in language laboratory.

***2103, 2104 HONORS: Intermediate French (3,3) F,S** Same as FREN 2101, 2102, with special honors emphasis for qualified students.

***2154 Intermediate Oral Communication (3) V** Prereq.: FREN 2102 or equivalent. Development of listening and speaking competency.

★ *2155 Readings in French Literature (3) F,S,Su Prereq.: FREN 2102 or equivalent. Introduction to interpretive reading of French texts; development of competency in written French.

2201, 2202 Intermediate Cajun French (3,3) F,S Prereq.: FREN 1202, 1002 or equivalent prior study is prerequisite for FREN 2201. FREN 2201, 2101 or equivalent prior study is a prerequisite for FREN 2202. Credit will not be given for both FREN 2101 and FREN 2201 nor for FREN 2102 and FREN 2202. Continuation of elementary Cajun French. Structures and lexicon of French as it is spoken in Louisiana. Emphasis on comprehension and production of extended discourse, both oral and written; supplementary work in language lab and one field work project required.

2254 Intermediate Oral Communication in Cajun French (3) V Prereq.: FREN 2202 or equivalent. Credit will not be given for both FREN 2154 and 2254. Development of listening and speaking competency.

***3058 Advanced Oral Communication (3) V** Development of listening and speaking competency using video and text materials; special problems in spoken French including register and variation.

3060 Advanced French Grammar and Composition (3) F,S Prereq.: FREN 2155 or equivalent or permission of instructor. Special problems in French grammar and syntax; emphasis on the written language.

★ 3071 Survey of French Literature (3) F,S Prereq.: FREN 2155 or equivalent. French majors are strongly urged to enroll in this course before their senior year. Development of French literature from its beginnings through the 18th century.

★ 3072 Survey of French Literature (3) F,S Prereq.: FREN 2155 or equivalent. French majors are strongly urged to enroll in this course before their senior year. Continuation of FREN 3071. The main authors and literary movements from the 18th century to the present.

★ 3080 French Culture and Civilization (3) V Taught in French. Various aspects of French culture and civilization; emphasis on those factors necessary for understanding contemporary France and the Francophone world.

3090 Francophone Texts and Contexts (3) May be taken for a max. of 6 sem. hrs. of credit when subject matter varies. Taught in French and English. Focus on specific aspects of Francophone literature, culture, history, and thought.

3260 Structure of Louisiana French (3) F,S Prereq.: FREN 2102 or 2202 or equivalent fluency in French. Descriptive study of the structure and lexicon of Louisiana French dialects, with particular emphasis on the variety known as Cajun; emphasis on contrast with normed French, as well as comparison with other regional varieties.

3280 Cajun French Culture (3) F,S Prereq.: FREN 2102 or equivalent. Taught in French. Various aspects of Cajun French culture in Louisiana; emphasis on both traditional folk culture and contemporary issues.

3295 Special Topics in Louisiana French (3) F,S Prereq.: FREN 2102 or 2202 or equivalent fluency in French. May be taken for a max. of 6 sem. hrs. credit when topics vary.

3401 Tutoring Learners of French as a Second Language (1) Prereq.: FREN 2155 or equivalent; EDCI 2001; concurrent enrollment in EDCI 3001. 3 hrs. lab/field experiences in multicultural settings. A carefully monitored and evaluated French tutoring experience in a local middle or high school under the guidance of the course instructor and a mentoring teacher.

3402 Developing Language Lessons for French as a Second Language (1) Prereq.: EDCI 3001, FREN 3401, and concurrent enrollment in EDCI 3002. 3 hrs. lab/field experiences in multicultural settings. Under the supervision of a French faculty member and a teacher mentor, teacher candidates will prepare and deliver second language French language lessons that incorporate audio-visual materials and technology-enhanced language learning activities.

4000 Old French and Medieval Literature (3) V Major aspects of the language and literature of the period.

4001 History of the French Language (3) V Development of French from its beginnings to the present; attention to formation of the modern language.

4003 Senior Seminar (3) Prereq.: FREN 3060, 3071, and 3072 or equivalent and senior standing. Required of French majors. Research project on a topic in French or Francophone literature, language, or civilization.

4004 Critical Methods and Theory (3) V Current and past modes of critical discourse and their application to literary texts.

4005 Advanced French Syntax and Stylistics (3) F,S Syntactical structure of French, with attention to stylistic improvement of written and oral expression.

4010 French Literature of the 16th Century (3) V Major aspects of the literature of the period; topics will focus variously on an author, a theme, or a genre.

4014 Introduction to French Linguistics (3) F French phonology, morphology, and syntax.

4015 Advanced French Phonetics (3) S Theoretical principles of French phonetics and their application.

4016 Applied French Linguistics (3) Y Prereq.: FREN 4014 or equivalent. French linguistics as applied to second language learning/acquisition.

4020 French Literature of the 17th Century (3) V Major aspects of the literature of the period.

4030 French Literature of the 18th Century (3) V Major literary, philosophic, and scientific currents of the period and their interrelations.

4031 The French Film (3) V Art of the French film from Louis Lumière to the present; its interrelations with French literature; screening and analyses of representative films.

4040 French Literature of the 19th Century (3) V Major aspects of the literature of the period.

4041 Translation Skills (3) O An analytic approach to the structures of English and French; strategies and techniques for their translation in literary, technical, and scientific contexts.

4050 French Literature of the 20th Century (3) V Major aspects of the literature.

4051 French for Business (3) V Language acquisition for students preparing for careers involving trade or business activities with French-speaking areas.

4060 French Literature of Quebec (3) V Major aspects of the literature of Quebec.

4064 Pidgin and Creole Languages (3) V See ANTH 4064 and LING 4064.

4065 Louisiana French (3) V Dialect areas of Louisiana, including Cajun and Creole speech communities; language contact, language variation, and problems of analysis.

4070 Literature of Africa and the Caribbean (3) Major aspects of francophone African and Caribbean literature.

4080 Special Topics in French/Francophone Cultures and Civilizations (3) V Taught in French. May be taken for a max. of 6 hrs. of credit when topics vary.

4081 French Literature in Translation (3) F,S Credit not applicable toward a major in French; knowledge of French not required. May be taken for a max. of 6 hrs. of credit when subject matter varies. Selected periods, topics, or movements.

4090 French and Francophone Women Writers (3) Prereq.: 3000-level French course or equivalent. Women's writing in France and in Francophone countries from the middle ages to the present.

4095 Studies in Gender and French Literature (3) Prereq.: 3000-level French course or equivalent. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Examination of selected periods, themes, and genres.

4100 Special Topics in French Language and Literature (3) May be taken for a max. of 6 hrs. of credit when topics vary.

4403 Instructional Strategies for the Second Language French Classroom (1) Prereq.: EDCI 3002, FREN 3402, and concurrent enrollment in EDCI 4003. 3 hrs. lab/field experiences in multicultural settings. Teacher candidates will study and participate in activities that incorporate different classroom interactional structures, including teacher-to-whole class, task-based group activities, and student-to-student (pair work); candidates will design and conduct French language lessons using learner-centered activities.

4404 Critical Issues in Teaching French as Second Language: Capstone Course (3) Prereq.: EDCI 4003, FREN 4403, and concurrent enrollment in EDCI 4004. Teacher candidates should be in their last two semesters of completion of the requirements for a major in French. Taught in French. Focus on the consolidation of knowledge about the French language, literature, and culture with respect to the teaching of subject content to middle or high school learners.

4915 Independent Work (1-3) F,S,Su May be taken for a max. of 3 hrs. of credit. Readings in French literature directed by a senior faculty member.

7005 François Villon and His Age (2) V François Villon and other important figures of the Middle French period, notably Guillaume de Machaut, Eustache Deschamps, Christine de Pisan, Alain Chartier, and Charles d'Orléans.

7006 Studies in Medieval French Literature (3) V May be taken for a max. of 6 hrs. of credit with consent of department if content varies. Topics focus on an author, movement, or literary mode.

7012 Studies in 16th Century French Literature (3) V May be taken for a max. of 6 hrs. of credit with consent of department if content differs. Topics focus on an author, movement, or literary mode.

7013 Montaigne (3) V The *Essays* and their importance.

7021 French Classicism (3) V The classical mode in 17th century French literature; literary and artistic doctrine, major authors, and genres.

7022 Studies in 17th Century French Literature (3) V May be taken for a max. of 6 hrs. of credit with consent of department if content varies. Topics focus on an author, movement, or literary mode.

7031 Les Philosophes (3) V Aesthetic and language theory as developed in the *Encyclopédie* and in other major texts of the period.

7032 Studies in 18th Century French Literature (3) V May be taken for a max. of 6 hrs. of credit with consent of department, if content varies. Topics focus on an author, movement, or literary mode.

7041 French Romanticism (3) V Historical, epistemological, and semiotic aspects of French Romanticism.

7042 Studies in 19th Century French Literature (3) V May be taken for a max. of 6 hrs. of credit with consent of department, if content varies. Topics focus on an author, movement, or literary mode.

7051 The 20th Century Novel (3) V The works of such major novelists of the modern period as Gide, Proust, Malraux, Camus, Beckett, and Robbe-Grillet.

7052 Studies in 20th Century French Literature (3) V *May be taken for a max. of 6 hrs. of credit with consent of department, if content varies.* Topics focus on an author, movement, or literary mode.

7201 French Phonology and Morphology (3) V Sound structure, form, and function in French; principles and techniques of French phonological and morphological analysis.

7202 French Syntax and Semantics (3) V French transformational generative syntax; modern semantic theory, with emphasis on generative semantics and its relationship to the syntactic component.

7203 French Dialectology (3) V Principles and methods of a real linguistics and social dialectology in French-speaking areas.

7204 Field Methods in French Linguistics (3) V Methods of eliciting linguistic materials, processing and analyzing data, and writing linguistic descriptions; detailed study of dialects of Louisiana French.

7206 Louisiana French and Bilingualism (3) V *Some field work required.* Sociolinguistic, psychological, and linguistic aspects of bilingualism as they apply to Louisiana; analysis of language contact situations, language change and variation.

7300 Old Provençal (3) V Phonology and morphology of Old Provençal based on the study of literary texts.

7915 Independent Study (1-3) *May be taken for a max. of 3 hrs. credit in a master's program and 9 hrs. credit in a doctoral program.* Directed individual readings guided by the graduate faculty.

7960 Special Topics in French Literature (3) V *May be taken for a max. of 6 hrs. of credit for the master's degree and 9 hrs. of credit for the doctorate when topics vary.* Topics to be announced.

7962 Special Topics in French Linguistics (3) V *May be taken for 6 hrs. of credit for the master's degree and 9 hrs. of credit for the doctorate when topics vary.* Topics to be announced.

7970 Seminar in French Literature (3) Y *May be taken for a max. of 6 hrs. of credit when topics vary.* Topics to be announced.

7980 Seminar in French Linguistics (3) Y *May be taken for a max. of 6 hrs. of credit when topics vary.* Topics to be announced.

7990 Topics in Gender Representations in French Literature (3) *With consent of department, may be taken for a max. of 6 sem. hrs. of credit when topics vary.* Dynamics of exchange, influence, and collaboration between male and female writers.

7995 French Feminist Theories (3) Current and past modes of feminist theoretical discourse; implications for literary studies.

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

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

GEOGRAPHY • GEOG

General education courses are marked with stars (★).

CORE CURRICULUM

(Required of majors.)

★ **1001 Human Geography: Americas and Europe (3)** *1001 and 1003 need not be taken in numerical order. Credit will not be given for this course and GEOG 2062.* Principal themes of human geography, including the spatial distributions and interactions of culture, history, economy, population, and environment, with a regional emphasis on the Americas and Europe.

★ **1003 Human Geography: Africa and Asia (3)** *1001 and 1003 need not be taken in numerical order. Credit will not be given for this course and GEOG 2062.* Principal themes of human geography, including the spatial distributions and interactions of culture, history, economy, population, and environment, with a regional emphasis on Africa and Asia.

★ **2050 Physical Geography: The Atmosphere (3)** *Credit will not be given for both this course and GEOG 2061. May be taken for elective geology credit.* Physical principles, processes, and operations in the atmosphere; world climatic realms.

★ **2051 Physical Geography: Land and Water Surfaces, Plant and Animal Realms (3)** *Credit will not be given for both this course and GEOG 2061.* Surface elements of the earth's environment; relationships among these elements.

2055 Map Reading (3) *2 hrs. lecture; 2 hrs. lab.* Nature and interpretation of topographic maps.

3999 Senior Proseminar (1) *For geography majors in the senior year.* Relationship of the subfields of geography to the overall objectives of the field.

MAPPING SCIENCES

(All majors select three courses.)

Cartography

2039 Cartographic Drafting and Graphic Presentation (3) *2 hrs. lecture; 2 hrs. lab.* Basic drafting instruments and techniques necessary for preparation of maps and scientific graphics.

4040 Advanced Cartography (3) *Prereq.: GEOG 2039 or equivalent. 2 hrs. lecture; 2 hrs. lab.* Cartographic history; map projection; advanced techniques of data presentation and cartographic production.

4043 Computer Cartography: Main-Frame (3) *No programming knowledge necessary. 2 hrs. lecture; 2 hrs. lab.* Introduction to selected mapping packages.

4044 Computer Cartography: Personal Computer (3) *No programming knowledge necessary. 2 hrs. lecture; 2 hrs. lab.* Introduction to selected mapping packages.

4049 Advanced Computer Cartography (3) *Prereq.: CSC 1240 and GEOG 4043. 2 hrs. lecture; 2 hrs. lab.* Use of computer mapping programs; theory and methods of display of point, line, and area elements in thematic maps; algorithms involved in encoding, editing, storing, retrieving, and displaying data from a digital cartographic data base.

Remote Sensing

4019 Aerial Photo Interpretation of Cultural Features (3) *2 hrs. lecture; 2 hrs. lab. Credit will not be given for both this course and GEOG 4020.* Analysis of land use/land cover, urban, industrial, and military aspects from aerial photographs.

4020 Aerial Photo Interpretation (3) *Prereq.: GEOL 1001 and 1003 or GEOG 2051. Credit will not be given for both this course and GEOG 4019. 2 hrs. lecture; 2 hrs. lab.* Analysis and mapping of geologic structure, lithology, and landforms from aerial photographs.

4045 Environmental Remote Sensing (3) *Prereq.: consent of instructor. May be taken for elective geology credit. 2 hrs. lecture; 2 hrs. lab.* Basic energy and matter relationships; principles of primary remote sensors; environment studied via remote sensing techniques

GIS/Techniques

4041 Field Methods in Geography (3) *1 hr. lecture; 4 hrs. lab. Cannot be repeated for credit. Students must have Saturdays free.* Fall semester emphasis on interpretation of the cultural landscape; spring semester emphasis on the physical landscape.

4047 Geographic Information Systems (3) *Prereq.: CSC 1240 or equivalent. 2 hrs. lecture; 2 hrs. lab.* 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.)

Systematic

4012 Elements of Cultural Geography (3) Culturally oriented proseminar in American geographical thought during the present century.

4060 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 seas, 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 in Developing Countries (3) Geographic theories and methods for analyzing environment and development in developing countries.

4080 Environmental Historical Geography (3) Human-environment interaction from a historical geographic perspective; human agency in altering the environment and managing resources, and social response to environmental hazards.

4086 Cultural Ecology (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 INTL 4002.*

4026 The Mountain World (3) Mountain regions and peoples from the Himalaya, Andes, and Alps to the Sierra Nevada and Rocky Mountains; mountain cultures, economies; current development and conservation issues.

4031 Spanish America (3) Physical and cultural geography of Mexico, Central America, and Spanish South America.

4032 Brazil and the Caribbean Area (3) Physical and cultural geography of Brazil, the Guianas, and the Caribbean Islands.

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 the southern U.S.; emphasis on geographical elements identified with the south and their historical development; environment, exploration, population, agriculture, and cultural landscape.

4052 Anglo-America (3) *Credit will not be given for both this course and GEOG 2052.* Physical and cultural geography of Anglo-America.

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 areal variations in composition and structure of the atmosphere; meteorological instruments and measurements.

4014 Climatology (3) Climatic phenomena; methods in development of regional climatology.

4015 Microclimatology (3) *Prereq.: GEOG 4013 or 4014 or equivalent. May be taken for elective geology credit.* Exchanges of radiation, energy, and moisture between the earth's surface and the atmosphere producing 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. 1 hr. lecture; 2 hrs. lab.* 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 Geographical 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.

Geomorphology and Coastal

4021 Alluvial Morphology (3) *Prereq.: GEOL 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.: GEOL 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 a basic course in historical geology, or equivalent. 2 hrs. lecture; 4 hrs. lab. Also offered as ANTH 4083.* Theory and method 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

2001 World Energy Resources (3) *See GEOL 2001.*

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; unitization, site analysis, and impact; emphasis on Louisiana and Gulf Coast.

4023 Coastal and Shallow-Marine Depositional Systems (3) *See GEOL 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 GEOL 4164.*

4997 Special Topics in Geography (3) *May be taken for a max. of 6 sem. 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.*

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

7902 Introduction to Research Methods in Geography (3)
7906 Settlement Geography: Exploration (3) *May be taken for a max. of 9 hrs. of credit with consent of department.*

7910 Form-Process Relationships in Coastal Environments (3) V

7911 Selected Topics in Geography (3) *May be taken for a max. of 9 sem. hrs. when topics vary.*

7917 Advanced Physical Geography (3) *May be taken for a max. of 9 hrs. of credit with consent of department.*

7921, 7922, 7923 Research and Field Work in Geography (3-6 each) *Each course may be repeated for credit.*

7926 Advanced Geomorphology (3) *May be taken for a max. of 9 hrs. of credit with consent of department.*

7935 Quantitative Methods for Geographical Analysis (3) *Prereq.: EXST 7003 or equivalent.* Spatial analytical methods for handling and interpreting data related to geography.

7937 Geographical Literature (3)

7938 Culture History (3) *May be taken for a max. of 9 hrs. of credit with consent of department.*

7941 Coastal Ecology (3) *Prereq.: GEOG 4028 or equivalent. 2 hrs. lecture; 2 hrs. lab. All students must have weekends free.*

7942 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.

7946 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.

7973 Advanced Geographic Information Systems (3) *Prereq.: GEOG 4047 or equivalent.* Theory and methods of design, development, implementation, and applications of geographic information systems.

7975 Advanced Remote Sensing Seminar (3) V *Prereq.: GEOG 4045 or equivalent. May be taken for a max. of 9 sem. hrs. of credit when topics vary.* Selected topics in remote sensing.

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

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

GEOLOGY • GEOL

General education courses are marked with stars (★).

★ **1001 General Geology: Physical (3)** *An honors course, GEOL 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 GEOL 1001, with special honors emphasis for qualified students.*

★ **1003 General Geology: Historical (3)** *Prereq.: GEOL 1001. An honors course, GEOL 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 GEOL 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; place of dinosaurs in earth's geological history; emphasis on catastrophes and patterns of extinction.

★ **1601 Physical Geology Laboratory (1)** *Prereq.: credit or concurrent enrollment in GEOL 1001. Lab related to GEOL 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 south Louisiana.

★ **1602 Historical Geology Laboratory (1)** *Prereq.: GEOL 1601; credit or concurrent enrollment in GEOL 1003. Lab related to GEOL 1003.* Sedimentary rocks and environments, geobiological sequences, fossils, and the historical geological record as interpreted from maps.

2020 Geology and the Environment (3) S *Prereq.: GEOL 1001.* Interaction between human activities and geological processes, hazards, and materials; emphasis on environmental geology of Louisiana and the Gulf Coast region.

2066 Continents Adrift and Global Tectonics (3) S *Prereq.: GEOL 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.

2071 Structural Geology (4) *Prereq.: GEOL 1003, 1602; credit in MATH 1550. 2 hrs. lecture; 6 hrs. lab.* Description, classification, and interpretation of structures; introduction to tectonics.

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.: GEOL 2081. 2 hrs. lecture, 3 hrs. lab.* Optical mineralogy, phase diagrams, and rock forming minerals.

3011 Introduction to Paleontology (4) *Prereq.: GEOL 1003, 1602; CHEM 1202, 1212; BIOL 1201. 3 hrs. lecture, 3 hrs. lab. One to two field trips required.* Characteristics of modern/fossil animal groups, and biological and geological systems that produced them; systematics, evolution, taxonomy, and paleoecology.

3032 Introduction to Sedimentology and Depositional Environments (3) *Prereq.: GEOL 1001, 1003, 1601, or equivalent; concurrent registration in GEOL 2082; 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.: GEOL 2082. 2 hrs. lecture; 3 hrs. lab.* Composition, textures, structures, distribution, and origin of igneous and metamorphic rocks.

3666 Field Geology (6) Su only *Prereq.: GEOL 2071 and 2082; or equivalent. Students planning to take this course should apply to the camp director no later than Feb. 15. Camp fee.* Six weeks in the Front Range of Colorado and adjacent mountainous areas.

3909 Geological Research (1-3) F,S,Su *May be taken for a max. of 9 sem. hrs. of credit when topics vary. Primarily for geology majors.* Directed reading, conference, and field/laboratory investigations of geological problems.

4002 Special Topics in Geology and Geophysics (3) V *Prereq.: senior standing in geology or consent of instructor. 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 Micropaleontology (3) F *Prereq.: GEOL 3011 or equivalent. 2 hrs. lecture; 3 hrs. lab.* Morphology, classification, stratigraphy, paleoecology, and evolutionary patterns of common marine microfossils; emphasis on foraminifera.

4023 Coastal and Shallow-Marine Depositional Systems (3) *Also offered as GEOG 4023.* Dynamics of sediment transport in coastal zones and on continental shelves; sea-level changes; morphological, sedimentary, and stratigraphic attributes of coastal and shallow-marine lithosomes.

4031 Introductory Sedimentation (3) *Prereq.: GEOL 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.: GEOL 3032. Field trip required.* Physical sedimentary processes in nonmarine and marine depositional systems, including fluvial, alluvial fan, lacustrine, eolian, and carbonate and clastic marine environments; influence of tectonics, climate, and sea level on sedimentary architecture and sequences.

4042 Principles of Economic Geology (3) *Prereq.: GEOL 2071 and 2081. 2 hrs. lecture; 3 hrs. lab.* Geology and genesis of metallic and nonmetallic earth resources.

4043 Earth Materials and the Environment (3) *Prereq.: CHEM 1202, GEOL 1001, 2081 or permission of instructor.* Earth materials as problems and solutions in environmental issues; physiochemical behavior of asbestiform silicates, silica, zeolites, and associated health hazards; potential geological repositories for hazardous waste.

4044 Petroleum Geology (3) *Prereq.: GEOL 2082, 3012, 2071 and MATH 1550.* Modern concepts of the origin, migration, entrapment and production of hydrocarbons from sedimentary basins.

4055 Volcanology (3) *Prereq.: GEOL 2082 and credit or enrollment in GEOL 3041.* Landforms and deposits produced by volcanism; significance of volcanism to earth and human history.

4062 Exploration and Environmental Geophysics (3) *Prereq.: GEOL 2071 and MATH 1552 or permission of instructor. 2 hrs. lecture; 3 hrs. lab.* Principles and methods of acquisition, processing, and interpretation of geophysical data used to investigate the shallow subsurface; seismic refraction, seismic reflection, gravity, magnetics, electrical resistivity, well logs, and ground penetrating radar.

4064 Solid Earth Geophysics (3) *Prereq.: GEOL 2071 and MATH 1552.* Concepts and methods used to study the structure and dynamics of the earth; rotation, gravity, seismology, heat flow, geomagnetism, paleomagnetism, radioactivity, and deformation.

4066 Plate Tectonics (3) *Prereq.: GEOL 2071.* Contemporary concepts of plate tectonics; geophysical observations and geological implications.

- 4067 Introduction to Seismology (3)** Prereq.: MATH 2057, 2090, and either GEOL 2071 or consent of instructor. Fundamental concepts and methods in seismic wave analysis used to study earth; body waves, plane wave reflection, surface waves, earthquakes, and focal mechanisms.
- 4068 Reflection Seismology (3)** Prereq.: GEOL 4067 or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Seismic reflection techniques used to investigate shallow earth structure; waves in layered media, correlation, convolution, deconvolution, and spectral analysis; interpretation of seismic record sections.
- 4071 Advanced Structural Geology (3)** Prereq.: minimum of 20 hrs. in geology courses, including GEOL 2071. 2 hrs. lecture, 3 hrs. lab. Structural geology of the U. S.; its application to problems of folding, faulting, rock mechanics, and plate interactions.
- 4081 Chemical Oceanography (3)** Prereq.: consent of instructor. 3 hrs. lecture/seminar. Also offered as OCS 4126. Controls on the mass balance and distribution of major elements, trace elements, heavy metals, dissolved gases, and nutrients in estuarine and open-ocean systems.
- 4082 Introduction to Geochemistry (3)** Prereq.: GEOL 2082 and MATH 1550. Crystal chemistry; application of chemical principles to problems of the origin and evolution of the earth's crust, ocean, atmosphere, and economic resources; major geochemical cycles.
- 4083 Introduction to Isotope Geology (3)** Prereq.: GEOL 2082 and MATH 1550; or equivalent. Principles of nuclear chemistry, radioactive decay, and isotopic fractionation processes; radiometric dating techniques and stable isotopic studies.
- 4085 Geochemistry of Sediments and Natural Waters (3)** Prereq.: GEOL 2082 and MATH 1550. Controls on the composition of natural waters and the role of fluid-rock interactions in the geochemical evolution of sedimentary rocks, the ocean, and the atmosphere; major geochemical cycles.
- 4098 Tectonic Evolution of North America (3)** Prereq.: GEOL 2071. Structural, magmatic, and sedimentary history of the North American continent.
- 4111 Vertebrate Paleontology (3)** Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab. Phylogenetic survey of fossil vertebrates; their origins and transitions; vertebrate taphonomy, biostratigraphy, and fossil collection and preparation.
- 4131 Basin Analysis (3)** Prereq.: GEOL 4031. Basic environment of sediment deposition; sedimentological models and their relationships within depositional basins; analysis of theoretical basin models and comparison with modern and ancient sedimentary basins.
- 4161 Gulf Coast Geology (3)** Prereq.: GEOL 2071. Origin and evolution of the Gulf Basin; stratigraphy and structure of Mesozoic and Cenozoic rocks, sedimentary facies, sedimentary tectonics, geothermal heat flow, fluid migration, mineral and water diagenesis, salt and shale diapirism, structural deformation, and the occurrence of oil and gas.
- 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.
- 4165 Subsurface Geology (3)** Prereq.: GEOL 1001, 1003, 1601, 1602; PETE 4088 strongly recommended. 2 hrs. lecture; 3 hrs. lab. Principles and methods of exploration, analysis, and interpretation using borehole data, electric logs, and samples of rocks and fluids; construction of geological maps and sections showing sediment facies, geological structure, geotemperature, fluid pressure and water salinity; analysis of fluid migration, oil and gas accumulation, and geothermal resources.
- 4182 Physical Hydrogeology (3)** Prereq.: GEOL 3032 or 4031 and MATH 1552 or permission of instructor. Subsurface fluid flow in geological materials; 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 of science.
- 7031 Deep-water Depositional Environments (3)** Prereq.: introductory course in sedimentology, e.g., GEOL 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.
- 7043 Advanced Igneous Petrology (3)** Prereq.: GEOL 3041 or equivalent. 2 hrs. lecture; 3 hrs. lab. Phase diagrams, magmatic origin of igneous rocks, and evolution of igneous provinces.
- 7044 Advanced Metamorphic Petrology (3)** Prereq.: GEOL 3041 or equivalent. 2 hrs. lecture; 3 hrs. lab. Facies concept, theoretical and field relations, textures, and their significance.
- 7052 Advanced Volcanology (3)** Prereq.: GEOL 2081, 2082, and 3041 or equivalent. Dynamic processes involved in volcanism; physical products, and development of the facies concept for interpretation of ancient volcanic deposits.
- 7061 Sequence Stratigraphy (3)** Prereq.: GEOL 4031 or equivalent. One-week field trip to the southern Rocky Mountains is required. Principles of physical stratigraphy with emphasis on contemporary concepts about the interaction of tectonics, sea level, and sediment supply in generating a predictable architecture of sedimentary basin fills.
- 7062 Seismic Stratigraphy (3)** Prereq.: GEOL 2071 or equivalent. Interpretation of seismic reflection data in terms of sedimentary facies, stratigraphic sequences, and implications for local and eustatic sea-level fluctuations.
- 7064 Numerical Methods in the Geological Sciences (3)** Prereq.: CSC 2262, MATH 1552, and GEOL 4064; or equivalent. Numerical methods applied to geological research; interpolation and extrapolation, nonlinear equations, solutions of simultaneous linear equations, least squares approximations, numerical integration, numerical solution of differential equations, and Fourier transforms.
- 7065 Geodynamics (3)** Prereq.: MATH 2057 and 2090 or equivalent; and GEOL 4064 or equivalent. Fundamental physical processes involved in plate tectonics and other geological phenomena; concepts in mantle convection, rock rheology, faulting, flexure, and heat transfer.
- 7066 Earthquake Seismology (3)** Prereq.: GEOL 4068 or equivalent. Basic principles of earthquakes; source mechanism, seismic waves and tectonic application; seismicity, magnitude, radiation pattern, source description, ray tracing, earthquake location, seismotectonics, and earthquake prediction.
- 7071 Geological Strain Analysis and Deformation Microstructures (4)** Prereq.: GEOL 2071 and 3041; MATH 1552 (MATH 2057 and 2085 are recommended). 3 hrs. lecture; 3 hrs. lab. Techniques for measuring strain in deformed rocks; development of deformation textures and kinematic indicators.
- 7072 Mesoscopic and Macroscopic Structures (3)** Prereq.: GEOL 2071 and 3041; MATH 1552; PHYS 2102; or equivalent. Description and origin of folds, diapirs, joints, and faults.
- 7081 Isotope Geochemistry (3)** Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab/demonstration. Stable isotope fractionation in natural systems; emphasis on oxygen, hydrogen, and carbon isotope-ratio variation in natural waters, carbonates, and silicates with application to the solution of petrologic problems.
- 7083 Mass Spectrometry for Isotope Geology (3)** Prereq.: GEOL 4083 or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Principles of thermal ionization mass spectrometry; chemical preparation of geological samples for isotope ratio measurements; use of multicollector solid source mass spectrometer; applications to geological studies.
- 7084 Isotope Stratigraphy (3)** Prereq.: GEOL 7081. Application of isotope techniques to stratigraphy; isotope systematics of sedimentary depositional environments; emphasis on utilization of isotopes as stratigraphic markers; interpretation of geological events from time-series isotope records.
- 7111 Advanced Micropaleontology (3)** Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit. Advanced training in micropaleontology.
- 7115 Paleocology (3)** Prereq.: GEOL 3011 and 4031. 2 hrs. lecture; 2 hrs. field trip. Diversity, structure, taphonomy, and evolution of fossil and modern marine assemblages; adaptations and functional morphology; organism-sediment relationships.
- 7117 Biostratigraphy (3)** Prereq.: GEOL 3011 or equivalent. 2 hrs. lecture; 2 hrs. lab. Stratigraphic concepts; modern rules and procedures in interval and assemblage zonations; distribution of stratigraphically important fossil groups; event stratigraphy and chronostratigraphic modeling using computer techniques; applications to global and regional problems.
- 7120 Paleobiology (3)** Prereq.: GEOL 3011 or equivalent. Patterns and processes of evolution as discerned from the fossil record; tempo and mode of evolution, hierarchy and macroevolution, mass extinctions, patterns of diversification; emphasis on development of theories and case studies.
- 7131 Petrology of Sandstones (3)** 2 hrs. lecture; 3 hrs. lab. Petrology and petrography of terrigenous sandstones; applications of sediment mineralogy and texture to the analysis of provenance, deposition, and diagenesis; emphasis on the interrelationship of tectonics and sedimentation.
- 7132 Dynamics of Sedimentation (3)** 2 hrs. lecture; 3 hrs. lab. Fluid mechanics as applied to sedimentation, fluid-particle interactions, erosion, mechanics of sediment transport including fluid and sediment flows, deposition and the origin of primary structures, and hydrodynamic instability and soft-sediment deformation.
- 7133 Sedimentary Petrography of Carbonates (3)** 2 hrs. lecture; 3 hrs. lab. Principles governing formation, deposition, and diagenesis of carbonate sediments and sedimentary rocks; lab stresses textural, fabric, and mineral relationship and interpretation of depositional environments and mineral paragenesis of ancient carbonate sequences.
- 7134 Clay Mineralogy (3)** 2 hrs. lecture; 3 hrs. lab/discussion. Mineralogy; geochemistry, and geology of clay minerals; argillaceous sediments and rocks.
- 7163 Mesozoic and Cenozoic Stratigraphy (3)** Paleogeographic development of the earth during the Mesozoic and Cenozoic Eras; emphasis on global reconstructions, climates, and the stratigraphy of major basins.
- 7183 Physical Geochemistry of Burial Diagenesis (3)** Prereq.: GEOL 4082 or equivalent. Quantitative techniques in thermodynamics, kinetics, and mass transport applied to problems of burial diagenesis of sedimentary minerals and fluids.
- 7666 Gulf Coast Field Geology (8)** Su only Prereq.: GEOL 3666 or equivalent. Students requiring this course should contact the departmental office no later than Feb. 15. All incoming graduate students interested in "soft rock" specialties should enroll. Camp fee. Eight-week field course. Comparison of recent depositional environments with Paleozoic, Mesozoic, and Cenozoic counterparts in the Gulf Coastal Plain and its margins.
- 7900 Special Topics in Geology and Geophysics (3)** V May be taken for a max. of 12 sem. hrs. of credit when topics vary. Advanced and/or emerging topics in geology and geophysics.
- 7909 Directed Research in Geology and Geophysics (1-6)** May be taken for a max. of 10 sem. hrs. of credit when topics vary. General student-selected research topics and focused group research, including all topics in geology and geophysics.
- 7911 Seminar in Geology: Paleontology (2)** May be repeated for credit.
- 7931 Seminar in Geology: Sedimentology (2)** May be repeated for credit. Fall semester: carbonate sedimentology; spring semester: clastic sedimentology and sedimentary environments.
- 7941 Seminar in Geology: Igneous and Metamorphic Petrology (2)** May be repeated for credit.
- 7961 Seminar in Geology: Structural Geology (2)** May be repeated for credit.
- 7966 Field Work (1-9)** 7971 Seminar in Tectonics (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary. Plate tectonics, diapirism, isostasy, and the tectonics of specific areas.
- 7972 Seminar in Geophysics (3)** May be taken for a max. of 9 sem. hrs. of credit when topics vary. Structure and composition of the mantle; physical processes at ridges, trenches, and transform faults; dynamics of plate interiors; intraplate stress; and thermal histories of the earth and other terrestrial planets; physics of rock magnetism; and hydrodynamics of sedimentary basins.
- 7981 Seminar in Geochemistry (2)** Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit. Mineralogy, paragenesis, geochemistry, and natural occurrence of authigenic silica in sediments; other topics such as hydro geochemistry, isotope geochemistry, and the geochemistry of carbonates.
- 8000 Thesis Research (1-12 per sem.)** "S"/"U" grading.
- 9000 Dissertation Research (1-12 per sem.)** "S"/"U" grading.

GERMAN • GERM

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

General education courses are marked with stars (★).

*1101 **Elementary German (4)** Basic lexicon and structures of German; emphasis on communicative language use; supplementary work in language and computer laboratories.

★ *1102 **Elementary German (4)** *Prereq.: GERM 1101 or equivalent. Continuation of GERM 1101.* Basic lexicon and structures of German; emphasis on communicative language use. Supplementary work in language and computer laboratories.

★ 2075 **German Civilization (3)** *Knowledge of German not required. Also offered as HIST 2075.* Development of the modern German states from early Germanic times; art, literature, music, and philosophy in an historical context.

★ 2090 **Germanic Mythology (3)** *Knowledge of German not required.* Germanic myths and legends; their major manifestations in religion, literature, art, and music.

★ *2101 **Intermediate German (3)** *Prereq.: GERM 1102 or equivalent.* Reading, conversation, composition; review of lexicon and structure; supplementary work in language and computer laboratories.

★ *2102 **Intermediate German (3)** *Prereq.: GERM 2101 or equivalent. Continuation of GERM 2101.* Reading, conversation, composition; emphasis on lexicon of spoken German; supplementary work in language and computer laboratories.

★ *2155 **Readings in German Literature (3)** *Prereq.: GERM 2102 or equivalent.* Analysis of literary texts; expansion of lexicon, comprehension, and composition skills.

3060 **German for Business (3)** *Prereq.: GERM 2102 or equivalent.* Introduction to German in a business environment: focus on linguistic structures and vocabulary, forms of business communication, reading of business text, and social customs.

3061 **German Discourse (3)** *Prereq.: GERM 2102.* Intensive practice in listening comprehension, oral and written communication; special problems in German structure; thematic treatment of contemporary issues in German speaking countries.

3062 **Advanced German Discourse (3)** *Prereq.: GERM 3061.* Continued intensive practice in listening comprehension, oral and written communication; special problems in German structure; thematic treatment of contemporary issues in German speaking countries.

3081 **Survey of German Literature and Culture: Beginning to 1700 (3)** *Prereq.: GERM 2155 or equivalent.* Readings from, and an historical overview of, the Middle Ages, the Renaissance and Reformation of the Baroque periods.

3082 **Survey of German Literature and Culture: 1700-1830 (3)** *Prereq.: GERM 2155 or equivalent.* Readings from, and an overview of, the Enlightenment, Storm and Stress, Weimer Classicism, and Romanticism.

★ 3083 **Survey of German Literature and Culture: 1830-1890 (3)** *Prereq.: GERM 2155 or equivalent.* Readings from, and a historical overview of, Biedermeier/Vormarz, Realism, and Naturalism.

★ 3084 **Survey of German Literature and Culture: 1890 to the Present (3)** *Prereq.: GERM 2155 or equivalent.* Readings from, and a historical overview of, Expressionism, New Objectivity, the Group 47, GDR literature, and Post-Modernism.

3090 **Friedrich Nietzsche (3)** *Knowledge of German not required. Also offered as PHIL 3090.* Major works of Nietzsche studied in the context of the three periods of productivity and evolution of his thought.

3091 **Special Topics in German Literature in Translation (3)** *Knowledge of German not required. May be taken for a max. of 6 hrs. of credit when topics vary.*

4005 **German 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 undergraduates, although hours may count toward baccalaureate. Credit will not be given for both this course and introductory German courses.*

4030 **German Drama (3)** Dramatic literature in German.

4031 **German Poetry (3)** Study of German poetic expression.

4032 **German Prose (3)** Emphasis on stylistic analyses and narrative theories

4041 **Special Topics in Older Germanic Literature and Culture (3)** *May be taken for a max. of 6 hrs. of credit when topics vary.*

4042 **Special Topics in 18th Century German Literature and Culture (3)** *May be taken for a max. of 6 hrs. of credit when topics vary.*

4043 **Special Topics in 19th Century German Literature and Culture (3)** *May be taken for a max. of 6 hrs. of credit when topics vary.*

4044 **Special Topics in 20th Century German Literature and Culture (3)** *May be taken for a max. of 6 hrs. of credit when topics vary.*

4045 **Special Topics in Contemporary German Literature and Culture (3)** *May be taken for a max. of 6 hrs. of credit when topics vary.*

4046 **German Film (3)** *Knowledge of German not required.* German film in its socio-historic contexts with some attention to cinematic technique.

4091 **Special Topics in German Literature and Culture in Translation (3)** *May be taken for a max. of 6 hrs. of credit when topics vary. Knowledge of German not required.*

4915 **Independent Work (1-3)** *May be taken for a max. of 3 sem. hrs. credit. Permission of department required.*

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.

★ 2051 **Intermediate Greek (5)** *Prereq.: GREK 1001 or equivalent. Continuation of GREK 1001.* Readings in prose texts of moderate difficulty.

★ 2053 **Homer (3)** *Prereq.: GREK 2051 or equivalent.* Readings from the *Iliad* or *Odyssey*; selected passages 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.

2056 **New Testament (3)** *Prereq.: GREK 2053 or equivalent.* Selected readings from the New Testament.

2065 **Plato'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 topics vary.*

HEBREW • HEBR

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 HEBR rubric.* The alphabet, basic grammar, and vocabulary of classical Hebrew; simple prose passages from the Bible.

★ 1002 **Beginning Hebrew (4)** *Also offered as REL 1002. Prereq.: HEBR/REL 1001 or equivalent. This course will count toward the fulfillment of a foreign language requirement only when taken under the HEBR rubric.* Basic grammar and vocabulary of classical Hebrew; simple prose readings from the Bible.

★ 2003 **Intermediate Hebrew (4)** *Also offered as REL 2003. Prereq.: HEBR/REL 1002 or equivalent. This course counts toward the fulfillment of a foreign language requirement only when taken under the HEBR rubric.* Biblical narratives; details of syntax; development of vocabulary.

★ 2004 **Intermediate Hebrew (4)** *Also offered as REL 2004. Prereq.: HEBR/REL 2003 or equivalent. This course counts toward the fulfillment of a foreign language requirement only when taken under the HEBR 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.

★ 1003 **Western Civilization Since 1500 (3)** *An honors course, HIST 1004, is also available.* Development of western civilization from the Reformation to the present.

★ 1004 **HONORS: Western Civilization Since 1500 (3)** *Same as HIST 1003, with special honors emphasis for qualified students.* Supervised reading, discussion, research, and writing.

★ 1007 **World History Since 1500 (3)** Interactions among Asian, Middle Eastern, African, European, and American cultures in the modern era.

★ 2001 **The Ancient Near East and Greece (3)** Development of institutions and thought in the earliest civilized societies of the Ancient Mediterranean from the beginning of civilization to the end of the Hellenistic Age.

★ 2002 **Rome: Republic and Empire (3)** Development of the Roman state, society, and thought from the prehistory of Italy to St. Augustine.

★ 2011 **England: Roman Times through 1688 (3)**

★ 2012 **Britain from 1689 to the Present (3)**

2020 **Medieval Europe (3)** Social, cultural, religious, and political history of medieval Europe from the reign of Constantine in the fourth century to the fall of Constantinople in 1453.

★ 2021 **Modern Europe (3)** Political, economic, and social developments and diplomacy from the Renaissance to 1848.

★ 2022 **Modern Europe (3)** Political, economic, and social developments and diplomacy from 1848 to the present.

2023 **The World Since 1960 (3)** Major events since 1960 in the U.S., U.S.S.R., and selected nations of Europe, the Middle East, Latin America, Africa, and Asia; emphasis on social, economic, political, and national security issues.

★ 2055 **The United States to 1865 (3)** *An honors course, HIST 2056, is also available.*

★ 2056 **HONORS: The United States (3)** *Same as HIST 2055, with special honors emphasis for qualified students.*

★ 2057 **The United States from 1865 to the Present (3)** *An honors course, HIST 2058, is also available.*

★ 2058 **HONORS: The United States (3)** *Same as HIST 2057, with special honors emphasis for qualified students.*

★ 2061 **African-American History (3)** Social, cultural, and economic role of African-Americans in the U.S. from 1619 to the present.

★ 2075 **German Civilization (3)** *See GERM 2075.*

★ 2085 **Colonial Latin America (3)** Colonial period emphasizing the European background, explorations, political and economic systems, and wars of independence.

★ 2086 **Latin America Since Independence (3)** Latin American countries in the 19th and 20th centuries; search for political stability, economic and social progress, and international relations.

★ 2095 **East Asian Civilization to 1800 (3)** Interdisciplinary and cultural approach to the civilization of East Asia, particularly China and Japan, from antiquity to early contacts with the West.

★ 2096 **East Asian Civilization Since 1800 (3)** Modern Asian civilization; emphasis on contact with the West, and the rise of nationalism and communism.

2135 **Introduction to Russian Culture and Civilization (3)** *See RUSS 2075.*

2195 **Topics in History (3)** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.*

3071 **Louisiana (3)** Political, economic, social, and cultural development.

3115 **Introduction to Historical Method (3)** Survey of different methods and perspectives used in the research and writing of history.

3117 Undergraduate Proseminar in World History (3) Prereq.: consent of instructor. Open to students with at least 6 sem. hrs. of credit in history and with an overall 3.00 gpa. May be taken for a max. of 9 hrs. of credit when topics vary. Supervised reading and research in an assigned field of historical study.

3118 Undergraduate Proseminar in European History (3) Prereq.: consent of instructor. Open to students with at least 6 sem. hrs. of credit in history and with an overall 3.00 gpa. May be taken for a max. of 9 hrs. of credit when topics vary. Supervised reading and research in an assigned field of historical study.

3119 Undergraduate Proseminar in United States History (3) Prereq.: consent of instructor. Open to students with at least 6 sem. hrs. of credit in history and with an overall 3.00 gpa. May be taken for a max. of 9 hrs. of credit when topics vary. Supervised reading and research in an assigned field of historical study.

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 Macedonian Empire of Alexander the Great; attention to growth of democratic institutions.

4003 The Roman Republic (3) The Roman state, culture, and society 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 Carolingians; 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, 1660-1760.

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.

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 powers of early modern Europe; 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 Wilhelmian 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 aftermath.

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.

4039, 4040 English Constitutional History (3,3) Origin and development of English legal institutions; their influence on American legal institutions.

4043 Tudor England (3) Political, economic, and cultural history of 16th century England.

4044 Stuart England (3) Period of transition from kings who would be absolutist, through the crisis of civil wars, to the beginnings of parliamentary dominance.

4045 18th Century Britain (3) Political, economic, social, and intellectual history from the accession of George I to the French Revolutionary Wars.

4046 19th Century Britain (3) Emphasis on the acquisition of Empire, emergence of industrial society, and the rise of Victorianism between 1780 and 1900.

4047 20th Century Britain (3) Intellectual, political, social, and economic developments since 1900, including the experience of total war, construction of the welfare state, imperial decline, and the significance of Thatcherism.

4048 Modern Irish History: 1600-Present (3) Development of communities and conflicts in Ireland from the Tudors to the European community; emphasis on cultural, political, and military affairs.

4049 The British Empire and Commonwealth (3) British Empire and development of the British Commonwealth of Nations.

4051 Colonial America: 1607-1763 (3) Political, economic, cultural, and military developments in the 13 colonies.

4052 The American Revolution, 1763-1789 (3) Political, intellectual, economic, and military developments in the formation of a permanent American union.

4053 The Age of Jefferson and Hamilton: 1789-1820 (3) Implementation of the Constitution, adoption of the Bill of Rights, formation of a political party system, and economic and social change.

4054 The Age of Jackson: 1820-1860 (3) Examination of democratization, economic transformation, party development, the reform movement, slavery, and the sectional crisis.

4055 Civil War (3) Also offered as MILS 4055. Secession; social and economic conditions, principal military campaigns.

4056 Reconstruction (3) Political, social, and economic changes in the South from 1865 to 1880.

4057 The Emergence of Modern America (3) Industrialization, party politics, and social life in the U.S. from 1870 to 1900.

4059 The American Teens and Twenties (3) From the inaugural of Woodrow Wilson to the Crash of 1929; Wilson and reform at home and revolution abroad; the Great War and its impact; the Jazz Age, its tension and its collapse.

4060 The Age of Roosevelt (3) From the inaugural of FDR to the surrender of Japan: the Great Depression and the New Deal; the thirties' search for an American culture; the road to Pearl Harbor; America in World War II, at home and abroad.

4061 Intellectual and Social History of the United States to 1865 (3) Ideas and their relationship to American society from the colonial period to the Civil War.

4062 Intellectual and Social History of the United States from 1865 to the Present (3) Ideas and their relationship to American society from the Civil War to the present.

4063 Diplomatic History of the United States to 1914 (3) American foreign policy from its colonial antecedents up to the eve of the First World War with a focus on commercial and territorial expansion.

4064 Diplomatic History of the United States, 1914 to the Present (3) Interpretations of American foreign policy in the 20th century; emphasis on public opinion and relationship of business investment to foreign policy.

4065 History of Contemporary America (3) History of America since 1945, focusing on domestic affairs.

4066 Military History of the United States (3) Also offered as MILS 4066. Military policy and campaigns, war economy, and organization of the armed forces.

4067 African-American History to 1876 (3) Life and history from 1619 to the end of Reconstruction; African background of African Americans.

4068 African-American History since 1876 (3) Life and history from the end of Reconstruction to the present; emphasis on the 20th century as an era of change.

4069 The American West in the 19th Century (3) Selected themes in the political, military, social, economic, and cultural history of the Trans-Mississippi West in the 19th century.

4070 The American West in the 20th Century (3) Selected themes in the political, social, economic, and cultural history of the Trans-Mississippi West in the 20th century.

4071 The Antebellum South (3) Economic, social, intellectual, and political development of the South to 1860.

4072 The New South (3) Political, economic, social, and intellectual history of the South since 1877.

4073 Louisiana to 1815 (3) Political, economic, and social development of early Louisiana.

4075 American Economic History to 1860 (3) Also offered as ECON 4075. American economic growth and development from the colonial period to 1860, including the railroad, slavery, technology, and nature of the industrial revolution; findings and method of the "new" or quantitative economic history.

4076 American Economic History: 1860 to the Present (3) Also offered as ECON 4076. American economic growth and development from 1860 to the present; economic impact of the Civil War, technological change, mechanization of agriculture, railroads, automobiles, war, the Great Depression, and multinational corporations; findings and method of the "new" or quantitative economic history.

4077 American Popular Culture (3) Examination of popular culture forms from 19th-century vaudeville to today's music videos; emphasis on development of mass media.

4078 Asian-American History (3) History of Asian peoples in the United States; topics including immigration, community development, cultural conflict, racism, and stereotypes.

4079 Women in American History (3) Survey of political, social, economic, and cultural development of American women from colonial times to present; topics include nineteenth century women's rights movement, woman suffrage, women in civil rights movement, birth control, the modern feminist movement, and southern women.

4081 The Caribbean: 1492-1830 (3) Nature of and changes in economic and political institutions after European colonization, international conflicts, and abolition of slavery, primarily in the Greater and Lesser Antilles.

4083 Mexico: The National Period (3) Political, economic, and social development since Independence.

4087 Mexico: The Colonial Period (3) Emphasis on events that gave rise to the socioeconomic and political problems of modern Mexico.

4089 Brazil: The National Period (3) Political, economic, social, and diplomatic developments from the early 19th century to the present.

4091 China to 1600 (3) History and civilization, including a survey of religion and philosophy, language and literature, art and archaeology, and popular culture.

4092 China since 1600 (3) Western impact on civilization and the processes of revolution and modernization during the past century.

4093 Pre-Modern Japan (3) Political and cultural history and civilization from the beginnings to the close of the Japanese middle ages.

4094 Modern Japan (3) From 1600 to the present; emphasis on historical and cultural roots of Japan's modernization in the late 19th century and quest for empire in the 20th century; cultural and intellectual developments in modern Japan.

4095 The Middle East to 1800 (3) Also offered as REL 4095. History and culture of the Arab people in the Middle East and the Maghrib from the pre-Islamic period to the end of the 18th century.

4096 The Modern Middle East (3) Also offered as REL 4096. Major problems of the Middle East and North Africa in the modern period; internal Arab social, economic, and intellectual developments; Muslim responses to European colonialism; modern Arab nationalism and political trends; Islamic reformist and revivalist movements; problem of Palestine.

4100 Approaches to History (3) Open to students having 6 hrs. credit in history and to others with consent of instructor. Can be taken for Honors credit. Changing conceptions and methods of writing history from classical Greece to the present.

4105 Studies in Classical History (3) Selected periods and problems in Greek and Roman history; methods and materials of ancient scholarship.

