

# COURSE DESCRIPTIONS

Courses are numbered as follows: freshmen - 100 level; sophomores - 200 level; juniors - 300 level; seniors - 400 level; graduate students - 500 & 600 level. Certain 300- and 400-level courses may be taken by graduate students for graduate credit; in such cases, graduate students complete additional research assignments to bring the courses up to graduate level rigor. The letter **G** in parentheses, (**G**), appears at the end of those 400-level undergraduate course descriptions which are approved for graduate level work. Only students admitted to the Graduate School may enroll in 500 & 600 level courses.

No credit is allowed in any curriculum for any course with a catalog number beginning with zero (0) (e.g. ENGL 099). These courses are open only to those students who place in them by examination.

The numerical listing after each course title gives the following information: the first number represents lab hours per week; the second digit represents the number of 75-minute lecture periods per week; the third digit is the semester credit hours earned for completion of the course. A few courses will have a fourth digit in parentheses. This means the course may be repeated for credit and the fourth digit designates the total amount of semester hour credit that may be earned through repetition of the course. Typically, these courses are research-, performance-, or project-oriented and found in the 300-, 400-levels (undergraduate student) or 500-, 600-levels (graduate student).

Some courses require the student to complete a prerequisite course or to secure special permission from faculty prior to enrolling in the course. These prerequisites are listed immediately after the numerical semester credit hour designations. Each student is responsible for complying with prerequisite course work requirements and special instructions.

**NOTE:** Course offerings for each term are listed in the *Quarterly Schedule of Classes*, published prior to Early Registration each quarter. Offerings by quarter are subject to change to accommodate needs of students.

## ACCOUNTING (ACCT)

- 201: Elementary Accounting.** 0-3-3. Basic understanding of concepts and methods of accounting and the significance of accounting information for managerial decision-making.
- 202: Elementary Accounting.** 0-3-3. Preq., ACCT 201. Basic understanding of concepts and methods of accounting and the significance of accounting information for managerial decision-making.
- 206: Financial Statement Analysis for Entrepreneurial Decision Making.** 0-3-3. Not open to accounting majors. This course is designed to provide non-accounting majors with an understanding of financial statement analysis from an entrepreneurial decision making perspective.
- 303: Intermediate Accounting.** 0-3-3. Preq., ACCT 202. The theory and application of accounting procedures to financial reporting.
- 304: Intermediate Accounting.** 0-3-3. Preq., ACCT 303. The theory and application of accounting procedures to financial reporting.
- 305: Intermediate Accounting.** 0-3-3. Preq., ACCT 304. The theory and application of accounting procedures to financial reporting.
- 307: Income Tax.** 0-3-3. Preq., ACCT 201. A study of Federal income tax laws and state income tax laws and their effect on individual income.
- 308: Managerial Cost Accounting.** 0-3-3. Preq., ACCT 202. A study of cost systems; accounting peculiar to manufacturing enterprises; making cost statements; and solving cost problems.
- 401: Internship in Accounting I.** 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 402: Internship in Accounting II.** 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 404: Tax Factors in Entrepreneurial Decision Making.** 0-3-3. Preq., ACCT 201 or 206. Not open to undergraduate accounting majors or MPA students. This course is designed to provide non-accounting majors with an understanding of major federal income tax, estate, and gift tax issues that confront entrepreneurs. (**G**)
- 406: Advanced Income Tax.** 0-3-3. Preq., ACCT 307. A continuation of ACCT 307 with further study into tax problems of fiduciaries, partnerships, and corporations; solutions of problems.
- 412: Municipal and Government Accounting.** 0-3-3. Preq., ACCT 303. Accounting procedures of the Federal, municipal, and state governments.