4109 HONORS: Proseminar (3) Open to qualified honors students having 12 hrs. credit in history and consent of instructor. Candidates for the honors degree in history will select an honors thesis before the end of the semester. Supervised reading in an assigned field of historical study; discussion of historical methods and research.

4110 HONORS: Senior Thesis Research Seminar (3) Prereq.: HIST 4109. Open to honors students with consent of seminar director. Thesis writing under supervision of seminar director; oral examination upon completion of thesis; student will be examined by a committee of three or four faculty members on thesis content and on student's general field of historical interest.

4112 Modern European Intellectual History: the Enlightenment to 1850 (3) Modern thought in cultural, social, political contexts from Voltaire to Marx.

4113 Modern European Intellectual History Since 1850 (3) European thought affecting society in the industrial age; realism, psychoanalysis, existentialism, the information explosion.

4120 Russian Ideologies: 1840-1940 (3) Social and political ideologies in the context of autocracy, serfdom, industrialization, and revolution; evolution of Soviet Marxism.

4125 History of Ancient Israel (3) See REL 4125.

4126 The Russian Economy in the 20th Century (3) See ECON 4025.

4130 World War II (3) Also offered as MLS 4130. Global crisis of the 1930s; Axis and Allied strategies; major military campaigns; great power diplomacy; life on the homefronts; the Holocaust; espionage and resistance; the experience of combat; social, political, and scientific consequences.

4140 The Vietnam War (3) French colonial rule and Vietnamese nationalism; Ho Chi Minh and the war against the French (1946-54); the National Liberation Front (Vietcong); process of American involvement and disengagement; counter-insurgency and the air war; anti-war movement in the United States; reasons for failure of American policy; Vietnam since 1975; lessons and legacies for the U.S.

4151 Historical Archaeology (3) See ANTH 4018.

4161 Religion in the United States (3) Also offered as REL 4161. From the colonial period to the present; relation between changing religious beliefs and behavior of Americans and political, social, economic, and intellectual developments; Puritanism, revivalism, response to Darwinian evolution, social gospel, and civil religion.

4191 Religions of China and Japan (3) Also offered as REL 4191. Major religious traditions of East Asia; Confucianism, Taoism, Mahayana Buddhism, Shinto, and Chinese and Japanese folk religion; religion in the context of Chinese and Japanese cultural history.

4195 Special Studies in World History (3) Prereq.: consent of department. May be repeated for credit when topics vary.

4196 Special Studies in European History (3) Prereq.: consent of department. May be repeated for credit when topics vary.

4197 Special Studies in United States History (3) Prereq.: consent of department. May be repeated for credit when topics vary.

4200 African-American in Louisiana (3) Life, history, and culture of African-Americans in Louisiana, from the colonial times to the present.

4201 Civil Rights Movement (3) The history of the black freedom struggle from 1945-1972.

4202 Black Nationalism (3) The evolution of black nationalist thought from the colonial period to the present.

4901 Independent Study (3) Prereq.: open to advanced students of high academic standing by consent of department. Reading and research on selected topics.

4902 Independent Study (3) Prereq.: open to advanced students of high academic standing by consent of department. Reading and research on selected topics.

7902 Independent Study in History (3) May be taken for a max. of 9 sem. hrs. of credit.

7904 American Historiography and Criticism (3) American historical writing from the colonial period to the present.

7908 Introduction to Research in European History (3) History of historiographical theory and practice; current issues and debates; problems and methods of research.

7909 Research Seminar in European History (3) Sources, bibliography; reports on original research.

7915 Reading Seminar in European History (3) V

7916 Reading Seminar in Renaissance and Reformation (3) V

7917 Reading Seminar in Early Modern Europe (3) V

7918 Reading Seminar in 18th Century Europe (3) V

7919 Reading Seminar in 19th Century Europe (3) V

7920 Reading Seminar in 20th Century Europe (3) V

7921 Reading Seminar in Special Topics in European History (3) V May be taken for a max. of 6 sem. hrs. credit when topics vary.

7922 Reading Seminar in European History to 1650 (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary.

7923 Reading Seminar in European History from 1500 (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary.

7930 Reading Seminar in British History (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary.

7951, 7952 Reading Seminar in American History from 1607 to 1865 (3,3) 7951 and 7952 may be taken together.

7955, 7956 Reading Seminar in American History from 1865 to the Present (3,3) 7955 and 7956 may be taken together.

7957 Research Seminar in American History (3) Introduction to research methods, sources, and bibliography; reports on original research.

7958 Research Seminar: Special Topics in American History (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary. Reports on original research.

7959 Reading Seminar: Special Topics in American History (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary.

7970 Reading Seminar in Comparative History (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary.

7981, 7982 Seminar in Latin American History (3,3)

Sources and bibliography; reports on original research.

7983, 7984 Seminar in Latin American History (3,3)

Sources and bibliography; reports on original research.

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

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

HOME ECONOMICS EDUCATION • HEED

2004 Education and Counseling Methods in Nutrition (3) Prereq.: major in dietetics or consent of instructor. Not for teacher certification. Communication skills needed for individual and group counseling and education in nutrition.

2008 Individual Field Experience in Occupational Home Economics (1-3) Prereq.: consent of instructor. A max. of 3 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.

4003 Independent Reading and Research in Home Economics Education (1-3) Prereq.: consent of director and instructor. May be taken for a max. of 3 sem. hrs. of credit. Students are responsible for registering with a faculty member with whom they will select the area of reading and research. Faculty-directed individual study.

4004 Methods in Home Economics Education for Noneducation Majors (3) 2 hrs. lecture; 2 hrs. lab. Open to senior and graduate home economics majors. Methods and organization of home economics programs outside the secondary school that incorporate various socioeconomic levels.

4007 Organization and Administration of Home Economics Occupational Programs (3) Prereq.: VED 2001 or equivalent. Principles of operating Home Economics Related Occupational (HERO) programs; emphasis on developing student employability in wage earning areas of home economics; includes program standards, requirements and procedures, curriculum, public relations, teaching materials, and evaluation of preparatory (in-school laboratory) and cooperative home economics programs.

4008 Advanced Individual Field Experience in Occupational Home Economics (1-3) Prereq.: consent of instructor. A max. of 3 sem. hrs. of credit may be earned in each occupational area. Pass-fail grading. Advanced individual, supervised, field-based study in selected businesses and industries to learn management strategies, personnel supervision, promotion techniques, and executive planning in a specified occupational home economics area.

4464 Adult and Nonformal Home Economics Education (3) 2 hrs. lecture; 2 hrs. lab. Working with adults and youth in community agencies and other programs with clientele outside the formal school system.

4869 Special Topics in Home Economics Education (1-3) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. Current practices and technological advanced in vocational home economics.

7162 Program Development in Home Economics Education (3) V Principles and applied practices in developing programs in home and family life education for multicultural groups.

7662 Program Improvement in Home Economics Education (3) Principles and procedures for evaluating and improving home economics programs for diverse groups.

7862 Current Problems in Home Economics Education (3) V Study of social, legislative, and educational problems.

7866 Seminar in Home Economics Education (1) May be taken for a max. of 4 sem. hrs. of credit. Research reporting and topics of current interest.

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

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.

★ **1007 Introduction to Life Sciences (4)** 2 hrs. lecture; 4 hrs. lab. Not open to students who have had BIOL 1001, 1002, 1201, 1202, 1207, 1208, 1209, or 1503. A basic course, organized in accordance with the principle of organic evolution, emphasizing the chemical basis of life and cell biology.

★ **1008 Introduction to the Life Sciences (4)** 2 hrs. lecture; 4 hrs. lab. Not open to students who have had BIOL 1001, 1002, 1201, 1202, 1207, 1208, 1209, or 1503. Continuation of HNRS 1007. A basic course, organized in accordance with the principle of organic evolution, emphasizing phylogeny, morphology, function of multicellular organisms, and people's relation to their environment.

★ **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 1001. Curricular equivalent of ENGL 1002, 1003, or humanities elective. Comparative and interdisciplinary study of the history, literature, philosophy, religion, and art of five ancient civilizations: Greek, Indian, Chinese, Japanese, and Meso-American.

★ **1103 Lectures in Comparative Civilizations (3)** Coreq.: HNRS 1101. Credit will not be given for this course and HNRS 1003. 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.: HNRS 1001 and 1003; or 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 1001 and 1003; or 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, and science of 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.

2021 Colloquium in the Arts (3) May be taken for a max. of 6 hrs. of credit. Art forms and their cultural significance; particular themes involving examination of art works.

★ **2202 Seminar in Colonial and Early National America (3)** Prereq.: HNRS 1001 and 1003; or HNRS 1101 and 1003; or ENGL 1002; or ENGL 1003. Coreq.: HNRS 2204. Interdisciplinary presentation of development of the American world to 1828, integrating literature and culture with political, economic, and social history.

★2204 Lectures in Colonial and Early National America (3) Prereq.: HNRS 1001 and 1003; or HNRS 1101 and 1003; or ENGL 1002; or ENGL 1003. Coreq.: HNRS 2202. Lecture, readings, and examination coordinated with HNRS 2202.

★3001 European Civilization from 1400 to 1789: The Old Regime (4) Continuation of HNRS 2002, 2004. Interdisciplinary presentation of development of western civilization from the Renaissance through the Enlightenment; literature, history, philosophy, religion, government, and fine arts.

★3003 Western Civilization from 1789: The Modern World (4) Continuation of HNRS 3001. Interdisciplinary presentation of development of western civilization from the era of revolution to the present; literature, history, philosophy, religion, government, and fine arts.

3030 Humanities Colloquium (3) May be taken for a max. of 6 hrs. of credit. Selected themes and materials in literature, philosophy, history, and art.

3031 American Studies (3) May be taken for a max. of 6 hrs. of credit when topics vary. Selected topics in American civilization.

3033 Social Science Colloquium (3) May be taken for a max. of 6 hrs. of credit when topics vary. Topics of significance from the standpoint of various social sciences.

3035 Natural Science Colloquium (3) Prereq.: completion of one-year course in a physical science and one-year course in a biological science, at least one with laboratory; or consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Selected topics illustrative of developing concepts of the natural and physical universe and of living organisms.

3100 Internships, Field Work, Off-Campus Programs (1-6) Prereq.: consent of dean of Honors College. May be taken for a max. of 6 sem. hrs. of credit. For special learning opportunities.

3991 Thesis (3) Independent research and writing toward the honors thesis; the thesis itself to be completed in HNRS 3992.

3992 Thesis (3) An essay based on independent reading and research or a report on laboratory or field research.

HORTICULTURE • HORT

2001 Organic Gardening (2) F One hr. lecture; 2 hrs. lab. For non-horticulture majors. Principles and practices of organic vegetable production.

2050 General Horticulture (4) F,S 3 hrs. lecture; 2 hrs. lab. Science and art of modern horticultural plant production, including propagation, fertilization, pest control, and pruning; major groups of garden crops including vegetables, fruits and nuts, ornamentals, houseplants, and florist crops; lab includes propagation and culture of garden plants in field and greenhouse.

2061 Plant Propagation (3) S-O Prereq.: HORT 2050. 2 hrs. lecture; 2 hrs. lab. Principles of sexual and asexual propagation; specific methods for reproduction of plants.

2076 Foliage Plants and Greenhouse Management (3) F-E 2 hrs. lecture; 2 hrs. lab. Managing commercial and home greenhouses; identification and study of major greenhouse foliage plants.

3000 Horticultural Internship (3) Prereq.: HORT 2050 and written consent of instructor. May be taken for a max. of 6 sem. hrs. credit. Work experience in horticultural industries culminating in acceptable written reports and a seminar presentation.

3010 Research Problems (3) May be taken for a max. of 6 sem. hrs. credit. Independent research under a faculty member culminating in an oral and written research report.

3012 Culture and Management of Fruit, Nut, and Vegetable Crops (3) F-O Prereq.: HORT 2050 or equivalent. 2 hrs. lecture; 3 hrs. lab. Required field trips. Culture and management of fruit, nut, and vegetable crops production; review of Louisiana commercial fruit, nut, and vegetable crops industries.

3015 Urban Landscape Management (3) S-E Prereq.: HORT 2050 and LA 2121 or equivalent. 2 hrs. lecture; 2 hrs. lab. Management of the landscape through proper installation, soil management, plant care, pesticide management, employee management, and cost accounting.

4010 Tropical/Subtropical Horticulture (3) S-E Prereq.: HORT 2050 or equivalent. Current status of cultivation throughout the world; production practices; postharvest handling; international trade of tropical/subtropical horticultural crops.

4012 Special Topics in Horticulture (1-3) V Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Lab/field trip may be required. Subject areas not covered in other horticulture courses.

4021 Florist Crop Production (3) S-E Prereq.: HORT 2076 or equivalent. 2 hrs. lecture; 2 hrs. lab. Principles and practices involved in production of a range of floricultural crops, including potted plants and cut flowers; post-harvest treatment and marketing practices.

4051 Processing of Fruits and Vegetables (3) S-O Prereq.: FDSC 1049 or HORT 2050 or equivalent. 2 hrs. lecture; 2 hrs. lab. Methods of processing horticultural crops; includes canning, freezing, dehydration, and fermentation.

4064 Principles of Plant Breeding (4) See AGRO 4064.

4071 Nursery Management (3) F-O Prereq.: BIOL 3060 or equivalent. 2 hrs. lecture; 2 hrs. lab. Required field trips. Principles and practices involved in commercial production, management, and marketing of nursery crops.

4083 Principles and Practices in Olericulture (4) F-E Prereq.: AGRO 2051 and HORT 2050. 3 hrs. lecture; 3 hrs. lab. Required field trips. Review of U.S. commercial vegetable industry; seed handling, field microclimate modification, transplant handling, stand establishment, influence of soil chemical and physical properties, and greenhouse vegetable production.

4085 Principles and Practices in Fruit and Nut Production (4) S-O Prereq.: HORT 2050 or equivalent. 3 hrs. lecture; 2 hrs. lab. Required field trips. Physiological principles involved in growing pomological crops; overview of state, U.S., and worldwide fruit and nut industry; marketing and production strategies.

4086 Turfgrass Management (3) S-E Prereq.: BIOL 1402, AGRO 2051 or equivalent. 2 hrs. lecture; 3 hrs. lab. Required field trips. Also offered as AGRO 4086. Turfgrass identification and adaptation; establishment and maintenance of high quality turf areas; turfgrass pests and their control.

4090 Golf Course Operations (4) S Prereq.: HORT 4086. 3 hrs. lecture; 2 hrs. lab. Golf course management; construction; cultural practices; environmental concerns.

4096 Postharvest Physiology (4) S-E Prereq.: PLHL 3060. 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 applied laboratory analysis techniques.

7023 Growth and Development of Horticulture Crops (3) F-E Horticultural plant constituents, their occurrence, transformation, and metabolism; changes induced in plants by variations in water, light, temperature, etc.

7050 Plant Tissue Culture (4) Prereq.: BIOL 4024, PLHL 3060, HORT 2061 and 7023. 2 hrs. lecture; 6 hrs. lab. The *in vitro* culture of selected higher vascular plants; media preparation; cell, callus, and organ cultures; protoplast isolation, culture, and fusion; embryo genesis and plantlet regeneration and haploid culture.

7070 Advanced Plant Breeding (4) S-E See AGRO 7070.

7071 Advanced Plant Genetics (4) S-O Prereq.: AGRI 2072 or equivalent. See also AGRO 7071. Theory and practical application of cytogenetics, extrachromosomal inheritance, and molecular techniques in plant genetics.

7074 Quantitative Genetics in Plant Improvement (3) See AGRO 7074.

7075 Advanced Food Preservation (4) See FDSC 7075.

7913 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.) "S"/"U" grading.

8900 Research Problems in Horticulture (3) Prereq.: consent of department head. May be taken for a max. of 6 hrs. of credit when topics vary. Students minor 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 (except 7094 which is a nutrition course).

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.

2091 Special Topics in Human Ecology (1-3) Prereq.: 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.

3090 Seminar in Human Ecology (1) For human ecology majors only. The professional human ecologist in today's society; preparation for professional experiences.

3091 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.

4091 Special Topics in Human Ecology (1-3) Prereq.: 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.

7090 Research Methods in Human Ecology (3) Philosophy of human ecology research; issues and trends; design and methodology.

7091 Independent Reading and Research in Human Ecology (1-6) May be taken for a max. of 6 hrs. of credit. Directed individual reading and research in a selected area of human ecology.

7092 Human Ecology Research Seminar (1) F,S Required of all doctoral students in human ecology during each semester of full-time residence. Only 3 sem. hrs. of credit may be applied toward the degree. May be taken for a max. of 3 sem. hrs. of credit. Research reports and discussion of current topics and issues in human ecology.

7093 Advanced Research Methods in Human Ecology (3) Prereq.: HUEC 7090 or equivalent and EXST 7013 or 7014 or 7015. 2 hrs. lecture; 2 hrs. lab. Research methods and applications in human ecology.

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

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

9091 Independent Research for Doctoral Students (1-6 per sem.) Prereq.: must be a doctoral student and have consent of instructor and approval of the student's full doctoral committee for each repetition of the course. This course may be repeated for credit; a max. of 15 sem. hrs. is allowed toward doctoral requirements. Credit in HUEC 7091 is included in the 15 sem. hrs.

FAMILY, CHILD, AND CONSUMER SCIENCES

2065 Management of Family Systems (3) Prereq.: HUEC 1000. A systems perspective of contemporary families and their processes including environmental influences, elements of family management, and management of school and community resources and services.

2083 Introduction to Early Childhood Education (3) An introduction to the field of early childhood education (ECE), encompassing the years from birth through age eight.

3060 Family Finance (3) Prereq.: ECON 2030 or AGECE 2075 or equivalent. Development of bases for decision making related to family income, saving, and spending.

3055 Development of Young Children in Context (4) Prereq.: BIOL 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 experience in the School of Human Ecology's Preschool Laboratory and in other early childhood settings.

3056 Young Children's Cognitive and Linguistic Development (3) Prereq.: HUEC 3055. 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 mathematical concepts in young children; emphasis on implications for the early childhood education classroom.

3061 The Family in a Consumer Society (3) Prereq.: ECON 2030 or AGECE 2075 or equivalent. Family consumer opportunities and problems in contemporary society.

3062 Families and the Law (3) Prereq.: ECON 2030 or equivalent. Federal and state consumer bills, one's legal status as a family member; effectiveness of warranties and the judicial process regarding consumers' rights; responsibilities delegated to consumers.

3070 Housing Fundamentals (3) F Prereq.: HUEC 2065 and SOCL 2001 or ANTH 1003. Physio/socio/psychological functions of housing; principles of functional, energy-efficient, and cost-effective dwelling design and construction; housing issues; government policies; industry trends.

3381 PK/K Curriculum (3) Prereq.: membership in PK-3 teacher education program and concurrent enrollment in

HUEC, 3055, 3382, and 3383. Comprehensive integrated curriculum content for children in pre-kindergarten and kindergarten: reading/language arts, mathematics, science, social studies, and the arts.

3382 PK/K Pedagogy (3) Prereq.: membership in the PK-3 teacher education program and concurrent enrollment in HUEC 3055, 3381, and 3383. 2 hrs. lecture; 3 hrs. lab/field experience in multi-level, multicultural settings. Ways of instructing children in pre-kindergarten and kindergarten.

3383 Assessment and Planning for Reflective Instruction: PK-K (3) Prereq.: membership in PK-3 teacher education program and concurrent enrollment in HUEC 3055, 3381, and 3382. 1 hr. lecture; 6 hrs. lab/field experience in multi-level, multicultural settings. Process of building the teaching and learning cycle (assessing, planning, teaching, reflecting) into integrated instruction of children in pre-kindergarten and kindergarten.

4050 Family Dynamics (3) Prereq.: PSYC 2000, 2004, 2040, or 2060. Interpersonal, family, and marital competence; integration of family science research and contemporary lifestyles; decision making and professional applications for family science.

4051 The Adolescent and the Family (3) Prereq.: HUEC 3055 or equivalent. Growth, development, and guidance of the adolescent in the home, family, and community.

4052 Families: Policy and Law (3) Prereq.: 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.

4055 Principles and Practices in Kindergarten Education (3) Prereq.: HUEC 3055 or PSYC 2076; 2.50 gpa required for registration; same as EDCI 4055. Classroom organization and instructional management using preacademic objectives for the kindergarten as an entry point into the elementary school.

4056 Foundations of Reading Concept Development (3) Prereq.: HUEC 3055 or PSYC 2076, and EDCI 3000. 2.50 gpa required for registration. Experiences 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.

4057 Methods of Teaching Nursery School and Kindergarten (3) Prereq.: HUEC 3055 or PSYC 2076; 2.50 gpa required for registration; 2 hrs. lecture; 2 hrs. lab. Same as EDCI 4057. Essentials needed for successful involvement with children from various socioeconomic and cultural groups at the nursery/childergarten level; philosophy, teaching methods, and materials providing optimum learning experiences for the child under six.

4058 Student Teaching in the Kindergarten (5) Prereq.: 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 kindergarten programs for varied cultural groups and socioeconomic levels.

4059 Student Teaching in the Nursery School and Other Early Childhood Settings (5) Prereq.: prior application required; EDCI 3200, HUEC 4056, and HUEC/EDCI 4057; and credit or registration in HUEC/EDCI 4055; 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 programs for varied cultural groups and socioeconomic levels.

4060 Organization and Administration of Early Childhood Programs (3) Prereq.: HUEC/EDCI 4057 or equivalent; 2.50 gpa 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.

4064 Family Stress Management (3) Prereq.: HUEC 2065 and SOCL 2211 or equivalent. Strategies used by families to manage stress; current family stress management theory and research.

4066 Systems in Housing (3) Prereq.: HUEC 3070 or permission of instructor. Current technologies, features, and energy consumption of security, computer, heating, cooling, lighting, utility, and appliance systems.

4067 Internship in Family, Child, and Consumer Agencies (6) Prereq.: HUEC 2065 and 3090. 2 hrs. lecture; 8 hrs. lab. For majors only, senior standing. Application must be made at the school one semester prior to proposed enrollment. Supervised professional experience and observation in a family, child, or consumer agency; integration of academic experience with practice.

4381 Student Teaching: Practice and Reflection in PK/K (12) Prereq.: EDCI 3481, 3482, and 3483; concurrent enrollment in HUEC 4382. 4 hrs. lecture; 24 hrs. lab/field experience in multi-level, multicultural settings. Designed to partially fulfill student teaching requirements and to prepare students to be effective classroom teachers in PK/K settings.

4382 Critical Issues in Early Childhood Education (3) Prereq.: EDCI 3481, 3482, and 3483; concurrent enrollment in HUEC 4381. Historical and contemporary perspectives on developmental, socioeconomic, and pedagogical issues in early childhood education.

7050 Research Seminar in Family, Child, and Consumer Sciences (1) May be taken for a max. of 2 hrs. of credit when topics vary. Reports and discussion of current literature and research.

7051 The Contemporary Family (3) Effects of change on family integration; adaptive responses in family lifestyles, roles, and relationships to political, social, and technological change.

7052 Topics and Issues in Family and Consumer Sciences (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary. Lectures and research on topics not covered in other family or consumer science courses.

7053 Infant Behavior and Development (3) Infant personality, development, and socialization; major transactions in the infant's life; family and home; child-care facilities and caregivers; support systems within larger societies.

7054 Child Guidance and Behavior (3) Prereq.: HUEC 7056 or consent of instructor. Normal, age-related behavior patterns; child guidance practices and their consequences; techniques and procedures for successful parenting and for improved classroom management; theoretical bases.

7055 Human Development (3) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Dynamics of human development and practical implications.

7056 Theories of Child Development (3) Research and theory in child development; relation to the major domains in the child's ecology—child development, the family, services, and the environment.

7057 Theories in Family Science (3) Historical and contemporary theories and conceptual frameworks in family science.

7058 Adulthood and Aging (3) Prereq.: HUEC 4050 and 7051; or equivalent. The lifespan, with emphasis on adulthood; early and middle adulthood, and old age.

7059 Parent Involvement in Early Childhood Education (3) 2 hrs. lecture; 2 hrs. lab. Interpersonal relationships and involvement of parents in early childhood education programs; research and existing models of parent involvement.

7061 The Consumer in the Economy (3) Interrelationships among consumer knowledge and responsibility of the family, consumer legislation and protection, and competitive market processes.

7062 Family Financial Counseling (3) Personal, social, and legal climates affecting family financial decisions; skills designed to assist families to become self-sufficient in money management.

7063 Economics of Aging (3) Determinants and components of the financial status and economic well-being of the elderly household; income, investment, insurance, grants, taxation, assets, time use, resource management, and techniques used to examine these components.

7065 Management of Family Resources (3) Individual and family resources, including identification and evaluation; principles of resources and management satisfaction for individuals and families.

7843 Early Childhood Education (3) See EDCI 7843.

HUMAN NUTRITION AND FOOD

1010 Introduction to Human Nutrition (3) Credit will not be given for both this course and HUEC 2010. Not for dietetics majors. Basic nutrition information; role of nutrition in maintaining health; guidelines for evaluation of diet by consumer.

1021 Dietetics as a Career (1) For dietetics majors only or by consent of instructor. Introduction to the dietetics major at LSU and the dietetic profession; strategies for future practice; development of a professional portfolio.

2010 Nutrition in Health (3) Prereq.: CHEM 1001 or 1201 or BIOL 1001 or 1201. Credit will not be given for both this course and HUEC 1010. Primarily for students planning to enter dietetics, nursing, and other food or health related professions. Principles of nutrition and their application in promoting health; guidelines for assessing nutritional status; emphasis on the adult.

2012 Introduction to Nutritional Assessment (2) Prereq.: HUEC 2010. 1 hr. lecture; 3 hrs. lab. For majors only or consent of instructor. Assessment of nutritional status including nutrient intakes, body composition, and laboratory analyses; interpretation of nutritional status indicators.

2014 Food Fundamentals (4) F,S 3 hrs. lecture; 3 hrs. lab. Also offered as FDSC 2014. Principles of food selection, preparation, and management.

2018 Computer Applications in Food Service and Nutrition Systems (1) Prereq.: registration in or credit for HUEC 2010. 3 hrs. lab. For nutritional sciences majors and minors only. Computer applications in food service and nutrition systems including hands-on experience in word processing, data base management, graphics, spreadsheet applications, and nutrient analysis.

2019 Nutrition Education and Counseling (3) S Prereq.: HUEC 2012; credit or registration in HUEC 2018 or consent of instructor. Not for teacher certification. Includes a service-learning component. Nutrition education and counseling skills needed for serving ethnically diverse individuals and groups.

3010 Nutrition and Wellness (3) F Prereq.: HUEC 2010 and BIOL 2160 or KIN 2500 or equivalent. Relationship of life-style and wellness; consumer issues and their impact on health; counseling for change.

3012 Human Nutrition During the Life Cycle (3) S Prereq.: HUEC 2010 and BIOL 1202 or 2160; or permission of instructor. Nutritional needs during pregnancy, infancy, early childhood, adolescence, adulthood, and later years.

3015 Food Theory and Experimentation (3) S Prereq.: HUEC 2014, CHEM 2261 and EXST 2201. 2 hrs. lecture; 3 hrs. lab. Also offered as FDSC 3015. Scientific principles related to food products, preparation, and quality; emphasis on laboratory research and evaluations.

3016 Community Nutrition (4) Prereq.: HUEC 2012, 2019, 3012, or consent of instructor. 3 hrs lecture; 2 hrs. lab. Includes a service-learning component. Assessment, planning, implementation, and evaluation of community nutrition programs serving ethnically diverse populations; emphasis on field and laboratory studies.

3019 Quantity Food Production and Management (3) Prereq.: HUEC 2014, 2018 and registration in BIOL 1011 or equivalent. Principles of quantity food procurement, production, distribution, and service; menu development; sanitation and safety; materials and resource management.

3021 Quantity Food Production Laboratory (2) Prereq.: credit or registration in HUEC 3019, 4 hrs. lab. Principles of quantity food production illustrated by demonstrations, observations, studies, and laboratories; use and care of quantity production equipment; sanitation and safety; materials and resources management; distribution and service.

4010 Human Nutrition (3) F Prereq.: BIOL 2160 or 4160 and BIOL 2083 or 4087 or KIN 3515. Energy metabolism and the functions, requirements, and food sources of nutrients.

4011 Medical Nutrition Therapy I (3) F Prereq.: BIOL 2160 or 4160; BIOL 2083 or 4087 or equivalent; HUEC 2019; credit or registration in HUEC 3012, 4010. Biochemical and physiological changes that occur in dental, gastrointestinal, and absorption abnormalities and weight imbalances that require clinical diet modification; nutritional assessment and interpretation; drug/nutrient interactions.

4013 Applied Medical Nutrition Therapy I (1) F Prereq.: HUEC 2012, 2018; credit or registration in HUEC 4011 or equivalent. 2 hrs. lab. Clinical diet modification relevant to biochemical and physiological changes during gastrointestinal, absorption, and weight disorders; nutritional assessment; computer nutritional analysis.

4014 Medical Nutrition Therapy II (3) S Prereq.: HUEC 4011. Biochemical and physiological changes that occur in food allergy and immunological disorders, diabetes, cancer, metabolic and neurological, and inherited disease and disorders of the heart or kidney, that require clinical diet modification; nutritional needs during surgery, trauma, and burns.

4016 Cultural Food Patterns (3) S Prereq.: HUEC 2014, 2019; or consent of instructor. Cultural, religious, and historical influences on food, as it relates to nutrition, health, and diet counseling.

4017 Applied Medical Nutrition Therapy II (2) S Prereq.: HUEC 4011, 4013, and concurrent enrollment in HUEC 4014. 2 hrs. lab. Clinical diet modifications relevant to biochemical and physiological changes during heart or renal diseases; diabetes, surgery, trauma, and inherited errors of metabolism; quality assurance programs; computer nutrient analysis.

4021 Contemporary Topics in Nutrition (1) Prereq.: CMST 2060; enrollment limited to nutritional sciences majors and minors. May be taken for a max. of 2 hrs. credit

when topics vary. Oral presentations of independent library or other research on selected contemporary issues in food, nutrition, dietetics, or food systems.

4023 Food Systems Management (3) S Prereq.: HUEC 3021 and MGT 3200. Functions of management, including a review of accounting principles, applied to food service systems in child nutrition programs, healthcare nutritional services, university food service programs, and commercial food service facilities.

4027 Practicum in Dietetics (1-3) Prereq.: dietetics majors only; 60 hrs. in dietetics curriculum; overall gpa of 2.50; and permission of instructor. Each hour of credit requires 60 hours of supervised experience. May be taken for a max. of 3 hrs. of credit. Supervised professional experience designed to integrate academic learning with practice in dietetics.

7000 Dietetic Internship (2-4) Prereq.: Department approval, successful defense of the M.S. thesis. May be taken for a max. of 8 hrs. credit. Pass-fail grading. Preprofessional field experience in clinical dietetics, food systems management, and community nutrition that meets the registration eligibility requirements of the American Dietetic Association.

7003 Vitamins in Nutrition (2) Prereq.: credit or registration in BIOL 4087. History, chemistry, function and evaluation of nutritional status, requirements for various species, assay methods, and interrelationships of vitamins.

7004 Molecular and Clinical Nutrition I (2) F Prereq.: BIOL 4087 or 4094 or permission of the coordinator. The development of current concepts of nutritional effects on health and disease through the use of cellular/molecular tools.

7005 Molecular and Clinical Nutrition II (2) S Prereq.: HUEC 7004. The development of current concepts of nutritional effects on health and disease through the use of cellular, molecular, genetic, and epidemiologic tools.

7010 Food and Nutrition Seminar (1) F May be taken for a max. of 6 hrs. of credit when topics vary. Reports and discussion of current literature and research.

7011 Current Advances in Food and Nutrition (3) Recent research and developments.

7017 Advanced Human Nutrition (3) F Prereq.: HUEC 4010 and BIOL 4094. Human requirements, evaluation of nutritional status, and problems related to kind and amount of food consumed.

7018 Proteins in Nutrition (3) S Prereq.: BIOL 4094. Nutritional aspects of proteins and amino acids; deficiencies, interrelationships, requirements, and metabolic pathways.

7019 Advanced Medical Nutrition Therapy (3) S Prereq.: HUEC 4014 or equivalent or consent of instructor. Progressive, updated information on medical nutrition therapy and intervention strategies in specific clinical diseases; rationale for biochemical and physiological bases of diseases.

7094 Seminar in Nutrition (1) S Same as ANSC 7094, DARY 7094, FDSC 7094, PLSC 7094. May be taken for a max. of 2 hrs. of credit. Prereq.: ANSC 7093, DARY 7091, FDSC 7071, HUEC 7010, PLSC 7091 or equivalent or previous slide (not poster) presentation at a professional meeting.

TEXTILES, APPAREL, AND MERCHANDISING

2032 Introductory Apparel Design (4) Prereq.: general education art elective. 2 hrs. lecture; 4 hrs. lab. The design process; art elements and principles applied to aesthetic, functional, and structural design of textile and apparel products; introduction to fashion illustration and computer-aided design.

2037 Apparel Structure and Fit (4) Prereq.: credit for or registration in HUEC 2041. 2 hrs. lecture; 4 hrs. lab. Fundamental principles of garment assembly and the relationships between garment design, fabric characteristics, and production processes; analysis of fit; development of foundation block.

2040 Textile Science (3) F,S Basic physical, biological, and chemical characteristics of fibers, yarns, and fabrics; selection, maintenance, and performance of textiles.

2041 Textile Science Laboratory (1) F,S Prereq.: credit or registration in HUEC 2040. 3 hrs. lab. Introduction to basic physical and chemical testing of textiles.

2044 Early Experience in the Textile/Apparel Industry (1) 4 hrs. practicum; 32 hrs. of supervised experience. Pass-fail grading. Pre-internship work in a component of the textile/apparel industry. Arranged on individual basis for students with limited or no industry experience.

2045 The Fashion Industry (3) F,S Interrelationships of design, production, and distribution; historical aspects and cyclical nature of fashion.

3030 Field Study in Textiles, Apparel, and Retailing (3) May be taken for a max. of 6 hrs. of credit when field site varies. 2 hrs. lecture; 3 hrs. lab. Offered through Continuing Education. 28 hrs. of on-campus seminars. Fee to cover expenses. Structured educational experiences in major industry centers in the U. S. and abroad.

3032 Textile and Apparel Product Development (3) Prereq.: HUEC 2040, 2045. Processes and issues related to development of textiles and apparel products for consumers.

3034 Textile and Apparel Manufacturing (3) Prereq.: HUEC 3032. Overview of the global textile and apparel complex; emphasis on mass production processes including standards and specifications 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 1011 or equivalent. 2 hrs. lecture; 2 hrs. lab. Factors involved in selection, performance, and maintenance of textile products used in residential and commercial interiors.

3041 Textile and Apparel Economics (3) Prereq.: HUEC 2041, 2045, ECON 2030. Application and analysis of economic concepts and principles associated with the textiles and apparel industry; overview of global economics.

3043 Apparel Merchandising Strategies and Assortment Planning (3) Prereq.: HUEC 3032; MATH 1022 or MATH 1431 or EXST 2201; and computer literacy. 2 hrs. lecture; 2 hrs. lab. Assortment planning and sales strategies; quantitative concepts and procedures used in apparel buying; management and interpretation of data related to merchandising and sales.

3045 Visual Merchandising and Promotion Strategies (3) Prereq.: HUEC 2032, 2045. Display elements and techniques; visual merchandising; special events strategies; public relations; Internet promotions.

3230 Computer Design and Patterning (3) Prereq.: HUEC 2032, 3037. 1 hr. lecture; 4 hrs. lab. Use of industry-specific software to design textile and apparel products from concept to final presentation; computer development of apparel patterns; grading and marker making.

3232 Apparel Design Studio (3) Prereq.: HUEC 2032, 2037, ART 1848. 1 hr. lecture; 4 hrs. studio. May be taken for a max. of 6 hrs. of credit when topics vary. Fashion illustration techniques; adaptation of inspirational themes to designs for diversified apparel markets; use of an industry-specific CAD system.

4030 History of Dress and Adornment (3) Male and female dress and adornment from earliest times to present: an emphasis on styles of western civilization.

4034 Textile and Apparel Product Evaluation (3) Prereq.: HUEC 2041, 3034. 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 aspects.

4037 Advanced Apparel Product Design (4) Prereq.: HUEC 3037. 2 hrs. lecture; 4 hrs. lab. Principles and application of three-dimensional pattern design.

4041 History of Textiles (3) S-O Cultural, functional, and technological developments of textiles by selected periods and countries.

4043 Advanced Textiles (3) F Prereq.: HUEC 2041 and CHEM 1002 or MATH 1021 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.

4045 Synthesis: Textile and Apparel Product Processes (3) Prereq.: HUEC 3034, 3041, and credit for or registration in 3045; apparel design concentration prereq. HUEC 3037. 1 hr. lecture; 3 hrs. lab. Multi-functional team approach to creative problem solving and development of apparel and related products and services; application, evaluation, and presentation of facts and concepts.

4046 Advanced Topics in Apparel Merchandising (3) F Prereq.: HUEC 3034. Application of principles of product development, buying and management of apparel merchandise; current industry issues and trends; emphasis on theory and policy related strategies.

4047 Internship in Textiles, Apparel, and Merchandising (3-6) Prereq.: senior standing with a gpa of at least 2.30 on all work taken at LSU or permission of instructor; participation in orientation workshop during semester prior to enrollment. 11-21 hrs. practicum. MKT 3401. Merchandising concentration: credit or registration in HUEC 4046

or consent of instructor; apparel design concentration: HUEC 3037, 3232.; textile science concentration; HUEC 4043, 96-192 hrs. of supervised experience. Not for graduate credit.

4070 Entrepreneurship in Human Ecology (3) S Prereq.: MKT 3401 or consent of instructor. Application of principles of entrepreneurship with an emphasis on home-based and/or microbusinesses; case studies of successful entrepreneurs.

7031 Social-Psychological Influence in Apparel (3) S-E Psychological and cultural factors in selection and use of apparel.

7032 Comparative Studies in World Costume (3) F Same as ANTH 7032. Relationship between man and dress in different cultural settings; emphasis on nonwestern costume; western ethnic and folk traditions in dress; impact of cultural exchange and western culture on world dress.

7033 Fashion Theory and Analysis (3) S-O Theoretical approaches to fashion as a social and economic force; analysis of research.

7035 Textile and Apparel Manufacturing (3) Prereq.: HUEC 3034, 4042, or 4043; one 7000-level statistics course. Mass production of apparel and textiles; detailed analysis of production systems, management methods, and other manufacturing issues facing the industry in a global market.

7041 Current Advances in Textiles, Apparel, and Fashion Merchandising (3) F Introduction to the literature and research in textiles, apparel, and fashion merchandising.

7042 Research in Textiles (3) 1 hr. lecture; 4 hrs. lab. Research methods applied to fabric analysis and testing; trends and recent developments.

7043 Seminar: Textiles, Apparel, and Fashion Merchandising (1) May be taken for a max. of 2 hrs. of credit if topics vary. Reports and discussion of current literature and research.

7044 Selected Topics in Apparel, Textiles, and Fashion Merchandising (3) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Analysis and discussion of selected research topics.

7045 Apparel and Textile Economics (3) F-E Prereq.: HUEC 4042 or 4043 and ECON 4010 or equivalent. Effects of economic trends on apparel and textile industries; impact of international trade, changing technologies; implications for the global consumer.

7049 Advanced Individual Field Experience In Clothing, Textiles and Fashion Merchandising (3) Prereq. or Coreq.: HUEC 7091; 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 clothing, textiles, and fashion merchandising; emphasis on analysis, synthesis and critique of research data applicable to selected businesses, industries, agencies and institutions.

7518 Studies in American and European Dress (3) See also THTR 7518. 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.

INDUSTRIAL EDUCATION • INED

1001 Industrial Engines: Maintenance and Repair (3) V 6 hrs. lab. Design, construction, operation, and maintenance procedures of industrial engines, including electrical, cooling, lubricating, and fuel systems.

2012 Woodworking Technology (3) V 6 hrs. lab. Advanced machine tool operations, job procedures, design and finishing.

2022 Advanced Metals (3) V 6 hrs. lab. Founding, forging, heat treatment, and machine tool work.

2030 General Electricity (3) V 6 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 Takeoff (3) V 1 hr. lecture; 4 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 metalwork, plastics, and leather-craft.

2045 Fundamentals of Air Conditioning and Refrigeration (3) V 1 hr. lecture; 4 hrs. lab. Principles, parts, components, functions, and application of air conditioning and refrigeration systems; problems in equipment performance, operation, inspection, repair, and maintenance.

2053 Occupational Safety (3) F,S Identification of accident-producing conditions and practices in plant facilities, materials handling, machine safeguarding, hand tools, and occupational health.

3043 Industrial Arts for Elementary Teachers (3) V 1 hr. lecture; 4 hrs. lab. Organization and construction of hand-crafts activity units and methods of correlating with subject matter of elementary grades.

3055 Occupational Analysis Techniques (3) V Essential elements of an occupation or activity identified for purposes of job classification and instruction.

3061 Industrial Supervisory Practice (3) V The supervisor as a key person in the industrial organization; duties, responsibilities, and successful supervisory practices.

3062 Principles of Industrial Training (3) V Functions of a training department, duties and responsibilities of a director, and teaching methods used to develop goals of teamwork and production in business and industry.

3065 Industrial Safety Management (3) V Prereq.: INED 2053 or equivalent. Management practices applied to loss prevention and control; analysis of loss prevention programs; certification, professional ethics; functions of the safety professional.

3068 Fire Prevention and Protection (3) V Prereq.: INED 2053 or equivalent. Science of controlling fire potentials and methods of extinguishment.

4067 System and Product Safety (3) Prereq.: INED 3065, EXST 2055. Application of system safety analysis and product safety methodologies to contemporary loss prevention programs.

4068 Regulatory Considerations in Occupational Safety (3) V Major legislation affecting the occupational safety and health field; Occupational Safety and Health Act (OSHA), Worker Compensation laws, Consumer Product Safety Act (CPSA), and Mine Safety and Health Act (MSHA).

4069 Principles of Industrial Hygiene (3) V Prereq.: INED 2053 and BIOL 2160; or equivalent. Industrial hygiene related to environmental factors that produce adverse employee health.

4070 Teaching: Construction Industries (3) V An activity-oriented, conceptually based teacher education curriculum, incorporating methods and materials of *The World of Construction* as developed by the Industrial Arts Curriculum Project.

4080 Teaching: Manufacturing Industries (3) V An activity-oriented, conceptually based teacher education curriculum, incorporating methods and materials of *The World of Manufacturing* as developed by the Industrial Arts Curriculum Project.

4849 Special Topics in Industrial Education (1-3) V May be taken for a max. of 6 sem. hrs. credit. Current practices and technological advances in industrial education; individual or group study under the direction of a faculty member.

7041 Foundations of Industrial Education (3) V History and philosophy of industrial arts/technology education and vocational trade and industrial education.

7042 Principles of Vocational Trade and Industrial Education (3) V Contemporary principles and practices in vocational trade and industrial education at the secondary, postsecondary, and adult levels.

7142 Program Development in Industrial Education (3) V Program research, development, evaluation, and implementation.

7242 Programmed Instruction (3) V Principles of programmed instruction; emphasis on methods and application of instruction and development of materials.

7741 Administration and Supervision of Vocational Trade and Industrial Education (3) V Philosophical, theoretical, and operational considerations in administering and supervising secondary and postsecondary vocational trade and industrial education programs and staff.

7848 Special Topics in Industrial Education (1-3) V Maybe taken for a max. of 6 sem. hrs. Independent or group study under the direction of the graduate faculty.

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

INDUSTRIAL ENGINEERING • IE

1002 Industrial Engineering Fundamentals (3) Design; introduction to computers; description of the profession.

2060 Introduction to the Use of Computers (3) Prereq.: eligibility to take MATH 1550 or equivalent. 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 Group Ware.

3201 Principles of Engineering Economy (3) Credit will not be given for both this course and IE 3710. Planning economy studies for decision making, including consider-

ations of rate of return, cost and yield studies, depreciation and tax relationships, increment costs, replacement, and introduction to multivariate alternative studies.

3302 Engineering Statistics (3) Prereq.: MATH 1552. Probability, discrete and continuous distributions, functions of random variables, estimation theory, tests of hypotheses including goodness-of-fit and independence.

3603 Manufacturing Processes and Methods (3) Prereq.: CM 1030, ME 2733. 2 hrs. lecture; 3 hrs. lab. Modern manufacturing processes integrated into total manufacturing systems; CAD/CAM flexible manufacturing operations; metal casting, forming, removal; welding processes and machinery; fine measurement, inspection, and quality assurance.

3710 Engineering Systems Analysis and Optimization (3) Prereq.: CE 2720 or equivalent and MATH 2057. Credit will not be given for both this course and IE 3201. Project scheduling methods, engineering economy, linear and nonlinear programming in the analysis and optimization of engineering systems.

4362 Advanced Engineering Statistics (3) Prereq.: IE 3302. Linear regression and correlation, curvilinear regression, analysis of variance, and factorial experiments.

4419 Engineering Production Control (3) Prereq.: IE 1002 and 4510; or equivalent. Organization and functions of industry; production control planning; scheduling, forecasting, and inventory relationships; network scheduling principles.

4425 Information Systems Engineering (3) Prereq.: credit or registration in IE 4510. 2 hrs. lecture; 3 hrs. lab. Analysis and design of information systems; projects relating comprehensive computer systems to typical industrial and service applications; ethics and professionalism.

4426 Distributed Information Systems Engineering (3) Prereq.: 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.

4453 Industrial Quality Control (3) Prereq.: IE 3302. Principles and practice of quality assurance and control; theory of statistical sampling and control and related economic analysis.

4461 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 worker performance.

4462 Safety Engineering (3) Occupational safety and health and accident prevention management; design and implementation of safety programs; cost analysis; control of hazardous physical and environmental conditions.

4463 Fundamentals of Industrial Hygiene Engineering (3) Prereq.: senior standing. Basic principles of chemical hazards, air contamination, ionizing and nonionizing radiation, sound and vibration, and thermal stresses; theoretical foundation and application of theory in the control of occupational health hazards.

4465 Biomechanics for Engineers (3) See BE 4323.

4466 Human Performance with Information Processing Systems (3) Prereq.: IE 1002 or equivalent. Systems approach to the identification, design, analysis, and development of human-operated information processing systems; applications to practical problems in industry, armed services, athletics, music, and education.

4470 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 as applied to engineering problems; expert systems theory; systems building tools; state-of-the-art engineering expert systems.

4480 Manufacturing Automation (3) Prereq.: IE 3201 and 3603. 2 hrs. lecture; 3 hrs. lab. Application of computer-based control system techniques to manufacturing automation; programming of numerically controlled machine tools using Compact II and APT; robotics with multidegree of freedom linkages; NC programming using CAD/CAM; computer-automated part programming.

4485 Computer Automation & Systems Integration in Manufacturing (3) Prereq.: IE 2060, 3603. 2 hrs. lecture; 3 hrs. lab. Principles and application of information technologies to monitoring, control, and integration of manufacturing operations at all levels within the organization.

4487 Engineering Project Management (3) Series of design projects. Development of networks, time estimation, and level of detail, scheduling computations, project cost control, time-cost trade-off, PERT, and computer processing.

4490 Engineering Maintenance Management (3) Prereq.: IE 1002, 4510, and credit or registration in IE 4425. Design, operation, and monitoring of a system to efficiently control maintenance costs; maintenance organization and systems,

preventive maintenance, maintenance planning and scheduling, maintenance work measurement, labor performance measures, and spare parts.

4510 Operations Research in Engineering I (3) Prereq.: MATH 2085 or 2090 or equivalent; and credit or registration in IE 3302. Linear programming; queuing theory; inventory theory; simulation models and math models relevant to engineering problems.

4511 Industrial Simulation (3) Prereq.: IE 4510, 2060, credit or registration in IE 4362, or equivalents. 2 hrs. lecture; 3 hrs. lab. Also offered as ISDS 4511. Computer used to simulate operating characteristics of industrial systems in time; problems encountered in constructing simulation programs applied to industrial plant operations and service-industry systems.

4512 Operations Research in Engineering II (3) Prereq.: IE 4510. Stochastic models; decisions under uncertainty; arrival and departure distributions; advanced topics in mathematical programming.

4516 Plant and Systems Design (3) Prereq.: IE 1002, 3201, 4510 and senior standing in College of Engineering. Machine loading, assembly balancing techniques, design of physical-manufacturing systems, integrating 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.

4540 Reliability Engineering (3) Prereq.: IE 3302. Reliability in design; reliability models; reliability assessment during preproduction development and testing; and special problems in maintenance, spare parts, and Markov processes.

4599 Industrial Engineering Senior Design Project (3) Prereq.: IE 3603; credit or registration in IE 4419, 4425, 4511, and 4516. Should be taken during the last semester of the undergraduate program. Application of previous industrial engineering courses in a comprehensive design project; preparation for the FE exam in industrial engineering.

4607 Industrial Relations (3) Prereq.: senior standing. Industrial organization; personnel forecasting; sources, selection, appraisal, and evaluation; training, compensation, and motivation; labor relations including contract negotiation, administration, and grievance handling.

4785 Special Topics in Industrial Engineering (1-3) Prereq.: senior standing. May be taken for a max. of 6 hrs. of credit when topics vary. Two sections may be taken concurrently if topics vary. Topics in industrial engineering not sufficiently covered in other undergraduate courses.

7201 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.

7211 Project Engineering (3) Prereq.: IE 3201 or equivalent. Large-scale engineering construction or development projects from schematic to on-line condition.

7382 Probability Theory in Engineering (3) Prereq.: IE 4362 or equivalent. Random variables and their functions; transformation of random variables; sets of random variables and random sequences; expectation, special distributions, random processes, discrete and continuous Markov processes, birth and death processes, and waiting line theory.

7408 Industrial 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.

7425 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.

7453 Advanced Quality Control (3) Prereq.: IE 4453 or equivalent. Advanced procedures of statistical quality control, statistical analysis of quality control data, economic aspects of quality assurance, human element in quality control, and relationship of quality control to productivity and to ability of American products to compete in world markets.

7461 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 4461 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 4461 or equivalent. 2 hrs. lecture; 3 hrs. lab. Principles of biomechanics applied to human movement; applications to work systems such as manual materials handling and tool design.

7466 Human Interaction with Computers (3) Prereq.: IE 4461 or IE 4466 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 maintenance, product design, process planning, factory scheduling and control, robotics, and intelligent warehouse systems.

7480 Automation and Computer-Aided Manufacturing (3) Prereq.: IE 3201 and MATH 1552; or equivalent. Automated flow-line production, numerical control, industrial robots, computer-aided manufacturing, process monitoring and control, group technology, flexible manufacturing systems, and material requirements planning.

7485 Advanced Microcomputer Applications (3) Prereq.: IE 4485 or equivalent. 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 4490 and 4510; 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 manufacturing environments.

7541 Linear Programming Algorithms (3) Prereq.: IE 4510 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; decomposition, and cutting plane algorithms.

7551 Queuing Theory (3) Prereq.: IE 4510 or equivalent. Fundamentals of queuing processes, transient and limiting behavior, measures of effectiveness; birth and death processes, single and multi-server queues, 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 4510 or equivalent. Aspects of advanced programming methods for unconstrained and constrained problems; development of goal, zero-one, gert, and multiple objective programming with application to industrial processes and planning.

7640 Equipment Failure Analysis and Prevention (3) Prereq.: credit or registration in IE 4540 or equivalent. Analysis, monitoring, and prevention of failures in mechanical equipment; failure mechanisms; mechanical failure analysis techniques; Weibull failure analysis techniques; and failure management.

7642 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.

7645 Management of Technology (3) Cross-listed with MGT 7001. 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 (3,3) May be taken for a max. of 6 sem. hrs. of credit when topics vary. Student interest in specialized industrial engineering areas such as design and analysis of complex production control, maintenance, quality control, reliability, and work-measurement 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; sequencing and scheduling; line balancing and workforce scheduling.

7762 Supply Chain Systems (3) Prereq.: IE 4510 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.

7771 Engineering Design of Manufacturing Systems (3) Prereq.: IE 4419 and 4510 or equivalent. Principles in modeling, analysis, design, and operations; mass production, 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.

INFORMATION SYSTEMS AND DECISION SCIENCES • ISDS

1100 Introduction to Management Information Systems (3) Management of information, computers, and systems; utilization of management information systems to improve managerial decision making.

2000 Statistical Methods and Models I (3) Prereq.: MATH 1431 and ISDS 1100. Statistical description and inference; data distributions, descriptive measures, index numbers, time series analysis; review and extension of probability theory; probability distributions; standard distributions, including normal and binomial; sampling distributions.

2001 Statistical Methods and Models II (3) Prereq.: ISDS 2000. Continuation of ISDS 2000. Regression analysis and analysis of variance; basic management science techniques for helping managers cope with business problems.

3000 Statistical Methods and Models III (3) Prereq.: ISDS 2001. Continuation of ISDS 2001. Statistical inference; additional applications of sampling distribution; the chi-square, student's t, and F distributions; estimation; hypothesis testing; survey sampling; linear regression; simple correlation; analysis of variance; nonparametric tests.

3001 Conceptual Foundation for Statistical Analysis (3) Prereq.: MATH 1021 or equivalent. Foundations for advanced work in statistical inference; probability, probability distributions, expected value, sampling distributions; application of sampling distributions to problems of estimation and control.

3002 Conceptual Foundations for Operations Research (3) Prereq.: MATH 1021 or equivalent. Not open to undergraduate students in the E. J. Ourso College of Business Administration. Foundations for work in operations research; fundamentals of analysis, systems of linear equations, selected topics from matrix 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 report 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 and grade of "C" or better in CSC 1250 or equivalent. Understanding of the Internet and its structure for use in business; technologies employed to develop Internet applications; development of business applications for the Internet.

3110 Database Processing for Management (3) Prereq.: ISDS 3100. 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 2001. 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.

3200 Advanced Business Programming (3) Prereq.: ISDS 3105. 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. Concepts of probability distribution and statistical inference; theoretical foundations for estimating and testing hypotheses about means, proportions, and variances; chi-square and F 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. Applied 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. Assessment of subjective probability distributions; Bayesian estimation and inference; application of Bayesian techniques to business problems.

4020 Operations Research for Managerial Decisions (3) Prereq.: ISDS 2001 or equivalent. Managerial decision making, including decision analysis, linear programming, transportation models, integer programming, project scheduling, and waiting line models; basic understanding and evaluation of operations research techniques.

4021 Foundations of Mathematical Programming (3) Prereq.: credit or registration in ISDS 4020. Theoretical foundations of linear programming in single and multiple objectives; classical nonlinear optimization of unconstrained and constrained functions; Kuhn-Tucker conditions and quadratic programming.

4031 Applied Linear Models (3) Prereq.: ISDS 3000 or equivalent. Development of a unified approach to estimation and hypothesis testing in linear statistical models; emphasis on appropriate specification and interpretation of models and statistical hypothesis; use of available computer routines and interpretation of results; unbalanced analysis of variance models, linear regression models, and analysis of covariance models.

4110 Business Decision Support and Expert Systems (3) Prereq.: ISDS 3110 or equivalent. Laboratory practice includes use of a particular software system. Business decision modeling; constructing a decision support system (DSS); DSS development tools; executive information systems; expert systems (ES) in business; building ES; process, tools, and strategy; integration of DSS and ES.

4111 Enterprise Systems (3) Prereq.: ISDS 3100. Overview of key enterprise systems concepts from functional, technical, and implementation perspective; emphasis on the process-centered organization and how integrated systems are designed to support cross-functional business; hands-on computer based exercises involving a hypothetical global company.

4112 Data Warehousing (3) Prereq.: ISDS 3100. Data Warehouses for business; topics include: top-down design, bottom-up design, data charts, multidimensional data, data mining, Web-enabled data warehouse, knowledge management.

4113 Information Technology Project Management (3) Prereq.: ISDS 3100 or equivalent. Topics on effectively managing information technology projects including: setting goals and objectives; work breakdown structures; project scheduling; managing project resources; evaluation and review; incentives and qualitative analysis; project accounting; extensive use of cases involving hands-on computer analyses with state-of-the-art project management software.

4114 Software Quality Assurance (3) Prereq.: ISDS 3100. Modern practices of software quality management; topics include: software development process models, software quality metrics, basic quality tools, software reliability models, customer satisfaction measures, and the ISO 9000 quality system standard.

4120 Business Data Communications (3) Prereq.: ISDS 3100 or equivalent. Telecommunications in business, including both voice and data communication, technical details (hardware, software, protocols, network configurations), network management, and security issues.

4125 Analysis and Design of Management Information Systems (3) Prereq.: ISDS 3110, 3200. Design philosophies and techniques for the creation of information systems for management decision making; conceptual design of actual information systems.

4165 Operation of Service and Distribution Systems (3) Prereq.: ISDS 3115. Application of operations management concepts and techniques in service and distribution organizations; service system design and control, including location, layout, capacity expansion, staffing and scheduling; special attention to structure design and operational control of distribution systems and interfaces with other functional areas.

4167 Operations Planning and Control (3) Prereq.: ISDS 3115 or equivalent. Planning and control of operations in manufacturing and service organizations; aggregate planning, master scheduling, requirements planning, and activity control; emphasis on developing skills through case studies and computer models.

4168 Supply Chain Management (3) Prereq.: ISDS 4165. Planning, implementing, and controlling the efficient, cost-effective flow and storage of raw material, in-process products, finished products, and related information in a supply channel; resource/material management; supplier strategy; inventory planning and control; just-in-time systems; customer service; logistics and interfaces with other functional areas; emphasis on concepts, model development, and analysis.

4180 Business Analysis in Practice (3) Prereq.: Senior standing or permission of instructor. Contemporary problems encountered by the business analysis professional; emphasis on case analysis and use of business analysis skills and computer technology to solve business problems.

4200 Quality Management (3) Prereq.: ISDS 3115. Credit will not be given for both this course and IE 4453. Principles and practices of statistical quality control in industry; control charts for variables and for attributes; process capability analysis; acceptance sampling for variables and for attributes; design of experiments; Taguchi methods; and ISO 9000 standards.

4501 Systems Modeling and Analysis I (3) Prereq.: ISDS 2001. Final project involves the application of discrete-event simulation to a real-world problem. Modeling and analysis of production and service systems using discrete-event computer simulation; discrete-event simulation mechanics; model structure, model building, modeling of complex systems; verification and validation; arrival processes; design of simulation experiments; statistical analysis of terminating and steady-state systems.

4502 Systems Modeling and Analysis II (3) Prereq.: ISDS 4501. Final project involves the application of simulation to solve an operations problem in business or government. Advanced application of computer simulation concepts to dynamic systems; alternative approaches to simulation modeling; discrete-event, hybrid discrete/continuous, system dynamics, simulators, and template approach; further development of modeling and analysis skills; advanced analysis concepts including variance-reduction, simulation meta-models and simulation optimization.

4511 Industrial Simulation (3) Prereq.: IE 4510, 2060, credit or registration in IE 4362, or equivalents. See IE 4511.

5010 Statistical Methods for Public Administration (3) Prereq.: college algebra. 2 hrs. lecture; 2 hrs. lab. Open only to students in the M.P.A. program. Also offered as PADM 5010.

7000 Statistical Theory (3) Prereq.: ISDS 4000 or equivalent; and consent of instructor. Continuation of ISDS 4000. Theoretical basis for topics in statistical inference including tests of hypotheses, experimental design, regression analysis, general linear models, nonparametric statistics; sequential tests of hypotheses; and complex sample designs.

7009 Simulation of Stochastic Processes (3) Prereq.: fundamental knowledge of computer programming, statistics, and operations research; and consent of instructor. Simulation models, methodologies, and languages; development of complex models; validation of results; completion of several large-scale projects involving extensive use of digital computer required.

7010 Decision Models for Public Administration (3) Open only to students in the M.P.A. program. See PADM 7010 and POLI 7010.

7020 Theory of Stochastic Processes (3) Prereq.: ISDS 4000 or equivalent. Joint, marginal, and conditional probability distributions treated in detail; stochastic

processes, including random walks, Markov processes, birth-death processes, stationary stochastic processes, and renewal processes; statistical inference based on stochastic processes.

7021 Sample Design and Analysis (3) Prereq.: BADM 7020 or equivalent. Methodology of designing sampling systems; alternative sample designs; relative efficiency of sampling systems; problems of bias; techniques of estimation; criteria for selecting optimal sampling plans; emphasis on applications with theoretical foundations.

7022 Multivariate Data Analysis (3) Prereq.: BADM 7020 or equivalent. Multivariate methods, including principal components, canonical correlation, factor analysis, discriminant analysis, classification procedures.

7024 Advanced Statistical Analysis for Research I (3) Prereq.: proficiency in calculus, linear algebra, basic statistical methods, and computer programming. Methods of statistical inference; statistical estimation; testing hypotheses about single and multiple means and proportions; simple and multiple linear regression; design of simple random, stratified, and cluster samples; extensive use of statistical computer programs.

7025 Advanced Statistical Analysis for Research II (3) Prereq.: ISDS 7024 or equivalent. Continuation of ISDS 7024. Advanced regression analysis; experimental design and analysis of variance; nonparametric methods; multivariate techniques; extensive use of statistical computer programs.

7027 Advanced Forecasting Models (3) Prereq.: BADM 7020 or equivalent. Advanced topics in forecasting; time-series analysis; emphasis on stochastic parameter models and autocorrelated error structures; univariate autoregressive integrated moving average (ARIMA) models; multivariate models and transfer functions; extensive use of computer programs.

7070 Seminar in Advanced Business Problems (3) May be taken for a max. of 6 hrs. of credit when topics vary. Special topics in statistics and quantitative methods.

7101 Introduction to Operations Research Methods (1.5) Prereq.: BADM 7020 or equivalent. Topics cover models that support managerial decision-making including decision analysis, simulation, risk analysis, linear programming, and integer programming; Excel spreadsheet is used extensively.

7102 Survey of Operations Research: Deterministic Models (3) Prereq.: ISDS 7101. Integer and mixed-integer programming, extensions of classical optimization, quadratic programming, separable programming, and dynamic programming; applications of more advanced mathematical programming; techniques with some theory.

7103 Survey of Operations Research: Stochastic Methods (3) Prereq.: ISDS 7101 or 4021. Extensions of decision theory, game theory, dynamic programming, Markovian decision processes, reliability models, and queuing models; probabilistic methods in operations research.

7105 Digital Methods (3) Prereq.: ISDS 7102 and working knowledge of FORTRAN. Numerical problem solving in operations research and statistics; Monte Carlo methods, numerical solution of systems of equations, search techniques, and heuristics.

7106 Multiple Criteria Decision Making (3) Prereq.: ISDS 7103. Theory of the displaced ideal, linear multi-objective programming, goal programming, compromise programming, and multi-attribute utility measurement.

7107 Dynamic Programming (3) Prereq.: ISDS 7102. Theory and computational techniques of dynamic programming; single and multidimensional problems; relationship to classical optimization techniques.

7111 Theoretical Foundations of Operations Research (3) Prereq.: ISDS 7101 and 7102. Properties and theoretical foundations for operations research methods.

7200 Quality and Productivity Management (1.5) Prereq.: BADM 7020 or equivalent. Principles and practices of statistical quality control in industry; control charts for variables and for attributes; process capability analysis; acceptance sampling plans; design of experiments; Taguchi methods and ISO 9000 standards.

7210 Process and Planning Control (3) Prereq.: BADM 7050. Integration of operations planning and control with other business functions of an enterprise; enterprise resource planning (ERP); cases and managerial techniques to plan and schedule business processes in industrial and service areas; decision problems and appropriate tools; hands-on experience with ERP software; cross-functional case projects.

7211 Process and Planning Control II (1.5) Prereq.: ISDS 7210. Cases and management techniques to control business processes in industrial and service areas; material requirements planning, manufacturing resource planning, operations control; overview of computerized packages, enterprise management systems, decision problems, and case projects.

7220 Supply Chain Management (1.5) Prereq.: BADM 7120 or equivalent. Supply chain process analysis and control; 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.

7221 Supply Chain Management II (1.5) Prereq.: ISDS 7220. Supply chain design and integration; network design, warehouse location, outsourcing, global supply chain, and information, EDI and DSS technologies in supply chain management; case study and SCM software.

7230 Project Management (1.5) Prereq.: BADM 7120 or equivalent. Topics on effectively managing projects including setting goals and objectives, project planning, evaluation and review; incentives and qualitative analysis, and project accounting; extensive use of cases involving hands-on computer analyses with state-of-the-art project management software.

7272 Operations Strategy (1.5) Prereq.: BADM 7120 or equivalent. Perspective for managers to integrate operations strategy into an overall business strategy; issues in selection of the capabilities, characteristics, and configuration of facilities; process/technologies; aggregate capacity; vertical integration; operations infrastructure; organizational structure and jobs; extensive use of case analyses drawn from service and manufacturing industries.

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, inventory control, scheduling, facilities location and layout, quality control, job design, industrial design, network analysis; emphasis on application of techniques.

7510 Database Management (3) Prereq.: BADM 7050. Analysis, design, and implementation of databases based on the relational database model; data modeling using entity-relationship (E-R) diagramming; logical and physical database design; SQL; hardware/software architecture considerations; data and database administration; emerging database technologies and advanced database applications.

7511 Advanced Database 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 7520. In-depth look at Internet applications architecture, 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 management perspective; software development methodology; topics include requirements determination; feasibility determination; project management; evaluation of a software development strategy 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; disintermediation/ reintermediation; 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; newsgroups, virtual communities, extranet and intranet.

7545 Collaborative Computing (1.5) Prereq.: BADM 7050. Foundation of collaborative computing; issues of motivation, synchronicity, 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 (1.5) Prereq.: *ISDS 7550*. Foundation of critical issues in the design and implementation of business and information systems change including business process reengineering, project and change management, and information systems design and management.

7555 Auditing Enterprise Systems (1.5) Prereq.: *ISDS 7550 and ACCT 7233*. Principles of auditing enterprise wide information systems in business; audit plans; controls and security issues.

7560 Social and Organizational Issues in MIS (1.5) Prereq.: *BADM 7050*. Impact of electronic communities on organizations; implications of design choices on business; ethical considerations.

7570 Total Quality Management in Systems Design (1.5) Prereq.: *BADM 7050*. Contemporary topics in total quality management; quality in software and system design and implementation; problem solving tools; process control; quality function deployment and FMEA; team building and quality standards and awards.

7900 Contemporary Issues in Statistics and Management Science (3) Prereq.: *advanced Ph.D. study and consent of instructor*. Philosophical foundations of science and their implications for contemporary management science.

7910 Contemporary Issues in Production/Operations Management (3) Prereq.: *advanced Ph.D. standing or consent of instructor*. May be taken for a max. of 9 hrs. of credit when topics vary. Philosophical foundations and contemporary issues in production/operations management.

7920 Contemporary Issues in Management Information Systems (3) Prereq.: *advanced Ph.D. standing or consent of instructor*. May be taken for a max. of 9 hrs. of credit when topics vary. Philosophical foundations and contemporary issues in management information 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.: *advanced master's standing or consent of instructor*. May be taken for a max. of 6 hrs. of credit. Pass-fail grading.

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

8900 Pre-dissertation Research (1-9) May be repeated for credit.

9000 Dissertation Research (1-12 per sem.) "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.

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 (3) F Prereq.: *admission to professional program in interior design or permission of instructor*. Concurrent enrollment in ID 2781. 6 hrs. studio. Basic design problems in the built environment; emphasis on design process, form and principles of spatial organization.

2751 Interior Design Studio II (3) S Prereq.: *ID 2750 or equivalent*. 6 hrs. studio. Continuation of ID 2750. 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 projects.

2774 Interior Construction and Systems (3) F Prereq.: *admission to professional program*. Building systems and construction methods; code requirements for interiors.

2775 Interior Materials, Finishes, and Furnishings (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 (3) F,S Prereq.: *admission to professional program or consent of instructor*. Credit will not be given for this course and ARCH 2173, IE 2185, or LA 2185. 1 hr. lecture; 4 hrs. lab. Computer drafting and three-dimensional modeling for spatial designers.

★ **3741 History of Interior Design and Decoration I (3) F** 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*. 1 hr. lecture; 4 hrs. studio. Design, materials, and construction techniques of interior components; scale model and computer simulated design prototypes.

3752 Interior Design Studio III (3) F Prereq.: *ID 2751 and ID 2775 or equivalent*. 6 hrs. studio. Formulation of design concept/image; design implications of function, space, and scale.

3753 Interior Design Studio IV (3) S Prereq.: *ID 3752 or equivalent*. 6 hrs. studio. Continuation of ID 3752. 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.

3770 Color and Illumination II (3) Prereq.: *junior standing in major; nonmajors by consent of instructor only*. 1 hr. lecture; 4 hrs. studio. Quantitative and qualitative aspects of color/light; application to interior design.

3782 Interior Design Construction Documents (3) Prereq.: *ID 2751 or equivalent*. 1 hr. lecture; 4 hrs. studio.

Development of construction documents for interior projects; design and documentation of interior architectural details.

4720 Seminar in Interior Design (3) F Prereq.: *ID 3752 or equivalent*. Research, discussions, and presentations related to contemporary issues in interior design.

4754 Interior Design Studio V (3) F Prereq.: *ID 3753 or equivalent*. 6 hrs. studio. Advanced application of the design process; development of comprehensive solutions to complex interior design problems.

4755 Interior Design Studio VI (3) S Prereq.: *ID 4754 or equivalent*. 6 hrs. studio. Continuation of ID 4754. Design synthesis.

4756 Independent Study Project (3) S Prereq.: *ID 4720*. 6 hrs. studio. Execution of a project selected by the advanced student with guidance from an advisory committee.

4761 Professional Practice (3) S Prereq.: *senior standing in the major or consent of instructor*. Entering the profession; interior design business practices; ethics and project management.

INTERNATIONAL STUDIES • INTL

★ **2001 Introduction to International Studies (3)** Interplay between globalization and regionalism in several major areas of the world.

3002 Independent Study in International Studies (3) May be taken for a max. of 6 hrs. of credit when topics vary. Independent study relevant to the field of international studies.

3786 Religion of Islam (3) See REL 3786.

4000 International Studies Workshop (3) For international studies majors in junior or senior year. Prereq.: *consent of instructor*. Development of research project in international studies—prospectus, annotated bibliography, and research proposal.

4002 South Asian Society, Polity, and Culture (3) Cross-listed with ANTH 4002, GEOG 4002, and REL 4001. Historical anthropology of South Asia examining the four major cultural traditions (Hindu/Buddhist, Islamic, British, and nationalist) which currently shape the politics of nationalism, development, ethnicity, caste, and gender in the region.

4003 International Studies Senior Seminar (3) Prereq.: *INTL 2001*. Required for all international studies majors, seniors only. Advanced theory and case studies of globalization and its discontents.

4010 A History of Geopolitics (3) History of European geopolitics and geopolitical thought from Thucydides through the end of the Cold War.

4100 Migration, Diasporas, and Identity (3) An interdisciplinary survey of global migration in the modern era and the resultant subnational and transnational forms of community, identity, and subjectivity: colonists, exiles, immigrants, refugees, and transients.

ITALIAN • ITAL

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

General education courses are marked with stars (★).

*1001, ★ 1002 Elementary Italian (4,4) F,S Supplementary work in language laboratory. Basic lexicon and structure of Italian; emphasis on communicative language use.

2002 Italian for Travelers (3) F,S Does not count toward satisfying the foreign language requirement for undergraduates. Basic communication patterns; practical everyday vocabulary; exercises in comprehension and conversation.

2028 Italian for Music (3) Prereq.: *music majors are expected to have taken MUS 2018 and 2019 before enrolling in this course*. Study of Italian language with major emphasis on opera libretti and song texts.

★ *2101, ★ 2102 Intermediate Italian (3,3) F,S Supplementary work in language laboratory. Basic lexicon and structure of Italian; emphasis on communicative language use.

★ *2155 Readings in Italian Literature (3) 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 present.

3058 Advanced Oral Communication (3) Prereq.: *ITAL 2102*. Enhancement of oral communication skills through debating contemporary issues.

3060 Advanced Grammar and Composition (3) Prereq.: *ITAL 2155*. 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, Sannazaro, and Ariosto.

4053 Modern Italian Literature (3) Prereq.: *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.: *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,Su May be taken for a max. of 3 sem. hrs. credit. Permission of department 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 • JAPN

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. Language laboratory work required. Basic lexicon and structure; emphasis on communicative language use.

★ *1002 Beginning Japanese (5) *JAPN 1001 or equivalent. Language laboratory work required. Basic lexicon and structure; emphasis on communicative language use.*

★ *2001, ★ *2002 Intermediate Japanese (3,3) *Prereq.: JAPN 1002 is prerequisite for 2001; 2001 is prerequisite for 2002; approval of the instructor. Structures and lexicon; emphasis on communicative language use and developing facility in reading Japanese.*

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 activity courses are offered on a letter-grade basis. Kinesiology majors and minors must register for a letter grade; other students may petition to receive a pass-fail grade.

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)

1123 Archery

1124 Tennis

1125 Golf

1126 Gymnastics

1128 Riflery

1129 Badminton

1130 Bowling

1132 Ballroom Dance

1133 Children's Rhythms *For elementary grades, physical education, or special education majors.*

1134 International Folk Dance

1136 Swimming

1140 Scuba Diving *Prereq.: KIN 1236 or consent of instructor.*

1142 Conditioning Exercises

1144 Aerobic Dance

1146 Weight Training

1150 Recreational Dance

1151 Racquetball

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)

1224 Tennis

1236 Swimming

1244 Aerobic Dance

1246 Weightlifting

1251 Racquetball

1254 Martial Arts

1255 Jogging

1257 Aerobic Swimming

1336 to 1338 Advanced Courses (1 sem. hr. each)

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 kinesiology majors or minors.*

1406 Basketball (1) 3 hrs. lab. *For kinesiology majors or minors.*

1407 Softball (1) 3 hrs. lab. *For kinesiology majors or minors.*

1408 Volleyball (1) 3 hrs. lab. *For kinesiology majors or minors.*

1409 Flag Football (1) 3 hrs. lab. *For kinesiology majors or minors.*

1410 Field Sports (1) 3 hrs. lab. *For kinesiology majors or minors.*

1411 Gymnastics (1) 3 hrs. lab. *For kinesiology majors or minors.*

1412 Tennis (1) 3 hrs. lab. *For kinesiology majors or minors.*

1413 Badminton (1) 3 hrs. lab. *For kinesiology majors or minors.*

1427 Physical Activity I: Volleyball and Basketball (1) *For kinesiology majors or minors. 3 hrs. lab. Identification, analysis, and practice of skills and techniques fundamental to volleyball and basketball; rules, strategies, safety.*

1428 Physical Activity II: Soccer and Football (1) *For kinesiology majors and minors. 3 hrs. lab. Identification, analysis, and practice of skills and techniques fundamental to soccer and football; rules, strategies, safety.*

1429 Physical Activity III: Softball and Track and Field (1) *For kinesiology majors and minors. 3 hrs. lab. Identification, analysis, and practice of skills and techniques fundamental to softball and track and field; rules, strategies, safety.*

1430 Physical Activity IV: Tennis and Badminton (1) *For kinesiology majors and minors. 3 hrs. lab. Identification, analysis, and practice of skills and techniques fundamental to tennis and badminton; rules, strategies, safety.*

1600 Personal and Community Health Problems (3) *Content and theory related to basic health information; critical health issues; improving and maintaining optimal health and wellness.*

1999 Special Topics (1) *May be taken for a max. of 4 sem. hrs. credit when topics vary. 3 hrs. lab. Identification, analysis, and practice of skills and techniques fundamental to sports; rules, strategies, and appropriate safety procedures.*

2500 Human Anatomy (3) *Micro and macroscopic study of the human body.*

2501 History and Philosophy of Kinesiology (3) *Developments in kinesiology and health from ancient times to the present.*

2503 Basic Athletic Training (2) 1 hr. lecture; 2 hrs. lab. *Athletic training room procedure; first aid treatment of injuries; use of athletic training room equipment; protective strapping; padding for all sports.*

2504 Principles of Conditioning (2) 1½ hrs. lecture; 1½ hrs. lab. *Methods and concepts of training and conditioning; physical fitness activities and current trends; participation in selected activities designed to promote fitness; planning programs for physical fitness for educational institutions and social agencies.*

2507 Methods and Materials in Physical Education for the Elementary School (4) 2 hrs. lecture; 4 hrs. lab. *For elementary teachers. Progressively graded programs of activities for elementary schools.*

2511 Sports Officiating (2) *Prereq.: proficiency in sports indicated. 1 hr. lecture; 2 hrs. lab. Rules interpretation and techniques of officiating basketball, volleyball, and softball.*

2515 The Coaching of Track and Field (2) 1 hr. lecture; 2 hrs. lab. *Principles and techniques of coaching track and field; organization and administration of practice and various levels of competition.*

2516 The Coaching of Basketball (2) 1 hr. lecture; 2 hrs. lab. *Principles and techniques of coaching basketball; organization and administration of practice and various levels of competition.*

2517 The Coaching of Baseball/Softball (2) 1 hr. lecture; 2 hrs. lab. *Techniques of coaching baseball/softball; organization and administration of practice and various levels of competition.*

2518 The Coaching of Volleyball (2) 1 hr. lecture; 2 hrs. lab. *Techniques of coaching volleyball; organization and administration of practice and various levels of competition.*

2519 The Coaching of Football (2) *Prereq.: 1 hr. lecture; 2 hrs. lab. Techniques of coaching football; organization and administration of practice and various levels of competition.*

2525 Practicum in the Coaching of Individual and Team Sports (1-3) 3-9 hrs. lab. *May be taken for credit when sports vary.*

2526 Psychology of Coaching (3) *Psychological perspectives applied to the athletic situation; coaching personalities, athletic personalities, psychological injuries, motivation, mental preparation, relaxation techniques, and stereotypes in athletics.*

2530 Sport in Society (3) *Interdisciplinary study of sport as a mirror of society reflecting the dynamics of human social existence; emphasizes process through which individuals formulate their identity from youth to old age.*

2540 Introducing Physical Education for All Handicapped Children (3) *Credit will not be given for both this course and KIN 3545. Open only to kinesiology majors. Laws affecting the handicapped; motor abilities of handicapped children; adjusting programs to suit their needs and interests.*

2577 Health and Physical Education for the Elementary School (4) 3 hrs. lecture; 2 hrs. lab. *Basic principles and concepts of a healthy lifestyle; nutrition, fitness, exercise; study and analysis of movement.*

2600 Human Sexuality (3) *Historical, semantic, religious, social, medical, and comparative cultural aspects of human sexuality from childhood to senility.*

2601 First Aid (1) 1 hr. lecture; 1 hr. lab.

2602 Methods, Materials, and Content in Health Education for the Elementary School (3) *Theoretical foundations, essential content and pedagogical practices for K-8 Health Education.*

2603 Consumer Health (3) *Major consumer health problems; selecting, purchasing, and financing health services and products.*

2604 Issues in Mental Health (3) *Issues in mental health; stress, depression, alienation, family violence, suicide, death and dying.*

3500 Human Anatomy Laboratory (1) *Prereq.: KIN 2500 or consent of instructor. 2 hrs. lab. Computer based study. Interactive software of the human body; gross anatomy with emphasis on muscle, bone, nerve, and blood vessels.*

3501 Advanced Athletic Training (3) *Prereq.: KIN 2503. 2 hrs. lecture; 2 hrs. lab. Advanced topics in athletic training; advanced taping techniques; emergency care protocols including spine boarding, crutch fitting, and splinting; proper use and indications of therapeutic modalities.*

3502 Tests and Measurements in Kinesiology (3) 2 hrs. lecture; 2 hrs. lab. *Principles of measurement and evaluation in kinesiology and health; emphasis on criteria for selection and evaluation of tests and techniques of testing; analyzing and interpreting motor performance and cognitive test scores.*

3505 Practicum in Athletic Training (1) *Prereq.: KIN 2503. 2 hrs. clinic/practicum. May be taken for a max. of 6 sem. hrs. credit.*

3506 Orthopedic Assessment in Athletic Training (3) *Prereq.: KIN 2503 and 3501. 2 hrs. lecture; 2 hrs. lab. For students in the Athletic Training certification concentration. Techniques and procedures for clinical evaluation of common athletic injuries; emphasis on major joint structures, incorporation of appropriate examination techniques, and procedures into an effective, systematic clinical evaluation; mechanism of injury and sport specific consideration.*

3507 The Olympic Games: Ancient and Modern (3) *Origins, growth, politicalization, and governance of the games.*

3508 Organization and Administration in Athletic Training (3) *Limited to students in the athletic training certification concentration. Organization and administration of an Athletic Training Program including budget, facilities, equipment, insurance, legal aspects, records, employment, personnel, and structure of the National Athletic Trainer's Association.*

3509 Therapeutic Exercise and Rehabilitation in Athletic Training (3) *Prereq.: KIN 3506. 2 hrs. lecture; 2 hrs. lab. For students in the Athletic Training certification concentration. Basic components of designing and implementing rehabilitation programs; rationale use and application of exercise in athletic injury rehabilitation; specific techniques of rehabilitation.*

3510 Techniques and Methods of Teaching Physical Education (3) *Prereq.: KIN 2504 and competency in four activities. Concurrent enrollment in KIN 3516. Education majors only. 2 hrs. lecture; 3 hrs. lab. Microteaching and field experience required. Current teaching methods and materials in physical education; teaching styles, aids, and formulation of lesson and unit plans.*

- 3511 The Physical Education Program in Elementary Schools (3)** 2 hrs. lecture; 2 hrs. lab/field experiences in multicultural settings. For kinesiology majors or minors. Must be taken concurrently with KIN 3516. Students must be enrolled in the College of Education. Progressively graded programs of activities.
- 3512 Therapeutic Modalities (2)** Limited to students enrolled in the athletic training area of concentration or by permission of instructor. Cognitive, psychomotor, and affective skills for therapeutic modalities in treatment of athletic injuries; topics include principles of tissue trauma, wound healing, pain mechanism, thermal modalities, mechanical modalities, and electromagnetic modalities.
- 3513 Introduction to Motor Learning (3)** 2 hrs. lecture; 2 hrs. lab. Motor skills learning principles that can be applied to instructional and rehabilitation situations; psychological and physiological characteristics that influence skill learning; behavioral changes related to the stages of skill learning; the influence of various types of practice conditions on skill learning.
- 3514 Biomechanical Basis of Kinesiology (3)** Prereq.: MATH 1022, KIN 2500, PHYS 2001 or equivalent. Education majors only. Anatomical and mechanical analysis of human movement; emphasis on structure and function of bone and muscle, statics, dynamics, kinematics, kinetics, and projectile motion.
- 3515 The Physiological Basis of Activity (3)** Prereq.: KIN 2500, 2504; BIOL 2160. Basic physiological concepts of the muscular, metabolic, cardiovascular, and circulorespiratory systems; behavior of each system in relation to exercise; determination of normal and abnormal physical responses to exercise; development of a philosophy of scientific inquiry.
- 3516 Curriculum Construction in Physical Education (3)** Concurrent enrollment in KIN 3510 or 3511. Education majors only. Curriculum construction and program content for elementary and secondary schools.
- 3517 Neuromotor Control of Human Movement (3)** Prereq.: KIN 2500. Muscle dynamics; sensory and motor neural pathways; subcortical reflexes; supraspinal mechanisms; behavioral issues.
- 3525 Laboratory Techniques in Exercise Physiology (1)** Prereq.: credit or registration in KIN 3515. 2 hrs. lab. Laboratory sessions examining the physiological effect of different types of exercise on the functions of the human body.
- 3534 Scientific Basis for Exercise (3)** Prereq.: KIN 3515. For students in the fitness studies concentration. Historical development of CHD risk factors; contraindications and valid uses of exercise in the amelioration of CHD risk factors.
- 3535 Exercise Testing and Prescription (3)** Prereq.: KIN 3534. 2 hrs. lecture; 2 hrs. lab. For students in the fitness studies concentration. Theory and practice of fitness testing, exercise prescription, health promotion, and related concerns.
- 3540 Behavior Impairment and Physical Education (3)** Prereq.: EDCI 2700 and KIN 2540. Substantial observation in schools required. Focus on children sometimes labeled mentally retarded, emotionally disturbed, or learning disabled.
- 3541 Chronic Disability and Physical Education (3)** Prereq.: EDCI 2700 and KIN 2540. Substantial observations in schools required. Focus on children with overt physical and/or sensory disabilities of a long-lasting nature who need adjusted physical education programs.
- 3545 Handicapped Children in Physical Education (3)** Prereq.: EDCI 2700. Credit will not be given for both this course and KIN 2540. Not open to kinesiology majors. Motor traits of handicapped children; curriculum implementation specified in federal and state legislation.
- 3602 Instructor's Course in First Aid (2)** 1 hr. lecture; 2 hrs. lab. For persons qualifying to teach the junior and standard Red Cross courses in aid to the injured.
- 3603 Organization of the School Health Program (3)** Prereq.: KIN 1600. Organization of school health programs involving health services, healthful school living, school environment, school health administration, and evaluation of school health programs.
- 3604 Methods of Teaching Secondary Health Education (3)** Prereq.: KIN 1600. 2 hrs. lecture; 2 hrs. field experiences in multicultural settings. Structure of school health education and its relationship to official and voluntary health agencies and to professional associations; modern health resources suitable for teaching health.
- 3605 Health and the Aging Process (3)** Health conservation of human resources; emphasis on understanding attitudes and practices related to health in the aging process.
- 3608 Communicable and Noncommunicable Diseases (3)** Etiology, prophylaxis, and control of communicable and noncommunicable diseases and impairments; cancer, diabetes, and cardiovascular, respiratory, and sexually transmitted diseases.
- 3660 The Holistic Health Approach to Stress (3)** Sources of stress; evaluation of stress-related diseases; techniques for promoting stress reduction; prevention of stress-related diseases.
- 4500 Adapted Physical Education (3)** 2 hrs. lecture; 2 hrs. lab. Preparation for teaching special activities to a typical or handicapped children; organization and administration of clinical exercise programs.
- 4501 Special Topics in Kinesiology (3)** May be repeated for a max. of 6 sem. hrs. of credit when topics vary. For students interested in additional study in specific aspects of kinesiology.
- 4510 Knowledge Structure Approach to Skills Analysis (3)** Prereq.: physical education cohort membership or consent of instructor. Analyses 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 graduate standing. Psychological and sociological perspectives of physical activity; theories and research related to sport and exercise behavior; and psychological factors that influence involvement and performance in physical activity settings.
- 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.
- 4540 The Physical Education Curriculum for All Handicapped Children (3)** Prereq.: KIN 3540 and 3541. Curriculum needs, implementation, and evaluation, using the Louisiana State Regulations and P. E. Needs Assessment.
- 4550 Reflective Teaching in Health and Physical Education (3)** Prereq.: physical 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 implications 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 administration of these programs.
- 4605 Habituating and Addictive Drugs in Our Culture (3)** Prereq.: KIN 1600 and senior or graduate standing. Harmless, harmful, useful, and useless chemical substances that affect physiological well-being and behavior or mood; interaction of psychological, sociological, and physiological components.
- 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 research 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 Dimensions of Aging (3)** Focus on physical, cognitive, and emotional aspects of biological aging; role of physical activity and lifestyle issues and their interaction with chronological aging and functional ability.
- 7504 Tests and Measurements in Kinesiology (3)** Measurement theory applied to testing in educational, fitness, and other kinesiology settings.
- 7505 Problems in Kinesiology (3)** May be taken for a max. of 6 hrs. of credit when topics vary. Individual study.
- 7507 Historical and Philosophical Foundations of Kinesiology (3)**
- 7508 Analysis of Human Movement (3)** Mechanisms involved in the production of human movement and the techniques available for scientific analysis of such movement.
- 7510 Motor Learning (3)** Cognitive and motor processes influencing the learning of motor skills; emphasis on assessing learning, changes during learning, attention, augmented feedback, transfer of learning, and practice conditions, with implications for a variety of skill instruction and rehabilitation contexts.
- 7511 Administrative Problems in Kinesiology (3)** Organization and management theory and techniques for administration of programs in educational and fitness settings.
- 7512 Motor Control (3)** Prereq.: consent of instructor. Neurophysiological and behavioral issues in control of human movement; emphasis on contrast between ecological and constructionist approaches.
- 7513 Seminar in Physical Education Professional Preparation (3)** Issues and trends in physical education; emphasis on undergraduate and graduate professional preparation.
- 7514 Pedagogy in Physical Education (3)** Prereq.: KIN 7502 and admission to the doctoral program. Theory and research relating to systematized instruction in physical education.
- 7520 Motor Development (3)** 2 hrs. lecture; 2 hrs. lab. Psychomotor development of children; implications for skill learning; analyzing and planning motor development research; motor development in special children; research on youth sports; evaluation and assessment; and perceptual-motor development.
- 7521 Laboratory Techniques in Motor Behavior (3)** Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab. Techniques and equipment used in motor behavior and biomechanics labs; data acquisition and processing techniques; hardware and software associated with computerized data acquisition and processing; timing equipment; force measuring instrumentation; motion analysis equipment; electromyography.
- 7522 Physical Education for Preschool and Elementary School Children (3)** Essentials for a successful movement program for children at the preschool and elementary school level; philosophy, objectives, trends, teaching methods, and materials necessary for program development.
- 7523 Theories of Motor Skill Acquisition (3)** Prereq.: KIN 7510 and 7520. For Ph.D. students in motor learning or motor development. Issues in motor control and learning, i.e., central and peripheral mechanisms, theories of motor learning, motor programs, and short-term memory.
- 7525 Children and Sport (3)** Open to graduate students from any area. Children's involvement in organized sports; understanding of the present structure of youth sports; research in child development, training, injuries, social psychology, skill acquisition, and coaching behavior; implications for children in sport.
- 7527 Seminar: Developmental Factors in Children's Motor-Skill Learning (3)** Prereq.: KIN 7510 and 7520; or equivalent. For doctoral students only. Developmental learning theory and literature; effects of developmental factors on children's motor performance and learning.
- 7528 Sport Psychology (3)** Problems of several areas of social psychology related to sport; research methodology and theories.
- 7530 Exercise Physiology (3)** 2 hrs. lecture; 2 hrs. lab. Physical, chemical, and environmental factors influencing physical performance; bioenergetics, cardiovascular and respiratory adjustments to exercise; research relevant to conditioning and physiological responses to exercise.
- 7531 Structural and Functional Characteristics of the Developing Child (3)** 2 hrs. lecture; 2 hrs. lab. Structural changes of growth of prepubertal and pubertal children related to function in physical activity.
- 7533 Exercise Testing in Health and Disease (3)** Prereq.: KIN 7530. 1 hr. seminar; 4 hrs. lab. Theory and practicum in evaluating fitness, prescribing exercise, and planning and supervising group programs for adults.
- 7534 Exercise in Health and Disease (3)** Contraindications and valid uses of exercise in mediating risk factors.
- 7535 Neuromuscular Aspects of Exercise (3)** Prereq.: KIN 7530. Effects of exercise on muscle cell structure and function; neuromuscular integration and neural function in exercise.
- 7536 Cardiovascular and Respiratory Function in Exercise (3)** Prereq.: KIN 7530. 2 hrs. lecture; 2 hrs. lab. Mechanics of cardiovascular and respiratory function related to exercise.
- 7537 Exercise and Environment (3)** Prereq.: KIN 7530. 2 hrs. lecture; 2 hrs. lab. Effects of environmental conditions on performance of various types of exercise.

7538 Practicum in Cardiac Rehabilitation (6) *Prereq.: KIN 7530, 7533, 7534, 7551. Pass-fail grading. Minimum on-site requirement is 20 hours per week. Important for exercise specialist, exercise leader, or graded exercise technician certification. Involvement in the practical application of exercise testing, exercise prescription and exercise leadership for cardiac patients.*

7539 Laboratory Techniques in Exercise Physiology (3) *Prereq.: KIN 7530; 1 hr. lecture, 4 hrs. lab; exercise physiology and college chemistry recommended. Laboratory techniques in exercise physiology; principles of metabolic measurement and assay procedures for quantification of dynamic changes in blood chemistry during exercise.*

7540 Motor Characteristics of Handicapped Children (3) *Prereq.: KIN 4500 or 4540 or equivalent. Structure of gross and fine motor abilities in regular and handicapped children; inter- and intra-individual performance differences and factors associated with them.*

7541 Motor Activity Programming for Handicapped Children (3) *Prereq.: KIN 7540. Motor activity programs developed from factor analytical studies contrasted with those of an intuitive base; implications of federal and state regulations.*

7542 Program Approaches for Special Physical Education (3) *Prereq.: KIN 7541. Open only to doctoral students. Approaches for eliciting behavior change in handicapped children, from a motor activity frame of reference.*

7550 Advanced Exercise Physiology (3) *Prereq.: KIN 7530; 2 hrs. lecture; 2 hrs. lab; college chemistry, mathematics, physics recommended. Quantitative approach to both systematic and cellular control during exercise.*

7551 Exercise Electrocardiography: Principles and Practice (3) *Prereq.: KIN 7530 or consent of instructor. Physiological bases, practical considerations, and rhythm identification of resting and exercise electrocardiograms.*

7560 Fall Practicum in Health and Physical Education (5) *Prereq.: physical education cohort membership or consent of instructor. 1 hr. lecture; 8 hrs. lab. Pass-fail grading. First teaching practicum in local schools.*

7561 Spring Practicum in Health and Physical Education (5) *Prereq.: physical education cohort membership or consent of instructor. 1 hr. lecture; 8 hrs. lab. Pass-fail grading. Second teaching practicum in local schools.*

7570 Critical Issues in Teaching Health and Physical Education (3) *Prereq.: physical education cohort membership or consent of instructor. Critical theory and research related to pedagogical practices in health and physical education.*

7575 The Teacher-Researcher in Health and Physical Education (3) *Prereq.: physical education cohort membership or consent of instructor. Analysis of teacher-researcher literature; its application to teaching health and physical education.*

7580 Research Project in Health and Physical Education (3) *Prereq.: physical education cohort membership and completion of KIN 7560 and 7561 or consent of instructor. 2 hrs. lecture; 2 hrs. lab. Development, completion, and presentation of a research problem in teaching health and physical education that grows out of fifth-year clinical experiences and course work.*

7601 Changing Health Behavior (3) Motivation and determinants of health behavior; behavior change strategies designed for utilization in individual and group health education programs; promoting innovative health education programs in schools and the community.

7620 Epidemiological Approach to Community Health (3) *Prereq.: EXST 4001 or equivalent. Vital health statistics via the disease model and its determinants; community organization and program development related to community health education, both qualitatively and quantitatively.*

7900 Introduction to Research Methods (3)

7999 Seminar in Selected Topics in Kinesiology (1-3) *May be taken for a max. of 6 sem. hrs. credit. Topics vary.*

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

8900 Independent Research (1-9) *May be taken for a max. of 9 sem. hrs. credit. Pass-fail grading.*

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

LANDSCAPE ARCHITECTURE • LA

General education courses are marked with stars (★).

★ **1150 Views of the American Landscape (3)** Concepts, patterns, and themes that shape human attitudes and activities concerning the American landscape; natural systems as links between managed landscapes and built environments; environmental and conservation ethics.

★ **1151 Introduction to Landscape Architecture (3)** Concerns and responsibilities of landscape architects; overview of the profession; elements and processes of design, and examples of public and private design work.

1153 Basic Design for Landscape Architecture (3) *Prereq.: majors only or consent of instructor 1 hr. lecture; 4 hrs. studio. Two- and three-dimensional design; two-dimensional surfaces and three-dimensional spaces; materials, time, and meaning in design.*

1181 Landscape Architectural Graphics (Freehand) (3) *Prereq.: majors only or consent of instructor. 1 hr. lecture; 4 hrs. studio. Freehand drawing skills and techniques used in illustrating components of the landscape; landscape elements as separate objects; composition and rendering of elements in combination.*

1182 Landscape Architectural Graphics (Mechanical) (3) *Prereq.: majors only or consent of instructor. 1 hr. lecture; 4 hrs. studio. Technical drawing for the landscape architect; measured, scaled, and dimensioned drawings to illustrate components of the landscape and landscape materials; use of plans, sections, elevations, isometrics, and orthographic projections.*

2000 Computer Basics for Designers (3) *2 hrs. lecture; 2 hrs. lab. Introduction to microcomputer systems; emphasis on design application.*

2111 Survey of Landscape Architecture (3) *Primarily for nonlandscape architecture majors. Awareness and appreciation of home and community problems that can be resolved by landscape architects.*

2112 Ecology in Landscape Architecture (3) Ecological principles and relationships as basis for resource, recreation, and landscape planning; natural systems and the interaction between natural and man-made elements of the environment; environmental and conservation ethics.

2121 Plant Materials (3) *1 hr. lecture; 4 hrs. studio. Identification and study of plant materials; ecological and visual characteristics of plants used in landscape design.*

★ **2141 Landscape of the Ancient World (3)** Development of the earliest landscape traditions; relationship of man to the landscape in the major culture areas of the ancient world.

★ **2142 The Landscape of Western Civilization (3)** *LA 2141 recommended. Development of landscape traditions in western Europe and America from the 15th to the 20th centuries.*

★ **2143 The Contemporary Landscape (3)** *LA 2141 and 2142 recommended. Major landscape movements of the 20th century; various aspects of the contemporary practice of landscape architecture.*

2145 Historic Preservation for the Landscape Architect (3) Theory and practice of historic preservation as a component of the landscape architect's responsibility for resource management; analysis, management, and design methodology for cultural resources.

2152 Landscape Design Theory (4) *Prereq.: LA 1153 or equivalent. 3 hrs. lecture; 2 hrs. studio. Application of basic design concepts to landscape design; site information and its relation to client use and needs; the design process as a technique in the integration of site, client, and materials.*

2171 Landscape Architectural Implementation: Materials (4) *Prereq.: LA 1182 or equivalent. 2 hrs. lecture; 4 hrs. studio. Technical concepts, materials, and products used in landscape architecture; properties of materials and methods of construction.*

2183 Landscape Architectural Design Graphics (3) *Prereq.: LA 1181 and 1182; or equivalent. 6 hrs. studio. Graphic techniques, tools, and methods used in landscape architectural analysis and design; communication of design ideas.*

2185 Automated Graphics for Designers (3) *Prereq.: majors only or consent of instructor. Also offered as ARCH 2173 and CM 2402.*

2652 Evolution of Park and Recreation Planning (3) History of parks in the U.S. from earliest developments to the present; interrelationships of cultural influences.

3000 Landscape Architecture Computer Applications (3) *Prereq.: majors only or consent of instructor. 1 hr. lecture; 4 hrs. studio. Microcomputers in the landscape architect's office; use of small systems and common software.*

3122 Plant Materials in Design (3) *Prereq.: LA 2121 or equivalent. 1 hr. lecture; 4 hrs. studio. Identification and study of plant materials as landscape design elements integrated with and related to theoretical aspects of planting design.*

3153 Detail Design (4) *Prereq.: LA 2121 and 2152; or equivalent. 8 hrs. studio. Comprehensive landscape architectural design; use of earth, structural materials, plants, and other elements.*

3154 Site Design (4) *Prereq.: LA 3153 or equivalent. 8 hrs. studio. Arrangement of buildings, circulation, and other landscape design elements; design processes and conceptualization.*

3173 Landscape Architectural Implementation: Grading (4) *Prereq.: LA 2171, MATH 1021 and 1022, and either BE 2307 or CE 2500 and 2510; or equivalent. 2 hrs. lecture; 4 hrs. studio. Topographic grading, earth volume estimation, and horizontal and vertical roadway alignment.*

3183 Applied Landscape Architectural Graphics (2) *Prereq.: LA 2183 or equivalent. 4 hrs. studio. Design and presentation graphics applied to landscape architectural design projects.*

4000 Integrated Studio (4) *Prereq.: consent of instructor. 8 hrs. studio. Project-oriented design studio for landscape architects, architects, and other design majors. Integration of various design professions and student levels on a comprehensive design project.*

4112 Environmental Issues in Design (3) Institutional factors and relationships as they affect resource, recreation, and landscape planning and design; assessment and mitigation of the environmental impact of design activities.

4156 Planting Design (4) *Prereq.: LA 3122 and 3154 or equivalent. 1 hr. lecture; 6 hrs. studio. Plant selection and arrangement for a series of landscape design projects from detailed to large scale.*

4157 Site Master Planning (4) *Prereq.: LA 3154 and 3173; or equivalent. 8 hrs. studio. Arrangement of complex multiple land uses, buildings, circulation, and other landscape design elements; design processes and conceptualization.*

4158 Landscape Architectural Design (4) *Prereq.: LA 4157 and 4175 or equivalent. 8 hrs. studio. Scope of landscape architecture presented through a variety of large scale projects including multiple land uses; buildings, circulation, and other design elements.*

4174 Landscape Architectural Implementation: Structures (4) *Prereq.: LA 3173 or equivalent. 2 hrs. lecture; 4 hrs. studio. Design, technical layout, and construction of site structures; specialized aspects such as structural mechanics, wood construction, and retaining walls.*

4175 Landscape Architectural Implementation: Systems (4) *Prereq.: LA 3173 or equivalent. 2 hrs. lecture; 4 hrs. studio. Design, technical layout, and construction of site systems; drainage, irrigation, and utilities.*

4183 Advanced Landscape Architectural Graphics (4) *Prereq.: LA 3183 or equivalent. 8 hrs. studio. Professional quality presentation techniques; model building, computer graphics, video, graphic media.*

4191 Independent Studies in Landscape Architecture (1-6) *May be taken for a max. of 6 sem. hrs. credit. Problems in landscape architecture adapted to specific needs of students.*

4195 Field Studies in Landscape Architecture (1-3) *May be taken for a max. of 9 sem. hrs. credit. Nonrefundable deposit of \$100 required at registration. Additional amount required for transportation may be nonrefundable. Balance due no later than one month prior to departure. Field trips to landscape architectural offices, projects, and schools throughout the U.S. and abroad; discussions with professional landscape architects and with students and faculty of other universities to promote exchange of ideas and to observe professional practice.*

4250 Comprehensive Design (6) *Prereq.: LA 4158 or equivalent. 12 hrs. studio. Comprehensive design package relating site planning and detail design with implementation documents.*

4251 Design Specialization (4) *Prereq.: LA 4158. 8 hrs. studio. Approaches to specialized design projects developed around faculty expertise and/or emerging design opportunities.*

4252 Independent Study Project (4) *Prereq.: LA 4158 and 4251. 8 hrs. studio. Execution of a project selected by the advanced student with guidance of an advisory committee; credit for work in the academic setting or for structured study away from campus.*

4253 Independent Study Abroad (6) *Prereq.: LA 4158. 12 hrs. studio. Structured study away from campus; work in an academic setting other than LSU.*

4276 Landscape Architectural Professional Practice (3) Legal, business, and professional aspects of landscape architectural practice; significance of orderly, ethical procedures in the relationship of landscape architect to clients, contractors, and other consultants.

4277 Planning Disaster Resilient Communities (3) Theory and methods of building disaster resilient communities including analyzing actual community vulnerability to natural and man-made hazards and planning strategies for lessening risk.