Attention is given to the preparation of budgets, financial statements, and to budgetary control. (**G**)

- 413: Auditing.** 0-3-3. Preq., ACCT 305 and credit for or registration in ACCT 308. The study of basic auditing concerns, objectives and methodology.
- 414: Advanced Accounting.** 0-3-3. Preq., ACCT 305. Study of business combinations and consolidated financial statements; partnerships; international operations; fiduciary accounting; and governmental and not-for-profit entities. (**G**)
- 422: Taxation of Corporations and Shareholders.** 0-3-3. Preq., ACCT. 307 and senior standing. In-depth study of tax law that pertains to corporations and shareholders; corporate organizations; liquidation; reorganization; and Subchapters. (**G**)
- 433: Accounting Systems.** 0-3-3. A study of accounting systems and systems installations.
- 451: Advanced Cost Accounting.** 0-3-3. Preq., ACCT 308. A study of the advanced phases of cost accounting: standard costs; distribution costs; cost analysis. (**G**)
- 490: Contemporary Problems in Accounting.** 0-3-3. (Pass/Fail). Intensive study of current advanced accounting topics.
- 491: Advanced Theory of Accounting.** 0-3-3. Preq., permission of adviser. Intensive study of current advanced accounting theory. (**G**)
- 493: Advanced Auditing.** 0-3-3. Preq., ACCT 413. Intensive study of professional conduct, auditing standards, auditor's liability, reports, and internal auditing. (**G**)
- 505: Accounting Analysis for Decision-Making.** 0-3-3. Preq., ACCT 201 and 202. A study of accounting data and their uses with the goal of aiding management in the use of such data for decision making.
- 506: Seminar in Financial Accounting.** 0-3-3. Preq., ACCT 305 A brief historical development of accounting thought followed by investigations into controversial and special areas of financial accounting.
- 507: Contemporary Accounting Theory.** 0-3-3. Preq., ACCT 305. An intensive study of recent developments, research and literature in accounting theory promulgated by the various professional accounting associations and related financial organizations.
- 508: Advanced Managerial Accounting.** 0-3-3. Preq., ACCT 308. A study of the role of accounting in supporting the management of organizations.
- 513: Advanced Auditing.** 0-3-3. Preq., ACCT 413. Intensive study of professional conduct, auditing standards, auditor's liability, reports, statistical sampling, and internal auditing.
- 517: EDP Accounting.** 0-3-3. Preq., ACCT 413. A study of the accounting procedures and systems in a computer-intensive environment, including the proper utilization of computers in auditing the firm.
- 519: International Accounting.** 0-3-3. Preq., ACCT 305. A study of the financial and managerial accounting issues and practices related to the globalization of business.
- 521: Cases and Problems in Income Taxes.** 0-3-3. Preq., ACCT 307. Research cases covering various phases of income taxes; study of some source materials and research methods for ascertaining current rulings and trends in laws and regulations.
- 541: Accounting Analysis.** 0-3-3. Preq., ACCT 413. Accounting policy and analysis through integration and application of knowledge gained in accounting and accounting related courses; emphasizes interrelationships of major functions of business and analysis.
- 550: Directed Study in Accounting.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of accounting.
- 606: Seminar in Financial Accounting.** 0-3-3. Preq., ACCT 305. Requires Doctoral standing. May require additional class meetings. A brief historical development of accounting thought followed by investigations into controversial and special areas of financial accounting. Credit will not be given for ACCT 606 if credit is given for ACCT 506.
- 607: Contemporary Accounting Theory.** 0-3-3. Preq., ACCT 305. Requires Doctoral standing. May require additional class meetings. An intensive study of recent developments, research and literature in accounting theory promulgated by the various professional accounting associations and related financial organizations. Credit will not be given for ACCT 607 if credit is given for ACCT 507.
- 608: Advanced Managerial Accounting.** 0-3-3. Preq., ACCT 308. Requires Doctoral standing. May require additional class meetings. A study of the role of accounting in supporting the management of organizations. Credit will not be given for ACCT 608 if credit is given for ACCT 508.