4291, 4292 Specialized Aspects of Landscape Architecture (2,2) Prereq.: consent of instructor. Advanced research, design, and discussion.

4654 Areas and Facilities for Recreation (3) 1 hr. lecture; 6 hrs. studio. Design and management of recreation areas.

5101 Landscape Graphics (2) 4 hrs. studio. Freehand and mechanical graphic techniques, tools, and methods used in illustrating landscape design projects; quick perspective sketching and drafting techniques; application of orthographic projections and the development of a visual vocabulary.

5102 Presentation Graphics (1) 2 hrs. studio. Application of design and presentation graphics to landscape architectural design problems; paired with design studio; emphasis on visual communication of design ideas through the use of various media.

5123 Landscape Plant Materials (3) 1 hr. lecture; 4 hrs. studio. Identification and study of ornamental plants with special emphasis on their visual characteristics.

5124 Planting Design (3) 1 hr. lecture; 4 hrs. studio. Development of skills in planting design using a series of projects at various scales and levels of detail; visual characteristics and ecological value of plants and conceptual attitudes behind their use.

5151 Landscape Design I (4) 8 hrs. studio. Basic two- and three-dimensional design concepts; art elements and principles applied to landscape design; landscape design materials and processes.

5152 Landscape Design II (4) 8 hrs. studio. Approaches and techniques of site design problems; use of site analysis, design program information, and elements of design form; refinement of visual and verbal techniques of communication.

5153 Landscape Design III (4) 8 hrs. studio. Approaches and techniques of site and master planning; emphasis on methods of solving design problems; use of site analysis techniques and land use program information; refinement of plan resolution and detail design elements.

5171 Landscape Construction I (3) 2 hrs. lecture; 2 hrs. studio. Materials and methods of landscape construction; investigation of materials, structural systems, and construction practices in current use.

5172 Landscape Construction II (4) 2 hrs. lecture; 4 hrs. studio. Development and refinement of knowledge and skill of topographic grading, drainage, earth volume estimation, and roadway alignment.

5173 Landscape Architecture Construction III (4) Prereq.: LA 5172 or equivalent. 2 hrs. lecture; 4 hrs. studio. Comprehensive site engineering problems; synthesis and utilization of previous design and engineering courses; enhancement of skills in design, technical layout, and construction of site structures and systems.

5190 Qualitative Research Methods (3) 2 hrs. lecture; 2 hrs. lab. Concepts of qualitative research; skills in finding and using research material; landscape architectural research trends; evaluation of research; application of research to landscape design.

5191 Quantitative Research Methods (3) 2 hrs. lecture; 2 hrs. studio. Research overview and processes related to needs of landscape architects; approaches to research problems; skills needed to conduct research; selection and use of data sources; review of landscape architecture research; application of research to landscape design.

7000 Reading the Landscape (3) 1 hr. lecture; 4 hrs. lab. Role of natural and cultural processes in shaping the landscape; approaches to landscape analysis; interpretation of landscape settings for design decision making.

7141 Shapers of the Landscape I (2) History of the built landscape from prehistory to mid-nineteenth century.

7142 Shapers of the Landscape II (2) History of the built landscape from mid-nineteenth century to the present.

7174 Landscape Architectural Professional Practice (3) 2 hrs. lecture; 1 hr. recitation. General, legal, business, and professional aspects of landscape architectural practice; significance of orderly, ethical procedures in relationships of landscape architect, client, and contractor; the landscape architect's responsibility to the public.

7352 Advanced Design Studio (4) 8 hrs. studio. May be taken for a max. of 12 sem. hrs. Comprehensive design projects emphasizing the study of complex problems at one or more of the following scales: personal, neighborhood, community, metropolitan, or regional; multidisciplinary considerations and integration of research and design.

7354 Independent Study in Landscape Architecture (1-6) Enrollment based on faculty acceptance of student's proposal prior to registration; for the superior and advanced student. Supervision by graduate faculty member in case-study situations; faculty evaluations based on periodic reviews, written

report, and verbal presentation. Student may work under faculty member with special expertise but who is not teaching a course on the topic; or work with a professional in the community or with a government agency on projects of meaningful academic experience; or engage in individual study away from campus.

7393 Document Survey in Landscape Architecture (1-6) Prereq.: LA 5191 or equivalent. Information resource availability and use; literature of landscape architecture; literature and document review of specific problems; individual guidance and group discussion of analysis and reporting techniques and relationship of research to landscape design.

7394 Research in Landscape Architecture (1-6) Prereq.: LA 5191. Examination of design determinants or specific landscape architectural problems through selected term research projects; individual and group discussion of research objectives and field methods; application of research to design.

7395 Special Topics in Landscape Architecture (3) Prereq.: consent of instructor. 1 hr. lecture; 4 hrs. studio. May be taken for a max. of 6 sem. hrs. credit. Development of concepts, skills, and techniques related to use of computer, video, and other advanced technologies in landscape architecture research, design, planning, and management.

7398, 7399 Seminar in Landscape Architecture (2,2) Seminars related to issues and problems in landscape architecture; student presentations and use of informed guests from the university and community.

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

LATIN • LATN

General education courses are marked with stars (★).

1001 Elementary Latin (5) Nonlaboratory reading course in classical Latin; emphasis on comprehension rather than grammar; repetition of controlled vocabulary and contextual clues used to read extensive passages of simple Latin.

★ **2051 Intermediate Latin (5)** Prereq.: LATN 1001 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 2051 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. Readings from the narrative poets, including selections from Vergil's *Aeneid* and/or from Ovid's *Metamorphoses*.

★ **2066 Golden Age Prose (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.

4001 Intensive Latin Language (3) A specialized course intended to provide a reading knowledge of Latin. For graduate students and advanced undergraduates for whom a familiarity with another foreign language is strongly 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 will not be given for both this course and introductory Latin courses. Syntax, grammar, and lexicology of Latin; graduated readings from representative authors.

4002 Roman Satire (3) Readings from Petronius' *Satyricon*, Martial, and Juvenal for their humor, with attention to evidence of the lives and language of ordinary Roman people.

4003 Readings in the History of Livy (3) Selections from the *History of Livy*; literary and historical significance.

4004 Roman Comedy (3) Reading of representative plays of Plautus and Terence, with attention to dramatic techniques and comic situations.

4006 Medieval and Renaissance Latin (3) Readings from the time of the medieval Latin writers to Milton.

4007 Latin Prose Composition (3) Practice in writing Latin prose; emphasis on grammar and syntax of classical Latin, using Ciceronian prose style as the model.

★ **4010 Survey of Latin Literature (3)** Readings in major Roman authors from the beginning to Ammianus Marcellinus; supplementary readings in English in the literary, political, and social history of Rome.

4023 Special Topics in Latin Poetry (3) May be taken for a max. of 6 sem. hrs. of credit. Readings and studies in the works of one or more major poets of the Roman Republic or Roman Empire.

4024 Special Topics in Latin Prose (3) May be taken for a max. of 6 sem. hrs. of credit. Readings and studies in the works of one or more of the major prose writers of the Roman Republic or Roman Empire.

4120 Roman Elegy (3) Readings in the major Latin elegiac poets such as Ovid, Propertius, and Tibullus; attention to poetic technique and to Roman attitudes toward love and women.

4915 Independent Work (1-3) May be taken for a max. of 6 sem. hrs. of credit. Permission of department required. Readings in Latin literature directed by a senior faculty member.

7003 Seminar in Latin Literature (3) May be taken for a max. of 15 hrs. of credit as topics vary.

LIBERAL ARTS • LIBA

Liberal Arts 7000 and 7900 are required.

7000 Liberal Arts: Methods of Inquiry (3) Interdisciplinary study in the liberal arts; modes of inquiry in different disciplines, common themes in the humanities, and means of integrating these into the whole.

7900 Liberal Arts: Themes and Commonalities (3) Major ideas in the liberal arts as reflected in exemplary published studies and student research; the cultural function of the humanities.

7950 Special Topics in the Liberal Arts (3) Prereq.: credit in LIBA 7000 or consent of instructor. May be taken for a max. of 9 hrs. of credit when topics vary. Interdisciplinary studies in the liberal arts, with attention to major periods, movements, themes, or problems in Western culture.

7990 Independent Study (1-3) Prereq.: credit or concurrent enrollment in LIBA 7000. May be taken for a max. of 6 sem. hrs. of credit. Directed individual readings by the graduate faculty.

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

LIBRARY AND INFORMATION SCIENCE • LIS

1001 Library Research Methods and Materials (1) Fundamentals of college-level research; location, evaluation, and use of information for research needs; introduction to the library and to the organization, access, and retrieval of information; hands-on experience in a variety of printed and electronic resources.

2001 Introduction to Information Technologies (3) Credit will not be given for both this course and ISDS 1100. Introduction to hardware, software, networking, and telecommunications issues; use of application software, electronic databases, and search engines.

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 development and management, including community and user needs analysis, selection strategies, and tools.

7004 Principles of Management for Librarians and Information Specialists (3) 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 course work to be counted for the M.L.I.S. degree, whichever occurs first. History, theory, practice, philosophy, and current organization of the information service professions.

7008 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.

7011 Information Needs Analysis (3) Prereq.: major or permission of department. User-centered approaches to meeting information needs of individuals and communities; community analysis, user studies, and reference interview.

7012 Bibliographic Organization and Resource Development (3) *Prereq.: major or permission of department.* Conceptual foundations of bibliographic organization and resource development; basic principles and methods of description, organization, and access; bibliographical lists; principles, methods, issues, and trends of resource selection for user populations.

7013 Evaluation of Information Systems (3) *Prereq.: major or permission of department.* Evaluation of information system performance; systems analysis techniques; development and use of performance measures; strategies for improving system performance.

7101 Media and Services for Children (3) Developmentally appropriate library and information services for children, ages birth to eleven; emphasis on literature and uses of literature in schools and libraries.

7102 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.

7103 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 pubescent youths.

7106 Problems in Collection Management (3) *Prereq.: LIS 7003 or consent of instructor. May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Advanced study in collection management; emphasis on formats and special conditions, such as serials, audio-visual materials, rare and out-of-print markets, foreign book trade, or alternative literatures or procedures, such as evaluation or acquisitions.

7107 Use of Media in Libraries (3) Examination of media as translated into a variety of library settings and as related to various library patron groups; problems and trends with types of media, software and hardware.

7200 Resources for the Humanities (3) Information resources in major areas of the humanities.

7201 Resources for the Social Sciences (3) Information resources in major areas of the social sciences.

7202 Resources for Science and Technology (3) Information resources in major areas of pure and applied sciences.

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 and function in business, government, and other organizations; principles of administration; technical processing; reference services; special methods, routines, and records.

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 Adult Services in Public Libraries (3) Lifelong learning theory; adult information seeking patterns; adult education activities in public libraries; emphasis on specific services including genealogy, local history, literacy, parenting, and outreach to special groups.

7408 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.

7501 Management of Information Systems (3) Management of the selection, acquisition, and implementation of computer systems within the context of library and information service agencies.

7502 Networks for Information Centers (3) *Prereq.: LIS 7008 or permission of instructor.* Standards, policy, theory, and technical issues related to electronic networks; impact on information transfer and organizations.

7603 Electronic Description of Archival Materials (3) 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 analysis, classification 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.* Detailed analysis of cataloging and classification of special resources, including serials, electronic and cartographic resources, kits, music, manuscripts, relia, including formatting of bibliographic representations; intensive survey of conceptual foundations of descriptive and subject metadata.

7610 Information Retrieval Systems (3) *See CSC 7481.*

7700 History of Books and Libraries (3) History and cultural relationships of the book and libraries; rise of the modern library since the mid-19th century.

7800 The Art and Practice of 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 effectiveness of illustrators in telling stories from children's literature; evaluation of artistic media in review sources; survey of works of noted children's books illustrators.

7807 Library User Instruction (3) Theories, techniques, strategies, and current practice for teaching the effective and efficient use of academic, school, public, and special library resources.

7809 Research in Library and Information Science (3) *Prereq.: LIS 7013 or permission of instructor.* Research methodology applicable to library and information phenomena; definition of research problems, selection of inquiry tools, and data collection; emphasis on evaluation of research.

7900 Field Experience in Library and Information Services (3) *Prereq.: completion of 24 hrs. of LIS courses, and permission of instructor. Preparation for course begins semester prior to registration. 120 hrs. per semester at field site.* Experience in management of library and information services, such as cataloging, reference, technical services, or automation.

7901 Issues in Library and Information Science (1) *Prereq.: major or permission of department. Pass-fail grading.* All graduating students are expected to participate in discussions of contemporary professional issues.

7902 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 libraries.

7903 Field Experience in Special Libraries and Information Centers (3) *Prereq.: completion of 24 hrs. of LIS courses, including LIS 7403, 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 special libraries.

7904 Field Experience in Academic Libraries (3) *Prereq.: completion of 24 hrs. of LIS courses, including LIS 7401, 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 academic libraries.

7905 Field Experience in Public Libraries (3) *Prereq.: completion of 24 hrs. of LIS courses, including LIS 7405, 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 public libraries.

7906 Field Experience in Health Sciences Information Centers (3) *Prereq.: completion 24 hrs. of LIS courses, including LIS 7404, 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 health sciences libraries.

7909 MLIS Directed Independent Study (1-3) *May be taken for a max. of 6 sem. hrs. credit.*

7910 Special Topics in Library and Information Science (1-3) *Prereq.: major or permission of instructor. May be taken for a max. of 3 sem. hrs. of credit when topics vary.*

7911 Special Topics in Library and Information Science (1-3) *May be taken for a max. of 3 sem. hrs. of credit when topics vary.*

7912 Special Topics in Library and Information Science (1-3) *May be taken for a max. of 3 sem. hrs. of credit when topics vary.*

7913 Field Experience in Archives (3) *Prereq.: completion of 24 hrs. of LIS courses including LIS 7603, 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 archives.

7914 CLIS Directed Independent Study (1-3) *Prereq.: MLIS or equivalent. May be taken for a max. of 12 sem. hrs. credit.*

8000 Thesis Research (1-9 per semester) "S"/"U" grading.

LIFE COURSE AND AGING • LCA

2000 Interdisciplinary Seminar in Aging (1) Contemporary issues in aging; preparation for the study of aging in contemporary society.

LINGUISTICS • LING

4008 History of the German Language (3) *See GERM 4001.*

4011 Topics in Advanced Logic (3) *Prereq.: PHIL 4010. See PHIL 4011.*

4060 Language and Culture (3) *See ANTH 4060.*

4064 Pidgin and Creole Languages (3) *See ANTH 4064 and FREN 4064.*

4150 Phonetics (4) *See COMD 4150.*

4153 Acoustics of Speech and Hearing (3) *See COMD 4153.*

4310 Studies in Language (3) *See ENGL 4310.*

4606 Russian Language: Phonetics and Phonemics (3) *See RUSS 4002.*

4710 Introduction to Linguistics (3) *See ENGL 4710.*

4711 History of the English Language (3) *See ENGL 4711.*

4712 Roots of English (3) *See ENGL 4712.*

4713 Syntax (3) *See ENGL 4713.*

4714 Phonology (3) *See ENGL 4714.*

4715 Semantics (3) *See ENGL 4715.*

4716 Introduction to Sociolinguistics (3) *See ENGL 4716.*

4750 Independent Research in Speech Science or Linguistics (1-3) *See COMD 4750.*

4914 Philosophy of Language (3) *See PHIL 4914.*

7005 Historical Linguistics (3) *See ANTH 7005.*

7006 Phonology: Theory & Methods (3) *See ANTH 7006.*

7060 Conversation and Discourse (3) *See ANTH 7060.*

7750 Special Topics in Linguistics (3) *See COMD 7750.*

7752 Seminar in Linguistics (3) *See COMD 7752.*

7754 Psycholinguistics: Linguistic Perspectives (3) *See COMD 7754 and PSYC 7754.*

7755 English for Speakers of Other Languages: Methods and Materials (3) *See COMD 7755.*

7756 Independent Research: Phonetics and Linguistics (1-3) *See COMD 7756.*

7909 Selected Topics in Anthropology (3) *See ANTH 7909.*

7910 Seminar (3) *See PHIL 7910.*

7962 Field Methods in Linguistics (3) *See ANTH 7962.*

7999 Research in Anthropology (1-6) See ANTH 7999.

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

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

LOUISIANA STATE UNIVERSITY • LSU

1001 Freshman Seminar (1) Open to freshmen only. Integration into the academic life of the campus, including orientation to the University's policies and resources, its history, and traditions; development of essential academic skills, personal growth/self-awareness, and career exploration; instill a sense of community on campus and beyond.

MANAGEMENT • MGT

3000 Petroleum Land Management Practice (1) V Open only to petroleum land management majors. Required of petroleum land management majors; waived only by consent of department. Pass-fail grading. A minimum of 6 weeks of full-time employment by a firm participating in the program.

3001 Petroleum Land Management (3) V Practical and evidentiary aspects of petroleum land management; principles, and techniques derived from a synthesis of legal and geographical sciences; legal effects of various procedures of boundary locations for petroleum properties; petroleum land practices concerning utilization, a real association, and environmental impacts of drilling activity; use of topographical and historic maps, map compilations, historical cartography, air photos, archival records, and field techniques; some focus on coastal Louisiana and the Gulf South.

3111 Entrepreneurship (3) S Prereq.: senior standing. Principles of entrepreneurship; feasibility studies; financial and location analysis; marketing; promotion; management; venture capitalism; legal considerations.

3200 Principles of Management (3) Management functions, including planning, organizing, staffing/human resource management, leading/interpersonal influence, and controlling in both domestic and international spheres.

3203 Independent Study: Advanced Management Topics (1-6) Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit. Independent research under direction of a faculty member.

3211 Business and Society (3) Prereq.: senior standing. Social roles of organizations whose primary function is the accumulation of profits; emphasis on current issues; historical development of business-society relationships.

3280 Management Internship (3) Prereq.: junior or senior standing. May be taken for a max. of 6 sem. hrs. of credit. Students, supervised by a management faculty member and an approved business executive, will follow a predetermined schedule of activities while working for a business firm.

Hands-on experience in the fields of management, human resource management, organizational behavior, small business management, entrepreneurship, and administrative practices.

3320 Human Resource Management (3) Prereq.: MGT 3200. Human resource functions, including planning, recruitment, selection, development, maintenance, and reward of employees; relationships with environment and employee associations.

3500 Introduction to Labor Relations (3) F,S Management's response to organized labor in the workplace; emphasis on U.S. unionization development; government regulation of labor-management relations; union structure, political activity, collective bargaining, and contract administration.

3512 Public Sector Labor Relations (3) S Prereq.: MGT 3500. Labor-management relations in government employment; variations in labor regulations in federal, state, and local government; role of third-party neutrals in public sector bargaining.

3513 Labor-Management Conflict and Cooperation (3) F Prereq.: MGT 3500. In-depth examination of issues important to labor management relations; topics include, but are not limited to, collective bargaining, alternative dispute resolution, union-management cooperation, and/or recent developments in labor-management relations.

3830 Strategically Managing Organizations (3) Prereq.: FIN 3715, MGT 3200, and MKT 3401. May be taken only during the final semester of course work. Analyzing strategic situations and decision making based on these analyses to ensure the success of for-profit and non-profit organizations.

4113 Small Business Management (3) F Prereq.: senior standing. A multidisciplinary approach to small business; business start-ups, accounting, finance, marketing, management, promotion, layout, retail management, location analysis, and international small business.

4114 Franchising Management (3) S Prereq.: senior standing. Understanding the franchising process; becoming a franchisor or franchisee; franchisor start-up, venture capital,

finance, legal compliance, disclosure documents, franchise agreements, franchise start-ups, franchisor-franchisee relationships, anti-trust laws, and international franchising.

4322 Employee Selection and Placement (3) S Prereq.: ISDS 2000; or equivalent. Staffing requirements, recruitment strategies, development and validation of selection procedures, classification and placement of employees; problems associated with person-job matching; socialization of new employees.

4323 Compensation Administration (3) F Prereq.: MGT 3320. Quantitative and nonquantitative methods of job evaluation; wage level, wage structure, incentive plans; issues of employee compensation.

4420 Multinational Management (3) Prereq.: MGT 3200 or equivalent. Management concepts and philosophical bases for international management operations; environmental dynamics, multinational business organizations, cultural constraints, organizational structures and processes, and conceptual systems of international operations.

4523 Legal Issues in Human Resource Management (3) S Prereq.: MGT 3320. An examination of the most significant laws and court rulings influencing companies' employment practices; topics include: anti-discrimination statutes, affirmative action, commonly committed workplace torts, occupational safety and health laws, workers' compensation, and wrongful termination.

4620 Human Behavior in Organizations (3) Prereq.: MGT 3200. 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 of Innovation (3) V The competitive environment; innovative process and invention evaluation; anatomy of successful innovation; management of creativity; patenting innovation; social/cultural, organizational, and governmental influence on innovation.

4702 Managing Technology Transfer (3) V Models of technological transfer; mechanisms and barriers to technological transfer; technological transfer and industrial innovation; domestic and international aspects of technology transfer.

7000 Operations Management (3) See ISDS 7268.

7001 Management of Technology (3) See IE 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 managerial concepts; contributions of leaders associated with major schools of management thought, including: scientific management, management process, empirical, human behavior, social system, decision theory, and quantitative methods.

7212 Seminar in Contemporary Management Topics (3) V Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary.

7301 Seminar in Human Resources (3) S Role of human resource managers; their relationships with employees, the external environment, and top management.

7302 Reward Systems in Organizations (3) V Theories of motivation, reward, performance and behavior; their application to major issues regarding human resources allocation, development and utilization.

7401 International Business Management (3) F Theories and management of international operations; development of environmental, operational, strategic, and decision making perspectives.

7402 Comparative and Cross-Cultural Management (3) V Organizing, operating, and managing in other cultures and countries; multicultural environments and cross-cultural issues concerning multinational corporations; technological, economic, political, and societal issues; their influence on multinational management.

7500 Labor-Management Relations (3) F Primarily for master's level students. An examination of union-employer interactions in all phases of the industrial relations process including union certification elections, contract negotiation, and grievance administration; emphasis on application of course concepts through the completion of experiential learning exercises.

7600 Organizational Behavior (3) F-E Behavior of people within organizations; the environment within which organizations function; components of the behavioral unit; processes, interactions, and outputs of organizational behavior.

7620 Strategic Management of Health Care Organizations (3) Cross-listed with PADM 7620. Strategic management decisions relating to the long-term survival of various health care delivery systems and the implications for health care consumers; focus on management and financial decisions and on ethical considerations required in making the decisions.

7700 Organization Theory (3) S-O Macro aspects of organizations; processes by which organizations are formed, structures used in their elaboration; internal processes; environmental considerations; organizational viability and renewal.

7800 Current Issues in Strategic Management (3) S Contemporary issues in strategic management theory and practice; emphasis on field projects that provide top-management problem-solving experience.

7811 Research Issues in Strategic Management (3) F-E Prereq.: MGT 7800 or equivalent. Strategic planning; issues including environmental scanning, goal formulation, strategic implementation, control, and evaluation in successful organizations.

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

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

9201 Research Seminar I: Theory and Design of Organizational Studies (3) F-O Foundations of organizational research; philosophy of social science; theory building; research design for field and lab; quasi-experimentation; survey-based research; qualitative research methods.

9202 Pre-dissertation Research (1-9) May be repeated for credit. Pass-fail grading.

9204 Proseminar in Management (1) Required of all in-resident Ph.D. students. Pass-fail grading. May be taken for a max. of 3 sem. hrs. when topics vary. Contemporary research and critical issues in management.

9222 Research Seminar II: Advanced Methods in Organizational Studies (3) S-E Prereq.: MGT 9201 and ISDS 7024 or consent of instructor. Psychometrics, reliability, and validity; structural equation methods; confirmatory factor analysis; mediators and moderators; archival research methods; meta analysis.

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 Administration. Marketing aspects of contemporary social issues; emphasis on methods for dealing with societal issues and their impact on marketing activities.

3401 Principles of Marketing (3) Prereq.: ACCT 2000 or 2001, and either ECON 2030 or ECON 2010 and 2020. 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.

3410 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 3401 and ISDS 2000. Formulation of marketing policies; theories, 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 integration and organization of promotional 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; communication in buyer-seller relationships.

3431 Retailing Management (3) Prereq.: MKT 3401. Store organization, operation, and management; retail method of inventory; problems connected with retail buying and selling.

3433 Distribution Channels, Structure, and Management (3) Prereq.: MKT 3401. Distribution channel's 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.

3441 Business Marketing (3) Prereq.: MKT 3401. Strategies developed by manufacturers to compete for markets; differences between industrial and final consumer markets;

function of industrial purchasing with regard to selection of sources of supply and development 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.

4414 Marketing Research Field Project (3) *Prereq.: MKT 3413.* Advanced marketing research problems and theory; client-supplier relations; research proposals and reports.

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.

4437 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.

4442 Strategic Marketing (3) *Prereq.: MKT 4440 or consent of instructor.* Study of the concepts, principles, and practices 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 environment and analytical processes; global marketing as all-encompassing (import-export, joint ventures, foreign subsidiaries, licensing, management contracts); marketing systems in various countries; strategies for international and multinational operations.

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.: senior standing or consent of instructor.* Analytical principles used in development of strategies for solving marketing problems; policy areas of product, price, channels, and promotion integrated in development of the firm's total marketing effort.

4477 Independent Study: Advanced Marketing Problems (1-6) *For undergraduate students in the E. J. Ourso College of Business Administration with a gpa of 3.00 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 in-store operations; store management, product distribution, and departmental layout.

4490 Services Marketing (3) *Prereq.: MKT 3401.* Developing, pricing, distributing, and promoting the service; control of quality of customer encounters through service automation and/or employee selection and training; place of marketing in service organization structure; strategic implications of structure of service industries.

7110 Marketing Tools Foundations (1.5) *Prereq.: credit or registration in BADM 7100 or equivalent.* Introduction to current and emerging tools used by marketing practitioners, including customer tracking systems, market segmentation tools, market share analysis, and competitive intelligence.

7111 Marketing Tools Applications (1.5) *Prereq.: MKT 7110, credit or registration in BADM 7100 or equivalent.* Applications of current and emerging tools used by marketing practitioners; use of these tools with real or simulated market situations.

7120 Customer Decision Making and Satisfaction (1.5) *Prereq.: BADM 7100 or equivalent.* Treatment of elements comprising customer expectations, evaluation of service and product performance satisfaction, and the buyer behavior process.

7121 Consumer Behavior and Marketing Strategy (1.5) *Prereq.: MKT 7120.* Emphasis on formulation of marketing strategy and tactics based on consumer behavior models, conceptualizations, constructs, and information.

7130 Marketing Information Sources and Uses (1.5)

Prereq.: BADM 7100 or equivalent. Coverage of secondary and syndicated data services and uses plus market information gathering, reporting, and interpretation techniques.

7131 Applied Marketing Research Methods (1.5) *Prereq.: MKT 7130.* Applications of marketing research methods such as qualitative research techniques, marketing surveys, and marketing experiments.

7140 Promotion Management and Strategy (1.5) *Prereq.: BADM 7100 or equivalent.* Examines the techniques and methods used by marketing communicators with emphasis on theory and best practices.

7141 Applications of Promotion Management and Strategy (1.5) *Prereq.: MKT 7140.* Development of a marketing promotions strategy for a present or emerging marketing organization.

7150 Global Marketing Strategies (1.5) *Prereq.: BADM 7100 or equivalent.* Examination of international marketing strategies and tactics available to organizations with global markets or facing global competition.

7151 Exporting Issues and Strategies (1.5) *Prereq.: BADM 7100 or equivalent.* Examination of marketing opportunities and strategies in exporting, including: market entry methods, low-cost marketing research, identifying and negotiating with foreign distributors, and competing with large multinational enterprises.

7160 Services Marketing (1.5) *Prereq.: BADM 7100 or equivalent.* Introduction to service marketing with emphasis on differences between service and product marketing and service quality issues.

7161 Professional Services Marketing (1.5) *Prereq.: MKT 7160.* Central issues involved in planning, implementing, and controlling professional services marketing; treats positioning, using information technology, and ethical considerations.

7300 Marketing Strategy Formation (1.5) *Prereq.: MKT 7110, 7111, 7120, 7121, 7130 and 7131.* Overall processes of marketing strategy formulation, including market segmentation, identification of customer need, competitor analysis, environmental analysis, and resource allocation.

7301 Marketing Strategy Implementation (1.5) *Prereq.: MKT 7300.* Issues involved in marketing strategy: implications of marketing strategy on organizational structure, marketing-oriented culture, customer relationship management, managing product/service quality, adaptation to environmental change, and marketing control systems.

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.

7450 Topics in Advanced Marketing Management (3) *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 areas such as distribution channels, pricing, and product management.

7471 Marketing Strategy (3) Design, implementation, and evaluation; corporate marketing models; demand forecasting; marketing programming; product, price, promotion, and distribution policies; information systems; marketing audit; application of economic, quantitative, and behavioral 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 development.

7477 Seminar in Advanced Marketing Problems (3) *May be taken for a max. of 9 hrs. of credit.*

7486 Applications of Marketing Theory (3) *Prereq.: MKT 7476 and 7113.* Marketing theory development and testing; theory operationalization and refinement.

7488 Marketing Models (3) *Prereq.: BADM 7100 or consent of instructor.* 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 4451 or BADM 7100 or permission of instructor and ISDS 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.

7716 Advanced Marketing Research Techniques (3) *Prereq.: BADM 7100.* Advanced designs and techniques applied to marketing research; theory and assumptions of analytical methods; marketing applications; use of computer programs; marketing strategy; interpretations of empirical results.

7717 Advanced Seminar in Consumer Behavior (3) *Prereq.: MKT 4451 or BADM 7100. Open only to doctoral students.* Theoretical, conceptual, and methodological issues for selected topics in this area.

7720 Seminar in Marketing Theory and Experimental Methods (3) *Prereq.: BADM 7100 or equivalent.* Nature and importance of theory in marketing, interplay of theory 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.

8900 Pre-dissertation Research (1-9) *May be repeated for credit.*

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

MASS COMMUNICATION • MC

Required of all mass communication majors: MC 2010, 2015, 2020, 3018, 3080, 4090.

General education courses are marked with stars (★).

GENERAL COURSES

★ **2000 Introduction to the Mass Media (3)** The mass communication process within American society; development, structure, function, and cultural impact of the mass media.

2010 Media Writing (3) *Prereq.: keyboarding proficiency of at least 35 words per minute and passing score on the department's grammar exam. 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.

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. Majors and minors only or permission of department. 2 hrs. lecture; 2 hrs. lab.* Strategies for the design, development, and production of media programs using advanced computer and video systems.

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.

3018 Foundations of Media Research (3) *Prereq.: majors and minors only or permission of department; LIS 1001.* Role of research in media institutions and the mass communication process; basic concepts of research evaluation.

3080 Mass Media Law (3) *Prereq.: majors and minors only or permission of department.* Legal rights of and restraints on the mass media; emphasis on First Amendment considerations.

3998 Internship (3) *F,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 per week (28 hrs. in a summer term) under general 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, entrepreneurial leadership, organizational behavior, and strategic planning applicable to media organizations; study of social, political, ethical, technological, and legal issues confronting media companies.

4090 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 geographical influences.

4111 Mass Media Practices (3) *Prereq.: consent of Manship School of Mass Communication; concurrent registration in MC 4211. Keyboarding proficiency of at least 35 words per minute. 1 hr. lecture; 3 hrs. lab. Open to LSU*

undergraduates who qualify for entry into the University's Accelerated Master's Degree Program. Required of all students who enter the mass communication graduate program without a degree or professional experience in mass communication. May not be counted for undergraduate or graduate degree credit by Mass Communication majors. An honors course, MC 4112, is also available. An intensive course in laboratory practice in the professional skills required of all media practitioners.

4112 HONORS: Mass Media Practices (3) *Same as MC 4111, with special honors emphasis for qualified students. Consult school before registering.*

4211 Mass Media Principles (3) *Prereq.: consent of the Manship School of Mass Communication; concurrent registration in MC 4111. Open to LSU undergraduates who qualify for entry into the University's Accelerated Master's Degree Program. Required of all students who enter the mass communication graduate program without a degree or professional experience in mass communication. May not be counted for undergraduate or graduate degree credit by Mass Communication majors. An honors course, MC 4212, is also available. An intensive course that provides an overview of the role of the mass media within society.*

4212 HONORS: Mass Media Principles (3) *Same as MC 4211, with special honors emphasis for qualified students. Consult School before registering.*

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 under faculty direction.*

7000 Proseminar 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 Manship 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 ideas 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 media management issues.*

7005 Public Opinion and Public Affairs (3) *Formation and development of public opinion; interaction of media organizations and public communication practitioners 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.*

7015 Mass Communication and Society (3) *Roles of the mass media; responsibilities and rights of the communicator; interaction of mass media and society.*

7016 International Mass Communication (3) *How nations get their news; organization and operation of press 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.*

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 the 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 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.*

7971 Independent Research: Mass Communication (1-3) *F, S, Su Prereq.: consent of instructor and the associate dean for graduate studies. 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 6 hrs. of credit when topics vary. Intensive 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 courses as specified in Manship Policy Statement 304; 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 general supervision 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 (3) *A research component is required. Pass-fail grading. A project, approved by the student's advisory committee, related to the student's area of professional interest.*

8009 Public Affairs Service Externship (9) *Prereq.: consent of Manship School of Mass Communication. A research component is required. Pass-fail grading. 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 professional public affairs context.*

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

ADVERTISING

3030 Principles of Advertising (3) *Fundamentals of advertising theory and practice; social and economic role of advertising; functions of advertising in marketing and communication.*

3031 Advertising, Copywriting, and Layout (3) *Prereq.: MC 2010, 2015, 2020. 2 hrs. lecture; 2 hrs. lab. Techniques in the creation and production of advertising messages; laboratory execution of layouts and storyboards for electronic and print media.*

3038 Fundamentals of Advertising and Public Relations Research (3) *Prereq.: MC 2020, 3018. Research methods and procedures for advertising and public relations; emphasis on effectiveness of communication and media efficiency.*

4031 Advertising Design (3) *Prereq.: MC 2010, 2015, 2020, and 3031. 2 hrs. lecture; 2 hrs. lab. Advertising design techniques for print and electronic media, using computerized desktop publishing procedures; development of layouts and storyboards; emphasis on creative approaches to advertising problems.*

4033 Direct Response Advertising and Promotion (3) *Prereq.: MC 2020. Types and roles of direct response advertising strategies and tactics 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 marketing problem required. Quantitative study of techniques and procedures used in determining advertising media selection, budget allocation, and levels of message intensity.*

4035 Electronic Media Advertising Sales (3) *Prereq.: MC 2010 and 2015. Electronic media advertising sales and management; advertising production; accounting procedures; and case studies.*

4036 Advertising Campaigns (3) *Prereq.: MC 2020, 3031, 4034, and 4040. 2 hrs. lecture; 2 hrs. lab. Team development of advertising campaigns on a competitive basis (simulated advertising agency operation); emphasis on research, marketing, and advertising problems; budgetary planning, media strategy, and creative design.*

4040 Advertising Problems (3) *Prereq.: MC 3031 and 4034. Seminar in advertising problems and related readings.*

7025 Advertising Theory and Processes (3) *Role of advertising in communication, marketing, and society; analysis of various advertising processes.*

7026 Issues in Advertising (3) *Exploration of socioeconomic, legal, ethical and cultural issues related to advertising as an institution.*

ELECTRONIC MEDIA

2700 Production and Performance (3) *2 hrs. lecture; 2 hrs. lab. Production and performance techniques for use in video and audio programming of electronic media.*

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 3650. Development of telecommunication media law and regulation through case studies relating to the Federal Communications Act; rules and policy decisions of the Federal Communications Commission and other regulatory bodies; emphasis on current legal issues affecting the telecommunication media; legal documents and literature.*

3720 Television Producing and Directing (3) *Prereq.: "C" or better in MC 2010. 2 hrs. lecture; 3 hrs. lab. Producing and directing programs for television; basic set design; lighting; operation of studio cameras; microphone use and sound production; operation of studio and control room equipment.*

4705 Electronic Media Programming (3) *Strategies in developing program schedules for of electronic media; techniques of program development for target audiences.*

4710 Electronic Media Management (3) *Managing broadcast stations and cable systems; general management, sales, programming, and promotion.*

7020 Electronic Media Systems (3) *Integration of traditional electronic media with new media systems; political, economic, and regulatory matters; cable television.*

JOURNALISM

3001 Business Journalism (3) *Writing for and editing house magazines, trade journals, and miscellaneous industrial publications; business news reporting for the daily newspaper.*

3002 Feature Writing (3) *Prereq.: MC 2010 and 3101 or permission of department. Developing and writing feature stories, vignettes, and other human-interest material.*

3065 Photojournalism (3) *Prereq.: "C" or better in MC 2010; 2 hrs. lecture; 2 hrs. lab. Photographic principles for communication media.*

3101 Print Newsgathering and Editing (3) *Prereq.: MC 2010, 2015, 2 hrs. lecture; 2 hrs. lab. Basic skills of reporting and news writing and primary editing process for accuracy, proper grammar, and consistency of style.*

3102 Broadcast Newsgathering and Producing (3) *Prereq.: MC 2010, 2015, 1 hr. lecture; 3 hrs. lab. Also required in the political communication area of concentration. May also be taken as one of the 12 hrs. of required courses in political communication area of concentration. Development of skills to report, write, and produce a weekly television newscast and public affairs show.*

3103 Advanced Print Newsgathering (3) *Prereq.: MC 3102. 2 hrs. lecture; 2 hrs. lab. Specific application of newsgathering techniques; covering courts, law enforcement agencies, government, business; using polls and other statistical methods; relational databases.*

3104 Advanced Broadcast Newsgathering (3) *Prereq.: MC 3102. 1 hr. lecture; 3 hrs. lab. Development of advanced broadcast reporting and presentation skills; newsgathering focus on depth, context, and presentation of information.*

3151 Advanced Reporting (3) *F/S Prereq.: "C" or better in MC 2010, 3101, and 3103. 1 hrs. lecture; 3 hrs. lab; individually arranged hours conducted at The Advocate. Reporting news for The Advocate.*

4010 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 Scholastic Journalism (3) Basic communication techniques and instructional methods for scholastic journalism teachers; duties of counselors for newspapers and yearbooks.

4081 Opinion Journalism (3) *Prereq.: MC 2010 and 3101.* Analysis of various forms of journalistic writing that involve subjective expression: interpretive reporting, news analysis, essays, editorials and columns, critical reviews, and interviews.

4250 Public Affairs Reporting (3) *Prereq.: MC 3101 and 3102 or permission of instructor. 2 hrs. lecture; 2 hrs. lab.* Using public records to document fraud, abuse, or interesting and significant social change.

4260 Long-Format Video Production (3) *Prereq.: MC 3102.* 2 hrs. lecture; 2 hrs. lab. Strategies in producing video programs to inform mass electronic media audiences.

4270 News Production for the Internet (3) *Open to undergraduate and graduate students approved by the Manship School. 1 hr. lecture; 4 hrs. lab.* Advanced reporting for an electronic publication, using converging media technology to create content for a news website.

4500 Advanced Journalism (3) *Prereq.: MC 3103 or 3104 or permission of instructor. 1 hr. lecture; 3 hrs. lab.* Techniques of newspaper editing and production; application of advanced reporting techniques; production of laboratory newspaper; techniques of producing all aspects of a television news program, including videography, nonlinear video editing, producing a newscast and on-set news performance.

4900 Propaganda and Mass Communication (3) Theory, development, and impact of propaganda as a controversial mass communication strategy for influencing public opinion.

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 involving 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 vary from semester to semester; students will complete a project in strategic political communication that will integrate knowledge derived from previous course work in this area.

7036 Seminar in Media and Public Affairs Theory (3) *Required for Manship School of Mass Communication Ph.D. students.* Advanced studies in the application of mass communication theory to public affairs and public policy cases, problems, and issues.

PUBLIC RELATIONS

3000 Principles of Public Relations (3) Mass communication techniques applied to theories and principles of the public relations function.

3010 Public Relations Practices (3) *Prereq.: MC 2010, 2015, and 2020.* History, theory, and current communication strategies in public relations.

4001 Public Relations Writing (3) Y *Prereq.: MC 2020, 3010, and keyboarding proficiency of at least 35 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.

4004 Case Studies in Public Relations (3) Y *Prereq.: MC 3010.* Theoretical concepts of public relations practice applied to solution of strategic business, institutional, and organizational problems.

4005 Public Relations Campaigns (3) V *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.

7006 Public Relations Strategies and Tactics (3) Formal and informal models, tasks, and techniques used to formulate and complete management activities of public relations and to function ethically in social systems.

7007 Public Relations Administration (3) Principles of public relations management and application of project research techniques; strategies of campaign setting; planning, organizing, staffing, leading, and controlling.

7008 Public Relations Programming and Production (3) *Prereq.: MC 2010 and 3152 or equivalent media 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.

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 be registered in a mathematics course numbered below 1550, unless given special permission by the Department of Mathematics.

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) V Prereq: MATH 0092 or placement by department. This course does not serve as a prerequisite for calculus. Credit will not be given for both this course and MATH 1021, 1022, or 1023. Offered by correspondence only. Basic mathematical skills of graphing, formulas for geometric measurement, systems of linear equations and inequalities, review of quadratic equations, logarithms and application to exponential growth and decay, triangle trigonometry and its application to geometry and measurements.

★ **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 1015 or 1023. Quadratic equations, systems of linear equations, inequalities, functions, graphs, exponential and logarithmic functions, complex numbers, theory of equations.

★ **1022 Plane Trigonometry (3) F,S,Su Prereq:** MATH 1021 or placement by department. Credit will not be given for both this course and MATH 1015 or 1023. Trigonometric functions and identities, inverse trigonometric functions, graphs, solving triangles and equations, complex numbers, polar coordinates.

★ **1023 College Algebra and Trigonometry (5) F,S,Su Prereq:** placement by department or grade of "A" in MATH 0092. Credit will not be given for both this course and MATH 1015, 1021, or 1022. For qualified students, a replacement for MATH 1021 and 1022 as preparation for calculus.

1025 Mathematics of Commerce (3) F,S Prereq: MATH 1015 or 1021. Interest, discount, annuities, depreciation, and insurance.

★ **1029 Introduction to Contemporary Mathematics (3) 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) F,S,Su Prereq:** MATH 1021 or 1029 or consent of department. 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; number sense; open-ended 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 Holmes 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.

★ **1431 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 1431, 1441, 1550. 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.

★ **1435 Mathematics for Business Analysis (3) Prereq:** MATH 1431 or equivalent. 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.

★ **1441 Calculus with Application to Technology (3) F,S 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.

★ **1550 Analytic Geometry and Calculus I (5) F,S,Su Prereq:** MATH 1022 or 1023 or consent of department. An honors course, MATH 1551, is also available. Credit will be given for only one of the following: MATH 1431, 1441, 1550. Analytic geometry, limits, derivatives, integrals.

★ **1551 HONORS: Analytic Geometry and Calculus I (5) F Same as MATH 1550, with special honors emphasis for qualified students.**

★ **1552 Analytic Geometry and Calculus II (4) F,S,Su Prereq:** MATH 1550. An honors course, MATH 1553, is also available. Techniques of integration, parameter equations, polar coordinates, infinite series, vectors in low dimensions; introduction to differential equations and partial derivatives.

★ **1553 HONORS: Analytic Geometry and Calculus II (4) S Same as MATH 1552 with special honors emphasis for qualified students.**

1635 Further Calculus for Quantitative Analysis (5) Prereq: MATH 1435 or 1550. Credit will not be given for this course and either MATH 1552 or 2057. Selected topics in single-variable calculus, including related rates, Riemann sums, Newton's method, elementary differential equations, infinite sequences and series; functions of several variables, including partial derivatives, least squares regression, Lagrange multipliers, double integrals; vectors in two and three dimensions.

2020 Solving Discrete Problems (3) F,S Prereq: MATH 1550. Logic, counting, discrete probability, graph theory, and number theory.

2025 Integral Transforms and Their Applications (3) F Prereq: MATH 1552. Introduction to mathematical proofs and structures using selected topics from analysis; series of functions, Fourier series, Fourier integrals, and introduction to wavelets; applications in differential equations and signal processing.

2030 Discrete Dynamical Systems (3) S Prereq: MATH 1552 or permission of instructor. Dynamical systems with discrete time and in one spatial dimension; hyperbolicity; quadratic maps; chaos; structural stability; bifurcation theory; and higher dimensional systems.

2040 Fundamentals of Mathematics (3) Prereq: MATH 1550. Introduction to techniques of mathematical proofs; sets, logic, relations and functions, induction, cardinality, and properties of real numbers.

2057 Multidimensional Calculus (3) F,S,Su Prereq: MATH 1552. An honors course, MATH 2058, is also available. Three-dimensional analytic geometry, partial derivatives, multiple integrals.

2058 HONORS: Multidimensional Calculus (3) F Same as MATH 2057, with special honors emphasis for qualified students.

2060 Technology Lab (1) F,S,Su Prereq: Credit or concurrent enrollment in MATH 2057. Students are encouraged to enroll in MATH 2057 and 2060 concurrently. Use of computers for investigating, solving, and documenting mathematical problems; numerical, symbolic, and graphical manipulation of mathematical constructs discussed in MATH 1550, 1552, and 2057

2065 Elementary Differential Equations (3) F,S Prereq: MATH 1552. Credit will be given for only one of the following: MATH 2065, 2070, 2090. Ordinary differential equations; emphasis on solving linear differential equations.

2070 Mathematical Methods in Engineering (4) F,S Prereq: MATH 1552. Credit will be given for only one of the following: MATH 2065, 2070, 2090. Ordinary differential equations, Laplace transforms, linear algebra, and Fourier series; physical applications stressed.

2085 Linear Algebra (3) F,S,Su Prereq: MATH 1552, 1635 or 2040, or equivalent. An honors course, MATH 2086, is also available. Credit will not be given for both this course and MATH 2090. Systems of linear equations, vector spaces, linear transformations, matrices, determinants.

2086 HONORS: Linear Algebra (3) V Same as MATH 2085, with special honors emphasis for qualified students.

2090 Elementary Differential Equations and Linear Algebra (4) F,S,Su Prereq: MATH 1552. Credit will be given for only one of the following: MATH 2065, 2070, 2090. Credit will not be given for both this course and MATH 2085. Introduction to first order differential equations, linear differential equations with constant coefficients, and systems of differential equations; vector spaces, linear transformations, matrices, determinants, linear dependence, bases, systems of equations, eigenvalues, eigenvectors, Laplace transforms, and Fourier series.

2203 Measurement: Proportional and Algebraic Reasoning (3) F,S Prereq: Professional Practice I Block, 12 sem. hrs of mathematics including MATH 1201 and 1202, and concurrent enrollment in EDCI 3125 AND 3126. 2 hrs. lecture; 2 hrs. lab/field experience (as part of Professional Practice II Block); Mathematics content course designed to be integrated in Praxis II with the principles and structures of mathematical reasoning applied to the grades 1-6 classroom. Development of a connected, balanced view of mathematics; application of measurable attributes of objects and the units, systems, and processes of measurement; appropriate techniques, tools, and formulas of measurement; interrelationship of patterns, relations, and functions; applications of proportional and algebraic reasoning in mathematical situations and structures using contextual, numeric, graphic, and symbolic representations; written communication of mathematics.

3001 Mathematics Tutoring Experience (1) F,S Prereq: MATH 1552, EDCI 2001 and concurrent enrollment in EDCI 3001 3 hr. lab. Course provides a carefully supported, monitored, and evaluated mathematics tutoring experience in a local middle, or high school under the guidance of a mathematics faculty member and a mentoring mathematics teacher in the local school.

3002 Mathematics Classroom Presentations (1) F,S Prereq: MATH 3001, EDCI 3001, and concurrent enrollment in EDCI 3002. Under the supervision of a mathematics faculty member and a mentoring mathematics teacher in a local school, students will prepare and deliver middle and/or high school mathematics lessons that incorporate appropriate use of technology.

3355 Probability (3) F,S Prereq: MATH 2057. Suggested for preparation for actuarial exams. Introduction to probability, emphasizing concrete problems and applications; random variables, expectation, conditional probability, law of large numbers, central limit theorem, and stochastic processes.

3903 Methods of Problem Solving (1) F Prereq: MATH 1552 and MATH 2070, 2085, or 2090. May be taken for a max. of 3 hrs. of credit when topics vary. Pass-fail grading. Instruction and practice in solving a wide variety of mathematical and logical problems, and participation in the Putnam competition.

3998 Undergraduate Major Seminar (1) V May be taken for a max. of 4 hrs. of credit. Pass-fail grading. Topics of current interest.

4003 Instructional Strategies in Mathematics (1) F,S Prereq: MATH 3002, EDCI 3002, and concurrent enrollment in EDCI 4003. Instructional activities and strategies for mathematics that depart from the lecture style cooperative learning or open-ended exploration; students will design and conduct a mathematics lesson using such strategies.

4004 Mathematics Education Capstone Course (3) F,S Prereq: MATH 4003, EDCI 4003, and concurrent enrollment in EDCI 4004. Student should be within two semesters of completion of requirements for a mathematics major. Same as MATH 4020 with special education emphasis for students in the secondary education area of concentration.

4005 Geometry (3) S Prereq: MATH 2040. The foundation of geometry, including work in Euclidean and non-Euclidean geometries.

4020 Capstone Course (3) S Prereq: Students should be within two semesters of completing the requirements for a mathematics major. Provides opportunities for students to consolidate their mathematical knowledge, and to obtain a perspective on the meaning and significance of that knowledge. Course work will emphasize communication skills, including reading, writing, and speaking mathematics.

4023 Applied Algebra (3) F,S,Su Prereq: MATH 2085 or equivalent. Credit will not be given for both this course and MATH 4200. Finite algebraic structures relevant to computers: groups, graphs, groups and computer design, group codes, semigroups, finite-state machines.

4024 Mathematical Models (3) S Prereq: MATH 1552 and credit or registration in MATH 2085; or equivalents. Construction, development, and study of mathematical models for real situations; basic examples, model construction, Markov chain models, models for linear optimization, selected case studies.

4025 Optimization Theory and Applications (3) F Prereq: MATH 2057 and credit or registration in MATH 2085; or equivalent. Basic methods 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) Prereq: MATH 2057 and 2085. Ordinary differential equations, with attention to theory.

4031 Advanced Calculus I (3) F Prereq: MATH 2057 and 2085; or equivalent. Differential and integral calculus of real and vector-valued functions of several real variables.

4032 Advanced Calculus II (3) S Prereq: MATH 4031 or equivalent. Vector integral calculus, Stokes's theorem, series, orthogonal functions, selected related topics.

4036 Complex Variables (3) F,S Prereq: MATH 2057. Analytic functions, integration, power series, residues, and conformal mapping.

4038 Mathematical Methods in Engineering (3) F,S,Su Prereq: MATH 2065 or 2070 or 2090. Also offered as ME 4563. 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 Prereq: MATH 4031 or equivalent. Examples and classification of two-dimensional manifolds, covering spaces, the Brouwer theorem, and other selected topics.

4050 Interest Theory (3) S Prereq.: MATH 1550 and EXST 4001. 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 Prereq: MATH 3355. Suggested for preparation for actuarial exams. Experimental design, sampling methods, nonparametric methods, hypothesis testing, and regression.

4060 Preparation for Actuarial Examinations (3) F Prereq.: MATH 1552, 2085 or 2090 and 3355 or 4056 or 4065. Concentrated preparation for Actuarial Examinations; focus on areas in mathematics treated in actuarial examinations on calculus, linear algebra, probability, statistics, and numerical methods.

4065 Numerical Analysis I (3) F Prereq: MATH 2057; basic programming ability in Fortran, Pascal, or C. Newton's method, Lagrange interpolation, least-squares approximation, orthogonal polynomials, numerical differentiation and integration, Gaussian elimination.

4066 Numerical Analysis II (3) S Prereq: MATH 4065 and one of the following: MATH 2065, 2070, 2090, 4027. Numerical solutions of initial value problems and boundary value problems for ordinary and partial differential equations.

4153 Finite Dimensional Vector Spaces (3) S Prereq: MATH 2057 or 2085. Vector spaces, linear transformations, determinants, eigenvalues and vectors, and topics such as inner product space and canonical forms.

4158 Foundations of Mathematics (3) V Prereq: MATH 2057 or equivalent. Real number systems, sets, relations, product spaces, order, and cardinality.

4171 Theory of Graphs (3) S Prereq: MATH 2085 or equivalent. Fundamental concepts of undirected and directed graphs, trees, connectivity and traversability, planarity, colorability, network flows, matching theory, and applications.

4172 Combinatorics (3) F Prereq: MATH 2085 or equivalent. Topics selected from permutations and combinations, generating functions, principle of inclusion and exclusion, configurations and designs, matching theory, existence problems, applications.

4181 Elementary Number Theory (3) F Prereq: MATH 2057 or 2085. Divisibility, Euclidean algorithm, prime numbers, congruences, and topics such as Chinese remainder theorem and sums of integral squares.

4200 Abstract Algebra I (3) F Prereq: 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 permutation groups; elementary properties of rings.

4201 Abstract Algebra II (3) S Prereq: MATH 4200 or equivalent. Ideals in rings, factorization in polynomial rings; unique factorization and Euclidean domains, field extensions, splitting fields, finite fields, Galois theory.

4325 Fourier Transforms (3) V Prereq: 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 Prereq: 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 Prereq: either MATH 2057 and 2090; or MATH 2057, 2065 or 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 other topics.

4470 Error-Correcting Codes (3) V Prereq: MATH 2085 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) V Prereq.: MATH 2040, 2057, and 2085; 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 Diophantus to the present; 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 Prereq: 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) Prereq: consent of department. May be taken for a max. of 9 sem. hrs. credit.

6300 Topics in Mathematics for Secondary Teachers (1-3) V Prereq: 6 sem. hrs. of mathematics at or above the level of 2040 or equivalent. May be taken for a max. of 6 sem. hrs. credit when topics vary. May be taken by M.N.S. students in mathematics with departmental approval. Areas of current interest to teachers of secondary school mathematics.

6301 Implementing the NCTM Standards I (3) M Prereq: consent of department. May be taken for a max. of 9 sem. hrs. of credit when topics vary. Enrollment is restricted to participants in the teacher-training and grant-supported programs. Topics for mathematics teachers (K-5) to be selected from those in the Principles and Standards of School Mathematics of the National Council of Teachers of Mathematics.

6302 Implementing the NCTM Standards II (3) M Prereq: consent of department. May be taken for a max. of 9 sem. hrs. of credit when topic vary. Enrollment is restricted to participants in the teacher-training and grant-supported programs. Topics for mathematics teachers (6-8) to be selected from those in the Principles and Standards of School Mathematics of the National Council of Teachers of Mathematics.

7200 Geometric and Abstract Algebra (3) Prereq: MATH 2085 or equivalent. Linear algebra, rings, finite fields, groups, multilinear algebra, other topics.

7210, 7211 Algebra I, II (3,3) 7210 offered S; 7211 offered F Prereq: MATH 7200 or equivalent. Groups: Sylow Theorems, finitely generated abelian groups; rings and modules: exact sequences, projective modules; 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 Prereq: consent of department. May be repeated for credit with 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 Prereq: consent of department. May be repeated for credit with the consent of the department. Advanced topics such as algebraic number theory, algebraic semigroups, quadratic forms, or algebraic K-theory.

7311 Real Analysis I (3) Prereq: MATH 4032 or equivalent. Axiom of choice, Lebesgue measure and integration, convergence theorems, bounded variation and absolute continuity, differentiation, Minkowski-Holder inequalities, Riesz-Fischer theorem.

7312 Real Analysis II (3) Prereq: 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) S Prereq: 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.

7330 Functional Analysis (3) V Prereq: MATH 7312 or equivalent. Banach spaces and their generalizations; Baire category, Banach-Steinhaus, open mapping, closed graph, and Hahn-Banach theorems; duality in Banach spaces, weak topologies; other topics such as commutative Banach algebras, spectral theory, distributions, and Fourier series.

7350 Complex Analysis (3) V Prereq: 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) F Prereq: MATH 7311 or equivalent. Probability spaces, random variables and expectations, independence, convergence concepts, laws of large numbers, convergence of series, law of iterated logarithm, characteristic functions, central limit theorem, limiting distributions, martingales.

7370 Lie Groups and Representation Theory (3) V Prereq: MATH 7312, 7200, and 7510 or equivalent. Lie groups, Lie algebras, subgroups, homomorphisms, the exponential map. Also topics in finite and infinite dimensional representation theory.

7380 Seminar in Functional Analysis (1-3) V Prereq: 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 Prereq: consent of department. May be repeated for credit with consent of department. Advanced topics such as harmonic analysis, partial differential equations, Lie group representation theory, several complex variables, or probability theory.

7400 Combinatorial Theory (3) S Prereq: 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, recurrence relations, inclusion-exclusion, Polya's theorem, graphs and digraphs, combinatorial designs, incidence matrices, partially ordered sets, matroids, finite geometries, Latin squares, difference sets, matching theory.

7490 Seminar in Combinatorics, Graph Theory, and Discrete Structures (1-3) V Prereq: consent of department. May be repeated for credit with consent of department. Advanced topics such as combinatorics, graph theory, automata theory, or optimization.

7510 Topology I (3) Prereq: MATH 2057 or equivalent. Basic notions of general topology, with emphasis on Euclidean and metric spaces, continuous and differentiable functions, inverse function theorem and its consequences.

7512 Topology II (3) Prereq: MATH 7510. Theory of the fundamental group and covering spaces including the Seifert-Van Kampen theorem; universal covering space; classification of covering spaces; selected areas from algebraic or general topology.

7520 Algebraic Topology (3) S Prereq: MATH 7200 and 7510; or equivalent. Basic concepts of homology, cohomology, and homotopy theory.

7550 Differential Geometry and Topology (3) F Prereq: MATH 7200 and 7510; or equivalent. Manifolds, vector fields, vector bundles, transversality, Riemannian geometry, other topics.

7590 Seminar in Geometry and Algebraic Topology (1-3) V Prereq: consent of department. May be repeated for credit with consent of department. Advanced topics such as advanced algebraic topology, transformation groups, surgery theory, sheaf theory, or fiber bundles.

7690 Seminar in Topological Algebra (1-3) V Prereq: consent of department. May be repeated for credit with consent of department. Advanced topics such as topological groups, topological semigroups, or topological lattices.

7999 Selected Readings in Mathematics (1-3) Prereq: consent of department. May be repeated for credit with consent of department.

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

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

MECHANICAL ENGINEERING • ME

2212 Introduction to Mechanical Engineering Design (2) Prereq.: ENGL 1001, CM 1030, PHYS 2101, ME 2533, or equivalent. 1 hr. lecture; 2 hrs. lab. Art and science of mechanical engineering design; reverse engineering; design methodologies; product realization; professional ethics; professional development.

2334 Thermodynamics (4) Prereq.: CHEM 1202, MATH 1552, CSC 2262, PHYS 2101. Thermodynamic systems and control volumes; thermodynamic properties of simple substances, work and heat; 1st and 2nd law; power and refrigeration cycles; ideal gas mixtures, water-vapor 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 equilibria and manipulation of properties and behavior by adjustment of composition and processing variables; responses of engineering materials to stress and environmental variables.

3103 Engineering Mechanics, Statics, and Dynamics (3) Prereq.: junior standing; PHYS 2101 and MATH 2057 or equivalent. Credit will not be given for both this course and either CE 2450 or ME 3133. Equilibrium, kinematics, and kinetics of particles and rigid bodies in a plane.

3133 Dynamics (3) Prereq.: 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; work and energy.

3143 System Dynamics and Modeling (3) Prereq.: ME 2533, MATH 2070 or equivalent, ME 3133, and credit or registration in ME 3834. Bond graph and lumped-parameter techniques for deriving dynamic equations of physical systems; time and frequency domain analyses, numerical simulation of mechanical systems.

3249, 3250 Engineering Practice (1-3,1-3) Su Prereq.: consent of instructor. Pass-fail grading. A minimum of 6 weeks of full-time employment by an industry participating in the summer program. Same as ENGR 3049, 3050. Selected engineering problems in an industrial environment.

3333 Thermodynamics (3) Prereq.: PHYS 2101 and MATH 1552; or equivalent. Not open to mechanical engineering majors. Basic laws of thermodynamics, availability, perfect gases and pure substances, fluid flow, and basic heat transfer.

3603 Instrumentation and Measurement (3) Prereq.: EE 3950, ME 3143; and proficiency in English as required by the College of Engineering. 2 hrs. lecture; 3 hrs. lab. Basic science and technology of instrumentation and measurement systems; fundamental measurement theory; statistical error estimation; error propagation; instrumentation specifications; analog and digital instrumentation fundamentals; data acquisition and analysis; extensive technical report writing.

3701 Materials of Engineering Laboratory (1) Prereq.: proficiency in English as required by the College of Engineering; ME 2733. 3 hrs. lab. Demonstrative and participative experiments to develop better understanding of characteristics of metals, ceramics, and plastics.

3752 Material Selection for Mechanical Engineers (2) Prereq.: ME 3701 or equivalent; credit or registration in CE 3400. Analysis of mechanical and other properties of engineering materials required for material selection; advanced engineering materials in mechanical engineering; applications and problems in processing and shaping; materials in selected mechanical systems.

3834 Fluid Mechanics (4) Prereq.: ME 2334, 3133. Statics, kinematics, and dynamics of continuum liquids and gases; conservation laws (mass, momentum, energy); integral analysis; differential analysis; dimensional analysis and similarity; internal and external viscous flows; compressible flows.

3903 Special Projects for Undergraduates (3) Prereq.: 2.50 cumulative gpa with consent of department. May be taken for a max. of 9 hrs. of credit. Library research, comprehensive design problems, and laboratory investigations.

4133 Machine Design I: Kinematics of Machinery (3) Prereq.: ME 2533 and 3133; or equivalent. Kinematic and dynamic analysis and synthesis of mechanisms.

4143 Mechanical Vibrations (3) Prereq.: CE 3400, MATH 2070, ME 3143 and 4133; or equivalent. Basic principles of oscillating mechanical systems; single and multiple degrees of freedom; dynamic balancing; applications to mechanical systems; continuous systems vibrations.

4153 Kinematic Synthesis of Mechanisms (3) S Prereq.: ME 4133 or equivalent. Three-dimensional mechanisms; emphasis on computer solution methods.

4163 Intermediate Dynamics (3) F Prereq.: MATH 2070 and ME 3133. Rotating reference frames, rigid body kinetics in three dimensions, central force motion, variable mass problems, and Lagrange's equations.

4183 Theory and Design of Mechanical Control Systems (3) Prereq.: MATH 2070, ME 3143, and credit or registration in ME 3603. Basic principles, concepts, characteristics, and performance of linear feedback control systems; stability of linear systems; frequency response methods; compensator design in the frequency domain.

4201 Mechanical Engineering Design Laboratory (1) Prereq.: ME 4183 or equivalent. 3 hrs. lab. Experiments involving basic concepts in machine design.

4202 Mechanical Engineering Capstone Design II (2) Prereq.: IE 3603, and ME 3752, 4243, 4433, 4183. 6 hrs. lab. Principles from heat transfer, thermodynamics, design, fluids, and materials courses utilized to complete the project set forth in the preliminary design outline submitted in ME 4243.

4243 Mechanical Engineering Capstone Design I (3) Prereq.: ECON 2030, ME 2212, 4244, senior standing in the College of Engineering, and credit or registration in IE 3603, ME 3752, 4183, and 4433, or equivalent. 2 hrs. lecture; 2 hrs. lab. Design project will be selected and approved (to be completed in ME 4202); project feasibility study and outline of the design project will be completed; design methodology, optimization, product reliability and liability, economics, use of ASME codes, and professional ethics.

4244 Machine Design II: Strength Considerations and Component Design (4) Prereq.: CE 3400 and ME 4133. Design, three-dimensional stress analysis; deflection and stiffness; static and dynamic loading; failure theories and fatigue; fasteners; welded joints; mechanical springs; bearing; gears; shafts; clutches; breaks and couplings; belts and pulleys.

4253 Introduction to Bearing Design and Lubrication (3) Prereq.: ME 4433 or equivalent. Analysis and design of tribological components particularly hydrodynamic bearings; computational modeling and other modern developments in the field.

4353 Advanced Engineering Thermodynamics (3) S Prereq.: ME 2334 or equivalent. Postulational treatment of laws of thermodynamics; equilibrium and maximum entropy postulates; development of formal relationships; principles and application to general systems.

4383 Thermal System Design (3) Prereq.: ECON 2030, ME 2334, and ME 4433. Principles and practices concerning the design and optimization of thermal systems.

4433 Heat Transfer (3) Prereq.: ME 2334 or 3333, MATH 2070, and ME 3834; or equivalent. Principles of heat transfer by conduction, radiation, and convection.

4443 Introduction to Combustion (3) Prereq.: ME 4433. Basic principles of combustion and their application in solving engineering problems.

4453 Laser Methods in Engineering (3) Prereq.: senior standing in the College of Engineering. Basic principles of lasers and their application to engineering problems.

4533 Engineering Use of Electronic Computers (3) Prereq.: ME 2533 or equivalent; or graduate standing. General rules of programming; construction of programs to solve mathematical problems common to all engineers; numerical methods including solutions to linear and nonlinear differential equations, least-squares approximation, interpolations, and integration.

4563 Mathematical Methods in Engineering (3) See MATH 4038.

4573 Interactive Computer Graphics (3) Prereq.: Experience in mathematics and computer programming. Also offered as CSC 4356. Analytical treatment of graphics using the digital computer; graphical display and input devices; computer graphics systems and standards; two- and three-dimensional transformations; geometric modeling; interactive techniques; basic data structures; realism in 3-D graphics; future trends.

4583 Applied Interactive Graphics and Computer-Aided Design (3) F Prereq.: ME 4573 or equivalent. Also offered as CSC 4357. Application of interactive graphics techniques to solve specific problems in engineering design and data retrieval.

4611 Thermal System Laboratory (1) Prereq.: ME 2334 or equivalent and credit or registration in ME 4433 and 3603. 3 hrs. lab. Oral presentations required. Thermal system analysis and independent experimentation.

4621 Thermal Science Laboratory (1) Prereq.: ME 3603, 3834, 4433, or equivalent. Laboratory demonstrations and experimentation in fluid mechanics, thermodynamics, and heat transfer concepts.

4633 Internal Combustion Engines (3) Prereq.: ME 2334 or 3333 or equivalent. Classification of internal combustion engines, gas turbines, cycles with different components, spark-ignition gasoline engines, detonation, carburetion, compression-ignition engines, combustion and diesel knock, fuel atomization and atomizers, combustion chambers, two- and four-stroke cycle engines, and supercharging.

4643 Thermal Environmental Engineering (3) Prereq.: ME 2334 and credit or registration in ME 4433; or equivalent. Design of thermal environment for humans, animals, processes, and inanimate objects; the means of control.

4663 Power Plant Engineering (3) Prereq.: ME 2334 and 4433; or equivalent. Power plants for industrial and central-station use; emphasis on cycles, design, capabilities, and economics of the plant as a whole; components used in various types of plants.

4673 Introduction to Modern Control Theory (3) Prereq.: ME 4183 or equivalent. State space modeling, controllability, observability and stability, pole placement, optimal control laws via minimum principle and dynamic programming.

4683 Sensors and Actuators (3) V Prereq.: EE 3950, ME 3143. Basic knowledge and operational principles of various transduction (sensing and actuating) methods, especially electromechanical sensors and actuators; actual designing, building, and testing transducers.

4723 Advanced Materials Analysis (3) F Prereq.: ME 2733, 3701 or equivalent. 1 hr. lecture; 6 hrs. lab. Concepts and operation of modern analytical instruments using photon or electron beams and X-rays; macroscopic and microscopic examination of materials coupled with separate and combined testing of mechanical, tribological, and corrosion properties.

4733 Deformation and Fracture of Engineering Materials (3) F Prereq.: CE 3400 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.

4743 Kinetics in Materials Processes (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.

4763 Fundamentals of Corrosion Science and Engineering (3) F Prereq.: ME 2733 or equivalent, and any first course in thermodynamics. Corrosion principles; polarization, passivation, inhibition, and other phenomena; principal methods used in corrosion prevention.

4783 Composite Materials: Manufacturing, Properties, and Design (3) Prereq.: ME 2733 and CE 3400 or equivalent. Constituent materials, micro- and macromechanics, mechanical behavior, fracture, manufacturing and design of components made of composite materials, including polymer, ceramic, and metal matrix materials.

4843 Gas Dynamics (3) Prereq.: MATH 2070 and ME 2334; 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. Preliminary design 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. Aerodynamic problems of special interest in the analysis and design of water, land, air, and space transportation systems.

7153 Advanced Vibrations (3) Prereq.: ME 4143 or equivalent. Modeling and response of continuous vibratory systems; inverse problems in vibration; active vibration control; dynamic absorption; wave propagation and reflection; numerical methods for continuous systems.

7233 Advanced Machine Design (3) S Prereq.: ME 4244 or equivalent.

7243 Bearing Design and Lubrication (3) Prereq.: consent of instructor. Derivation 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 4573 or equivalent. Mathematical elements of modeling complex free-form geometry in two and three dimensions for design, analysis, and display; wireframe, surface, and solid geometric modeling; computer graphics and algebraic, computational, and projective geometry.

7433 Advanced Heat Transfer I (3) F Prereq.: MATH 4016 or equivalent. Steady and transient heat conduction.

7443 Advanced Heat Transfer II (3) F Prereq.: ME 7843 or equivalent. Convection heat transfer.

7453 Advanced Heat Transfer III (3) S Prereq.: consent of instructor. Radiation heat transfer and advanced topics.

7533 Numerical Methods in Applied Mechanics (3) Computer methods used to solve engineering problems; advanced numerical methods.

7603 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.

7633 Advanced Engineering System Dynamics (3) Prereq.: ME 4183 or equivalent. Dynamic system modeling; bond graphs; state-determined systems; simulation; controllability/observability.

7643 Advanced System Modeling (3) Prereq.: ME 7633 or equivalent. Mathematical models and dynamic behaviors of engineering systems in multi-energy domains; bond-graph modeling methods, simulations using contemporary software.

7673 Advanced Mechanical Systems Control (3) Prereq.: ME 4183 or equivalent. Design and analysis of nonlinear control systems; adaptive and robust control techniques; state estimation; stability theory; control and stability of distributed parameter systems.

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.

7743 Defects, Diffusion, and Transformations in Solids (3) S Prereq.: ME 2733 or equivalent. Defects and atomistic mechanisms. dislocation theory, quantitative description of diffusion processes and phase transformations in materials.

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 4763 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 4533 or equivalent. Finite-difference 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 solving equations of fluid motions and energy; computer program used to solve complex problems involving fluid flow, heat transfer, and chemical reaction; mathematical models for turbulence, radiation, and combustion; their computing implications; application of prediction procedures for practical situations.

7833 Inviscid Fluid Flow (3) S Prereq.: ME 7863 or equivalent. Potential flow theory and gas dynamics; 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 number flows; incompressible laminar boundary layer theory; transition; turbulent boundary layers, compressibility effects, and numerical methods.

7853 Advanced Boundary Layer Theory (3) S Prereq.: ME 7843 or equivalent. Non-Newtonian 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) 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; radiation detection and safety; background radiation; applications of nuclear science in medicine, cancer therapy, and imaging.

4101 Tracer Methodology for Biological Sciences (3) F,S 2 hrs. lecture; 3 hrs. lab. Specially for students in the biological sciences. Properties of ionizing radiation, instruments for detection and measuring radiation, and biological use of radioisotopes.

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, including external and internal dosimetry, techniques of dose reduction, and consequences of radiation exposure.

4332 Medical Physics and Health Physics Laboratory (1) F Prereq.: credit or registration in MEDP 4331. 3 hrs. lab. Radiation measurement instrumentation; applied health physics and medical physics exercises in radiation surveys; inspections; exposure incident investigation.

4351 Radiation Detection and Instrumentation (2) F,S Prereq.: PHYS 4098 or equivalent, credit or registration in MEDP 4332 or consent of instructor. Principles of radiation detection; construction, operation, and application 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 12 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 Tracer Methodology for Biological Sciences (3) F,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, 4351, CSC 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 and research interest.

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.

7260 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 physics staff supervision.

7270 Advanced Radiation Therapy Physics (3) S Prereq.: MEDP 7121. 2 hrs. lecture; 3 hrs. lab. Technical aspects of the treatment of malignant diseases; instruments and their limitations; calibration and dosimetry techniques; clinical practice.

7280 Advanced Clinical Cancer Therapy Rotation (2) S,Su Prereq.: MEDP 7260. Sequel to MEDP 7260. May be taken for a max. of 4 sem. hrs. credit. Daily clinical rounds under the supervision of the medical and clinical physics staff; study of a wide variety of isotopic and radiation source techniques for diagnosis and treatment of malignant diseases.

7331 Radiation Therapy Physics (3) F Prereq.: MEDP 4331. Methods for measuring radiation fields and absorbed radiation doses by ion-collection devices, photographic methods, solid-state systems, chemical systems, and calorimetric methods, as applied to isotopic and machine sources.

7530 Radiation Shielding (2) F Prereq.: credit or registration in MEDP 7537. Design and analysis of shields, collimators, and compensators in clinical and industrial settings; calculation of source terms, 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 Prereq.: PHYS 2203 or equivalent, CSC 2262 or equivalent experience in computer programming. Also offered as PHYS 7537. Photon, neutron, and electron interactions and energy deposition, the Boltzmann equation, elementary analytical solutions; deterministic computational methods including spherical harmonics and discrete ordinates techniques; continuous slowing down and Fokker-Planck approximations.

7538 Monte Carlo Simulation of Radiation Transport (3) S Prereq.: MEDP 7537 or consent of instructor, CSC 2262 or equivalent experience in computer programming. Also offered as PHYS 7538. Radiation transport simulation by the Monte Carlo method; phase-space tracking; dose response estimators, biasing methods; integral form of the Boltzmann equation; condensed-history method for charged particles; neutron, photon, and electron transport calculations for shielding and medical physics applications.

7991 Advanced Projects in Medical Physics and Health Physics (1-3) Prereq.: MEDP 4101 or 4331, 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) Prereq.: 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,S 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 Investigation (1-6) Prereq.: MEDP 4101 or 4331; 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 I (1) F,S 1 hr. lecture; 1.5 hrs. lab. Role of the U.S. Army, National Guard, and Reserves; warfighting doctrine; the Army's writing style; military briefings; leadership dynamics; drill and ceremonies; other military qualification level I skills.

1012 First Year Basic Army II (1) F,S Prereq.: MILS 1011 or permission of instructor. 1 hr. lecture; 1.5 hrs. lab. Amplification of leadership dynamics concepts presented in MILS 1011; basic first aid; physical fitness; other military qualification level I skills.

2161 Second Year Basic Army I (2) F,S Prereq.: MILS 1011 and 1012 or permission of instructor; 2 hrs. lecture; 1.5 hrs. lab. Map symbols and reference systems; land navigation; small unit tactics; written and oral communication; other military qualification level I skills.

2162 Second Year Basic Army II (2) Prereq.: MILS 1011 and 1012 or permission of instructor; 2 hrs. lecture; 1.5 hrs. lab. Planning, organizing, and managing the activities of small organizations; time management; tactics; branches of the Army; leadership; other military qualification level I skills.

3011 Small Unit Leadership (3) F Prereq.: MILS 2161 and 2162 or equivalent. 2 hrs. lecture; 6 hrs. lab. Practical leadership development through repeated application at small

unit (squad and platoon) 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 Prereq.: 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 physical training.

3013 ROTC Advanced Camp (3) Su Prereq.: MILS 3011 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) F Prereq.: 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 Prereq.: 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: professional ethics, Military Justice System, Supply and Logistics, Personnel and Administration, battle analysis, Code of Conduct.

4055 Civil War (3) See HIST 4055.

4066 Military History of the United States (3) See HIST 4066.

4130 World War II (3) See HIST 4130.

MUSIC • MUS

Applied Music and Ensemble Courses

Admission to applied music courses is by audition only. Secondary and primary applied courses, MUS 2130-2152 and 3130-3154, are offered for 2 or 3 credits. Students who elect 2 credits will receive 30 minutes of individual instruction per week; students who elect 3 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 2130-54 and 3130-54 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 Piano (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)
- 7034 Graduate Harp (2-6)
- 7035 Graduate Violin (2-6)
- 7036 Graduate Viola (2-6)
- 7037 Graduate Cello (2-6)
- 7038 Graduate String Bass (2-6)
- 7039 Graduate Flute (2-6)
- 7040 Graduate Oboe (2-6)
- 7041 Graduate Clarinet (2-6)
- 7042 Graduate Saxophone (2-6)
- 7043 Graduate Bassoon (2-6)
- 7044 Graduate Trumpet (2-6)
- 7045 Graduate French Horn (2-6)
- 7046 Graduate Euphonium (2-6)
- 7047 Graduate Trombone (2-6)
- 7048 Graduate Tuba (2-6)
- 7049 Graduate Percussion (2-6)
- 7051 Graduate Composition (2-6)
- 7052 Graduate Guitar (2-6)
- 7053 Graduate Electroacoustic Composition (2-6)

ENSEMBLE COURSES

Admission to ensemble courses is by audition only, with the exception of 4230, 4232, and 4233. These courses are open to freshmen and sophomores. Courses marked with an asterisk (*) will satisfy the requirement to participate in a major ensemble each semester.

- 4220 Piano Ensemble (1)
- 4221 Vocal Chamber Music (1)
- 4222 Woodwind Chamber Music (1)
- 4223 Brass Chamber Music (1)
- 4224 String (or Piano and Strings) Chamber Music (1)
- 4225 Collegium Musicum (1)
- 4226 Percussion Ensemble (1)
- 4227 Marimba Ensemble (1)
- 4228 Contemporary Music Ensemble (1)
- 4229 Harp Ensemble (1)
- 4230 Gospel Choir (1)
- 4231 Swing Choir (1)
- *4232 Men's Chorus (1)
- *4233 Women's Chorus (1)
- *4234 University Chorus (0-1)
- *4235 Chamber Choir (1)
- *4236 A Cappella Choir (1)
- 4240 Opera Chorus (1)
- *4250 Tiger Marching Band (1)
- *4251 Wind Ensemble (0-1)
- *4252 Symphonic Band (0-1)
- *4254 Symphonic Winds (0-1)
- 4253 Jazz Band (1)
- 4260 Philharmonia (1)
- *4261 Symphony Orchestra (0-1)

GENERAL COURSES

General education courses are marked with stars (★).

1001, 1002 Voice Class (2,2) Open to nonmusic majors 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.

1018, 1019 Diction for Singers I, II (1,1) 1 hr. lecture; 1 hr. lab. Phonetics and phonemes used in singing in different 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.

1107 Secondary Piano (3) 2 half-hour lessons. May be taken for a max. of 6 hrs. of credit.

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 nonkeyboard music 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 I, II (4,4) 3 hrs. lecture; 2 hrs. lab. Credit will not be given for this course and MUS 1701, 1702, 1753, 1754, 2711, 2712, 3711. 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. Credit 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; correlation of musical literature with other disciplines in the humanities.

★ **1752 Music Appreciation (3)** Primarily for nonmusic majors. Credit will not be given for this course and MUS 1755. The varied facets of the musical arts: folk music, symphony, opera, ballet, vocal, and chamber music.

1753 Survey of Music History I (3) Some prior music experience is desirable. Music of western civilization from ca. 400 to ca. 1730.

1754 Survey of Music History II (3) *Some prior music experience is desirable.* Music of western civilization from ca. 1730 to the present.

★ **1755 HONORS: Music Appreciation (3)** *Primarily for qualified students not majoring in music. 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 fine arts disciplines.

★ **1799 Rudiments of Music (3)** *Not open to music majors.* The grammar of music, including basic notation and elementary construction leading to a study of tonal harmony.

★ **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, ★ 2054 Survey of Music History I, II (3,3)** *Prereq.: MUS 1732 or permission of instructor. Credit will not be given for this course and MUS 1753, 1754.* Music of Western Civilization from ca. 1730 to the present.

2100, 2101 Advanced Keyboard Skills I, II (1,1) *Open only to keyboard majors.* Functional use of the piano; emphasis on reading, harmonization, and improvisation.

2170 Music Education in the Elementary School I (3) Music fundamentals, materials, methods, and skills involved in teaching general music in the elementary school.

2171 Music Education in the Elementary School II (3) *Prereq.: MUS 2170 or equivalent.* Fundamentals of music theory, advanced materials, methods, and skills involved in teaching general music in the elementary school; emphasis on use of guitar to teach music lessons.

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.

2300 Instrumental and Vocal Techniques (1-2) *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 1732 or equivalent. 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 dictation.

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 (2-3) *Prereq.: permission of instructor. May be taken for a max. of 9 sem. 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.* Introductory performance course in jazz improvisation; emphasis on its theoretical basis.

2752 Jazz Improvisation II (2) *Prereq.: MUS 2751 or equivalent. Continuation of MUS 2751.*

3000 HONORS in Music (1-4) *Prereq.: junior standing. May be taken for a max. of 6 sem. hrs. of credit.* Preparation of an honors project.

3018 Vocal Pedagogy (3) *Prereq.: 12 sem. hrs. of applied voice study.* Principles and processes of voice production; psychology of teaching and studying singing; beginning comparative pedagogy; vocal repertoire for the beginning singer.

3020 American Musical Theatre (3) *See THTR 3020.*

3703 Theory Survey (2) *Admission by placement examination. 2 hrs. lecture; 1 hr. lab.* Written aspects of theory.

3704 Theory Survey: Aural Skills (1) *Admission by placement examination. 2 hrs. lab.* Dictation and sight singing.

3710 Overview of Western Music History (3) Survey of Western classical music from the Middle Ages to the present day.

3731, 3732 Music Theory III, IV (3,3) *Prereq.: Grade of "C" or better in MUS 2732 or equivalent.* Advanced tonal harmony; continued form and genre study; twentieth century compositional techniques; basic scoring and score reading; continued mastery of relevant musicianship skills.

3748 Choral Conducting (2) *F only. Credit will not be given for both this course and MUS 3749.* Elements of conducting choral groups.

3749 Choral Literature and Conducting I (3) *Credit will not be given for both this course and MUS 3748.* Elements of conducting choral groups; survey of choral literature for secondary school teaching.

3750 Choral Literature and Conducting II (3) *Prereq.: MUS 3749 or equivalent. Continuation of MUS 3749.*

3757, 3758 Organ Literature, History, and Design (3,3) *MUS 3757 is prerequisite for 3758.* Evolution and development of the organ and its literature; development of keyboard (organ) forms, techniques, and idiomatic styles; organ mechanism and action; tonal structure; design problems.

3771 Instrumental Conducting I (2) Elements of conducting instrumental groups.

3772 Instrumental Conducting II (2) *Prereq.: MUS 3771 or equivalent. 1 hr. lecture; 2 hrs. lab. Continuation of MUS 3771.*

3997 Directed Studies in Music (1-3) *Prereq.: consent of departmental faculty concerned and dean of the School of Music. May be taken for a max. of 6 sem. hrs. of credit. MUS 3997 cannot be used in lieu of a required course in any School of Music curriculum.*

4000 Music Workshops (1-3) *Su only. May be repeated for credit when topics vary.* Topics announced in advance.

4005 Fundamentals of Musical Theatre Singing: Technique and Repertoire (1) *Prereq.: permission of instructor. May be taken for a max. of 2 hrs. of credit.* Fundamentals of musical theatre style singing and repertoire; emphasis on vocal and stage performance of literature appropriate to the singer.

4020 Introduction to the Alexander Technique (1) *2 hr. lab.* Employing the basic principles of the Alexander Technique; students will begin the process of psycho-physical re-education through experimental movement exercises and hands-on work with the instructor.

4101 Piano Accompanying (1) *Open to pianists.* Individual projects in principles and practical applications of accompanying.

4102 The Advanced Coaching and Accompanying of Art Songs (2) *Open to singers and pianists who have completed the sophomore year, or its equivalent, in their major performance areas.*

4120 Reed Making for Double Reed Majors (1) *1 hr. lab. Recommended for all oboe and bassoon majors. May be taken for a max. of 8 sem. hrs. but with a max. of 2 hrs. credit towards any degree.* Principles of double-reed making with development of individual skill and application of reed making and finishing.

4124 String Literature (2) *Prereq.: 12 sem. hrs. of applied string instrument study or consent of instructor. May be repeated once.* Independent study in solo and ensemble literature for stringed instruments.

4126 Woodwind Literature (2) *Prereq.: 12 sem. hrs. of applied wind instrument study or consent of the instructor. May be repeated once.* Independent study in solo and ensemble literature for woodwind instruments.

4128 Brass Literature and Pedagogy (2) *Prereq.: 12 sem. hrs. of applied brass instrument study or consent of instructor. May be repeated once.* Independent study in solo and ensemble literature and methods and materials for instruction in brass instruments.

4130 Percussion Literature and Pedagogy (2) *Prereq.: 12 sem. hrs. of applied percussion instrument study or consent of instructor. May be repeated once.* Independent study in solo and ensemble literature and methods and materials for instruction in percussion instruments.

4172 Stringed Instrument Pedagogy (2) *Prereq.: 12 sem. hrs. of applied string instrument study or consent of instructor.* Independent studies in methods and materials for instruction in stringed instruments.

4173 Woodwind Instrument Pedagogy (2) *Prereq.: 12 sem. hrs. of applied wind instrument study or consent of instructor.* Independent studies in methods and materials for instruction in woodwind instruments.

4241 Opera Theater (2) *Admission by audition. 4 hrs. lab plus individual coaching. May be taken for a max. of 8 hrs. of credit toward the master's degree. May not be taken concurrently with MUS 9007. Students must schedule this course both fall and spring semesters, unless permission to schedule only one semester is granted by the instructor.* Techniques of the musical theater; preparation and performance of operatic scenes and complete operas.

4351 Song Literature I (2) The art song repertoire from the classical songs of Haydn and Mozart to the Romantic period.

4352 Song Literature II (2) The art song repertoire from the French *mélodie* to contemporary English and American song.

4500 Musical Theatre Production (1-3) *Also offered as THTR 4500. Admission by audition. May be taken for a max. of 4 sem. hrs. of credit toward any degree.* Techniques of

musical theatre production, including all production aspects, preparation aspects, preparation and performance of musical scenes and complete shows.

4701, 4702 Organ Practicum (2,2) *Prereq.: consent of instructor. MUS 4701 is prerequisite for 4702.* Techniques of service playing; techniques and materials of organ pedagogy.

4703 The Scientific Bases of Music (2) Musical acoustics; nature and generation of sound; computation of intervals and scales within various systems of tuning and temperament.

4710 Advanced Aural Skills (3) *Prereq.: MUS 3731.* Concentrated work in sight singing with a special emphasis upon skills needed for professional activity in performance, conducting and composition.

4712 Advanced Form and Analysis (3) *Prereq.: MUS 3732.* Complex forms and harmonic techniques of the 19th and 20th centuries.

4718 Styles and Practices of Beethoven and the Romantics (3) *Prereq.: MUS 3732.* Tonality, harmony, and form in music of the Romantic period; analysis of selected literature and creative writing in the Romantic style.

4719 Styles and Practices of the Late Romantics and Transition to the 20th Century (3) *Prereq.: MUS 3732.* Tonality, harmony, and form from Wagner through the Impressionistic period; analysis of selected literature and creative writing in Ultra-Chromatic and Impressionistic styles.

4720 Styles and Practices in the 20th Century (3) *Prereq.: MUS 3732.* Study of principal currents of musical composition in the century; analysis of selected works and creative application of techniques, procedures, and formal schemes studied.

4721 Modal Counterpoint (3) *Prereq.: MUS 2732 or equivalent.*

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.

4724 Advanced Tonal Counterpoint (3) *Prereq.: MUS 4723 or equivalent.* Writing of contrapuntal forms in four and five parts with use of advanced contrapuntal techniques and expanded harmonic vocabulary.

4730 Elementary Orchestration (2) *Prereq.: Grade of "C" or better in MUS 2732.* Traditional scoring practices.

4731 Intermediate Orchestration (2) *Prereq.: MUS 4730.* Orchestrating for full orchestra including extraordinary instruments; avant-garde orchestral practice.

4732 Band Arranging (2) *Prereq.: MUS 3732.* Scoring for band; transcription from other media and original composition.

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, legalities, 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 musical 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.* Digital sound design, sound synthesis, and signal processing; electroacoustic music composition using computers and computer music techniques.

4749 Seminar in Music History (3) *Prereq.: MUS 2053 and 2054 or equivalent or permission of instructor. May be taken for a max. of 6 sem. hrs. credit when topics vary.*

4750 Music of the Middle Ages and the Renaissance (2) *Prereq.: MUS 1753, 1754. Required of all music majors; open to others with consent of instructor.* The history of music from ca. 800 to 1600.

4751 Music of the Baroque and Classic Eras (2) *Prereq.: MUS 1753, 1754. Required of music majors; open to others with consent of instructor.* History of music from ca. 1600 to 1815.

4752 Music of the Romantic and Modern Eras (2) *Prereq.: MUS 1753, 1754. Required of music majors; open to others with consent of instructor.* The history of music from ca. 1815 to the present.

4753 Folk and Traditional Music: Music History and Literature (2) Background and history of folk and traditional music; emphasis on Anglo-American folk songs.

4754 Folk and Traditional Music: Music History and Literature (2) *Prereq.: MUS 4753 or equivalent.* Unwritten music of folk cultures; emphasis on Afro-American styles.

4755, 4756 Hymnology and Church Music (3,3) Music in worship from the Middle Ages to the 20th century; literary and musical aspects of the hymn and of the liturgy of the divisions of the ecclesiastical year.

- 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.
- 4766 Marching Band Techniques (3)** Charting techniques for marching band; emphasis on contemporary drill design; practical projects in charting drill.
- 4767 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.
- 4769, 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.
- 4789, 4790 Musical Theatre Production (2,2)** Each course may be repeated for credit. Open to advanced musicians interested in producing musical theatre. Various aspects of the lyric theatre: creation of the musical dramatic role, staging techniques for singers, coordination of set design, lighting, makeup, costuming, budgeting, and publicity.
- 4791 Introduction to Opera (3)** Open to majors and nonmajors. History, production, and performance of opera from 1600 to the present.
- 4796 Senior Project in Music Theory (2)** A written project on an approved topic in music theory. Required of all theory emphasis students in the composition curriculum.
- 4797 Senior Recital (1-3)** May be taken for a max. of 3 sem. hrs. of credit.
- 4798 Senior Composition Recital (1)** Pass-fail grading. Concert of solo and chamber works.
- 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.
- 4800 Foundations and Principles of Music Education (3)** Historical, philosophical, and aesthetic foundations of music education; derivation of contemporary principles from the practice of music education; current trends and issues.
- 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.
- 7018 Advanced German Diction for Singers (1)** 1 hr. lecture; 1 hr. lab. The rules of pronunciation utilizing the International Phonetic Alphabet; coaching in the Lied and operatic literature including spoken dialogue.
- 7019 Advanced French Diction for Singers (1)** 1 hr. lecture; 1 hr. lab. The rules of pronunciation utilizing the International Phonetic Alphabet; coaching in the French art song and operatic literature.
- 7020 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; some outside research expected.
- 7124 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 (2)** 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 string 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.
- 7221 Solo Literature for the Voice (3)** Prereq.: MUS 4351 and 4352; or equivalent. Solo vocal literature in German and French; emphasis on styles of performance.
- 7222 Solo Literature for the Voice (3)** Prereq.: MUS 4351 and 4352; or equivalent. Solo vocal literature by English, American, Italian, Scandinavian, Eastern European, Russian, Spanish, and Latin American composers; emphasis on styles of performance.
- 7270 Historical Perspectives of Voice (3)** Development of vocal technique and pedagogical thought 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, Mancini, Garcia, Marchesi, Vennard, and other individuals of primary historical eminence.
- 7271 Principles of Voice Production (3)** Prereq.: COMD 4250 and 4153. Anatomy and physiology of the respiratory, phonatory, and articulatory systems used in the production of the human voice; theories of phonation; acoustics of the vocal tract; laryngeal biomechanics; control of fundamental frequency and loudness; study of life-span changes of the voice and care of the human voice.
- 7500 Advanced Teaching Practicum (1-2)** Prereq.: MUS 4769 and 4770; or equivalent. May be repeated for credit. A total of 3 sem. hrs. is applicable to the M.M. degree. Supervised teaching internship of instrumental and/or vocal instruction in private and/or group settings.
- 7501 Piano Pedagogy and Literature I (2)** Prereq.: MUS 4763 and 4764; or equivalent. Piano methods and literature at the elementary and intermediate levels.
- 7502 Piano Pedagogy and Literature II (2)** Prereq.: MUS 4763 and 4764; or equivalent. Piano methods and literature at the intermediate and advanced levels.
- 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.
- 7700 Survey of Analytical Techniques (3)** Prereq.: MUS 3703 and 3704 or successful passing of the Music Theory Diagnostic Examination. Required of all D.M.A. candidates. Survey of analytical tools and concepts for common practice and 20th century repertoire.
- 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 20th Century Musical Practices (3)** 6 sem. hrs. applicable to the M.M. degree; 6 additional sem. hrs. applicable to the D.M.A. degree. Compositional trends in 20th century 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 musical thought 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. Readings and practice in various approaches to the analysis of music of the tonal era (ca. 1600-1900).
- 7711 Seminar in 20th Century Musical Analysis (3)** Prereq.: MUS 3703 and 3704 or successful passing of the Music Theory Diagnostic Examination. May be taken for a max. of 6 hrs. of credit. Analytical study of specific composers, works, or styles.
- 7712 Advanced Modal Counterpoint (3)** Prereq.: MUS 3703 and 3704 or successful passing of the Music Theory Diagnostic Examination. Writing exercises and composing works in two, three, and more voices in the style of Palestrina, Lassus, Victoria, and their contemporaries; analysis of representative compositions; survey of theoretical treatises of the time.
- 7714 Advanced Tonal Counterpoint (3)** Prereq.: MUS 3703 and 3704 or successful passing of the Music Theory Diagnostic Examination. Writing exercises and composing works in three, four, and more voices in the style of J. S. Bach and his contemporaries; analysis of representative compositions; survey of contemporary theoretical treatises.
- 7721 Survey of Choral Literature I (2)** A survey of choral literature beginning with Gregorian Chant and ending with the Baroque period of music, with emphasis on preparation for performance.
- 7722 Survey of Choral Literature II (2)** A survey of choral literature beginning with the Classical period and ending with contemporary music for chorus, with emphasis on preparation for performance.
- 7723 Survey of Wind Literature I (2)** A survey of chamber wind literature (6 to 20 performers) from the late Renaissance to the present.
- 7724 Survey of Wind Literature II (2)** A survey of orchestra, large wind ensemble, and large wind band literature (more than 20 performers) from the French Revolution to the present.
- 7725 Survey of Symphonic Literature I (2)** A survey of orchestral works beginning with the Baroque period of music and ending with the early Romantic; emphasis on preparation for performance.
- 7726 Survey of Symphonic Literature II (2)** A survey of orchestral works beginning with the Romantic period and ending with 20th century music for orchestra, with emphasis on preparation for performance.
- 7741 History of Music Theory I (3)** Prereq.: MUS 3703, 3704, and 3710 or successful passing of the Music Theory and Music History Diagnostic Examinations. History of technical writings on music, ca. 500-1600; acoustics, notes, and scales, intervals, tuning systems, modes, counterpoint, mensuration, musical poetics, speculative theory.
- 7742 History of Music Theory II (3)** Prereq.: MUS 3703, 3704, and 3710 or successful passing of the Music Theory and Music History Diagnostic Examinations. Music theory from ca. 1600 to 1900; development of species counterpoint and figured bass theory; the rise of harmonic theory and rhythmic/phrase analysis; 19th-century expansions of harmonic theory and formal analysis.
- 7745 Advanced Computer Music (3)** Prereq.: MUS 4745, or consent of instructor. Advanced techniques in digital sound synthesis and composition; analysis/resynthesis techniques, granular synthesis, physical modelling, interactive computer music performance, and algorithmic composition using computers; survey of representative music from the genre.
- 7749, 7750 Special Studies in Piano Literature (2,2)** Each course may be taken for a max. of 4 hrs. of credit when piano literature varies. Total amount of credit applicable to M.M. degree limited by student's advisory committee. Works of certain composers for the keyboard, such as selected concertos.
- 7751 Ancient and Medieval Music (3)** Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination. History of music from ancient Greeks and Hebrews through the 14th century.
- 7752 Music of the Renaissance (3)** Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination. Music of the 15th and 16th centuries.
- 7753 Music in the Baroque Era (3)** Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination.
- 7754 Music in the Classical Era (3)** Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination.
- 7755 Music in the Romantic Era (3)** Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination.
- 7756 Music in the Modern Era (3)** Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination.
- 7757 American Music (3)** Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination. The most important phases in development of music in the U.S.
- 7760 Performance Practices (3)** Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination. Primary and secondary source materials dealing with the performance of music in the 17th and 18th centuries; their application to the interpretation of music.
- 7762 Measurement and Evaluation in Music (3)** Teacher-designed and standardized tests in music; learning theories.
- 7763, 7764 Comparative Methods in Music Education (3,3)** Techniques in teaching music; functional projects; approaches and texts evaluated with emphasis on curriculum construction; 7763 deals with elementary grades, 7764 with secondary.

7767 Experimental Research in Music (3) Prereq.: ELRC 4006 and MUS 7905. Primarily for doctoral students in music. Systematic investigation of musical behavior and music learning; collection, quantification, and treatment of data; current research.

7771, 7772 Advanced Choral Conducting (3,3) 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 choral music with emphasis on score analysis and performance practices.

7773, 7774 Advanced Band Conducting (3,3) 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 function.

7775, 7776 Advanced Orchestral Conducting (3,3) 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 symphonic music, with emphasis on score analysis and performance practices.

7777, 7778 Advanced Keyboard Literature I, II (3,3) Prereq.: MUS 4757, 4758; or equivalent. Each course may be taken twice; once for the M.M. and once for the D.M.A. Genres and styles from earliest examples of keyboard literature through the most recent trends.

7797 Master's Pedagogy Project (2) Pass-fail grading. Completion of a 45-minute oral presentation and short supporting paper on a pedagogical topic.

7798 Master's Recital (1-3) Prereq.: MUS 4797 or equivalent. May be taken for a max. of 3 sem. hrs. of credit.

7799 Advanced Coaching in Applied Music (2) May be repeated for credit. Max. amount of credit applicable toward a degree is 4 sem. hrs.

7800 Introduction to Research in Music (3) Required of all doctoral students; recommended for 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.

7801 Psychology of Music (3) Physical and psychological bases of musical phenomena including physical properties of sound production, transmission, reception, and perception; affective, physiological, and cognitive responses to musical stimuli; and learning theories as related to musical development, ability, and preference.

7901 Composition (1-3) Individual instruction for graduate composition. Participation in the Composer's Forum is considered part of the course work and is, therefore, required. May be repeated for credit.

7903, 7904 Seminar in Music History (2-3,2-3) Prereq.: MUS 3710 or successful passing of the Music History Diagnostic Examination. Each course may be taken 3 times for credit. Only 6 sem. hrs. applicable to the M.A. degree; only 12 additional sem. hrs. applicable to the Ph.D.; maximum for M.A. and Ph.D. combined is 18 sem. hrs.

7905, 7906 Seminar in Music Education (2-6,2-6) Each course may be taken 3 times for credit. Only 6 sem. hrs. applicable to the M.M.Ed. degree; only 12 additional sem. hrs. applicable to the Ph.D.; maximum for M.M.Ed. and Ph.D. combined is 18 sem. hrs.

7921 Seminar in Music Theory (3) Prereq.: MUS 3703 and 3704 or successful passing of the Music Theory Diagnostic Examination. Primarily for master's candidates. May be taken for a max. of 6 hrs. of degree credit.

7997 Individual Projects in Music (1-3) Prereq.: consent of departmental faculty concerned and dean of the School of Music. May be repeated for credit as follows: for master's degree, 3 sem. hrs.; for doctoral degree, 6 sem. hrs. beyond the master's or a total of 9 sem. hrs. if both master's and doctoral totals included.

7998 Special Topics in Music (2-3) May be taken for a max. of 9 hrs. of credit when topics vary. Advanced studies in individual subject areas of music.

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

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

9001 Doctoral Solo Recital (1-3) May be repeated twice (max. of 6 sem. hrs. of credit). Students specializing in organ may repeat four times (max. of 12 sem. hrs. of credit).

9002 Second Doctoral Solo Recital (1-3)

9003 Doctoral Lecture Recital (1-3) Does not fulfill final project requirement for DMA (MUS 9010).

9005 Concerto with Orchestra (1-2)

9006 Major Solo Part in an Oratorio or a Cantata (1)

9007 Doctor of Musical Arts Role in Opera (1-3) May not be taken concurrently with MUS 4241. May be repeated for credit. A max. of 4 hrs. of credit may be applied toward the D.M.A. degree.

9008 Doctor of Musical Arts Chamber Music Recital (2) May be repeated for credit.

9009 Research and Monograph (1-12) S/U grading. For D.M.A. candidates in performance only. May be repeated until monograph is completed.

9010 Lecture Recital with Written Document (1-9) May be repeated. Pass-fail grading. Research, preparation, and presentation of a lecture recital and corollary written document.

9021 Seminar in Music Theory (3) For doctoral candidates only. May be taken for a max. of 6 hrs. of degree credit.

9758, 9759 Repertoire (3,3) Each course may be taken for a max. of 9 hrs. of credit; however, amount of credit applicable to a degree is determined by student's advisory committee.

9901 Doctoral Seminar in Musical Composition (1-3) May be repeated for credit; max. amount of credit applicable to a degree is 12 sem. hrs. Participation in the Composer's Forum is part of course work.

9925 to 9937 (Series) Seminar in Literature and Style in Performance (3 each) Historical developments of the various performance areas with concentration on their literature, important pedagogical principles, and stylistic problems related to each medium. To be given as follows:

9925, 9926 Voice

9929, 9930 Organ

9931, 9932 Strings

9935, 9936 Brass

9937 Percussion

MUSIC EDUCATION • MUED

1000 Foundations of Music Education (3) Credit will not be given for both this course and EDCI 1000. 3 hrs. lecture; 1 hr. lab. Field observations in music at the elementary and secondary levels. Historical and philosophical foundations, introduction to instructional strategies, professional organizations, legal aspects, and national standards of music education.

2045 Behavioral Techniques in Music Teaching (3) Prereq.: MUED 1000. Credit will not be given for both this course and EDCI 2045. Peer teaching practica. 2 hrs. lecture; 1 hr. teaching practicum each week. Managerial aspects of instruction; application of research in music teaching and learning principles to the classroom and rehearsal setting.

3170 Principles of Teaching Elementary School Music (3) Prereq.: MUED 1000 and MUED 2045. Materials, methods, and current trends in music teaching at the elementary level; curriculum development.