- 610: Current Accounting Research.** 0-3-3 Preq., Doctoral Standing with MPA or equivalent. Accounting research and design with emphasis on evaluation of results of research.
- 613: Advanced Auditing.** 0-3-3. Preq., ACCT 413. Requires Doctoral standing. May require additional class meetings. Intensive study of professional conduct, auditing standards, auditor's liability, reports, statistical sampling, and internal auditing. Credit will not be given for ACCT 613 if credit is given for ACCT 513.
- 615: Theory of Accounting.** 0-3-3. Preq., Doctoral Standing with MPA or equivalent. A detailed study of the development of accounting with emphasis on what should be as compared to Generally Accepted Accounting Principles.
- 617: EDP Accounting.** 0-3-3. Preq., ACCT 413. Requires Doctoral standing. May require additional class meetings. A study of the accounting procedures and systems in a computer-intensive environment, including the proper utilization of computers in auditing the firm. Credit will not be given for ACCT 617 if credit is given for ACCT 517.
- 619: International Accounting.** 0-3-3. Preq., ACCT 305. Requires Doctoral standing. May require additional class meetings. A study of the financial and managerial accounting issues and practices related to the globalization of business. Credit will not be given for ACCT 619 if credit is given for ACCT 519.
- 621: Cases and Problems in Income Taxes.** 0-3-3. Preq., ACCT 307. Requires Doctoral standing. May require additional class meetings. Research cases covering various phases of income taxes; study of some source materials and research methods for ascertaining current rulings and trends in laws and regulations. Credit will not be given for ACCT 621 if credit is given for ACCT 521.
- 641: Accounting Analysis.** 0-3-3. Preq., ACCT 413. Requires Doctoral standing. May require additional class meetings. Accounting policy and analysis through integration and application of knowledge gained in accounting and accounting related courses; emphasizes interrelationships of major functions of business and analysis. Credit will not be given for ACCT 641 if credit is given for ACCT 541.
- 650: Directed Study in Accounting.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of accounting.
- 685: Comprehensive Exam in Accounting.** No credit. Doctoral standing required. Required for all business administration doctoral students seeking to take the comprehensive exam in accounting. Successful completion is a prerequisite to the oral comprehensive exam for those seeking a primary field or examined minor in accounting. Requires consent of graduate director.

#### ADMINISTRATION & BUSINESS (AB)

- 110: Introduction to Business.** 0-3-3. Preq., CIS 110. A foundations course that emphasizes decision-making and entrepreneurial activities in an ever-changing world economy.
- 189: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Administration and Business. May be repeated for credit
- 194: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Administration and Business. May be repeated for credit.
- 289: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Administration and Business. May be repeated for credit.
- 294: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Administration and Business. May be repeated for credit.
- 300: Special Problems.** 0-3-3. Preq., approval of instructor and department head. Selected contemporary business and economics topics. Topic will determine course admissions criteria.
- 301: Independent Study.** 1-3 hours credit. Preq., approval of instructor and department head. Selected contemporary business and economics topics. Normally taken only by CAB students in their curricular specialty.
- 389: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Administration and Business. May be repeated for credit.
- 394: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Administration and Business. May be repeated for credit.

- 400: Special Problems.** 0-3-3. Preq., Approval of instructor, department head, and dean. Special contemporary business and economic topics. Topic will determine course admissions criteria.
- 401: Independent Study.** 1-3 hours credit. Preq., Approval of instructor, department head, and dean. Selected contemporary business and economic topics in a student's curricular specialty.
- 444: Critical Thinking for Business.** 0-3-3. An overview of the elements of thinking, reasoning, and questioning as applied to business decision-making.
- 489: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Administration and Business. May be repeated for credit.
- 494: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Administration and Business. May be repeated for credit.
- 495: Business Administration Capstone.** 0-3-3. Preq., all core business courses and senior standing in the College of Administration & Business. Administrative policy determination through integration and application of knowledge gained in previous courses; emphasizes interrelationships of major functions of business under conditions of uncertainty; utilizes case study approach.
- 551: Research and Thesis.** 3 hours credit. Maximum credit allowed is 6 hours.
- 594: Special Topics.** 1-4 hours credit. Preq., graduate standing. Selected topics in an identified area of study in the College of Administration and Business.
- 610: Current Topics in Research.** 0-3-3. May be repeated. Required of resident DBAs each quarter. Non-degree credit. Pass-Fail. Research methodology, current research of doctoral candidates, faculty, invited lecturers.
- 685: Oral Comprehensive Exam.** No credit. Doctoral standing required. Required for all business administration doctoral students. Successful completion of the oral comprehensive exam is a prerequisite to beginning the doctoral dissertation. Requires consent of graduate director and advisory committee chair.
- 690: Research and Dissertation.** 3 hours credit. Minimum credit allowed is 15 hours.