3171 Principles of Teaching Secondary School Music (3) Prereq.: MUED 1000 and MUED 2045. Materials, methods, and current trends in music teaching at the secondary level; rehearsal techniques.

3630 Student Teaching in Music (12) Prereq.: see "Requirements for Student Teaching" in the School of Music section of this catalog. 1 hr. lecture; 30 hrs. lab. Pass-fail grading.

4215 Technology for Music Educators I (3) 3 hrs. lab. Fundamentals of computer applications for educational uses in music; historical and social contexts of computer development; fundamentals in computer systems; configuring hardware; survey of commercial music software; and use of software applications.

4216 Technology for Music Educators II (3) Prereq.: MUED 4215 or equivalent. 3 hrs. lab. Application of hardware and software unique to music applications: notation, sequencing, technological applications of digital audio, video and acoustical sound specifically applied to the music education environment.

7217 Technology for Music Educators III (3) Prereq.: MUED 4215, 4216 or equivalent. Production of technological products for music education; theoretical foundations and research; implementation and evaluation of products in an educational setting.

NUCLEAR SCIENCE • NS

General education courses are marked with stars (★).

3411 Fundamentals of Nuclear Radiation Science (3) F,S Prereq.: one sem. of MATH 1021 or equivalent and one sem. of chemistry or physics; 2 hrs. lecture; 3 hrs. lab. Nuclear structure, transmutations, decay, interactions of radiation with matter; radiation detection and measurement.

4141 Radioecology (3) F Prereq.: NS 4101 or equivalent. 2 hrs. lecture; 3 hrs. lab. Also offered as ENV 4141. Radio tracers, stable tracers, and radiation effects in both natural and laboratory-contained communities of organisms.

4352 Environmental Radiological Evaluation and Remediation (2) S Prereq.: NS 3411 or permission of instructor. Methods of surveying and sampling to determine radiological concentrations; federal and state regulations governing remediation criteria; models and computer codes used to estimate dose; remediation planning and implementation.

4353 Environmental Radiological Evaluation and Remediation Laboratory (1) S Prereq.: credit for or concurrent enrollment in NS 4352. Laboratory supplement to NS 4352. Sampling and analytical techniques used to measure radionuclides in the environment.

4527 Nuclear Reactor Theory and Design (3) F,S Prereq.: two semesters of physics and an introductory course in computer programming. Characteristics of radioactive materials, neutron interactions, the fission process; static criticality, time-dependent behavior of cores, and design of nuclear power reactors.

4566 Nuclear Reactor Systems (3) F Prereq.: NS 4527 or equivalent. Engineering aspects of reactor systems; nuclear fuel cycles, isotope separation, mechanical and thermal design, selection of materials, and environmental impact of nuclear facilities.

4570 Nuclear Facility Safety (3) S Prereq.: PHYS 2102 or equivalent. Safety analysis of facilities that utilize radiation sources including hospitals and industrial sites; accident sequences; dispersal of radionuclides; estimation of dose and dose commitments; and engineered safeguards.

7115 N-15 Stable Tracer Methodology for Biological Sciences (2) S-E Prereq.: consent of instructor. 1 hr. lecture; 3 hrs. lab. Quantitative N-15 tracer applications and methodology in biological nitrogen systems, combining N-15 procedures with mass spectrometer techniques.

7520 Nuclear Reactor Materials (3) V Principles governing structure and properties of materials used in nuclear reactors; radiation effects, problems in selection, fabrication, and use of these materials.

7525 Nuclear Engineering Laboratory (2) S Prereq.: credit or registration in NS 7527. 6 hrs. lab. Operation of nuclear counting and spectroscopy systems; measurements of neutron behavior in multiplying and nonmultiplying media; development of design parameters from empirical data.

7527, 7528 Reactor Engineering (3,3) F,S Prereq.: consent of department. NS 7527 is prerequisite for 7528. Basic concepts of reactor physics; slowing-down theory, homogeneous and heterogeneous reactors; diffusion and transport theories for neutron flux calculations; criticality calculations; one-group, two-group, and multigroup methods; core burn up analysis.

7529 Nuclear Reactor Dynamics (3) S Prereq.: NS 7527 and credit for or registration in NS 7528. Transient reactor analysis; analytical and numerical point kinetics calculations; perturbation theory expressions for reactivity; feedback effects; reactor transfer functions and stability; coupled neutronics and thermal hydraulic transients; space-time kinetics.

7555 Nuclear Reactor Analysis (3) S Prereq.: MATH 4038 or 4340 and NS 7527; or equivalent. Numerical methods and solutions to multigroup neutron diffusion and transport equations; lattice physics methods; nodal techniques; applications to fuel management and light water reactor core physics analysis; calculation of temperature coefficients; advanced reactor systems.

7566, 7567 Advanced Nuclear Reactor Systems (3,3) F,S Prereq.: NS 4527 or equivalent. Engineering aspects of fission reactor systems, including fuel behavior, energy removal, materials selection, and core interface with the balance of the plant.

7575 Two-Phase Flow and Heat Transfer (3) Prereq.: ME 4433 or equivalent. Modeling and analysis of liquid-vapor flow systems and applications in nuclear reactor design and safety; nucleation phenomena; boiling heat transfer, burnout, condensation; flow instabilities, critical flow, loss of coolant accidents.

OCEANOGRAPHY AND COASTAL SCIENCES • OCS

General education courses are marked with stars (★).

★ **1005 Introduction to Oceanography (3)** *An honors course, OCS 1006, is also available.* The world's oceans, their origin and evolution; interactions between physical, geological, chemical, and biological 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 physical, geological, chemical, and biological processes of the ocean; effect of human activities.

2008 Introduction to Marine Sciences: Life Processes (4) *S 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 requirements for students in natural sciences curriculum.* Geological and physical processes in marine and aquatic environments; their influence on coastal Louisiana.

2095 Introduction to Marine Sciences (4) *Su only Prereq.: introductory science course. Four weeks at Louisiana Universities Marine Consortium coastal laboratories.* Physical, chemical, geological, and biological processes in the oceans and coastal environments and their interactions; interrelationships of man and the marine environment.

4001 Special Topics in Oceanography and Coastal Sciences (1-6) *V May be taken for a max. of 9 sem. hrs. of credit when topics vary.*

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 topics vary. Variable number of weeks at Louisiana Universities Marine Consortium (LUMCON) or Gulf Coast Research Laboratory (GCRL).*

4010 Marine Science for Teachers (4) *Su only Four-week short course offered at various locations by Louisiana Universities Marine Consortium. Credit not applicable to a degree in marine sciences.* Survey of the marine sciences; secondary and elementary school levels.

4012 Biology of Marine Vertebrates (3) *Prereq.: 8 sem. hrs. of introductory zoology or biology with laboratory.* Evolution, life history, ecology, and management of marine fishes, reptiles, birds, and mammals.

4021 Weather Analysis and Satellite Meteorology (3) *F* Diagnostic studies of surface and upper-air observational data using isoplething charts and satellite images to represent the state of the atmosphere over both land and sea; the use of satellite technology in weather forecasting including cloud identification, wind direction, storm development, and air quality.

4024 Coastal Morphodynamics (3) *Prereq.: MATH 1021, 1022, or 1023. Also offered as GEOG 4024.* Basic morphodynamic processes operative along coasts; emphasis on modern coastal process response systems.

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 1201, MATH 1550, and PHYS 2001.* Application of fluid-earth physical principles to characterize pollutant dispersion and transport processes in atmospheric, oceanic, and terrestrial environments, particularly across the coastal zone.

4041 Salt Marsh Ecology (4) *Su only Prereq.: general plant 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.: one year of biological science. 2 hrs. lecture; 2 hrs. lab. See BIOL 4052.*

4090 Marine Microbiology (3) *F-O Prereq.: BIOL 2051 or equivalent. Also offered as BIOL 4090.* Characterization and ecology of estuarine and open-ocean microorganisms; role of marine bacteria in organic and inorganic cycling processes and food web dynamics; microbial contribution to geomicrobiology, antibiotic, and productivity in the sea; indicator species; microbial activities in corrosion, fouling, and seafood-related spoilage and contamination.

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 Consortium coastal laboratory.* 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.

4164 Deltaic 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.

4165 Environmental Chemistry of Wetlands (3) *F,E Prereq.: CHEM 2060 or equivalent.* Transformations of pollutants and toxic substances that affect the solubility, bioavailability, fixation, and degradation of organic and inorganic substances in wetlands; emphasis on biological and physiochemical properties of wetlands that enhance this degradation and fixation.

4166 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 jurisdictional wetlands covering 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) *S Prereq.: CE 2200 and graduate standing or consent of instructor.* Physics of the ocean; with emphasis on dynamical problems; physical properties of sea water, marine instrumentation, flow dynamics in the earth's rotating coordinate system, water waves, general circulation.

4210 Geological Oceanography (3) *F Prereq.: two-semester introductory course in geology.* Principles of marine geology; sediments and sedimentation in the marine environment from the near shore zone to the abyssal plain; geological effects of bottom currents; sea-level history; geophysical techniques; continental drift and sea-floor spreading; tectonic history of the oceanic crust.

4308 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 4308.* 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 Estuarine 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 to coastal areas.* Ecological processes in estuaries, shallow coastal waters, and associated coastal environments; training and field use of equipment required for estuarine research.

4410 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 matter and energy flow models for quantifying and analyzing interdependence and dynamics in ecosystems; linear flow models, dynamic nonlinear models, 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 LAW 5803. Nonlaw students encouraged to participate. 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, such as legislation, regulations, contract provisions, 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 wetland loss, restoration, and management; wetland values, use, and potential management issues.

4666 Coastal Field Geology (4) *Su only See GEOL 4666.*

7001 Advanced Topics in Marine Sciences (1-6) *V May be taken for a max. of 9 sem. hrs. when topics vary.*

7010 The Concepts of the Ecosystem (3) *S-O Prereq.: one-semester course in ecology or consent of instructor.* Structure, function, diversity, and succession of ecosystems viewed as a whole and as applied to major biomes.

7020 Marine Microbial Ecology (3) *S-O Prereq.: one-semester course in microbiology and consent of instructor. Also offered as BIOL 7022.* Microbial ecosystems and population dynamics; response of marine microorganisms to physicochemical factors and environmental alterations; microbial interactions; nutrient regeneration processes; nutritional requirements and microenvironments; modeling and systems analysis in marine microbial ecology.

7028 Numerical Modeling of Ocean Circulation (3) *V Prereq.: OCS 4170 and ME 4563 or equivalent.* Numerical modeling of ocean dynamics; numerical methods; parameterization schemes; review of state-of-art models.

7112 Concepts in Marine Ecotoxicology (3) *Prereq.: ENVS 7100 and 7110. See ENVS 7112.*

7120 Dynamical Oceanography (3) *Prereq.: consent of instructor.* Dynamics of rotating, stratified, incompressible fluids with particular application to the oceans; conservation equations and boundary conditions, surface and internal gravity waves, vorticity, geostrophic adjustment, coastal trapped waves, Rossby waves, wind-driven ocean circulation.

7121 Ecology and Management of Tropical Estuaries (3) *Su Prereq.: 6 hrs. in marine ecology and consent of instructor. Two-week field trip/lecture at the Centro de Investigaciones y Estudios Avanzados in Merida, Mexico. 20 hrs. per week.* Intensive field course concerning aspects of ecology and management of tropical estuaries; plankton systems, sea grasses, mangroves, benthos, nekton, and macroalgae; emphasis on human impact and management, global change issues, and use of modeling.

7122 Gravity Waves in Shallow Water (3) *V Prereq.: MATH 1550, 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 (3,3) *F,S Prereq.: MATH 1550 and EXST 2055 or equivalent.* 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 their transportation.* Concepts of applied 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, seiches, storm surges, internal waves, salt balance, and inlet flows.

7126 Circulation and Mixing in Coastal Waters (3) *V Prereq.: OCS 4170.* Mechanics of circulation in coastal currents; buoyancy driving, wind driving, coastal jets, long shore pressure gradients; physical conditions controlling hypoxia; classification of coastal currents; mixing and dispersion of pollutants and oil slicks for environmental management.

7127 Dynamics and Sedimentary Response Features of Coastal Environments (3) *Su-O Interactions between 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 ecosystem; feedback of biogeochemical changes in wetlands caused by climate change.

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 spectroscopy and chromatography analytical instrumentation for the determination on 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 Same as AGRO 7165. Microbial and redox chemistry processes in fresh water, brackish water, and 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; radiation-ocean-atmosphere interactions, satellite systems, sensor design, and data types; analysis of infrared, visible, and microwave data for deep ocean, coastal, and estuarine phenomena.

7311 Marine and Estuarine Plankton (3) S-E Prereq.: background in ecology, invertebrate zoology, limnology, or phyecology; and consent of instructor. Structure and function of marine plankton populations; changes related to various environmental factors such as temperature, nutrients, radiation, transparency, currents, and water-masses; phytoplankton, zooplankton and ichthyoplankton food webs, trophic dynamics and case studies; life history, and biodemographic features; sampling theory, collecting techniques, distribution, abundances, production, analytical models, and economic significance.

7317 Marine Ecology (3) V See BIOL 7120.

7320 Fisheries Oceanography (3) Also offered as RNR 7320. Relationships between marine fish abundance and distribution and nonanthropogenic physical and biological processes; spatial and temporal scales; analytical methods and sampling strategies; marine fish life histories as related to oceanographic processes; marine ecosystem.

7370 Seminar: Theoretical Concepts of Ecology (1) S Prereq.: one-semester course in ecology or consent of instructor. May be repeated for credit. Announced topics.

7976 Seminar in Physical Oceanography and Meteorology (3) May be taken for a max. of 9 hrs. of credit when topics vary. Air-sea interaction, synoptic meteorology, tropical meteorology, geophysical fluid dynamics, ocean-atmosphere interaction related to climate change.

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

8900 Advanced Reading and Literature Research (1-6) May be taken for a max. of 6 sem. hrs. of credit.

8901 Advanced Field Research (1-6) May be taken for a max. of 6 sem. hrs. of credit.

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

PATHOBIOLOGICAL SCIENCES • PBS

7001 Seminar: Veterinary Medical Sciences (1) S,F May be taken for a max. of 8 hrs. of credit. Topics of current interest in various disciplines of veterinary medicine.

7002 Veterinary Medical Research Techniques (1-4) V May be taken for a max. of 6 sem. hrs. of credit. Specialized research techniques related to a specific discipline of veterinary medicine.

7003 Special Topics in Veterinary Medicine (1-4) V Prereq.: consent of instructor. May be taken for a max. of 8 hrs. of credit. Topics of current interest in veterinary medicine.

7301, 7302 Principles and Methods of Epidemiology and Disease Control I, II (4,4) 7301 offered F; 7302 offered S Prereq.: consent of instructor. 3 hrs. lecture; 3 hrs. lab. Ecological and epidemiological concepts used in studying diseases in populations; epidemiological methods, with laboratory exercises emphasizing problem solving; epidemiological principles applied to disease control; planning, administration, and evaluation of disease-control programs.

7303 Applied Veterinary Preventive Medicine (2-5) V Prereq.: PBS 7301, 7302, and consent of instructor. Principles of epidemiology and disease control applied to planning, administration, and evaluation of veterinary preventive medicine practice.

7304 Clinical Epidemiology in Companion Animal Practice (2-5) V Prereq.: consent of instructor. Epidemiological principles and disease control methods applied to companion animal practice; problem-oriented case studies on relation of patient and client to community.

7306 Veterinary Medicine and Community Health (2-5) V Prereq.: consent of instructor. Legal basis for veterinary preventive medical practice; economic, aesthetic, cultural, and human health factors associated with maintenance of animals; use of community resources to improve animal health.

7307 Project Management (2) V Prereq.: EXST 7005 or equivalent. 1 hr. lecture; 2 hrs. lab. Definition of aims and objectives in field research and investigations, financial and personnel management, communication of intentions and results, internal project control, liaison with other agencies, community acceptance, operational research, and organizational methodologies.

7308 Veterinary Economics (2) V Prereq.: AGECE 4015 or 4088 or equivalent. 2 hrs. lecture; 1 hr. lab. Economic analysis of farm and national livestock disease problems, analysis of existing and past programs, and forecasting of projected animal health schemes.

7309 Control and Prevention of Poultry Diseases in Tropical Countries (3-5) V Prereq.: consent of instructor. Environmental control, applied nutrition, and management in the occurrence of disease in commercial poultry under tropical conditions; review of significant conditions with specific reference to the epidemiology, diagnosis, and prevention of poultry diseases.

7310 Zoonotic Infectious and Parasitic Diseases (3) V Prereq.: BIOL 4122 and BIOL 4105 or equivalent. Epidemiology, ecology, and control of major infectious and parasitic zoonoses.

7312 Epidemiological Study Design (2) S-E Prereq.: PBS 7301. Principles of design, planning, and analysis of case-control and cohort epidemiological studies; design selection; sources of bias and pitfalls associated with each study design.

7404 Pathogenic Mechanisms of Bacteria (3) F-O Prereq.: BIOL 4094, 4121, and 4122 or equivalent. Relation of bacterial structure and function to the induction of disease; virulence factors, mechanisms of host-parasite interaction; vaccine strategies.

7405 Bacterial Pathogenesis Laboratory (1-3) F-O Prereq.: credit or concurrent registration in PBS 7404 or equivalent. 2-6 hrs. lab. May be taken for a max. of 6 hrs. credit. Laboratory techniques for selected topics in bacterial pathogenesis.

7410 Biochemistry of Viruses (3) S-E Prereq.: BIOL 4094 or equivalent. See BIOL 7289.

7411 Molecular Mechanisms of Viral Pathogenesis (3) F-E Prereq.: BIOL 4190 or VMED 5230 or equivalent. Virus-host interactions in disease induction emphasizing virus receptors and cell tropism, persistence and latency, oncogenesis, virus-induced immune suppression, and adverse responses of the host.

7413 Cellular and Molecular Immunology Laboratory (1-3) S-O Prereq.: credit or registration in PBS 7423 or equivalent. 2-6 hrs. lab. Laboratory techniques in modern immunology; isolation, identification, and functional testing of proteins and cells of the immune system.

7415 Current Experimental Methods in Parasitology (1-4) F-E Prereq.: a course in parasitology or equivalent. 2-8 hrs. lab. May be taken for a max. of 4 sem. hrs. when animal groups vary. Specialized laboratory methods used to produce experimental infections, diagnose parasitism and recover and identify protozoan and helminth parasites of ruminants, horses, pigs, and companion animals.

7417 Immune Response to Infectious and Parasitic Agents (3) S-E Prereq.: introductory course in immunology. Immune mechanisms in controlling or exacerbating disease caused by bacteria, viruses, protozoa, helminths, and arthropods; modern principles of vaccine development and trends in application.

7419 Population Dynamics and Ecology of Parasitic and Vector-Borne Diseases (3) S-E Prereq.: course in parasitology or equivalent. Population regulation and distribution of parasitic and vector-borne diseases of veterinary and medical significance; disease risk in populations and control strategies based on population models, transmission dynamics, climate, nutrition, immunity, geographic information systems, and herd health programs.

7423 Cellular and Molecular Immunology (3) S-O Prereq.: introductory course in immunology. Cellular and molecular basis for the immune response; emphasis on molecular structure and function of antibodies and other receptors; role of lymphocyte subsets and cytokines in regulation of immune responses.

7424 Diseases of Aquatic Animals (3) F-E Prereq.: consent of instructor. Basic microbiology and/or parasitology strongly recommended. 2 hrs. lecture; 2 hrs. lab. Same as RNR 7424.

7432 Cell and Organ Culture Techniques in Bioresearch (3) F Prereq.: BIOL 2051 and 4093 or equivalent. 1 hr. lecture; 4 hrs. lab. Application of cell and organ culture techniques to current research problems.

7501 Cellular Pathology (3) F Basic mechanisms of disease; pathogenesis and etiology of lesions and how they are expressed microscopically, histochemically, biochemically, and electron microscopically.

7502 Systemic Veterinary Pathology (5) S Prereq.: D.V.M. degree or equivalent; 2 hrs. lecture; 6 hrs. lab. Study of diseases by organ systems, using electron and light microscopy; pathogenesis of specific diseases.

7508 Histopathology Slide Conference (1) F,S Prereq.: D.V.M. degree or equivalent. May be taken for a max. of 4 hrs. of credit when topics vary. Histopathological aspects of diseases in various animal species; direct student participation in morphological description and literature review.

7509 Surgical Pathology (1-3) V Prereq.: D.V.M. degree or equivalent. May be taken for a max. of 8 sem. hrs. credit when topics vary. Gross and microscopic examination of surgery-derived specimens of diseased tissues from domestic and exotic animals; clinical case interpretation, histopathological description, diagnosis, prognosis, and consultation techniques.

7511 Veterinary Immunopathology (2) V Prereq.: D.V.M. degree or equivalent. Comparative microscopic and macroscopic study of lymphoid tissues and the relationship of structural changes to function in mammals and other species; alterations related to development and disease agents.

7512 Veterinary Gastrointestinal Pathology (2) Prereq.: D.V.M. degree or equivalent. Comparative macroscopic and microscopic study of responses of the mammalian gastrointestinal system to disease-producing agents; specific and unique aspects of the pathogenesis of gastrointestinal diseases.

7513 Pathology of Neoplasia (2) V Prereq.: DVM degree or equivalent and consent of department. 1 hr. lecture; 1 hr. lab. Comparative gross, microscopic, and pathogenetic study of naturally occurring neoplastic disease in the commonly seen animal species.

7514 Laboratory Animal Pathology (2) Prereq.: D.V.M. degree or equivalent. Macroscopic, microscopic, and pathogenetic study of the infectious, nutritional, degenerate, and toxic diseases that affect the commonly used species of laboratory rodents, rabbits, and primates.

7515 Veterinary Dermatopathology (2) V Prereq.: D.V.M. degree or equivalent 1 hr. lecture; 2 hrs. lab. Histopathological evaluation of integumentary system tissue response and diseases of various animal species of veterinary importance.

7516 Pathology of Food Animals (1-4) Prereq.: D.V.M. degree or equivalent. May be taken for a max. of 8 sem. hrs. of credit when topics vary. Necropsy of food animals submitted for postmortem examination; gross, light, and electron microscopy; biochemical and hematological evaluations necessary for an accurate determination of disease pathogenesis; comparative aspects of ultrastructural, microscopic, and gross lesions.

7517 Pathology of Companion Animals (1-4) Prereq.: D.V.M. degree or equivalent. May be taken for a max. of 8 sem. hrs. of credit when topics vary. Necropsy of companion animals submitted for postmortem examination; gross, light, and electron microscopy; biochemical and hematological evaluations necessary for an accurate determination of disease pathogenesis.

7518 Pathology of Equids (1-4) Prereq.: D.V.M. degree or equivalent. May be taken for a max. of 8 sem. hrs. of credit when topics vary. Necropsy of equids submitted for postmortem examination; gross, light, and electron microscopy; biochemical and hematological evaluations necessary for an accurate determination of disease pathogenesis.

7519 Pathology of Laboratory and Exotic Species (1-4) Prereq.: D.V.M. degree or equivalent. May be taken for a max. of 8 sem. hrs. of credit when topics vary. Necropsy of laboratory and exotic species submitted for postmortem examination; gross, light, and electron microscopy; biochemical and hematological evaluations necessary for an accurate determination of disease pathogenesis.

7520 Pathology of Aquatic Species (1-4) Prereq.: D.V.M. degree or VMED 5211 or equivalent and PBS 7424. Basic histology is strongly recommended. May be taken for a max. of 8 sem. hrs. of credit when topics vary. Necropsy of aquatic animals submitted for postmortem examination; gross, light, and electron microscopy; biochemical and hematological evaluations necessary for an accurate determination of disease pathogenesis.

7521 Pathology of Avian Species (1-4) Prereq.: D.V.M. degree or equivalent. May be taken for a max. of 8 sem. hrs. of credit when topics vary. Necropsy of avian species submitted for postmortem examination; gross, light, and electron microscopy; biochemical and hematological evaluations necessary for an accurate determination of disease pathogenesis.

7525 Veterinary Clinical Hematology (2-4) V Prereq.: *D.V.M. degree or equivalent. May be taken for a max. of 12 sem. hrs. of credit when topics vary.* Diagnosis and pathogenesis of hematological changes in mammals and birds, utilizing complete blood count data and microscopic examination of blood and marrow smears from current cases; review of hematological instrumentation and methodologies; their application to veterinary medicine.

7526 Veterinary Clinical Chemistry (2-4) V Prereq.: *D.V.M. degree or equivalent. May be taken for a max. of 12 sem. hrs. of credit when topics vary.* Topics in clinical biochemistry related to disease diagnosis and pathophysiology; laboratory methods related to quality control and comparative methodology; clinical case material as the basis for laboratory discussion.

7527 Veterinary Clinical Cytology (2-4) V Prereq.: *D.V.M. degree or equivalent. May be taken for a max. of 12 sem. hrs. of credit when topics vary.* Interpretation of cytological specimens and correlation with clinical and histopathological findings of cutaneous, subcutaneous, visceral, and body cavity abnormalities in domestic animals.

7528 Toxicology III (3) See CBS 7625.

7530, 7531, 7532 Laboratory Animal Science I, II, III (2, 2, 2) F,S,Su Prereq.: *D.V.M. degree or equivalent and consent of department.* Biology, husbandry, diseases, medical care, regulations, and experimental uses of the commonly used laboratory animal species. Courses need not be taken in sequence.

PETROLEUM ENGINEERING

• PETE

1010 Introduction to Petroleum Engineering (3) F Scientific bases of petroleum geology and chemistry, exploration, drilling, production, reservoir engineering, and refining.

1060 Use of Microcomputers in Petroleum Engineering (2) S Prereq.: *PETE 1010, credit or registration in MATH 1550, and consent of department. 6 hrs. lab.* Computer network, operating systems, high-level programming languages, word processing, electronic spread sheets; and two-dimensional drawing; applications to elementary petroleum engineering problems.

2031 Reservoir Rock Properties (3) F Prereq.: *PETE 1060, MATH 1552 and credit or registration in PHYS 2101.* Physical properties of reservoir rock related to the production of oil and gas.

2032 Reservoir Fluid Properties (3) S Prereq.: *PETE 2031 and credit or registration in PHYS 2102.* Physical and chemical properties of petroleum reservoir fluids related to production of oil and gas.

2034 Rock and Fluid Properties Laboratory (1) S Prereq.: *credit or registration in PETE 2032. 3 hrs. lab.*

3002 Communicating Petroleum Engineering Technology (3) F Prereq.: *ENGL 1002, junior standing in the College of Engineering, and permission of department.* Communication skills including technical writing, public speaking, group management, and computer usage applied to petroleum engineering topics.

3025 Economic Aspects of Petroleum Production (3) F Prereq.: *PETE 2032 and ECON 2030.* Mineral ownership and leasing in Louisiana; production decline curve analysis; profitability analysis; risk analysis; evaluation of petroleum properties.

3036 Well Logging (3) F Prereq.: *EE 2950, PETE 2034, and PHYS 2102.* Qualitative and quantitative formation evaluation by means of electric, acoustic, and radioactive well logs.

3037 Petroleum Field Operations (1) S Prereq.: *credit or registration in PETE 3036; 3 hrs. lab.* Field operations required for well logging; cement design and testing; subsurface pressure measurements; well surveys; and cleaning of drilling fluids.

3053 Petroleum Engineering Aspects of Subsurface Geology (3) S Prereq.: *IE 1001, GEOL 1003 and 1601, and PETE 3025 and 3036; or senior status in geology.* Engineering aspects of petroleum geology; interpretation of subsurface data; reservoir mapping; determination of reservoir volume.

3990 Independent Research (1-2) F,S,Su *May be taken for a max. of 3 sem. hrs. of credit. Number of hours, outline of proposed work, and name of faculty supervisor must be stated at time of registration.* Individual research or engineering studies with faculty supervision.

4045 Drilling Engineering (3) F Prereq.: *CHEM 1212, CE 2200 and 3400, CE 2460 or ME 3133, ME 3333, PETE 3053, and credit or registration in ENGL 3002 or PETE 3002.* Drilling process, including equipment and performance; well pressure control and buoyancy; rheology, circulation pressure, and optimum hydraulics of drilling fluids; oil well casing design and cementing techniques.

4046 Well Design-Production (3) S Prereq.: *PETE 4045 and senior standing in College of Engineering.* Analysis and design of well production systems; rod pumping, gas lift, hydraulic fracturing, surface separation, and treating equipment.

4051 Reserve Estimation and Reservoir Management (3) F Prereq.: *PETE 3053, and credit or registration in PETE 4045 and PETE 3002 or ENGL 3002.* Quantitative study and behavior prediction of volumetric and water-drive reservoir systems by material balance.

4052 Testing of Oil and Gas Wells (3) S Prereq.: *PETE 4051 and senior standing in College of Engineering.* Applications of unsteady-state fluid flow in porous media; pressure draw-down and build-up tests; conventional and type-curve well test analysis.

4056 Numerical Simulation of Improved Recovery Processes (3) S Prereq.: *MATH 2057 and 2065, and credit or registration in PETE 4052.* Use of computer simulation to predict oil and gas reservoir performance and to design enhanced recovery processes.

4057 Petroleum Production Laboratory (1) F Prereq.: *credit or registration in PETE 4045. 3 hrs. lab.* Instruments, equipment, and systems used in oil and gas production; pollution prevention and safety systems in off-shore production operations.

4058 Reservoir Mechanics Laboratory (1) S Prereq.: *credit or registration in PETE 4052. 3 hrs. lab. Accompanies PETE 4052.*

4059 Drilling Fluids Laboratory (1) F Prereq.: *credit or registration in PETE 4045. 3 hrs. lab. Accompanies PETE 4045.*

4060 Prevention of Oil and Gas Well Blowouts (1) S Prereq.: *credit or registration in PETE 4045. 3 hrs. lab.* Causes and detection of well kicks and the proper handling of these kicks to prevent uncontrolled flow (blowout) from the well; methods and techniques currently used in the oil and gas industry.

4083 Secondary Recovery of Petroleum (3) V Prereq.: *PETE 4051 and 4052.* Reservoir mechanics and application of immiscible fluids displacement methods to secondary recovery of oil.

4085 Surface Handling of Produced Fluids (3) V Prereq.: *PETE 2032 and 2034.* Operating principles and design criteria for equipment used in field processing of oil and gas, e.g., lean oil gasoline plants, gas dehydration units, gas sweetening units, cryogenic gasoline plants, separators, gas transmission and compression facilities.

4086 Well Design-Drilling (3) V Prereq.: *PETE 4045.* Design of drilling operations; bit selection and evaluation; mathematical modeling of bit wear and penetration rate; determination of formation pore pressure and fracture pressure; selection of well casing and casing setting depths; directional drilling; special design considerations for horizontal wells.

4087 Environmental Control in Petroleum Engineering (3) V Prereq.: *PETE 4045, 4051, and 4059.* Environmental impact and pollution mechanisms in petroleum engineering technologies; basic concepts regarding oilfield waste generation, toxicity, and environmental regulatory process; synergy between process productivity and environmental performance.

4088 Formation Evaluation (3) V Prereq.: *PETE 3036.* Use of different formation evaluation techniques to provide a comprehensive description of reservoir content producibility; drilling fluid and cutting analysis; core analysis; formation tester; drillstem test; analysis of openhole logs by overlay, crossplot, and digital evaluation methods.

4089 Natural Gas Engineering (3) V Prereq.: *PETE 4051.* Application of reservoir engineering principles and practices to gas and gas-condensate reservoirs; prediction of gas well performance; management of all types of gas reservoirs; underground gas storage.

4241 Special Topics in Petroleum Engineering Design (3) Prereq.: *senior or graduate standing and permission of instructor. May be taken for a max. of 6 hrs. credit when topics vary.* One or more phases of current petroleum engineering design.

4253 Unitization and Appraisal of Petroleum Properties (3) V Prereq.: *PETE 3025, 3053, and 4051.* Technical aspects of unitization and evaluation of petroleum properties subject to joint management.

4999 Senior Project (1) S Prereq.: *PETE 4045 and 4051. Written and oral presentation required.* Theoretical and/or experimental investigation, including a literature review, of an approved topic in petroleum engineering.

7201 Fluid Flow in Porous Media (3) V Prereq.: *PETE 4052 and 4056, or equivalent.* General hydrodynamic equations for flow of fluids through porous media; two-dimensional flow problems and potential theory methods;

gravity flow systems; two-fluid systems; systems of non-uniform permeability; multiple well systems using computerized streamline tracking methods.

7202 Advanced Well Testing Theory and Analysis (3) V Prereq.: *PETE 4051 and 4052 or equivalent.* Unsteady-state flow of reservoir fluids in porous media; application of theory to pressure buildup analysis, well interference testing, pulse testing, pressure draw down analysis, drill stem testing, and water influx prediction.

7211 Production System Analysis (3) V Prereq.: *CE 2200, ME 3333 and PETE 4046 or equivalent.* Use of multiphase flow correlations to determine flow rates and pressure traverses in flowing oil wells, gas-condensate wells, gathering systems, and pipe lines; applications of correlations to the design of gas lift systems.

7212 Well Completion Design (3) V Prereq.: *PETE 4046 or consent of instructor.* Systems analysis for optimum production by designing best combination of tubing, flow lines, choke sizes, perforation density, and separator pressure; inflow performance of reservoirs; well completion techniques; gravel packing; tubing effects.

7221 Drilling Data Acquisition and Processing (3) V Prereq.: *PETE 4059, 4060, and 4086 or equivalent.* Mud and surface drilling data acquisition and processing; downhole data acquisition with drilling stopped and while drilling, data processing; formation evaluation and data analysis.

7222 Downhole Production Fluid Dynamics (3) V Prereq.: *PETE 4057 and 4085.* Wireline sidewall core and fluid recovery; data analysis and completion techniques; thermodynamic properties of fluids; downhole production data acquisition and interpretation; cased hole formation evaluation.

7231 Nonthermal Methods of Enhanced Oil Recovery (3) V Theory and field practice related to miscible displacement processes and chemical and polymer flooding techniques.

7232 Thermal Methods of Oil Recovery (3) V Theory of heat transfer and heat generation applied to the performance prediction of oil recovery by such field processes as forward and reverse *in situ* combustion, continuous and cyclic hot fluid injection, and production well heating.

7241, 7242 Selected Topics in Advanced Petroleum Engineering (3,3) V *May be repeated for credit when topic varies; a total of 12 sem. hrs. of credit may be earned in these two courses.*

7256 Special Problems in Petroleum Engineering (1-6) F,S,Su *May be taken for a max. of 6 sem. hrs. of credit.* Individual study and research.

7280 Mathematical Simulation of Petroleum Reservoir Performance (3) V Prereq.: *PETE 4056 or equivalent; and PETE 4051 and 4052.* Development and application of mathematical models for predicting petroleum reservoir performance, including multiphase fluid flow in three dimensions.

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

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

PHILOSOPHY • PHIL

General education courses are marked with stars (★).

★ **1000 Introduction to Philosophy (3)** Major works on such themes as appearance and reality, human nature, nature of knowledge, relation of mind and body, right and good, existence of God, and freedom and determinism.

★ **1001 Honors: Introduction to Philosophy (3) Prereq.:** *ENGL 1002 or equivalent. Same as PHIL 1000, with a special honors emphasis for qualified students. Credit will not be given for both this course and PHIL 1000.*

★ **1021 Introduction to Philosophy: Elementary Logic (3)** *No special background presupposed.* Formal and informal reasoning; traditional syllogistic logic; introduction to propositional logic; scientific method in natural and social sciences.

2000 Contemporary Moral Problems (3) Philosophical study of contemporary moral problems such as capital punishment, preferential treatment, sexual equality, sexual liberation, terrorism, war and nuclear arms, animal rights, world hunger, environmental ethics, and the morality of suicide.

★ **2010 Introduction to Symbolic Logic (3)** Propositional and elementary predicate logics; formal methods of proof; interpretation, and translation to and from natural language; philosophical assumptions underlying logic; relevance of formal logic to philosophical questions.

2018 Professional Ethics (3) Special problems of obligation and valuation related to law, medicine, politics, and education, as well as business, engineering, and architecture;

altruism, trust, vocation, codes of honor, professional privilege, and responsibilities for others arising from differential abilities.

★ **2020 Ethics (3)** Classical and recent theories of obligation and value, including works of philosophers such as Plato, Aristotle, Kant, Hume, and Nietzsche; topics including freedom, rights, justification of moral judgments.

★ **2023 Philosophy of Art (3)** Philosophical theories of beauty, art, and art criticism.

★ **2024 Philosophy in Literature (3)** Philosophical themes in world literature: fiction, poetry, drama, and autobiography.

2025 Bioethics (3) Defining health and disease; deciding on rights, duties, and obligations in the patient-physician relationship; abortion and the concept of a person; defining and determining death; euthanasia and the dignity of death; allocation of medical resources, both large-scale and small-scale; experimentation with fetuses, children, prisoners, and animals; genetic testing, screening, and interference.

★ **2028 Philosophy of Religion (3)** Same as REL 2028. Essence and meaning of religion as a pervasive phenomenon in human societies; faith and reason, nature of divinity, arguments for and against God's existence, religious knowledge and experience, morality and cult, the problem of evil.

★ **2033 History of Ancient and Medieval Philosophy (3)** An honors course. PHIL 2034, is also available. Introduction to philosophy through a study of some of the main writings of classical and medieval philosophy.

2034 HONORS: Tutorial in Ancient and Medieval Philosophy (1) To be taken concurrently with PHIL 2033. 1 hr. of tutorial instruction per week for honors students.

★ **2035 History of Modern Philosophy (3)** An honors course. PHIL 2036, is also available. Introduction to philosophy through a study of some of the main writings of modern philosophy.

2036 HONORS: Tutorial in Modern Philosophy (1) To be taken concurrently with PHIL 2035. 1 hr. of tutorial instruction per week for honors students.

2110 Proseminar in Philosophy (1) Majors must take this course twice; it may be repeated a third time with departmental approval. Nonmajors may enroll with departmental approval. Pass-fail grading.

2786 Logic, Science, and Society (3) Prereq.: completed analytical reasoning area of general education or consent of instructor. Logic, evidence, probability, and induction; objectivity and relativism; technology and utopia.

2953 HONORS: Philosophical Colloquium (3) Prereq.: a grade of "B" or higher in at least one other philosophy course; or consent of instructor. Subject drawn from prominent philosophical works.

2963, 2964, 2965 HONORS: Independent Work for Honors Students (1,1,1) Prereq.: sophomore standing, completion of at least 3 hrs. of philosophy with a grade of "B" or higher, and a gpa of at least 3.00 in all work taken. Readings, conferences, and reports under faculty direction.

3001 Existentialism (3) Basic themes of existentialist philosophy; the works of Kierkegaard, Nietzsche, Jaspers, Heidegger, Camus, Marcel, and Sartre.

3002 Philosophy and Film (3) Films as philosophical texts.

3015 Christian Philosophy (3) Prereq.: one course in either philosophy or religious studies or equivalent. Also offered as REL 3015. Applications of philosophy to such themes in Christianity as knowing God, the nature, and structure of faith, revelation, incarnation, faith and science, Christianity and other faiths.

3020 Special Topics in Philosophy (1-3) May be taken twice for credit when topics vary.

3090 Friedrich Nietzsche (3) See GERM 3090.

3110 The Philosophy of Socrates (3) Early dialogues of Plato; Socrates on pleasure, friendship, virtue, justice, courage, temperance, wisdom, and happiness; on knowing the better and following the worse; on reason and inspiration; Socratic irony.

4002 Philosophy of Film (3) Theories of film.

4010 Logic (3) Prereq.: PHIL 2010 or consent of instructor. First-order logic with extensions; semantics and syntax; deductive systems; metatheory.

4011 Topics in Advanced Logic (3) Prereq.: PHIL 4010 or consent of instructor. Also offered as LING 4011. Topics may include advanced metatheory of symbolic languages, intentional logics, and Montague grammar.

4015 Philosophy of Male and Female (3) Philosophical examination of the concepts of human nature that underlie a variety of theories about women and femininity.

4786 Selected Topics (3) May be taken for a max. of 6 sem. hrs. when topics vary.

4914 Philosophy of Language (3) Prereq.: one logic course or consent of instructor. Also offered as LING 4914. Various theories of meaning, their implications and presuppositions,

and their relevance to issues in such areas as theory of perception, theory of truth, metaphysics, ethics, philosophy of mind and action.

4922 Plato (3) Prereq.: PHIL 2033 or equivalent.

4924 Aristotle (3) Prereq.: PHIL 2033 or equivalent. Topics from Aristotle's *Metaphysics*, *Physics*, *De Anima*, and the logical treatises.

4928 Augustine, Anselm, and Aquinas (3) Also offered as REL 4928. Study of three major figures in medieval philosophy; emphasis on the development of the patristic, monastic, and scholastic traditions.

4931 Descartes, Spinoza, and Leibniz (3) Prereq.: 6 hrs. of philosophy or consent of instructor. 17th century rationalism, with emphasis on epistemology and metaphysics.

4933 Locke, Berkeley, Hume (3) Language, epistemology, ontology, self, God, causation, realism, and idealism in the writings of these British empiricists.

4935 Kant (3) Prereq.: PHIL 2035 or equivalent. Basic topics and arguments of Kant's *Critique of Pure Reason*.

4936 19th Century Philosophy (3) Prereq.: PHIL 2033 and 2035; or equivalent. 19th century philosophy, with emphasis on German thought; readings in Fichte, Hegel, Marx, Nietzsche, Bergson, and others.

4938 Philosophical Thought in America (3) Late 19th and early 20th centuries; topics from such philosophers as Peirce, James, Royce, Dewey, Santayana, Ward, and Mead.

4940 Aesthetics (3) Meaning and truth in the arts; artistic intention; critical canons.

4941 Philosophy of Mind (3) Prereq.: PHIL 2033 and 2035; or equivalent. Recent philosophical treatments of human nature; the mind-body problem, identity of the person in time, the person as rational and volitional, and relation of the person to the world.

4943 Problems in Ethical Theory (3) Prereq.: two courses in philosophy or consent of instructor. Recent developments in ethics.

4944 Philosophical Theology (3) Prereq.: two courses in philosophy and/or religious studies. Also offered as REL 4944. Major themes and works in philosophical theology.

4945 Political Philosophy (3) Prereq.: PHIL 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; legal liability; morals legislation; Good Samaritan laws; moral basis of contract law.

4948 Phenomenology (3) Prereq.: PHIL 2035 or 4936 or equivalent. Contemporary phenomenology; reading in Husserl.

4951 Philosophy of Science (3) Prereq.: consent of instructor. Philosophical issues related to concept formation and the 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 PHIL 2035 or 4933. 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 or consent of instructor. Theories of 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 such as *Groundwork of the Metaphysics of Morals*, *Metaphysics of Morals*, *Critique of Practical Reason*, and *Anthropology From A Pragmatic Point of View*.

4991 Independent Reading and Research (1-3) Prereq.: written consent of instructor and department. May be taken for a max. of 6 hrs. of credit when topics vary. Total credit earned as a graduate student in PHIL 4991 and PHIL 7991 combined may not exceed 9 hrs.

7901 Seminar in Contemporary Analytic Philosophy (3) Philosophy of language, metaphysics, 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 or school of philosophy.

7910 Seminar (3) May be taken for a max. of 6 hrs. of credit when topics vary. May be offered as LING 7910 when topic is appropriate.

7991 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 PHIL 4991 and PHIL 7991 combined may not exceed 9 sem. hrs.

8000 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 1021 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 sound.

★ **1022 Physical Science with Laboratory (3)** F,S Prereq.: MATH 1021 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 rigidly observed.

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 1550. 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 (4,4)** F,S Prereq. for 1201: PHYS 1100 or placement by examination; credit or registration in MATH 1550. Prereq. for 1202: PHYS 1201 and credit or registration in MATH 1552. 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 2101, 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 1202. 3 hrs. lab. Credit will not be given for these courses and PHYS 2108, 2109. Laboratory to accompany PHYS 1201, 1202.

★ **2001, ★ 2002 General Physics (3,3)** Prereq. for PHYS 2001: MATH 1022 or 1023; Prereq. for PHYS 2002: PHYS 2001. 3 hrs. lecture/demonstration. Credit will not be given for these courses and PHYS 1201, 1202 or 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 1552. 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)

Prereq.: PHYS 2101 and MATH 1552. 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 1208. Laboratory to accompany PHYS 2001 or 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 1552. Mathematical methods of physics; vector calculus, complex variables, Fourier series, matrices and determinants, differential equations with application to selected problems in physics.

2203 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.

2207 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 2057.

Basic concepts of mechanics with emphasis on corresponding mathematical techniques.

2231 Electricity and Magnetism (3) S

Prereq.: PHYS 2221 or CHEM 4581 and credit or registration in MATH 2065 or 2090. Electricity and magnetism; static and quasistatic electromagnetic fields in vacua and in dielectric and magnetic media.

★ 2401 Introduction to Concepts in Physics (3) V

Prereq.: MATH 1021 or an ACT math score of at least 25. Primarily for students in liberal arts and education. Historical evolution and underlying philosophy of principles of physics; provides appreciation of physics; does not develop technical skill.

2411 Computational Science I (3) Prereq.: PHYS 2221; or PHYS 1202 or 2102 and MATH 2057; or CHEM 4581 and credit or registration in MATH 2065. 2 hrs. lecture; 2 hrs. lab.

Introduction to symbolic manipulation and numerical techniques used to analyze or simulate a broad range of physical systems.

2995 Research Internship (1) Prereq.: consent of instructor and department chair. May be repeated for credit.

Individual reading and theoretical and/or experimental research on introductory problems in physics.

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.****4003 Science Teaching in Secondary School III: Instructional Strategies in Science (1) See BIOL 4003.****4004 Seminar in Teaching Secondary School Science (3) See BIOL 4004.****4098 Instrumentation Electronics for Scientists (3) S**

Prereq.: PHYS 1202 and 1209; or PHYS 2102 and 2109. 2 hrs. lecture; 3 hrs. lab. Basic electronic technology and circuits used in scientific instrumentation; circuit analysis, discrete components, operational amplifiers, and digital electronics.

4112 Intermediate Mathematical Physics (3) V

Prereq.: PHYS 2221 or CHEM 4581; and credit or registration in MATH 2065 or 2090. Mathematical methods of physics, with application to selected problems.

4123 Intermediate Mechanics (3) Prereq.: PHYS 2221 and MATH 2057.

Lagrangian mechanics; central force motion; rigid body dynamics; small oscillations.

4125 Thermodynamics and Statistical Mechanics (3) V

Prereq.: PHYS 2221 and credit or registration in MATH 2065 or 2090; or CHEM 4581 and credit or registration in MATH 2065 or 2090. Basic physical concepts and methods appropriate for description of systems involving many particles; unified view point of thermodynamics, statistical mechanics, and kinetic theory.

4132 Electromagnetism and Electromagnetic Waves (3) F

Prereq.: PHYS 2231. Continuation of PHYS 2231. Emphasis on electromagnetic waves and radiation.

4135 Modern Optics (3) V Prereq.: PHYS 2221 and MATH 2065 or 2090; or CHEM 4581 and MATH 2065 or 2090.

Review of geometrical optics and optical instruments, scalar diffraction theory, spatial filtering and holography, Gaussian beam optics, optical resonators, lasers, and optical properties of materials.

4136 Modern Optics Laboratory (3) V Prereq.: PHYS 4135. 1 hr. lecture; 5 hrs. lab.

Techniques in modern optics, including interferometers, electrooptic and magneto-optic devices, fiber optics, spatial filtering, holography, and spectroscopy.

4141, 4142 Introduction to Quantum Mechanics (3,3) F,S

Prereq.: PHYS 2221 and credit or registration in MATH 2065 or 2090; or CHEM 4581 and credit or registration in MATH 2065 or 2090; PHYS 4141 is prerequisite for 4142. Elementary principles of quantum mechanics, including Schrodinger equation, one-dimensional problems, harmonic oscillator, angular momentum, perturbation theory, matrix mechanics, and spin.

4198 Advanced Modern Physics Laboratory (3) S Prereq.: PHYS 2209 or 4055 or 4141. 1 hr. lecture; 6 hrs. lab/computations.

Electricity and magnetism, optics, and atomic, nuclear, and solid-state physics.

4201, 4202 Survey of Contemporary Physics (3,3) F,S

Prereq.: PHYS 4142 or equivalent. Current research in physics: relativity, atomic physics, solid-state physics, nuclear physics, elementary particles, astrophysics.

4251 Atomic Physics (3) V Prereq.: PHYS 4142 and credit or registration in 4132.

Modern theory of atomic structure, radiations, and processes.

4261 Introduction to Solid-State Physics (3) V Prereq.: PHYS 2203 or 4141 or CHEM 4492.

Properties of the crystalline state and the free-electron; band theories of metals, insulators, and semiconductors.

4271 Nuclear Physics (3) V Prereq.: PHYS 2203 or 4141.

Nuclear properties, abundance and stability of nuclei, nuclear instrumentation, particle accelerators and detectors, and nuclear reactions.

4399 Research in Experimental Physics (3) F Prereq.: PHYS 4198 or consent of instructor and department chair.

Individual research project conducted and reported under supervision of individually selected faculty member.

4412 Computational Science II (3) Prereq.: PHYS 2411 or equivalent. Continuation of PHYS 2411.

Advanced techniques for numerical computations in the physical sciences.

4991 Special Problems in Physics (1-3) Prereq.: thorough knowledge of the fundamentals of physics and mathematics, demonstrated ability in science, and consent of instructor and department chair. May be taken for a max. of 6 sem. hrs. credit.

Individual reading and theoretical and/or experimental work on advanced problems in physics.

6111 Mathematical Physics for Teachers (3) Su only-V

Prereq.: PHYS 2002 or 2102. Not for degree credit for physics majors. Mathematical structure of physics.

6121 Classical Physics for Teachers (3) Su only-V Prereq.: PHYS 2002 or 2102. For high school and junior college teachers; part of the M.N.S. degree program.

Application of conservation principles to development of classical physics.

6141 Quantum Physics of Atoms, Molecules, Solids, and Nuclei for Teachers (3) Su only-V Prereq.: PHYS 2002 or 2102. For high school and junior college teachers; part of the M.N.S. degree program.

Origins of quantum theory; application to atoms, molecules, solids, and nuclei.

6191 Research Participation for Teachers (3) Su only-V

Prereq.: PHYS 2002 or 2102. May be taken for a max. of 9 hrs. of credit.

6198 Laboratory Methods for Teachers (3) Su only-V

Prereq.: PHYS 2002 or 2102. 1 hr. lecture; 6 hrs. lab. For high school and junior college teachers; part of the M.N.S. degree program. May be taken for a max. of 9 hrs. of credit. Analysis of laboratory experiments in current high school physics curricula; selected experiments in modern physics.

6991 Seminar in Current Developments in Physics Curriculum Materials (1-3) Su only-V Prereq.: PHYS 2002 or 2102. For high school and junior college teachers; part of the M.N.S. degree program. May be taken for a max. of 6 sem. hrs. credit.**7211, 7212 Mathematical Methods of Theoretical Physics (3,3) F,S Prereq.: PHYS 4112 or equivalent. PHYS 7211 is prerequisite for 7212.**

Advanced topics in mathematical methods of theoretical physics; mathematical foundations of quantum mechanics.