#### AGRICULTURAL BUSINESS (AGBU)

- 220: Principles of Agricultural Economics.** 0-3-3. Economic theory with application to production, marketing, and financing in agribusiness. Institutions such as cooperatives, farm credit systems, foreign agricultural trade, and government will be emphasized.
- 310: Agricultural Policy.** 0-3-3. The impact of agricultural policy on the farm firm and agribusiness industry. Emphasis is placed on policy issues affecting producers and consumers of agricultural products.
- 402: Economics of Farm Management.** 0-3-3. Economics principles applied to individual farm organization and management and study of farm accounting systems. (G)
- 411: Seminar.** 0-1-1 (3). Reviews, reports, and discussion of current problems in Agriculture and related fields.
- 430: Principles and Practices of Agricultural Marketing.** 0-3-3. Methods and channels of agricultural marketing; marketing principles; governmental action concerned with the marketing process; analysis and evaluation of marketing problems. (G)
- 450: Natural Resource Economics.** 0-3-3. Tools for economic decision-making applied to the use and allocation of natural resources associated with agriculture. Costs and benefits of various approaches to natural resource management.
- 460: Agricultural Finance.** 0-3-3. Analysis of financial investments in the agricultural firm, credit sources, debt repayment, capital allocation, and the use of short, intermediate, and long-term credit. (G)

#### AGRICULTURAL EDUCATION (AGED)

- 450: Advanced Agricultural Shop Methods and Safety.** 3-2-3. Preq., AGSC 209 and 211. Methods and techniques for instruction in agricultural shop safety and power tool use in the high school agricultural shop laboratory. (G)
- 460: Fundamentals of Agricultural Education.** 0-3-3. History, traditions, and guidelines of agricultural education. Consideration of federal, state, and local laws and regulations concerning agricultural education and Louisiana's public high schools. (G)

#### AGRICULTURAL SCIENCE (AGSC)

- 201: Microcomputer Applications.** 0-3-3. Introduction to microcomputers with specific applications in filing conventions, word processing, spreadsheets, electronic communications, and other topics.
- 209: Small Engines.** 3-0-1. Principles of operation, construction, application, maintenance, and overhaul procedures of small internal combustion engines.
- 211: General Shop.** 6-0-2. Care and use of tools, gas and electric welding, cold metal work, and woodwork.
- 320: Statistical Methods.** 0-3-3. Preq., sophomore standing or above. Introduction to descriptive and inferential statistics, probability, sampling distributions, confidence intervals, hypothesis testing, ANOVA, correlation and regression, with an emphasis on biological data and applications.
- 321: Electricity Applied to Bio-Systems.** 3-2-3. Practical application of electricity to farm and forest operations including electric motors, safety, wiring, lighting, refrigeration, and heating.
- 477: Practica/Internship/Cooperative Education Work Experience.** 1-9 hours credit. (Pass/Fail). On-site supervised, structured work experiences located within a 100-mile radius of Ruston. Application and supervision fee required.
- 478: Practica/Internship/Cooperative Education Work Experience.** 1-9 hours credit. (Pass/Fail). On-site supervised, structured work experiences located within a 101- to 200-mile radius of Ruston. Application and supervision fee required.
- 479: Practica/Internship/Cooperative Education Work Experience.** 1-9 hours credit. (Pass/Fail). On-site supervised, structured work experiences located beyond a 201-mile radius of Ruston. Application and supervision fee required.
- 516: Contemporary Topics.** 1-6 hours credit (6). Examination and discussion of a variety of timely topics pertaining to the agricultural sciences. May be repeated with a change in subject matter.