7221 Classical Mechanics (3) Su Study of particle mechanics and rigid body mechanics using the methods of Lagrange's equations, Hamilton's equations, canonical transformations, and Hamilton-Jacobi theory.**7223 Mechanics of Deformable Bodies (3) V Mechanics of inviscid and Newtonian viscous fluids; elasticity of solids.****7225 Statistical Mechanics (3) Su Principles of classical and quantum statistics, with application to special problems.**

7231, 7232 Classical Electrodynamics (3,3) F,S *PHYS 7231 is prerequisite for 7232. Problems in electrostatics and magnetostatics; Maxwell's equations, electromagnetic waves, wave guides, and antennas; relativistic electrodynamics and radiation from moving charges.*

7241, 7242 Quantum Mechanics (3,3) F,S Prereq.: PHYS 4142 or equivalent. PHYS 7241 is prerequisite for 7242.

Basic concepts of nonrelativistic quantum mechanics, operators and matrices, intrinsic and orbital angular momenta, perturbation theory, atomic structure, second quantization, and scattering theory.

7336 General Relativity (3) V General tensor analysis; postulates of general relativity, field equations, equations of motion, interior and exterior Schwarzschild solutions; cosmology.**7343 Advanced Quantum Mechanics (3) V Prereq.: PHYS 7242.**

The Lorentz group, relativistic wave equations, introduction to quantum field theory.

7353, 7354 Atomic and Optical Physics I, II (3,3) V

Prereq.: PHYS 7242; PHYS 7353 is prerequisite for 7354.

Applications of quantum mechanics to atomic systems and their interaction with radiation; spectral levels, photo-absorption and collisions with charged particles.

7360 Low-Temperature Physics (3) V Properties of matter at temperatures near absolute zero; methods of producing low temperatures; superfluidity of liquid helium, superconductivity, magnetic effects, and adiabatic demagnetization.**7363, 7364 Condensed Matter Physics (3,3) V Prereq.: PHYS 7225 and 7242. PHYS 7363 is prerequisite for 7364.**

Application of quantum mechanics and statistical mechanics to condensed matter; lattice vibrations, energy bands in crystals, transport properties, collective excitations, ferromagnetism and superconductivity; theory of Fermi and Bose quantum fluids, phase transitions, and critical phenomena.

7373, 7374 Nuclear Physics (3,3) V Prereq.: PHYS 4271 and 7241. PHYS 7373 is prerequisite for 7374.

Applications of quantum mechanics to the two-nucleon system, to a system of many nucleons, and to nuclear reactions, with comparisons between theory and experimental results.

7383, 7384 High Energy Particle Physics (3,3) V Prereq.: PHYS 7231 and 7242.

Strong electromagnetic and weak interactions of hadrons and leptons, including symmetries and selection rules; quantum chromodynamics and electro-weak theory; accelerator and nonaccelerator experiments including cosmic rays and high energy astrophysics.

7398 Graduate Laboratory (3) S,Su 1 hr. lecture; 6 hrs. lab.

Practical experience in modern experimental physics laboratory techniques.

7411, 7412 Computational Physics (3,3) Prereq.: PHYS 7211. PHYS 7411 is prerequisite for PHYS 7412.

Basic numerical techniques for solution of mathematical equations, including coupled linear algebraic and differential equations, and numerical simulation techniques; emphasis on application to physical problems.

7463, 7464 Theoretical Condensed Matter Physics (3,3) F,S Prereq.: PHYS 7242. PHYS 7463 is prerequisite for PHYS 7464.

Density functional theory of electronic structure, mean field, and renormalization group theory of phase transitions; linear response theory; quantum transport, Landau theory of Fermi liquids; systems of strongly interacting electrons, superconductivity.

7537 Radiation Interactions and Transport (3) F Prereq.: PHYS 2203 or equivalent, CSC 2262, or equivalent. Same as MEDP 7537.**7538 Monte Carlo Simulation of Radiation Transport (3) S Prereq.: MEDP 7537 or consent of instructor, CSC 2262 or equivalent experience in computer programming. Same as MEDP 7538.****7741, 7742 Stellar Astrophysics (3,3) F,S PHYS 7741 is prerequisite for PHYS 7742. See ASTR 7741, 7742.****7745 Advanced Quantum Theory of Particles and Fields (3) V May be taken for a max. of 9 hrs. of credit.****7751, 7752 Galactic Astrophysics (3,3) F,S PHYS 7751 is prerequisite for PHYS 7752. See ASTR 7751, 7752.****7777 Seminar in Astronomy and Astrophysics (1-6) V May be taken for a max. of 6 sem. hrs. of credit. See ASTR 7777.****7783 Topics in Astronomy and Astrophysics (3) V May be taken for a max. of 6 hrs. of credit when topics vary. See ASTR 7783.****7857 Graduate Student Seminar (1) Pass-fail grading. May be repeated for credit.**

Introduction to research areas in the department; training for presentation of scientific talks; preparation of research proposals.

7893 Many-Body Theory (3) V Prereq.: PHYS 7242. Pass-fail grading. May be taken for a max. of 6 hrs. of credit.

Diagrammatic techniques, thermal Green's functions, transport theory, Fermi liquids, collective excitations, phase transitions.

7895 Selected Topics in Advanced Physics (3) V *May be repeated for credit. Pass-fail grading.*

7896 Current Developments (3) V *May be repeated for credit. Pass-fail grading.*

7996 Independent Research in Physics (3) V *Prereq.: permission of department.* An approved independent research project in experimental or theoretical physics; final written report and an oral presentation to a faculty committee is required.

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

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

PLANT HEALTH • PLHL

2050 Introduction to Pest Management (4) S *Prereq.: BIOL 1201, 1208 and 1402 or equivalent. 3 hrs. lecture; 3 hrs. lab. Also offered as ENTM 2050.* Recognition and classification of major pests; insects, pathogens, weeds, vertebrates; anatomy and morphology, life cycles, economic importance, and control measures.

3000 Pest Management Internship (3) Su *Prereq.: written consent of advisor. May be taken for a max. of 6 sem. hrs. credit. Also offered as ENTM 3000.* Work experience in an agricultural or urban pest management industry or in a pest management research area culminating in acceptable written reports.

3002 Pest Management Seminar (1) F *Prereq.: PLHL 3000 or ENTM 3000. Also offered as ENTM 3002.* Review and discussion of internship experiences including topics in agricultural pest management and urban entomology; development of professional skills.

3060 Introductory Plant Physiology (4) F *Prereq.: BIOL 1202 and 1209; CHEM 2060, 2261, or 2461. 3 hrs. lecture; 3 hrs. lab. Also offered as BIOL 3060.* Life processes of plants.

3900 Undergraduate Research in Plant Pathology (1-3) V *Prereq.: PLHL 4000 or equivalent and consent of instructor. May not be repeated for credit.* Research experience for students contemplating graduate study in plant pathology.

3960 Undergraduate Research in Crop Physiology and Weed Science (1-3) V *Prereq.: PLHL 3060 or equivalent and consent of instructor. May be taken for a max. of 6 sem. hrs. of credit.* Research experience for students contemplating graduate study in crop physiology or weed science.

4000 General Plant Pathology (3) S *Prereq.: BIOL 1201, 1208 and 1402; or equivalent. 2 hrs. lecture; 3 hrs. lab.* Nature and cause of disease in plants; relation of environment and host-parasite interactions to development of disease symptoms caused by plant pathogenic fungi, bacteria, viruses, mycoplasmas, and nematodes; abiotic causes of disease; methods of disease control; diseases affecting Louisiana crops and ornamentals.

4001 Plant Disease Management and Control (3) F *Prereq.: PLHL 4000 and either CHEM 2060 or 2261. 2 hrs. lecture; 2 hrs. demonstration/lab.* Plant disease management and control using cultural practices, disease resistance, biological control, legislation, therapy, pesticides; identity, properties, chemistry, mode of action, toxicity, and application of fungicides, bactericides, and nematocides; evaluation of chemicals for plant disease control.

4002 Special Topics in Agricultural Pest Management (1-3) V *Prereq.: consent of instructor. May be taken for a max. of 6 sem. hrs. of credit when topics vary. Lab/field trip may be required.* Subjects not covered in other weed science or plant pathology courses.

4014 Diseases of Economic Crops (4) F *Prereq.: PLHL 4000 or equivalent; 3 hrs. lecture; 3 hrs. lab.* Diseases affecting economically important crops; their causal agents, disease cycles, symptoms, distribution, economic importance, and control.

4018 Forest Insects and Diseases (4) F *See ENTM 4018.*

4054 Introductory Mycology (4) 3 hrs. lecture; 3 hrs. lab. Same as BIOL 4054.

4444 Seed Physiology (3) S *Prereq.: BIOL 1201, 1208, and 1402 and either CHEM 2060 or 2261. BIOL 3060 recommended. Also offered as BIOL 4444.* Introduction to the life processes of seeds: their development, germination, dormancy, ecology, vigor, and viability.

7000 Phytonematology (4) S *Prereq.: PLHL 4000. 2 hrs. lecture; 4 hrs. lab.* Taxonomy, identification, and control of plant parasitic nematodes.

7003 Plant Disease Diagnosis (3) Su-E *Prereq.: consent of instructor. 3 hrs. lecture; 6 hrs. lab. Primarily for Ph.D. students majoring or minoring in plant pathology or M.S. students majoring in plant pathology.* Practicum in plant disease diagnosis with field and clinic experience.

7010 Plant Molecular Biology (3) V *Prereq.: BIOL 3060, 4093 and 4094; or equivalent. Also offered as BIOL 7010.*

Molecular biology, biochemistry and genetics of higher plants and plant-associated microorganisms; genome organization and structure in nuclei, chloroplasts, and mitochondria; structure and expression of plant genes under control of developmental and environmental signals; plant interactions with pathogenic and symbiotic microorganisms.

7011 Phytobacteriology (4) S-O *Prereq.: PLHL 4000, BIOL 2051. 3 hrs. lecture; 3 hrs. lab.* Taxonomy, biology, mechanisms of pathogenesis; control of prokaryotic plant pathogens.

7014 Plant Stress Physiology (3) S-O *Prereq.: PLHL 3060 or equivalent. Also offered as BIOL 7014.* Plant responses to environmental stresses examined at tissue, cellular, biochemical, and whole-plant levels.

7032 Advanced Mycology: Ascomycetes and Deuteromycetes (4) S-O *Prereq.: PLHL 4054 or equivalent. 3 hrs. lecture; 3 hrs. lab. Also offered as BIOL 7032.* Taxonomy, biology and ecology of ascomycetes and deuteromycetes; collection, isolation, and identification of fungi.

7040 Plant Virology (4) F-E *Prereq.: PLHL 4000 and PLHL 7063; or equivalent. 2 hrs. lecture; 4 hrs. lab.* Viruses as causal agents of plant diseases; biological, chemical, and physiological properties of plant viruses; methods of transmission; host-virus and vector-virus relationship.

7051 Advanced Topics in Plant Pathology (1-4) V *Prereq.: consent of instructor. May be taken for a max. of 8 sem. hrs. of credit.*

7052 Seminar (1) F,S *May be taken for a max. of 3 hrs. of credit for each graduate degree.* Topics announced prior to registration.

7056 Advanced Mycology: Lower Fungi (4) *Prereq.: BIOL 4054 or equivalent. 3 hrs. lecture; 3 hrs. lab. Same as BIOL 7056.*

7061 Plant Growth and Development (3) F *Prereq.: BIOL 3060 or PLHL 3060 and BIOL 4093; or equivalent. Also offered as BIOL 7061.* Effects of naturally occurring growth substances and environmental conditions on plant growth.

7063 Plant Metabolism (3) S *Prereq.: PLHL 3060 or equivalent. Also offered as BIOL 7063.* Major metabolic systems of plants and their control.

7065 Transport Processes in Plants (3) S *Prereq.: BIOL 3060. Same as BIOL 7065.*

7067 Selected Topics in Plant Physiology (2) F *Prereq.: consent of instructor. May be repeated for credit. Same as BIOL 7067.* Mineral nutrition, metabolism, growth and development, and herbicides.

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 and classical papers in the field.

7080 Host-Parasite Interaction and Disease Resistance (3) S-E *Prereq.: PLHL 4000 and PLHL 7063; or equivalent. 2 hrs. lecture; 2 hrs. lab.* Genetics, physiology, and biochemistry of disease development and disease resistance in plants; mechanisms of pathogenicity and infectivity, tumorigenesis, metabolic consequences of infection, nature of disease resistance, and parasitism.

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 genetic; disease suppressive soils.

7083 Epidemiology and Crop Loss Assessment (3) S-E *Prereq.: PLHL 4000 and 4001 or equivalent.* Interactions between pathogen and host populations, and the environment; measurement and prediction of disease spread and increase; disease management strategies; techniques to assess losses due to plant disease.

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

8900 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.

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

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.

2001 Analyzing Politics and Public Policy (3) Techniques of analysis, logic of empirical research, and the use of simulation.

★ **2051 American Government (3) F,S,Su** *Required of all undergraduate majors. An honors course, POLI 2052, is also available.* Principles, structures, processes, and functions; emphasis on national government.

★ **2052 HONORS: American Government (3)** *Same as POLI 2051, with special honors emphasis for qualified students.*

★ **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** Basic principles, problems, and concepts 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** 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) Culmination of political science honors program; details available from department.

3809 HONORS: Seminar (3) *Students not enrolled in the honors program may be admitted with consent of the instructor. Subject matter and instructor vary. Details available from the department during registration.*

3896, 3897 HONORS: Readings Course (1-3,1-3) *Same as POLI 4996, 4997, with special honors emphasis for qualified students.*

3901 Undergraduate Internship in Political Science (1-6) F,S *Open to undergraduate students approved by the Department of Political Science. May be counted toward the total number of hours required for a major in political science but not toward fulfilling field requirements.* Program of study, research, and work in governmental or private agencies concerned with public policy.

3909 Contemporary Political Issues (3) *For undergraduate political science or other social sciences majors having a 2.70 overall average; also open to well-qualified students in other fields, by consent of department. May be repeated for credit when topics vary.* Course content depends on interests of instructor and class.

4000 Special Topics in American Politics (3) F,S,Su *Prereq.: consent of department. May be repeated for a max. of 6 sem. hrs. credit when topics vary.*

4001 Research Methods in Political Science (3) F, S, Su Basic components of the research process in political science, including design and structure of research, modes of observation, and techniques of analyzing data.

4010 Principles and Practices of Public Administration (3) F *Prereq.: POLI 2051.* Organization and administrative processes of public bureaucracies; political role of agencies that make and carry out public policies; characteristics of bureaucratic policy making.

4011 Bureaucracy, Politics, and Public Policy (3) S *Prereq.: POLI 2051 or 4010.* Interrelationships between bureaucracy and politics in formulation and execution of public policy; forces and forms affecting these relationships.

4012 Public Personnel Administration (3) *Prereq.: POLI 2051.* Development, administration, and politics of the U.S. civil service; the merit system; collective bargaining in the public sector and constitutional rights of public employees; comparisons with European civil services.

4013 Ethics and Public Policy (3) Ethical questions confronting the formulation of public policy; perspectives of the practitioner and the citizen; political corruption and citizen control and compliance; ethics of current policy in areas such as civil rights, health care, education, energy, and national defense.

4014 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.

4015 American State Politics and Policy Making (3) S *Prereq.: POLI 2051 or equivalent.* Politics and policy making in the American states; legal, cultural, socio-economic, political, and institutional factors affecting the formulation, implementation, and evaluation of American state public policies.

- 4018 Urban Politics and Policy Making (3) F** *Prereq.: POLI 2051 or equivalent.* Political problems in urban governance: the political environment of American cities, private sources of power, political machines and reform, crime and violence, service delivery, metropolitan fragmentation, and the consequences of growth and decay; public policy approaches to complex urban problems.
- 4020 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.
- 4021 The American Constitution and Civil Liberties (3) S** *Prereq.: POLI 2051 or equivalent.* Political relevance of major federal constitutional limitations; property rights; First Amendment freedoms; rights of criminal defendants and ethnic minorities.
- 4022 Jurisprudence (3) S** *Prereq.: POLI 2051 or equivalent.* Legal philosophies of natural law, positivism, idealism, sociological jurisprudence, and legal realism; relationships of law, morals, and political order.
- 4023 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.
- 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.
- 4033 Religion in Politics (3) V** Analysis of religion as a political force; religion as a shaper of political culture, a force for stability and change, and a determinant of political behavior and public policy.
- 4034 Political Participation (3) V** Voting behavior, conventional participation, and political protest and violence; political behavior and public policy.
- 4035 The Legislative Process (3) F** *Prereq.: POLI 2051 or equivalent.* Legislative politics; emphasis on the U.S. Congress; effect of party, constituency, and legislative institutions on legislative behavior and public policy; role of Congress in the American political system.
- 4036 The American Presidency (3) V** *Prereq.: POLI 2051 or equivalent.* The presidency in the American political system; emphasis on process of presidential selection, evolving role of the president, politics of the executive apparatus of the presidency, and presidential interaction with other political institutions and actors.
- 4037 Political Decision Making (3) V** Decision making processes at the subnational, national, and international levels; study and evaluation of decisions; role of situation and context.
- 4038 Blacks and the American Political System (3) V** *Prereq.: POLI 2051.* Interaction of blacks with the American political system since World War II; political resources available to blacks; responses of national institutions and leaders to black aspirations.
- 4039 Southern Politics (3) V** Contemporary politics of the American South.
- 4040 Special Topics in International Relations (3) F,S,Su** *Prereq.: consent of department. May be repeated for a max. of 6 sem. hrs. credit when topics vary.*
- 4041 International Law (3) V** *Prereq.: POLI 2057 or equivalent.* Development of international law; law of peace, war, and neutrality; treaty law; recognition, war crimes, law enforcement, state responsibility, and diplomatic immunities under the United Nations.
- 4042 International Organization (3) V** Origins, development, and future of international organization; emphasis on the United Nations.
- 4043 American Foreign Policy (3) F** "National interest" as guiding consideration in development of American foreign policy from the beginning to the present; importance of the constitutional framework; presidential and congressional leadership; pressure groups and public opinion; changing world environment and American response.
- 4044 The Contemporary International System (3) V** *Prereq.: POLI 2057 or equivalent.* Developments and trends in the international system since World War II; classical and modern versions of the balance of power; bipolarity, multipolarity, and other elements of systems theory; concept of deterrence and game theory; decision making theory; integration theory; conflict and conflict-resolution theory.
- 4046 International Political Economy (3) Prereq.: POLI 2057 or equivalent.** Theories of international interdependence, dependence, and integration; politics of decision making on protectionism and international finance; role of multinational corporations in world political economy; North-South debate; economic issues and national security.
- 4047 Political Psychology in International Relations (3) F,S,Su** Cognitive personality and group psychology in international relations.
- 4048 International Conflict and Cooperation (3) F,S,Su** Theories of international conflict, war, and conflict resolution.
- 4049 Global Environmental Politics (3) F,S,Su** Political and economic factors affecting the global environment.
- 4060 Special Topics in Comparative Politics (3) F,S,Su** *Prereq.: consent of department. May be repeated for a max. of 6 sem. hrs. credit when topics vary.*
- 4063 Comparative Political Institutions (3) F,S,Su** *Credit will not be given for both this course and POLI 7972.* Comparative analysis of political institutions; emphasis on constitutional design, electoral and party systems, legislatures and cabinets, and parliamentary and presidential structures.
- 4064 Comparative Politics of Developing Areas (3) V** Problems of development confronted by contemporary states and societies of the Third World; emphasis on role of ethnic pluralism, political parties, bureaucracies, and the military.
- 4065 Latin American Governments and Politics (3) F** Governmental and political processes of Latin America; their contributions to modern government.
- 4067 The Politics of Asia (3) F** Governments and politics of modern Asia, with a focus on China; contemporary nationalism, political development, revolution, and impact of communism, democracy, and capitalism on Asian states.
- 4068 Democratic Political Systems of Northern Europe (3)** Comparative analysis of the structures, functions, culture, socialization, and policies of northern European political systems: Great Britain, West Germany, the Scandinavian, and Benelux countries.
- 4070 Russian and Central Eurasian Politics and Government (3) F** Contemporary political institutions and policies of Russia, Ukraine, and other regional states of the Baltic, Caucasus, and Central Asian area; influence of internal forces, such as culture, ideology, and social structure; political, economic, and social problems and policies.
- 4072 Government and Politics of East Central Europe (3) V** Political systems of East Europe under Communist regimes; comparison of their common problems and methods; role of these party-states within the Communist system.
- 4074 The European Community (3) V** The political, social, legal, and economic unification of Europe.
- 4077 The Middle East (3) S** Governments and politics; modern Arab nationalism, major political trends since independence; Arab-Israeli dispute, intra-Arab relations, and role of the region in global affairs.
- 4078 African Government and Politics (3) F,S,Su** Governmental and political processes of Africa; factors affecting governmental performance in modern Africa.
- 4080 American Political Thought (3) V** Development of the American liberal-democratic tradition, and dissent to that tradition.
- 4081 History of Political Theory from Plato to More (3) F** Ancient and medieval political thought.
- 4082 History of Political Theory from Machiavelli to Nietzsche (3) S** Early modern European political thought.
- 4090 Special Topics in Political Theory (3) F,S,Su** *Prereq.: consent of department. May be repeated for a max. of 6 sem. hrs. credit when topics vary.*
- 4096 Contemporary Political Theory (3) S** Political thought from Nietzsche to present.
- 4234 Studies in Literature and Politics (3) See ENGL 4234.**
- 4996, 4997 Readings Course (1-3,1-3) Prereq.: consent of department. Honors courses, POLI 3896 and 3897, are also available. For junior, senior, and graduate students in the social sciences with a 3.00 average.** Individual reading in a specified field of political science.
- 7000 Professional Development (1) F** *Pass-fail grading.* Political scientist as teacher, researcher, citizen.
- 7010 Decision Models for Public Administration (3) See PADM 7010, ISDS 7010.**
- 7900 Seminar in American Politics (3) V** *May be taken for a max. of 6 hrs. of credit when topics vary.*
- 7901 Graduate Internship in Political Science (1-6) F,S** *Open only to graduate students approved by the Department of Political Science and accepted by a recognized internship program. May be counted toward total number of hours required in the M.A. program but not toward field requirements. Research and work in governmental or private agencies concerned with public policy.*
- 7902 Seminar in Public Policy (3) Also offered as PADM 7902.**
- 7903 Special Topics in American Politics (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary.**
- 7910 Seminar in Public Administration (3) F** *See PADM 7910.*
- 7912 Seminar in Public Personnel Administration (3) See PADM 7912.**
- 7914 Seminar in Public Budgeting (3) Also offered as PADM 7914.**
- 7915 Seminar in State Politics and Policy Making (3)**
- 7916 State and Local Government Administration (3) See PADM 7916.**
- 7917 Seminar in Program Evaluation (3) Also offered as PADM 7917.**
- 7918 Seminar in Urban Politics and Policy Making (3)**
- 7920 Seminar in Public Law (3) V** *May be taken for a max. of 6 hrs. of credit when topics vary.*
- 7930 Seminar in Political Behavior (3) May be taken for a max. of 6 hrs. of credit when topics vary.**
- 7931 Seminar in Political Parties (3) V** *May be taken for a max. of 6 hrs. of credit when topics vary.*
- 7935 Seminar in Legislative Politics (3) V** *May be taken for a max. of 6 hrs. of credit when topics vary.*
- 7936 Seminar in Executive Politics (3)**
- 7940 Seminar in International Politics (3) V** *May be taken for a max. of 6 hrs. of credit when topics vary.*
- 7941 Special Topics in International Politics (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary.**
- 7943 Seminar in the American Foreign Policy Process (3)**
- 7946 Seminar in the Politics of International Economic Relations (3) May be taken for a max. of 6 hrs. of credit when topics vary.**
- 7961 Approaches to the Study of Politics (3) F**
- 7962 Seminar in Research Design and Quantitative Techniques (3) S**
- 7963 Advanced Research Methods in Social Science (3) See SOCL 7203.**
- 7964 Specialized Topics in Social Science Methods (2-3) See SOCL 7213.**
- 7970 Seminar in Comparative Politics (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary.**
- 7971 Special Topics in Comparative Politics (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary.**
- 7972 Seminar in Comparative Political Institutions (3) V** *Credit will not be given for both this course and POLI 4063.* Advanced analysis of comparative political institutions, emphasis on constitutional design, electoral and party systems, legislatures and cabinets, and parliamentary and presidential structures.
- 7974 Seminar on the State and Society (3)** Focus on relations between the state and society; effects of social structure and social change on politics and the factors affecting political regimes and state capacity.
- 7975 Seminar in Comparative Political Behavior (3) V** Focus on individual level political phenomena and the relations to political institutions and social systems; topics include political culture and socialization, participation and protest, revolution and regime support, voting and voting behavior.
- 7976 Seminar in Comparative Political Economy (3) V** *May be taken for a max. of 6 sem. hrs. of credit when topics vary.* Focus on the interaction between politics and economics; topics include models of development, economic performance, and the impact of global economic forces on regional and domestic politics.
- 7980 Seminar in American Political Thought (3) V** *May be taken for a max. of 6 hrs. of credit when topics vary.*
- 7981 Seminar in Classical and Medieval Political Theory (3) May be taken for a max. of 6 hrs. of credit when topics vary.**
- 7982 Seminar in Early Modern Political Theory (3)**
- 7984 Seminar in Analytical and Empirical Political Theory (3)**
- 7990 Political Theory: Interpretation and Analysis (3)**
- 7991 Special Topics in Political Theory (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary.**
- 7995 Seminar in Contemporary Political Theory (3) V** *May be taken for a max. of 6 hrs. of credit when topics vary.*
- 7998, 7999 Readings Course (3,3) May be taken for a max. of 6 hrs. of credit when topics vary.**
- 8000 Thesis Research (1-12 per sem.) "S"/"U" grading.**
- 9000 Dissertation Research (1-12 per sem.) "S"/"U" grading.**

PORTUGUESE • PORT

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

***1101 Beginning Portuguese (4)** Development of basic language skills through oral and written exercises and reading texts; emphasis on communicative competence.

***1102 Beginning Portuguese (4)** Prereq.: PORT 1101 or consent of instructor. Development of listening, speaking, reading, and writing skills; emphasis on Brazilian culture.

***2101 Intermediate Portuguese (4)** Prereq.: PORT 1102 or equivalent. Continuation of PORT 1102. Additional emphasis on reading and writing.

***2102 Intermediate Portuguese (4)** Prereq.: PORT 2101 or equivalent. Continuing development of listening, speaking, writing, and reading skills.

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 on all work taken at LSU; consent of department head and industry cooperator. 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,Su Prereq.: consent of department. May be taken for a max. of 6 sem. hrs. of credit. Feeding, breeding, management, and marketing problems.

4031 Incubation and Hatchery Management (2) F-O Prereq.: 6 sem. hrs. of biological science or equivalent. 1 hr. lecture; 2 hrs. lab. Chick development and embryology; incubation principles and practices; hatchery equipment and design; hatchery management.

4032 Science and Technology of Poultry Products (3) S Prereq.: BIOL 1001, 1002, or equivalent and PLSC 1049 or higher. 2 hrs. lecture; 2 hrs. lab. Preparation of eggs and poultry for market; methods of maintaining quality during harvesting, processing, grading, and packaging of poultry meat and eggs.

4040 Quality Assurance in the Food Industry (4) See DARY 4040.

4051 Poultry Biology (3) F 2 hrs. lecture; 2 hrs. lab. Structure, conformation, and selection of fowl; emphasis on egg formation and oviposition; other physiological factors of economic importance.

4052 Poultry Management (3) S-E Prereq.: 6 sem. hrs. of biological science or equivalent. 2 hrs. lecture; 2 hrs. lab. Growth and development of the U.S. commercial egg and broiler industries; principles of nutrition, genetics, housing, management, and marketing; types of integrated operations and contract production.

4900 Special Topics in Poultry Science (1-3) Prereq.: consent of department. May be taken for a max. of 6 hrs. of credit when topics vary. Topics from current poultry production or poultry products 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) Su-E Prereq.: BIOL 4087 or equivalent. 2 hrs. lecture; 4 hrs. lab. Chemical and physicochemical methods and techniques; modern laboratory materials and equipment.

7091 Poultry Seminar (1) F,S May be taken for a max. of 4 hrs. of credit during period of graduate study. Graduate students in poultry science must participate in a report and discussion group on current literature in their fields.

7094 Seminar in Nutrition (1) S Same as ANSC 7094, DARY 7094, FDSC 7094, HUEC 7094. May be taken for a max. of 2 hrs. of credit. Prereq.: ANSC 7093, DARY 7091, HUEC 7010, FDSC 7071 or equivalent or previous slide (not poster) presentation at a professional meeting.

7095 Seminar in Applied Genetics (1) F,S Prereq.: consent of instructor. May be taken for a max. of 3 hrs. of credit. Special topics in advanced breeding and genetics.

7900 Advanced Poultry Research (1-5) F,S,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) An honors course, PSYC 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.

2017 Elementary Experimental Psychology (3) Prereq.: PSYC 2011 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.: 3 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 educative 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.

2999 Undergraduate Practicum in Psychology (1-3) Prereq.: PSYC 2000 or 2060, 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 2017 or equivalent. 2 hrs. lecture; 2 hrs. lab. Supervised research in general experimental psychology; selection, design, execution, analysis, and reporting of the psychological experiment.

3020 Psychological Tests and Measurements (3) Prereq.: 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) 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 disorders.

3083 Psychological Counseling (3) Prereq.: PSYC 2000 or 2060, and 2004. Concepts of psychological treatment in adjustment problems.

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.: 9 hrs. of psychology; LSU and overall gpa of at least 2.50. Open to psychology majors; 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 human thinking, decision making, comprehension, choice behavior, and problem solving.

4031 Sensory and Perceptual Processes (3) Prereq.: PSYC 2000 and 2017; or equivalent. Theories, data, and procedures in sensation and perception.

4032 Psychology of Learning (3) Behavior from the standpoint of learning; recent experimental literature in the learning area; major theories of learning.

4033 Psychology of Memory and Forgetting (3) 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 consent of instructor. Modes of action and effects on behavior of therapeutic drugs and drugs of abuse.

4036 Comparative Psychology (3) Behavioral development across species with reference to evolutionary and genetic factors relevant to understanding human behavior.

4037 Neuropharmacology (3) 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 psychiatric 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) The history of medical treatments for mental disorders.

4040 Research and Theory in Sexuality (3) Prereq.: PSYC 2000 or 2060 and one additional course in psychology; or KIN 2600. Sexual behavior viewed from different theoretical perspectives; emphasis on empirical sexual research literature.

4050 Advanced Industrial/Organizational Psychology (3) Prereq.: PSYC 2000 and 3050 or equivalent. Research, theory, and applications in industrial/organizational psychology; focus on psychological assessment of job candidates; testing; learning applied to organizational training; emotion, motivation, social processes, cognition in the job setting, and leadership.

4070 Developmental Psychology (3) 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 4032 or graduate standing. Methods, analysis, and intervention in the application of basic learning principles; emphasis on school applications.

4111 Intermediate Statistics (3) Preparatory for graduate study in statistics and research design in psychology. Computation procedures and elementary theory in statistics; analysis of variance, correlation (product moment, partial, multiple, and other methods), and nonparametric statistics.

4160 Advanced Educational Psychology (3) Prereq.: 6 hrs. of psychology or consent of instructor. Psychological theory and research as applied to the teaching-learning process.

4176 Advanced Child Psychology (3) Prereq.: 6 hrs. of psychology or consent of instructor. Psychological theories of child development, child behavior, and research methodology.

4178 Advanced Adolescent Psychology (3) Prereq.: 6 hrs. of psychology or consent of instructor. Psychological theories of adolescent behavior and problems.

4999 Independent Reading and Research in Psychology (1-6) Prereq.: LSU and overall gpa of at least 2.50. May be taken for a max. of 6 sem. hrs. credit. Open to seniors and graduate students. Student responsible for registering with a faculty member and selecting area of reading or research.

7020 Measurement of Behavior (3) Prereq.: PSYC 4111 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 controlling behavior.

7034 Biological Basis of Behavior (3) *Prereq.: graduate standing in psychology or other matriculated graduate students with consent of instructor.* Selected biological systems involved in mediation of behavior.

7040 Social Basis of Behavior (3) *Prereq.: graduate standing in psychology or other matriculated graduate students with consent of instructor.* Social, organizational, and cultural influences on human 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 4111 or equivalent; graduate standing in psychology or consent of instructor.* Machine calculation, coding, measures of centrality and variation, regression, correlation, prediction, probability, statistical inference, analysis of variance, multivariate techniques for the psychological sciences.

7117 Methodology and Research Design (3) *Prereq.: PSYC 4111 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 I (3) *Prereq.: graduate standing in clinical or school psychology or consent of instructor.* Clinical assessment techniques including individual tests of intelligence, mental status examination, interviewing, and behavioral assessment; procedures for both children and adults.

7165 Psychoeducational Assessment (3) *Prereq.: graduate standing in clinical or school psychology or consent of instructor.* Instruction and practicum in administration and interpretation of individually administered intellectual assessment measures 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 theories; behavioral analysis and theoretical orientations as applied to a wide variety of clinical disorders.

7640, 7641 Practicum in Social-Industrial Psychology (1-6,1-6) *Prereq.: consent of instructor. Each course may be taken for a max. of 9 sem. 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 practicum that provide psychological consultation on short-term behavior and academic problems for teachers and other school personnel.

7668, 7669 Practicum in School Psychology (1-6,1-6) *Prereq.: admission to doctoral program in school psychology. Each course may be taken for a max. of 6 sem. hrs. of credit. Pass-fail grading.* Closely supervised experience in schools in which students perform psychoeducational assessments, consult with teachers, and function as members of multidisciplinary teams; cases 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).

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

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 Psychotherapy 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.* Comm on assessment methods and empirically supported treatment procedures for the major adult behavior disorders.

7937 Seminar in Behavioral Neurology (3) *Prereq.: graduate standing in clinical psychology or consent of instructor.* Neuroanatomy of central nervous system and behavioral assessment techniques; neuropathology 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. of credit 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 examination. May be taken for a max. of 12 sem. hrs. of credit. Open only to graduate students nominated by the Department of Psychology and accepted by an approved internship organization. Pass-fail grading.* Supervised experience in an organization in the application of personnel and organizational psychology principles.

7958, 7959 Current Problems in Industrial Psychology (3,3) *Prereq.: consent of instructor. Each course may be taken for a max. of 12 hrs. of credit when topics vary.*

7968 Current Problems in School Psychology (3) *Prereq.: graduate standing in school psychology program or consent of instructor.* Research and methodological issues in school psychology; topics vary.

7969 Internship in School Psychology (1-6) *Prereq.: satisfactory completion of the general and language examinations and faculty approval. May be taken for a max. of 12 sem. hrs. of credit. One full academic year of supervised internship that is no less than 1,200 hours, half of which must be in a school setting; internship requirement may be fulfilled by completing one full academic year or two years of one-half-time internship experience; at least one hour per week is devoted to direct supervision of each intern. Pass-fail grading.*

7971 Advanced Techniques in Clinical Child Psychology (3) *Prereq.: PSYC 7125, 7171, and 7925; graduate standing in clinical or school psychology or consent of instructor.* Theory and principles of assessment and intervention in childhood psychopathology.

7972 Child Behavior Therapy (3) *Prereq.: PSYC 7171 or equivalent; graduate standing in clinical or school psychology or consent of instructor.* Behavioral treatment of children's behavior problems.

7973 School-Based Psychological Interventions (3) *Prereq.: graduate standing in psychology.* Survey of intervention strategies for various disorders and behavior problems displayed by children in school settings.

7978, 7979 Current Problems in Developmental Psychology (3,3) *Prereq.: consent of instructor. Each course may be taken for a max. of 12 hrs. of credit when topics vary.*

7982 Advanced Psychopathology (3) *Prereq.: PSYC 3082 or equivalent; graduate standing in clinical or school psychology or consent of instructor.* Theories of psychopathology, specific etiological hypotheses, and pertinent research evidence.

7983 Biological Variables in Psychopathology (3) *Prereq.: PSYC 4034 or equivalent; graduate standing in clinical or school psychology or consent of instructor.* Biological variables in major mental disorders; psychological variables in physical disorders.

7984 Special Topics in Advanced Techniques in Behavioral Medicine (3) *Prereq.: PSYC 7185; or consent of instructor. May be taken for a max. of 12 hrs. of credit when topics vary.* Assessment and treatment procedures used by behavioral clinicians in medical settings; issues in medical consultation and liaison.

7988, 7989 Current Problems in Clinical Psychology (3,3) *Prereq.: graduate standing in clinical psychology or consent of instructor. Each course may be taken for a max. of 6 hrs. of credit when topics vary.* Research and methodological issues.

7990 Teaching of Psychology (3) *Prereq.: graduate standing in psychology. Required of all doctoral candidates.* Seminar and supervised teaching experience; philosophy, theory, and practice in higher education with application to undergraduate instruction in psychology.

7997 Clinical Psychology Internship (3 or 6) *Prereq.: completion of course work and general examination. Open only to graduate 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) *Graduate standing in psychology. Required of all doctoral candidates.* Professional ethics, practice, and responsibility.

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

PUBLIC ADMINISTRATION • PADM

5010 Statistical Methods for Public Administration (3) *Prereq.: college algebra. 2 hrs. lecture; 2 hrs. 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.

5600 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 5600.* Concepts and analytical tools of microeconomics; their relevance for decision and policy making in public and nonprofit sectors; theories of demand, production, cost, market structures, and distribution; analysis of economic problems and policies, 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 POLI 7010 and ISDS 7010.* Models for decision making under conditions of certainty, risk, and uncertainty; statistical decision making with and without sample information; linear programming using graphical and simplex methods; transportation and assignment problems; project management using PERT and CPM; forecasting models; cost benefit analysis; current topics in public administration.

7610 Health Care Organization and Finance (3) Examination and analysis of organization, development, and operation of the U. S. health care delivery system; historical development of the delivery organization and how it is financed; current issues relating to financing, regulation, reimbursement, managed care systems, and system integration.

7620 Strategic Management of Health Care Organizations (3) *See MGT 7620.*

7640 Legal and Ethical Issues in Health Care Management (3) Legal and ethical issues in the delivery of health care including patients' rights, organizational responsibilities, malpractice issues, relationships among patient, providers and insurers, governmental influence in

health care management, patient-provider relationships, advancing technology and medical alternatives, working with limited resources, and organizational efforts to deal with ethical issues.

7710 Financial Management for Governments (3) Prereq.: *ACCT 4421 and ISDS 5010. Also offered as FIN 7710.*

7800 Independent Study in Public Administration (3) Prereq.: *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) Required of all 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 and submission of a research report to a member of the graduate faculty; internships selected with the assistance and approval of the director of M.P.A. program.

7900 Public Administration Colloquium (3) Required of all M.P.A. students in final semester of program; research project required. Legal, ethical, economic, political, and management principles used in assessing public administration topics; policy and administration issues.

7902 Seminar in Public Policy (3) Also offered as POLI 7902.

7910 Seminar in Public Administration (3) Also offered as POLI 7910.

7911 Organizational Analysis for Public and Nonprofit Organizations (3) Development of a functional understanding of the basic theories and principles necessary to manage and operate successfully the variety of agencies found in public and nonprofit sectors.

7912 Seminar in Public Personnel Administration Also offered as POLI 7912.

7914 Seminar in Public Budgeting (3) Also offered as POLI 7914.

7916 State and Local Government Administration (3) Also offered as POLI 7916. 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 services, and other topics.

7917 Seminar in Program Evaluation (3) Also offered as POLI 7917.

7920 Ethics in the Public Service (3) Examination and analysis of role that ethical behavior and moral reasoning play in the practice of public administration; overview of dominant schools of classical ethical thought, including works of Socrates, 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.

RELIGIOUS STUDIES • REL

General education courses are marked with stars (★).

1001 Beginning Hebrew (4) See HEBR 1001.

★ 1002 Beginning Hebrew (4) See HEBR 1002.

★ 1003 Introduction to Religion (3) Ways of being religious; nature of religious experience; nature and function of religious scripture, stories, beliefs, and rituals; role of religions in social and individual life.

★ 1004 Old Testament (3) Scholarly study of the Hebrew Bible (Old Testament) against 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 1003, with special honors emphasis for qualified students.

★ 2001 Faith and Doubt (3) Intellectual sources of religious doubt; alternatives to traditional Judeo-Christian religion, including existentialism, Freudianism, and psychological behaviorism.

★ 2003 Intermediate Hebrew (4) See HEBR 2003.

★ 2004 Intermediate Hebrew (4) See HEBR 2004.

2006 HONORS: Jesus in History and Tradition (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 Eastern 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 pervasive phenomenon in human societies; faith and reason, nature of divinity, arguments for and against God's existence, religious knowledge and experience, morality and cult, 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.

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 a 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 results of excavations 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.

3010 Special Topics in Religious Studies (3) May be taken for a max. of 6 hrs. of credit when topics vary.

3015 Christian Philosophy (3) See PHIL 3015.

3028 Mysticism (3) Mystical religious experience in eastern and western religion; some attention to shamanism and the occult; mystical grounds for belief in God.

3051 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.

3090 Comparative Mythology (3) See CLST 3090.

3100 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 and religious faith.

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 PSYC 3201. Use of various psychological theories to explain religious belief and practice, conversion experiences, ritual acts, and altered states of mind.

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 development of classical Islamic institutions and ideas, the diverse forms of Islamic religious and cultural life over the past fourteen centuries as the Islamic tradition has spread around the world.

4001 South Asian Society, Polity, and Culture (3) See INTL 4002.

4005 History of the Christian Church: 50-450 (3) Also offered as HIST 4005. Christianity's rise to prominence; its struggle against paganism; emphasis on institutional history of the church.

4006 History of the Christian Church: 450-1350 (3) Also offered as HIST 4006. Medieval Latin Christianity; emphasis on central role of the church in culture, politics, and social organization.

4010 Selected Topics in Religious Studies (3) May be taken for a max. of 6 hrs. credit when topics vary.

4011 The Age of Reformation (3) See HIST 4011.

4012 History of Modern Christian Thought (3) Prereq.: *one religious studies course. Also offered as HIST 4012.* Major figures in the history of Christian thought from the Reformation through the 19th century.

4031 Comparative Religions (3) See ANTH 4031.

4032 Religion, Gender, and Society (3) Also offered as ANTH 4032. Examination of the link between religious ideas and gender formulations within simple and complex societies and certain religious communities.

4050 A History of God (3) Traces the development of the concept of God from antiquity to the present.

4060 Ideas of the Afterlife (3) Traces the development of ideas concerning life after death in various traditions from antiquity to the present.

4095 The Middle East to 1800 (3) See HIST 4095.

4096 The Modern Middle East (3) See HIST 4096.

4125 History of Ancient Israel (3) Also offered as HIST 4125. Israelite history from its beginnings to the Christian era; readings from biblical and other ancient Near Eastern texts.

4161 History of Religion in the United States (3) See HIST 4161.

4171 Religion in Southern Culture (3) Religion as a component of Southern history and culture; emphasis on the religious culture of Louisiana.

4191 Religions of China and Japan (3) See HIST 4191.

4227 Contemporary Christian Thought (3) Major theologians and theological movements of the 20th century.

4228 Major Religious Thinkers (3) May be taken for a max. of 6 sem. hrs. of credit when topics vary. Concentrated study of the work of a religious thinker.

4236 Studies in Literature and Religion (3) See ENGL 4236.

4300 Theories of Myth (3) Theories from anthropology, sociology, psychology, and history of religion.

4350 Religious Ethics (3) Ethical issues derived from religious traditions.

4500 Seminar in Biblical Studies (3) Prereq.: *one course in Biblical studies. May be taken for a max. of 6 hrs. of credit when topics vary.*

4600 Hinduism (3) A survey of Hinduism from its origins to the present.

4800 Buddhism (3) Fundamental teachings from the Buddha to Zen; emphasis on Indian, Tibetan, and South and East Asian traditions.

4928 Augustine, Anselm, and Aquinas (3) See PHIL 4928.

4944 Philosophical Theology (3) See PHIL 4944.

4990 Independent Reading and Research (1-3) Open to advanced students with prior approval of faculty member who will direct the course. Student is responsible for selecting area of reading and research and gaining agreement of faculty member to direct the course. May be taken for a max. of 6 hrs. of credit when topics vary.

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 Asian 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 Relationship 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 Discussions of the ecological, economic, sociocultural, and political factors that affect human relationships with the natural environment and the exploitation and conservation of water, forest, range, wildlife, wetland, and fisheries resources.

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 1 hr. lecture; 6 hrs. lab. Students are responsible for paying for their transportation. Principal trees of the U.S.; their identification, classification, nomenclature, and distribution. Emphasis on southern timber species; common shrubs, ornamentals, woody vines, and some herbaceous plants will also be covered.

2002 Introduction to Fisheries and Aquaculture (3) F 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 interest groups.

2043 Wood Science and Forest Products (3) 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,Su Prereq.: Permission of instructor. May be taken for a max. of 4 sem. hrs. of credit. Topics covered vary with the needs of the student and availability of faculty.

2101 Ecology of Renewable Natural Resources (3) F Prereq.: BIOL 1202, 1209, 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.

3002 Silviculture (3) F Prereq.: RNR 2101. Basic knowledge of personal computers and e-mail is assumed. 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. A generalized approach to forest stand establishment and culture based on the ecological principles of regeneration and the identification of stand conditions that will satisfy specific goals and objectives for the forest.

3004 Photogrammetry, GPS and GIS (3) F Prereq.: Permission of department. 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. Principles, interpretation, and use of aerial photos, Global Positioning Systems (GPS), and Geographic Information Systems (GIS) in stand measurements and forest management applications.

3005 Field Studies in Wildlife Habitat (2) Intersession only. Prereq.: RNR 2001. Class meets 8 hrs. per day for 2 weeks at off-campus sites. Students are responsible for paying for their transportation. Identification of woody and herbaceous plants important to wildlife species and techniques used to quantify wildlife habitat; emphasis on collecting field data and plant identification in field setting to assess habitat quality for wildlife.

3018 Ecology of Louisiana Wildlife (4) S 2 hrs. lecture; 6 hrs. lab. Students are responsible for paying for their transportation. Habitat selection, food habits, and reproductive biology of selected species of amphibians, reptiles, birds, and mammals; emphasis on the diversity of niche exploitation strategies among these groups.

3034 Field Studies in Dendrology (1) S Prereq.: RNR 2001. One week of field practice. Students are responsible for paying for their transportation. Review of species studied in RNR 2001; 60 to 70 more species of trees, shrubs, and woody vines indigenous to the southeastern U.S. studied; herbarium collection required.

3036 Field Studies in Mensuration (2) S Prereq.: RNR 3102. Two weeks of field practice. Students are responsible for paying for their transportation. Exercises in designing and conducting timber and multipurpose cruises; boundary location and other types of land surveying associated with forest resource management.

3037 Field Studies in Silviculture (1) S Prereq.: RNR 2001, 3002, and 3102. One week of field practice. Students are responsible for paying for their transportation. Field tours of a range of forestry practices and field experiences in various silviculture practices.

3038 Field Studies in Timber Harvesting (1) S Prereq.: RNR 3002 and 3102. One week of field practice. Students are responsible for paying for their transportation. On-site studies of harvesting systems used in southern forestry; participation in timber harvesting; exercises in time and production.

3039 Field Studies in Wood Utilization (1) S Prereq.: RNR 2043, 3002, and 3102. One week of field practice. Students are responsible for paying for their transportation. On-site studies of wood manufacturing facilities; exercises in product/raw material relationships.

3040 Silvicultural Prescriptions (1) S Prereq.: RNR 3002 and 3102. One week of field practice. Students are responsible for paying for their transportation. 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 their transportation. May be taken for a max. of 4 sem. hrs. of credit. Field exposure to various aspects of forestry practices; intended for off-campus field, lab, workshop, or other intensive training in the field of forestry.

3044 Renewable Natural Resources Field Studies (1) S Prereq.: RNR 3002, 3102. One-week field trip. Students are responsible for paying for their transportation. Insight into management 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.

3102 Natural Resources Measurements (4) F Prereq.: EXST 2201 and MATH 1431. 3 hrs. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. Principles and sampling techniques in measuring renewable natural resources, such as trees, wood products, forest stands, wildlife and fisheries populations, and water quality.

3105 Forest Biology (2) S 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 ecological principles specific to the understanding of forest ecosystems and sustainable management of forests.

3106 Timber Harvesting (2) S 1 hr. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. This in 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) S Prereq.: RNR 3102. 1 hr. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. 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 purchasing and marketing timber crops; practicum of timber and pulpwood 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.

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) F Prereq.: RNR 2031 and EXST 2201. 2 hrs. lecture; 6 hrs. lab. Weekend field trips. Students are responsible for paying for their transportation. Population inventory and analysis; harvest management; methods to capture and determine species, sex, and age; immobilization and marking methods; measures of condition; surveys of human user groups; understanding the scientific method by generating hypotheses and predictions, reviewing literature, proposal writing, data collection and analysis, and writing a manuscript.

4013 Ecology and Management of Wetland Wildlife (2) S History and value of wetlands, waterfowl, fur animals, alligators, wetland habitat management.

4020 Taxonomy and Ecology of Wetland Plants (3) See BIOL 4020.

4021 Recreation in the Forest Environment (3) F Prereq.: senior standing. 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. 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) S Prereq.: 8 sem. hrs. of introductory chemistry and 8 sem. hrs. of introductory zoology and/or biology; or equivalent. 3 hrs. lecture; 3 hrs. lab with occasional extended field trips. Students are responsible for paying for their transportation. Principles underlying aquaculture of fish, crustaceans, and mollusks.

4023 Marine Fisheries Resources (3) S-O 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) F Prereq.: BIOL 1201, 1208 and CHEM 1201, 1202, 1212 or equivalent. Geomorphology, physiochemistry, biology, and ecology of inland waters.

4030 Tropical Forestry (1) V Distribution and characteristics of tropical forests; conservation and sustained management; managing the tropical forest resources of the world.

4032 Forest Fire Protection and Use (2) S 1 hr. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. 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 use; emphasis on southern forests.

4033 Silviculture and Management of Hardwoods (4) S Prereq.: RNR 3002 or consent of instructor. 3 hrs. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. Extended 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.

4035 Ecology and Management of Upland Wildlife (3) F 2 hrs. lecture; 3 hrs. lab; extended field trips. Students are responsible for paying for their transportation. Ecology and management of wildlife in upland habitat; recreational leasing of forest land; current issues related to upland wildlife.

4036 Forest Management (4) F Prereq.: ECON 2030 or AGE 2003 or equivalent, RNR 3036, 3037, and 3040. 3 hrs. lecture; 3 hrs. lab. Compounding and discounting; management of a single stand, even-aged and uneven-aged management, decision criteria, and decision variables, management of an existing stand; forest taxation and valuation; management of many stands; harvest scheduling.

4037 Biology of Fishes (3) S 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 AGE 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; international trade of forest products; demand for non-timber resources.

4039 Renewable 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; dynamics of exploited stocks; 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 2043 or equivalent. 2 hrs. lecture; 3 hrs. lab. Standard laboratory testing procedures, basic strength determination, working stresses, and timber design.

4045 Design and Control of Wood-Using Processes (3) V Prereq.: RNR 2043. Relationship of basic physical properties of wood to utilization processes involving machining, gluing, and finishing.

4046 Chemical Properties of Wood (4) V Prereq.: RNR 2043; and either CHEM 2060 or 2262. 3 hrs. lecture; 3 hrs. lab. Chemistry of wood, cellulose, lignin, and extraneous materials in wood and bark; chemical utilization and modification of wood.

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 treating industry.

4050 Industrial Forestry Operations (2) F Survey of major forest products corporations; upper management personnel; corporate structure, philosophy, strategy; business outlook, employment and personnel trends; wood procurement, land management, environmental concerns.

4051 Wildlife Habitat Management (3) S Prereq.: RNR 2001, 2031, and 3005. 2 hrs. lecture; 3 hrs. lab. One weekend field trip. Students are responsible for paying for their transportation. 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.

4055 Wildlife Policy and Law Enforcement (3) S International treaties, federal and state laws affecting wildlife resources; relationships between legislation and policy; current policy issues in wildlife and fisheries.

4061 Problems in Natural Resource Management (1-4) F,S,Su May be taken for a max. of 6 sem. hrs. credit. Independent or directed study.

4064 Forest Tree Improvement (3) F Prereq.: RNR 3002 or permission of instructor. Genetic basis of variation in natural populations of forest trees; principles for using this variation to obtain genetically improved trees for reforestation; techniques of genetic testing, selection, breeding, and genetic engineering; methods for *in situ* and *ex situ* conservation of genetic resources.

4101 Integrated Natural Resources Management and Policy (4) S Prereq.: RNR 4039 and senior status in School of Renewable Natural Resources. 2 hrs. lecture; 4 hrs. lab. Students are responsible for paying for their transportation. Development of problem solving skills for the management of renewable natural resources; application and integration of renewable natural resource management theory, policy and practices; analysis of management and policy decisions.

4102 Quantitative Silviculture (3) F Prereq.: RNR 3040. Techniques in growth-and-yield modeling, density management, and creation of desired stand conditions.

4103 Conservation Genetics (3) S Prereq.: BIOL 2153 or 3040. Application of genetic theory to the management of renewable natural resources; emphasis on fragmented populations, endangered species, maintenance of genetic variation.

4104 Forest Products Manufacturing (4) F Prereq.: RNR 2043. 3 hrs. lecture; 3 hrs. lab. Principles and techniques in the manufacture of forest products including lumber, treated materials, furniture, adhesive, and composite materials such as plywood, particleboard, medium density fiberboard, oriented strandboard, and engineered lumber.

4105 Aquaculture Production Systems (3) S Prereq.: BIOL 1201, 1208 or equivalent. General biology and culture techniques of the major global finfish, crustacean, molluskan, amphibian, and reptilian species.

4106 Techniques in Limnology and Fisheries (2) Prereq.: junior, senior, or graduate standing and permission of instructor. Taught Intersession only. 1 hr. lecture; 1 hr. lab. Students are responsible for paying for their transportation. Quantitative techniques in habitat, water quality, and fish population assessment in freshwater ecosystems.

4107 Human Dimensions in Natural Resources (3) F Prereq.: 6 hrs. social science general education electives. Human behavior as related to management and use of natural resources.

4145 Ichthyology (4) See BIOL 4145.

4600 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; silvics and silviculture of several major commercial species outside the southern U.S.

7003 Advanced Forest Soils (3) S-E Prereq.: AGRO 2051 or equivalent. 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for their transportation.

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 physiological processes affecting survival, growth, and yield of trees; interpretation of response of trees to environmental stresses.

7005 Ecophysiological Methods/Instrumentation (2) S-O Prereq.: credit or concurrent enrollment in RNR 7004 or PLHL 7014, or consent of instructor. 1 hr. lecture; 3 hrs. lab. Occasional extended field trips. Students are responsible for paying for their transportation. Research in whole-plant physiological ecology; presentation and use of selected field methods and instrumentation for eco-physiology or physiological plant ecology research.

7006 Behavioral Ecology (3) F-E Behavioral ecology of plants and animals; evolution of behavior; behavioral strategies for survival and reproduction; importance of behavior to management and conservation strategies.

7010 Nutrition of Aquatic Animals (3) S-E Prereq.: CHEM 2060 or 2261 or ANSC 4009. 2 hrs. lecture; 3 hrs. lab. Nutrition of cultured finfishes and shellfishes; nutrient requirements for growth and reproduction; digestion, metabolism, nutrition, and health interactions; feeds and feeding practices.

7011 Mammalian Ecology and Management (3) F 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. Management, ecology, and conservation of selected mammals of North America.

7012 Ecology and Management of Waterfowl (3) F-O 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. 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.

7013 Wildlife Population Dynamics (3) F-O Prereq.: EXST 7005 or equivalent. 2 hrs. lecture; 2 hrs. lab. Theories of population growth and regulation, population interaction, life tables, mortality rate calculation; band data analysis; population modeling.

7015 Ecology and Management of Upland Birds (3) F 2 hrs. lecture; 3 hrs. lab. Students are responsible for paying for their transportation. Ecology and management of selected upland birds found in North America; students will develop a comprehensive management plan for a selected species.

7018 Habitat Management Principles (3) S-O Principles of management applied to habitats, communities, populations, and species; habitat evaluation; endangered species; mitigation; global trends of habitat quality and change.

7020 Ecology of Fishes (3) S-E Prereq.: BIOL 4253 or equivalent. Ecology of fish populations; interactions of fishes and their environment; behavioral adaptations of fishes.

7025 Advanced Aquaculture (3) Su Prereq.: RNR 4022 or equivalent. 4 hrs. lecture; 6 hrs. lab with occasional extended field trips. Students are responsible for paying for their transportation. Systems and practices for maximizing production and profit of cultured aquatic species; emphasis on international aquaculture systems, exotic species, and preparation of management plan for commercial aquaculture.

7026 Shellfisheries Aquaculture (4) F-O Prereq.: RNR 4022 and BIOL 4154; or equivalent. 3 hrs. lecture; 3 hrs. lab. Principles and practices for culturing commercially important crustaceans and mollusks including soft crabs, marine shrimp, freshwater prawns, crawfish, oysters, clams, and mussels; emphasis on environmental requirements, facility development, hatchery and production management, budgets, and processing and markets.

7027 Genetics and Culture of Finfish (4) S-O Prereq.: RNR 4022 and BIOL 2153; or equivalent. 3 hrs. lecture; 3 hrs. lab. Practical culture techniques and methods of breeding for genetic improvement of commercially important finfish.

7029 Advanced Topics in Renewable Natural Resources (1-4) V May be taken for a max. of 6 sem. hrs. of credit when topics vary.

7036 Advanced Topics in Forest Biometrics and Forest Management (3) V Prereq.: EXST 7014 and RNR 4036; or equivalent. Theory and practices involved in predicting growth and yield of forest stands; applications of linear and goal programming, biometrics, and capital budgeting to timber and multiple-use management.

7041 Advanced Wood Science (4) V Prereq.: RNR 2043. 3 hrs. lecture; 3 hrs. lab. Topics in wood science, including review of selected literature; anatomical, physical, and chemical properties of wood, with emphasis on wood products.

7070 Graduate Seminar in Fisheries (1) F,S,Su May be taken for a max. of 4 sem. hrs. of credit when topics vary.

7071 Graduate Seminar in Forestry (1) F,S May be taken for a max. of 3 hrs. of credit. Pass-fail grading.

7072 Graduate Seminar in Wildlife (1) F,S,Su May be taken for a max. of 4 sem. hrs. credit when topics vary. Topics of current interest in wildlife science and management.

7320 Fisheries Oceanography (3) F See OCS 7320.

7424 Diseases of Aquatic Animals (3) Prereq.: consent of instructor. Basic microbiology and/or parasitology strongly recommended. 2 hrs. lecture; 2 hrs. lab. Same as PBS 7424. Identification, pathogenesis, and control of viral, bacterial, and parasitic agents causing diseases in aquatic animals.

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

8900 Research Problems in Natural Resources (1-3) F,S,Su May be taken for a max. of 6 sem. hrs. of credit. Pass-fail grading.

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

RUSSIAN • RUSS

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

General education courses are marked with stars (★).

***1001 Elementary Russian (5)** Pronunciation, oral-aural practice, elementary grammar, translation.

***1020 Russian for Reading Knowledge (5)** *Specialized course intended to satisfy departmental foreign language reading requirement for graduate students, but carrying no graduate credit. Undergraduates may enroll on pass-fail basis only. Does not count toward satisfying foreign language requirement for undergraduates, although hours may count toward baccalaureate. Credit will not be given for both this course and introductory Russian courses.*

★ *2051 Intermediate Russian (5) *Prereq.: RUSS 1001 or equivalent.* Pronunciation, oral-aural practice, completion of elementary grammar, translation.

★ *2053 Intermediate Russian (3) *Prereq.: RUSS 2051 or equivalent.* Continued oral-aural practice; readings and translation of Russian texts; vocabulary building.

★ *2055 Readings in Russian Literature (3) Russian literature and culture; readings in contemporary Russian materials.

★ 2075 Introduction to Russian Culture and Civilization (3) *Taught in English; knowledge of Russian not required. Also offered as HIST 2135.* Geography, history, religion, literature, music, art, architecture, and scientific and technological achievements of Russia.

3061 Advanced Russian Grammar (3) *Prereq.: RUSS 2055 or equivalent.* Vocabulary building, dictation, and readings of modern Russian prose.

3062 Advanced Russian Composition (3) *Prereq.: RUSS 3061 or equivalent.* Drill in oral and written original composition; attention to style, syntax, idioms, and inflections.

3071 Survey of Russian Literature (3) *Prereq.: RUSS 2055 or equivalent.* Russian literature from the beginning to the late 19th century.

3072 Survey of Russian Literature (3) *Prereq.: RUSS 2055 or equivalent.* Russian literature from the late 19th century to the present.

3401 The Fairy Tale (3) *Taught in English; knowledge of Russian not required.* Structure and substance of the traditional fairy tale; examples from German and Russian sources.

4002 Russian Language: Phonetics and Phonemics (3) *Also offered as LING 4606.* Phonologic elements of Russian; interrelation of consonants and vowels, syllabic division, and structure of the syllable; main types of stress and intonation; Russian script and various systems of phonetic transcription.

4030 Russian Literature: Novel (3) The Russian novel from its beginning to the end of the 19th century.

4031 Russian Literature: Novel (3) Special works of Turgenev, Dostoevsky, Tolstoy.

4061 Soviet Literature (3) Russian literature from 1917 to the present.

★ 4081 Russian Literature in Translation: 19th Century (3) *Knowledge of Russian not required.* Masterpieces of 19th century Russian literature, including the works of Turgenev, Dostoevsky, and Chekhov.

4082 Russian Literature in Translation: 20th Century (3) *Knowledge of Russian not required.* Masterpieces of 20th century Russian literature, pre- and post-Revolution, including the works of four Nobel Prize winners of literature: Bunin, Pasternak, Sholokhov, and Solzhenitsyn.

4915 Independent Work (1-3) *May be taken for a max. of 6 sem. hrs. of credit. Permission of department required.* Readings in Russian literature directed by a senior faculty member.

7003 Seminar in Russian Literature (3) *May be taken for a max. of 15 hrs. of credit when topics vary.*

SOCIAL WORK • SW

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; history, description of programs in contemporary American society; role of the social worker in meeting social needs.

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.

3002 The Child and the Community (3) Common and particular needs of children in the community; social welfare services developed by communities for care and training of children.

3003 Skills in Working with People (3) Basic skills in working with people; understanding attitudes; use of community resources.

3007 Juvenile Delinquency (3) Nature and extent; sociological and psychological 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; assisting the aged in obtaining services; implications for the future.

4000 Modern India: Society and Culture (3) Also offered as *GEOG 4000*. Interdisciplinary analysis of politico-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.

4005 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 sem. 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 sem. hrs. of credit when topics vary.

4090 Corrections Internship (3) Prereq.: 2.50 gpa, 60 hrs. of course work, three hrs. from *SW 4020, 4022, 4080, or consent of instructor*. Pass/fail grading. Field study/placement in a corrections institution under the supervision of a faculty member.

4099 Individual Readings in Corrections (3) Prereq.: 2.50 gpa, 60 hrs. of course work, 3 hrs. from *SW 4020, 4022, 4080, or consent of instructor*. May be taken for a max. of 6 hrs. of credit.

4500 Crisis Intervention (3) Introduction to major theories and research that describes and explains the range and complexity of problems that may emerge from natural or other disaster scenarios.

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*. Socio-behavioral science base of social work practice; interrelationship of biological, psychological, social, and cultural determinants of human behavior; major biopsychosocial developmental achievements and adaptations of human beings from conception through death.

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*. Social science base of social work practice; social systems in which human beings develop and live; focus on research related to social interaction.

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, 7003, 7005, and 7007*. Social dynamics of human

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, 7003, 7004, and 7007*. Introduction to social work theory, principles, and intervention skills common to social work practice with individuals and families; psychosocial perspectives in intervention.

7006 Social Work Practice II (3) Prereq.: *SW 7005*. Majors only and credit for or concurrent registration in *SW 7002, 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, 7003, 7004, and 7005*. 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, 7009, 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, 7006, 7008, and 7010*. Standards and methods of scientific inquiry applied in social work research; concept formulation; research design; sources, collection, and presentation of data.

7010 Differential Diagnosis (3) Prereq.: majors only and credit for or concurrent registration in *SW 7002, 7006, 7008, and 7009*. Diagnostic and treatment tools for examining the functionality of human behavior in the context of diverse social systems.

7200, 7201 Integrative Colloquium in Social Work I, II (3,3) Prereq.: admission to the Ph.D. program in social work or consent of instructor. Broad-ranging 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 agendas.

7205 Pedagogical Issues in Social Work Education (3) Prereq.: admission to the Ph.D. program in social work or consent of instructor. Enhancement of pedagogical knowledge, skills, and values; emphasis on teaching for the social work profession.

7206 Research Practicum (3-9) Prereq.: admission to the Ph.D. program in social work or consent of instructor; *SW 7203* and at least one of *EXST 7003, 7013, or SW 7435*. No more than 6 hrs. may be taken in one semester. Hands-on supervised research experience; demonstration of collaborative and/or independent research.

7306 Advanced Social Work Treatment of Individuals (3) Prereq.: *SW 7006*. Differential diagnostic assessment and treatment of individuals with complex intrapersonal problems.

7307 Direct Practice with Children and Adolescents (3) Prereq.: completion of all foundation courses. Maladaptive patterns of behavior in children and adolescents; 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 aspects; 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 marriage and family relations.

7409 Law and Social Work (3) Prereq.: completion of all foundation courses. Relationship of law to social work; statutes, cases, and doctrinal 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; design 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 management skills.

7501 Program and Practice Evaluation (3) Prereq.: completion of all foundation courses; majors only and credit for or concurrent registration in *SW 7502, 7503, 7504, 7505, and 7506*. Types of research, designs, and instruments used in social work; research processes from specification to hypotheses and collection of data.

7502 Advanced Field Internship I (3) Prereq.: majors only and credit for or concurrent registration in *SW 7501, 7503, 7504, 7505, and 7506*. 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 7501, 7502, 7504, 7505, 7506*. Pass-fail grading. \$100 internship fee. Continuation of *SW 7502*. Supervised internship in an approved agency setting where advanced knowledge, skills, values, and ethics are applied in the practice setting. 240 clock hours.

7504 Advanced Social Policy (3) Prereq.: majors only and credit for or concurrent registration in *SW 7501, 7502, 7503, 7505, and 7506*. Dimensions and patterns of social policy; evolution and design of provisions and services; current issues, problems, and trends.

7505 Advanced Direct Practice (3) Prereq.: completion of all foundation courses. Majors only and credit for or concurrent registration in *SW 7501, 7502, 7503, 7504, and 7506*. Advanced methods of effective individual, family, and group treatment of systemic issues in a holistic perspective.

7506 Advanced Indirect Practice (3) Prereq.: majors only and credit for or concurrent registration in *SW 7501, 7502, 7503, 7504, and 7505*. Community, organizational, and social aspects of social work practice; indirect practice skills associated with effective social work practice in multiple service environments.

7710 Task-Oriented 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 interventive 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 in 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.

7905 Independent Reading and Research in Social Work Practice (3) Prereq.: consent of instructor. May be repeated once by Ph.D. students if topics vary.

7906 Independent Reading and Research in Social Welfare Policy (3) Prereq.: consent of instructor. May be repeated once by Ph.D. students if topics vary.

7907 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.

7908 Social Development: International Perspectives (3) Concepts of social development; extent of social underdevelopment in the modern world; theories and normative perspectives; social and national planning.

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.

9000 Dissertation Research (1-12 per sem.) Prereq.: successful completion of the General Examination. "S"/"U" grading.

SOCIOLOGY • SOCL

In this department, the second digit of the course number denotes the subject area of the course, as follows: 0—general courses; 1—theory; 2—methods and statistics; 3—social organization; 4—social institutions; 5—social issues; 6—social interaction; 7—population and ecology; 8—not used; and 9—reading and research (except for thesis research and dissertation research that are numbered 8000 and 9000, respectively).

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 (3) Sociological analysis of knowledge generation, institutions of science and technology, and public understanding of science.

1701 Population Issues (3) Social demography; interrelationships between population and society.

★ **2001 Introductory 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) 3 hrs. lecture; 2 hrs. lab. Prereq.: MATH 1021 or equivalent. 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. 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.

★ **2411 Industrial Sociology (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 AAAS 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 ordeal of change.

3101 Sociological Theory (3) Prereq.: SOCL 2001 or equivalent. 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 and its organizational components.

3501 Sociology of Deviance (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, correlates, and consequences; strategies for its amelioration and elimination.

★ **3601 Social Interaction (3)** Prereq.: SOCL 2001 or PSYC 2000 or equivalent. Human behavior as social interaction.

3605 Collective Behavior (3) Prereq.: SOCL 2001 or equivalent. Sociological analysis of noninstitutionalized group behaviors; crowds, panics, fads, hostile outbursts, and social movements.

3900 Sociology Internship (1-3) Prereq.: 75 hours of course work completed, 2.50 overall gpa, written consent of department head and supervising faculty member; may be taken for a max. of 3 hrs. of credit. Faculty supervised field study/research with an agency or organization whose mission is considered relevant to the student's curriculum.

3901 Directed Reading and Research in Sociology (1-3) Prereq.: SOCL 2001 or equivalent. May be taken for a max. of 3 sem. hrs. credit. Student registers with a faculty member before registration to select the area of reading or research. Topic must not substitute for regularly offered courses unless reading goes beyond a standard course's offerings.

3905 HONORS: Senior Thesis Research (3) Prereq.: SOCL 3901; open to seniors who are candidates for a bachelor's degree with honors in sociology. Supervised research and preparation of a senior thesis.

3911 Research Practicum in Rural Sociology (1-3) Prereq.: SOCL 2211, 2351, and 3101. May be taken for a max. of 3 sem. hrs. credit. Student registers with a faculty member and, in consultation, selects a research problem. Supervised research experience in rural sociology, including design, execution, and reporting.

4011 Applied Social Research (3) Prereq.: SOCL 2001 or equivalent; 2201 or equivalent; and 2211 or equivalent. The use of sociological and social science knowledge and research techniques to understand the problems individuals and groups face in modern advanced industrial societies and to help ameliorate these problems through structural changes in social policies and practices.

4091 Selected Topics in Sociology (1-3) Prereq.: SOCL 2001 or equivalent. May be taken for a max. of 3 sem. hrs. of credit when topics vary.

★ **4111 Development of Social Thought (3)** Prereq.: SOCL 2001 or equivalent. Early social thought contributing to classical and contemporary sociology.

4211 Intermediate Research Methods (3) Prereq.: SOCL 2211 or equivalent. Also offered as PSYC 4017. Techniques and procedures in sociological research; alternative research designs, measurement, sampling procedures, observation, data collection procedures, coding, data processing, and analysis procedures.

4301 Social Organization (3) Prereq.: SOCL 2001 or equivalent. Structure and function of social systems and institutions.

4311 Complex Organizations (3) Prereq.: SOCL 2001 or equivalent. Bureaucracies and complex formal organizations; theories, goals, structure, processes, organizational behavior, and interaction of organizations with the environment.

4321 The Community (3) Prereq.: SOCL 2001 or equivalent. Classical and contemporary perspectives on the community; theoretical and methodological issues associated with community studies.

4331 Social Stratification (3) Prereq.: SOCL 2001 or equivalent. Class and rank structure in society; determinants of social class, mobility, and changes in class position of both individuals and groups; attitudinal and behavioral consequences of class position.

4341 Social Change (3) Prereq.: SOCL 2001 or equivalent. Major theoretical and empirical problems in the study of social change.

4351 Rural Social Organization (3) Prereq.: SOCL 2001 or 2351 or equivalent. Social organization in rural societies: groups, organizations, institutions, and communities.

4401 The Family (3) Prereq.: SOCL 2001 or equivalent. The family as a social institution.

4402 Modeling Communication Within Marital and Family Relationships (3) See CMST 4118.

4411 Sociology of Work (3) Prereq.: SOCL 2001 or equivalent. Work and the division of labor in industrial society; sociology of occupations and professions.

4413 Gender and Work (3) Prereq.: SOCL 4411 or 4521 or equivalent. Gender differences in workforce participation and occupational and earnings attainments; impact of historical, legal, and social factors on women's and men's employment and career options, pay equity, and occupational experiences.

4421 Political Sociology (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 socialization within schools.

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 function 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.

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 health 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. Interaction of social structures, such as the family, peer group, and school, with the personalities of individuals; processes by which each affects the other.

4611 Attitudes and Attitude Change (3) Prereq.: SOCL 3601 or PSYC 3140 or equivalent. Analysis of attitudes; social factors in their formation and change.

4621 Small Groups (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. Exposition and evaluation of theory of social organization; emphasis on interdependence of population, technology, and organization in adaptation of 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 ranging from structural functionalism to 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.: SOCL 7201 or equivalent. Also offered as POLI 7963. Survey of advanced methodology in the social sciences; emphasis on general linear model and causal models.

7211 Seminar: Methods of Social Investigation (3) Prereq.: EXST 7003 or equivalent. Research methods in the social sciences; interplay of theory and methods of research; formulation of research problems and design; measurement and scaling; sampling; ethics in research; and critiques of social science research.

7213 Specialized Topics in Social Science Methods (2-3) Prereq.: SOCL 7203 or POLI 7963 or equivalent. May be taken for a max. of 12 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 9 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 (3,3) Prereq.: successful completion of at least one year of graduate work.

7903 Proseminar in Sociology (1) Required twice of both master's and Ph.D. candidates. Pass-fail grading. Contemporary research and critical issues in sociology.

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

8900 Research in Sociology (1-6) 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 (★).

***1050 Elementary Spanish (4) F,S,Su** For students with previous study of Spanish who did not place into SPAN 1102 through the Spanish Placement Examination. Credit will not be given for this course and SPAN 1101. Material covered in SPAN 1101 is covered in 1050. Supplementary work in language laboratory. Basic lexicon and structure of Spanish; emphasis on communicative language use.

***1101 Elementary Spanish (4)** For students with no previous study of Spanish. Students with previous study of Spanish should enroll in SPAN 1050. Credit will not be given for this course and SPAN 1050. Supplementary work in language laboratory. Basic lexicon and structure of Spanish; emphasis on communicative language use.

★ 1102 Elementary Spanish (4) F,S Prereq.: SPAN 1050 or 1101 or equivalent. Supplementary work in language laboratory. Basic lexicon and structure of Spanish; emphasis on communicative language use.

2001 Spanish for Travelers (3) Su Credit not applicable toward a major in Spanish. Does not count toward satisfying foreign language requirement for undergraduates. Basic communication patterns; practical everyday vocabulary, with exercises in comprehension and conversation.

★ *2101 Intermediate Spanish (3) F,S,Su Prereq.: SPAN 1102 or equivalent. An honors course, SPAN 2103, is also available. Continuation of elementary Spanish. Additional emphasis on reading and writing.

★ *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 Same as SPAN 2101, with special honors emphasis for qualified students.

★ *2104 HONORS: Intermediate Spanish (3) F,S 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 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 consent of instructor.

3001 Tutoring Learners of Spanish as a Second Language (1) Prereq.: SPAN 2155 or equivalent, EDCI 2001 and concurrent enrollment in EDCI 3001. 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.: EDCI 3001, SPAN 3001, and concurrent enrollment in EDCI 3002. 3 hrs. 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 language lessons that incorporate audio-visual materials and technology-enhanced language learning activities.

3010 Advanced Spanish Grammar and Composition (3) Prereq.: SPAN 2155.

3020 Literary Analysis (3) F,S Prereq.: SPAN 2155 or equivalent. Literary genres and their characteristics; critical reading and commentary of Spanish texts.

★ 3043 Introduction to Latin American Literature I (3) Reading and analysis of representative selections from pre-Columbian through independence.

★ 3044 Introduction to Latin American Literature II (3) Reading and analysis of representative selections from independence to the present.

3070 Spanish for Professionals (3) F,S 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 Spanish literature from its beginning to the 18th century.

★ 3072 Survey of Spanish Literature (3) S Main authors and literary movements from the 18th century to the present.

3073 Advanced Readings on Spanish Civilization (3) F Ethnological, geographical, historical, political, economic, and sociological factors necessary for understanding Spanish literature.

3074 Advanced Readings on Hispanic-American Civilization (3) S Parallels SPAN 3073, but focuses on the Hispanic-American countries.

3980 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) Su 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 undergraduates, although hours may count toward baccalaureate. Credit will not be given for both this course and introductory Spanish courses.

4003 Instructional Strategies for the Second Language Spanish Classroom (1) Prereq.: EDCI 3002, SPAN 3002, and concurrent enrollment in EDCI 4003. 3 hrs. lab/field experiences in multicultural settings. Teacher candidates will study and participate in activities that incorporate different classroom interactional 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.: EDCI 4003, SPAN 4003, and concurrent enrollment in EDCI 4004. Teacher candidates should be in the last two semesters on completion of the requirement for a major in Spanish. 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 3010 or equivalent. Spanish morphology and syntax; structuralist, sociolinguistic, 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 juglaría*, *mester de clerecía*, 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.

4053 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 prose.

4054 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.

4063 Spanish Literature from 1898 to 1936 (3) Prereq.: SPAN 3071 or 3072. Literature in all genres from the early Modernists to the Avant Garde.

4064 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, Laforet, and Gironella.

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.

4100 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.

4145 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 modernism (1810-1915).

4146 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.

4147 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.

4200 Literature and Culture of Hispanics in the United States (3) Texts may be in English or Spanish. Selected periods, themes, and genres; related cultural topics.

4201 Cinema in Spanish (3) F,S Prereq.: consent of instructor. Screening and analysis of representative films from Spain and Latin America and their interrelations with literature.

4400 Topics in Hispanic Cultural Studies (3) V May be taken for a max. of 6 sem. hrs. of credit when topics vary. Hispanic literary texts in relation to such 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.

4603 Applied Spanish Linguistics (3) Prereq.: SPAN 3060. Structures and communicative functions of Spanish; classroom applications.

4915 Independent Research in Spanish or Spanish-American Literature (1-3) May be taken for a max. of 3 sem. hrs. credit. Permission of department required. Readings in Spanish or Spanish-American literature directed by a senior faculty member.

4917 Independent Research in Spanish or Spanish-American Linguistics (1-3) May be taken for a max. of 3 sem. hrs. credit. Permission of department required. Readings in Spanish or Spanish-American linguistics.

7930 Studies in Medieval Spanish Literature (3) V With consent of department, may be taken for a max. of 6 hrs. of credit when topics vary.

7940 Topics in Spanish American Literature: Beginnings to 19th Century (3) V With consent of department, may be taken for a max. of 6 hrs. of credit when topics vary.

7946 Topics in Spanish American Literature: 19th Century to the Present (3) V With consent of department, may be taken for a max. of 12 hrs. of credit when topics vary.

7950 Special Topics in Golden Age Spanish Literature (3) V With consent of department, may be taken for a max. of 6 hrs. of credit when topics vary.

7961 Special Topics in Modern Spanish Literature (3) V With consent of department, may be taken for a max. of 12 hrs. of credit when topics vary.

7970 Comparative Studies in Hispanic Literature (3) V With consent of department, may be taken for a max. of 6 hrs. of credit when topics vary.

7980 Special Topics in Hispanic Linguistics (3) When topics vary, may be taken for a max. of 6 hrs. of credit for the master's degree and 9 hrs. of credit for the doctorate. Topics to be announced.

7982 Spanish Language Variation (3) May be taken for a max. of six sem. hrs. with consent of department. Socio-linguistic perspectives and methodology in the analysis of Spanish language variation.

7983 Spanish Language Acquisition (3) V Theories and discourse perspectives in second language acquisition.

7984 Spanish in the United States (3) Spanish in contact with English language use, variation, and change; social and individual bilingualism.

7985 Research in Hispanic Linguistics (3) May be taken for a max. of 6 sem. hrs. of credit with consent of department. Scholarly investigation guided by departmental graduate faculty.

7990 Special Topics in Hispanic Criticism (3) V With consent of department, may be taken for a max. of 6 hrs. of credit when topics vary.

7991 Literature and Politics in the Modern Hispanic World (3) F.S. Study of Spanish and Spanish-American cultural politics through its literary manifestations.

7992 Theatre in the Modern Hispanic World (3) Study of Hispanic dramatic literature, examination of theatre traditions and dramatic theories from a cultural perspective.

7993 Literature and Religion in the Hispanic World (3) Prereq.: SPAN 3071 and/or 3072. Study of religious and spiritual systems in literature.

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

SWAHILI • SWAH

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

General education courses are marked with stars (★).

***1001 Elementary Swahili Language and Culture I (4)** Also offered as AAAS 1001. Introduction to Eastern Africa and its cultures; basic lexicon and structures of Swahili; emphasis on communicative language skills.

★ *1002 Elementary Swahili Language and Culture II (4) Prereq.: SWAH 1001. Also offered as AAAS 1002. Increased emphasis on speaking, reading, writing, and deepening appreciation of Swahili's role in Eastern African socio-cultural development.

★ *2003 Intermediate Swahili Language and Culture III (4) Prereq.: SWAH 1002. Also offered as AAAS 2003. Further mastery of grammar; development of reading skills and analysis of contemporary texts.

★ *2004 Intermediate Swahili Language and Culture IV (4) Prereq.: SWAH 2003. Also offered as AAAS 2004. Further development of skills in reading and analyzing contemporary texts and more difficult forms of expressions, such as Swahili poetry and traditional literary texts.

SYSTEMS SCIENCE • SYSC

7090 Systems Science Design Project (1-9) Prereq.: minimum of 12 sem. hrs. earned toward the systems science degree. Individual design, development, implementation, and documentation of a project applying systems techniques, possibly involving computing, to a problem in the student's specialization.

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

THEATRE • THTR

General education courses are marked with stars (★).

1001 Practical Elements of Stagecraft (3) 6 hrs. lab. Introduction to the skills and techniques used by artists and craftsmen in realization of the technological elements of all areas of live production, including training sessions in each of the main areas and departmental productions.

★ 1020 Introduction to Theatre (3) The arts of the theatre and its artists; acting, directing, costume and scenic design; playwrighting, 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 (1) 3 hrs. lab. May be taken for a max. of 2 hrs. of credit.

1131 Beginning Ballet (1) 3 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 (1) 3 hrs. 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 (1) 3 hrs. lab. May be taken for a max. of 2 hrs. of credit.

1800 Introduction to Dance (3) Dance 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 theatrical stage manager; emphasis on 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.

2026 Theatre Practicum I (1) 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 4136 may be taken for undergraduate credit. Participation in performance or production of a play produced by the Department of Theatre.

2027 Stage Voice: Basic Techniques (3) Development of the speaking voice through physical awareness, breath release, phonation, resonance, and articulation to meet theatre performance standards.

★ 2028 Introduction to Dramatic Literature (3) A study of representative plays from the Greek era to the present.

2030 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.

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 work of composers, lyricists, designers, 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 scene work.

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 stage combat.

3121 Development of Theatre and Drama I (3) Historical survey of the development of theatre and drama from ancient Greece 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 theatrical scenery and properties.

3435 Scene Painting I (3) Prereq.: THTR 2022, 2024. 1 hr. 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 sound and audio; 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 State Lighting Technology (3) Prereq.: THTR 2022, 2024. 2 hrs. lecture; 2 hrs. lab. Introduction to the technical and mechanical elements of stage lighting technology in both analog and digital formats.

3802 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 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, state management, administration, box office, or casting.

3830 Technical Drafting for the Theatre (3) Prereq.: THTR 2022, 2024. 2 hrs. lecture; 2 hrs. lab. Drafting conventions and techniques used for depicting common scenic elements.

3900 Selected Topics in Theatre (3) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit when topics vary. Consult Schedule of Classes for current offering.

4008 Writing Drama (3) See ENGL 4008.

4020 Women and Theatre (3) Survey of western drama by and about women; female characters and playwrights in past and present drama of Europe and America.

- 4024 Directing I (3)** Prereq.: THTR 2022, 2025, and 2028; or equivalent. Director's problems of script analysis, characterization, and scene visualization.
- 4025 Acting: Scene Study (3)** Prereq.: THTR 3025. 2 hrs. lecture; 3 hrs. lab. Open on to Theatre performance majors. Technique of developing an actor's score for a role.
- 4120 Drama from Aeschylus to Ibsen (3)** Prereq.: THTR 2028.
- 4121 Drama from Ibsen to the Present (3)** Prereq.: THTR 2028.
- 4123 Costume Design (3)** Principles of design related to stage costumes; design research, creative interpretation; adapting costumes to theatrical styles of production; inspiration from designs of the past.
- 4124 Scenic Design (3)** Basic principles of scenic design for the theatre; form, style, color, and lighting; sketches, renderings, and models.
- 4125 Directing II (3)** Prereq.: THTR 4024 or equivalent. Principles of play selection, concept formulation, casting, rehearsal, and directing plays and scenes in workshop performance.
- 4127 Styles of Acting (3)** Prereq.: THTR 4025 and permission of department. Fundamental techniques of acting; acting styles required by plays of the Greek, neoclassical, Elizabethan, and modern periods.
- 4131 Seminar: Contemporary Theatre and Drama (3)** Su May be taken for a max. of 6 hrs. of credit when topics vary. Selected topics in the contemporary theatre.
- 4134 Advanced Scenery Construction (3)** Prereq.: THTR 3134 or equivalent. 2 hrs. lecture; 2 hrs. lab. An advanced examination into the construction of both theatrical and nontheatrical scenery.
- 4135 Structures and Materials for the Stage (3)** Prereq.: THTR 3134 or equivalent. A detailed study of structural methods and materials available to the theatre technician.
- 4136 Theatre Practicum II (1)** May be taken for a max. of 3 hrs. of credit. No more than a total of 3 hrs. of THTR 2026 and 4136 may be taken for undergraduate credit. Participation in performance or production of a play produced by the Department of Theatre.
- 4144 Performance Art (3)** See CMST 4144.
- 4220 Black Drama and Theatre (3)** Also offered as ENGL 4220. Study of the form and characteristic features of black drama and theatre, as expressed in African and New World cultures.
- 4435 Scene Painting II (3)** Prereq.: THTR 3435 or equivalent. 1 hr. lecture; 4 hrs. lab. (IA) Contemporary scene painting for the stage; emphasis on advanced projects.
- 4436 History of Theatrical Design (3)** Prereq.: THTR 2022. Historical survey of theatre with emphasis on the development of lighting, costume and scenic design for the Greek theatre to the present; focus on individual designers important to each discipline.
- 4500 Musical Theatre Production (1-3)** See MUS 4500.
- 4530 Sound Design (3)** Prereq.: THTR 3530 or consent of instructor. 2 hrs. lecture; 2 hrs. lab. Sound design principles and techniques; their effect on production.
- 4531 Lighting Design I (3)** Lighting design for the theatre; emphasis on script analysis, production concepts, and visual ideas.
- 4801 Dance History (3)** Prereq.: THTR 1800 or consent of instructor. Development of dance from primitive cultures to the present.
- 4804 Dance Theatre (2)** 6 hrs. lab. May be repeated for credit every semester. Admission by audition. Experienced modern dancers participate in modern dance theatre as lead dancers and as choreographers.
- 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. lecture; 2 hrs. lab. Introduction to the fundamentals of AutoCAD drafting and its use in the theatre industry.
- 4901 Special Projects in Theatrical 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 production projects required by instructor prior to registration. Execution of practical production projects in theatrical technology.
- 7001 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 with close 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.
- 7220, 7221 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. (IIB) Acting demands of *commedia dell'arte*, comedy of manners, and farce; scene work with selected plays.
- 7224, 7225 Acting Studio IIIA, IIIB (2,2)** Prereq.: THTR 7223. (IIIA) Special acting problems and stretch 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. Development of vocal process through exercises in relaxation, alignment, and breathing; basics in speech articulation.
- 7228 Voice for the Actor II (3)** Prereq.: admission to the M.F.A. program. 2 hrs. lecture; 2 hrs. lab. Further development for the actor's resonance, pitch, range, and articulation; improvisations with texts.
- 7229, 7230, 7231 Voice for the Actor III, IV, V (3,3,2)** Prereq.: THTR 4228 or equivalent. 2 hrs. lecture; 2 hrs. lab. (III) 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 problems.
- 7233 Stage Movement III (4)** Prereq.: admission to M.F.A. program or consent of instructor. 3 hrs. lecture; 2 hrs. lab. Preparation and integration of the actor's body in spatial awareness, flexibility, realignment, gesture, and body composition.
- 7234 Stage Movement IV (3)** Prereq.: admission to M.F.A. program or consent of instructor. 3 hrs. lecture; 1 hr. lab. Continuation of THTR 7233 with additional work on ballet, Tai Chi, physical improvisation, and dance.
- 7235, 7236 Stage Movement V, VI (3,3)** Prereq.: THTR 7234 or equivalent. 2 hrs. lecture; 2 hrs. lab. (V) Unarmed and armed stage combat techniques. (VI) Period styles: manners, mores, dance forms, and social understandings in movement for major epochs of theatre from the Dark Ages through the 18th century; advanced stage combat.
- 7237, 7238 Stage Movement VII, VIII (3,3)** Prereq.: THTR 7236 or equivalent. 2 hrs. lecture; 2 hrs. lab. (VII) Continued movement styles with focus on Greek, *commedia dell'arte*, 19th century, and experimental theatre. (VIII) Exposure to major trends in movement as performance material.
- 7320, 7321 Directing Seminar IA, IB (3,3)** Prereq.: admission to M.F.A. directing program or consent of instructor. 2 hrs. lecture; 2 hrs. lab. (IA) Stage director's study of a script in preparation for creating an approach to production. (IB) Translating a play's text and director's approach into dynamic images on stage; one act of a realistic play mounted on workshop level.
- 7322, 7323 Directing Seminar IIA, IIB (3,3)** Prereq.: THTR 7321. (IIA) Director's approach to varying styles of production. (IIB) Director's approach to Shakespearean and Jacobean drama; acts from plays presented on the workshop level.
- 7324, 7325 Directing Seminar IIIA, IIIB (2,2)** Prereq.: THTR 7323. (IIIA) Current practices in directing techniques in world theatre. (IIIB) Current practices in directing techniques in American theatre.
- 7420 Director/Designer Communication (3)** Prereq.: admission to M.F.A. program or consent of instructor. Methods of communication between directors and designers explored through a series of pre-production projects.
- 7421 Advanced Scene Design I (3)** Prereq.: admission to M.F.A. design technology program or consent of instructor. Preparation and presentation of scene design projects; emphasis on script analysis, developing the ground plan and elevations.
- 7422, 7423 Advanced Scene Design IIA, IIB (4,4)** Prereq.: THTR 7421. (IIA) Preparation and presentation of scene design projects; emphasis on period and style. (IIB) Emphasis on opera, ballet, musical theatre.
- 7431, 7432 Rendering for the Theatre IA, IB (3,3)** Prereq.: admission to M.F.A. design technology program or consent of instructor. 1 hr. lecture; 4 hrs. lab. (IA) Drawing and rendering techniques for scenic, costume, and lighting designers; emphasis on basic design elements and use of various media. (IB) Emphasis on methods of presentation.
- 7518 Studies in American and European Dress (3)** See also HUEC 7518. 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 HUEC 7519.
- 7520 Seminar in American Dress: 1880 to Present (3)** See HUEC 7520.
- 7521, 7522, 7523 Advanced Costume Design I, II, III (4,4,4)** 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 ballet, opera, musical theatre.
- 7524 Advanced Costume Technology I (4)** Prereq.: admission to M.F.A. design technology program or consent of instructor. 2 hrs. lecture; 4 hrs. lab. Advanced problems in the planning and construction of historical costumes for the theatre, with emphasis on pattern drafting and draping.
- 7525, 7526, 7527 Advanced Costume Technology II, III, IV (3,3,3)** Prereq.: admission to M.F.A. design technology program or consent of instructor. (II) Advanced planning and construction of costumes for the theatre; emphasis on historical construction, cutting, and tailoring. (III) Emphasis on selection, modification, and preparation of fabrics for stage costumes. (IV) Emphasis on costume accessories including millinery, footwear, armor, and jewelry.
- 7623, 7624 Theatre Technology Seminar IA, IB (3,3)** Prereq.: admission to M.F.A. design technology program. (IA) Advanced techniques used on stage and in the scene shop. (IB) Techniques using electronics and optics for the stage.
- 7625, 7626 Theatre Technology Seminar IIA, IIB (3,3)** Prereq.: admission to M.F.A. design technology program. (IIA) Emphasis on theatre architecture and theatrical consulting. (IIB) Emphasis on roles and responsibilities of the technical director and on preparation to enter the professional world.
- 7630 Directed Professional Internship (1-12)** Prereq.: third-year status in theatre M.F.A. program. 2-24 hrs. lab. Pass-fail grading. A theatre-related internship with a professional organization or business (lighting manufacturer, professional theatre, computer company).
- 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: Realism to Contemporary (3)** May be taken for a max. of 6 hrs. of credit when topics vary.
- 7913 Seminar in 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 sem. 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 sem. 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 Theatre 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 (1-12 per sem.) "S"/"U" grading.

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

UNIVERSITY • UNIV

Unique courses of timely and general interest are offered periodically as "University" courses. These courses are interdisciplinary, broad in scope, and centered on topics of current concern. Permission to offer a UNIV course must be obtained from the Office of 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.

VETERINARY CLINICAL SCIENCES • VCS

7001 Seminar: Veterinary Clinical Sciences (1) *V Prereq.: D.V.M. or equivalent degree or consent of instructor. May be taken for a max. of 8 hrs. of credit when topics vary.* New developments in veterinary internal medicine, surgery, dermatology, ophthalmology, cardiology, neurology, theriogenology, and laboratory/exotic animal medicine.

7002 Research Techniques in Veterinary Clinical Sciences (1-4) *Prereq.: appropriate 4000- or 5000- level course in selected topic or equivalent and consent of instructor. May be taken for a max. of 6 sem. hrs. when topics vary.* Specialized research techniques related to a specific discipline of veterinary clinical sciences.

7003 Special Topics in Veterinary Clinical Sciences (1-4) *Prereq.: appropriate 4000- and 5000- level course in selected topic or equivalent and consent of instructor. May be taken for a max. of 8 sem. hrs. of credit when topics vary.*

Aspects of the biochemical, physiological, pathophysiological, epidemiological and economic basis of clinical veterinary medicine.

7201 Veterinary Gastroenterology (2) *V Prereq.: D.V.M. or equivalent degree or consent of instructor.* Gastrointestinal diseases and related conditions; emphasis on diagnostics, pathophysiology, and management options.

7202 Veterinary Surgical Techniques (1) *V Prereq.: D.V.M. or equivalent degree or consent of instructor. 3 hrs. lab. May be taken for a max. of 6 hrs. of credit when topics vary.* Advanced surgical and experimental techniques related to an organ system.

7204 Advanced Veterinary Orthopedics (2) *V Prereq.: D.V.M. or equivalent degree or consent of instructor.* Bone, muscle, tendon, and ligament diseases with emphasis on pathophysiology, diagnostics, and management options.

7205 Advanced Veterinary Clinical Neurology (2) *V Prereq.: D.V.M. or equivalent degree or consent of instructor.* Diseases of the central and peripheral nervous system with emphasis on pathophysiology, diagnostics, neurosurgery, and other management options.

7206 Advanced Veterinary Urogenital Disease (2) *S Prereq.: DVM or equivalent degree or consent of instructor.* Urinary and reproductive tract diseases and related conditions with emphasis on pathophysiology, diagnostic, and management options.

7208 Advanced Veterinary Cardiovascular Disease (2) *V Prereq.: DVM or equivalent degree or consent of instructor.* Cardiovascular diseases and related conditions with emphasis on pathophysiology, diagnostic and management options.

7209 Advanced Veterinary Respiratory Disease (2) *V Prereq.: DVM or equivalent degree or consent of instructor.* Respiratory diseases and related conditions with emphasis on pathophysiology, diagnostic and management options.

7210 Veterinary Scientific Journal Review (1) *Prereq.: DVM or equivalent degree or consent of instructor.* In depth critique of current veterinary journals with emphasis on appraising experimental design and analysis; and interpretation and application of results.

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 5000 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.

7001 Seminar: Veterinary Medical Sciences (1) *May be taken for a max. of 8 hrs. of credit.* Reports and discussions on topics of current interest in various disciplines of veterinary medicine.

7004 Introduction to Research (2) *F 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.

VOCATIONAL EDUCATION • VED

2001 Foundations of Vocational Education (3) *F 2 hrs. lecture; 2 hrs. lab.* Overview of programs and practices; history, philosophy, and purposes of vocational education.

3200 Presentation Methods in Vocational and Adult Education (3) *S* Recognized methods of group presentation and individual training.

3602 Learning Styles (1) *V* How individuals perceive and process information; learning cycle applications in teaching management; work-team performance; business, industry, and career development.

3603 Classroom Management in Vocational Education (1) *V* Managing the vocational classroom; emphasis on student behavior; techniques for preventing, diagnosing, and handling student discipline problems.

4001 History of Vocational Education (3) *V* Events and organizations that contributed to the development of vocational education.

4102 Course Development in Vocational Education (3) *F* Course, unit, and lesson plan development in vocational education; selection and evaluation of course materials.

4200 Teaching in Vocational Education Content Areas (3) *S-O Prereq.: VED 2001 and 3200.* Teaching vocational education in the formal classroom; emphasis on content area, selection of materials, and planning instruction.

4201 Management of Vocational Education Laboratory Experiences (3) *V Prereq.: VED 2001.* Preparation, organization, and evaluation of vocational education laboratory experiences.

4301 Assessment, Career Development, and Productivity (3) *F* Assessing present and future needs of the vocational education student; procedures used to evaluate student preferences, career potential, and occupational placement.

4504 Youth Leadership Development (3) *V* Principles and practices in planning, organizing, and conducting youth organization activities.

4601 Vocational Education Student Evaluation (3) *S* Assessment of progress of vocational students in psychomotor, cognitive, and affective skills.

4604 Field Experiences in Vocational Classroom Management (1) *V Prereq.: concurrent registration in or credit for VED 3603 or 7203.* Observation and evaluation of classroom management techniques.

4704 Time Management Techniques in Vocational Education (3) *V* Methods of planning and procedures for using time efficiently in conducting the vocational education program.

4705 Education, Business, and Entrepreneurship (3) *V* Principles and strategies involved in establishing and operating small businesses; emphasis on resources available to aid the educator in bridging the gap between business and entrepreneurship.

4801 Internship: Professional (3) *F,S,Su* *Must be taken in conjunction with both VED 4802 and 4803. Not for graduate credit.* Professional responsibilities; teacher association work; teacher, parent, and student organization activities; school visits and certification.

4802 Internship: Preparation (3) *F,S,Su* *Must be taken in conjunction with both VED 4801 and 4803. 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) *F,S,Su* *Must be taken in conjunction with both VED 4801 and 4802. Not for graduate credit.* Evaluation of the student's lesson preparation, demonstration ability; laboratory organization and participation in class activities.

4809 Advanced Problems in Vocational Education (1-3) *F,S,Su* *May be taken for a max. of 6 sem. hrs. credit.* Individual and group problems.

7001 Principles of Practical Arts and Vocational Education (3) *V* Practical arts and vocational education in programs below the baccalaureate level; relationships to career education, general education, and society.

7003 Philosophy of Vocational Education (3) *F* Major philosophies that have influenced vocational education; philosophical approaches to problems in vocational education.

7101 Curriculum Development in Vocational Education (3) *V* Curricular patterns, problems of balance, scope, organization, sequence, selection, and articulation.

7201 Advanced Teaching Techniques in Vocational Education (3) *S* Principles underlying the vocational teaching/learning process; use of effective vocational 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 nonformal settings.

7203 Discipline in Vocational Education (3) Su Prevention, recognition, 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.

7301 Orientation to the World of Work (3) V See *ELRC 7301*.

7304 Vocational Education for Special-Needs Students (3) V Regulations, issues, assessment, instruction, and special problems in vocational education for learners with special needs.

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 Vocational Education Programs (3) S Role of adult education as a component of vocational education in contemporary society; program conceptualization, needs assessment, program initiation, development, financing, administration, and evaluation.

7602 Program Evaluation Design (3) S Systematic application of social research procedures for evaluating the conceptualization, design, implementation, and utility of vocational educational programs.

7701 Organization and Administration of Vocational Education (3) V Principles of organization, leadership, and administration; development of skills needed for effective vocational education leadership.

7702 Supervision in Vocational Education (3) V Principles of supervision in vocational teaching at local and state levels.

7703 Supervision of Professional Field Experiences in Vocational Education (3) V Philosophy, principles, and procedures in supervision of student teaching in vocational education.

7766 Home Economics in Higher Education (3) Goals and objectives of home economics; program development; roles and responsibilities of faculty.

7801 Current Problems and Issues in Vocational Education (1-3) F,S,Su Legislative, societal, and educational concerns affecting vocational education.

7803 Independent Study in Vocational Education (1-3) F,S,Su May be taken for a max. of 3 sem. hrs. credit. Faculty directed study of relevant topics in vocational education.

7805 Seminar in Vocational Education (1-6) F,S,Su May be taken for a max. of 6 sem. hrs. credit. Selected topics of interest to vocational educators.

7809 Practicum for the Vocational Educator (3-9) F,S,Su Practical experience under the guidance of practicing vocational educators in various educational settings.

7901 Scientific Methods in Vocational Education (3) V Principles involved in formulating educational problems, hypotheses, research strategies; historical, descriptive, experimental, and research methodologies.

7903 Survey Research Design and Implementation (3) Su Prereq.: *VED 7901 and EXST 4001 or equivalent*. Survey and correlational research in vocational education; emphasis on selection and/or development of appropriate measuring devices.

7905 Advanced Research Design (3) V Prereq.: *VED 7901 and EXST 4001 or equivalent*. Research design; emphasis on research concepts and procedures and their application to extension education.

7909 Application, Interpretation, and Reporting of Research Results (3) V Prereq.: *VED 7901, 7903 or 7905; and EXST 7006 or equivalent*. Selection of appropriate statistical techniques and interpretation of results.

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

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

VOCATIONAL TRADE AND INDUSTRIAL EDUCATION • VTIE

These courses are designed to meet Vocational Trade and Industrial Education teacher certification requirements in secondary and post-secondary schools in Louisiana.

2070 Introduction to Vocational Trade and Industrial Education (3) V

2071 Safety Practices and Industrial Hygiene (3) V

2072 Principles of Teaching Vocational Trade and Industrial Education (3) V

2073 Preparation of Instructional Materials (3) V

2074 Vocational Selection and Placement (3) V

2075 Occupational Analysis (3) V

2076 Management of Vocational Industrial Shops (3) V

2077 Testing in Vocational Trade and Industrial Education (3) V

3079 Apprentice Teaching in Vocational Trade and Industrial Education (8) V

WOMEN'S AND GENDER STUDIES • WGS

General education courses are marked with stars (★).

★ **1001 Evolution of Sex and Gender (3)** Interdisciplinary study of the biological and cultural aspects of sexual differences; topics include sexual dimorphism, reproduction-related evolutionary change, diversification of vertebrates, genetics of sex, reproductive strategies, anatomy and physiology of human reproductive systems, sex and gender 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.

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.

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.

4900 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.

7900 Independent Reading and Research in Women's and Gender Studies (3) S May be taken for a max. of 6 sem. hrs. of credit.