#### AIR FORCE AEROSPACE STUDIES (AFAS)

- 125: Introduction to the U. S. Air Force. (GMC).** 0-1-1. Discussion of the Air Force today. Includes topics such as professionalism, communications, and the Air Force installation. Must be taken concurrently with AFAS 155.
- 126: U.S. Air Force Organization (GMC).** 0-1-1. Analysis of the organization of the U.S. Air Force with discussion of the various major Air Force commands. Must be taken concurrently with AFAS 156.
- 127: The U.S. Air Force Doctrine (GMC).** 0-1-1. Completes the analysis of Air Force organization. Examines Air Force doctrine and relationships with other U.S. military forces. Must be taken concurrently with AFAS 157.
- 155: AFROTC Leadership Laboratory.** 1-0-0. Orientation and instruction in Air Force dress and grooming standards and application of Air Force discipline, customs and courtesies. Study of the Armed Forces and AFROTC grade structure, insignia, and chain of command. Introduction to military drill. (Pass/Fail)
- 156: AFROTC Leadership Laboratory.** 1-0-0. Continuation in military customs and courtesies and military drill. Familiarization with Air Force services and activities. Application of physical fitness regimen to meet weight and fitness standards. (Pass/Fail)
- 157: AFROTC Leadership Laboratory.** 1-0-0. Structure and functions within the cadet corps, wing and base organizations. Additional instruction in military customs, courtesies and drill. Application of physical fitness regimen to meet weight and fitness standards. (Pass/Fail)
- 225: The Development of Air Power I (GMC).** 0-1-1. The beginnings of manned flight from balloons and dirigibles, to the Wright Brothers, World War I and the interwar years. Must be taken concurrently with AFAS 255.
- 226: The Development of Air Power II (GMC).** 0-1-1. Continuation of 225. A study of air power during World War II, the Berlin Airlift and Korea. Must be taken concurrently with AFAS 256.
- 227: The Development of Air Power III (GMC).** 0-1-1. Continuation of 226. A study of U.S. air power in the international arena from 1955 to the present. Must be taken concurrently with AFAS 257.
- 255: AFROTC Leadership Laboratory.** 1-0-0. Understanding the Air Force base environment. Application of Air Force standards, discipline, conduct, customs, and courtesies. Advanced drill positions and movements. Application of physical fitness regimen to meet weight and fitness standards. (Pass/Fail)

- 256: AFROTC Leadership Laboratory.** 1-0-0. Understanding selected career areas available based on individual qualifications. Advanced drill movements to include review and ceremony procedures. Discussion of privileges and responsibilities associated with an Air Force commission. Physical fitness training. (Pass/Fail)
- 257: AFROTC Leadership Laboratory.** 1-0-0. Advanced drill movements to include orientation in commanding a flight, command voice, and use of guidon. Preparation for summer field training. Application of physical fitness regimen to meet weight and fitness standards and conditioning for field training environment. (Pass/Fail)
- 331: Communications for the Air Force (POC).** 0-2-2. Functions and formats of Air Force communications. Emphasis on written and oral communications used by junior officers. Must be taken concurrently with AFAS 351.
- 332: Air Force Leadership (POC).** 0-2-2. Analysis of leadership styles and the traits of a leader. Group dynamics. Must be taken concurrently with AFAS 352.
- 333: Military Management (POC).** 0-2-2. Study of management principles with emphasis on the view of an Air Force junior officer. Must be taken concurrently with AFAS 353.
- 351: AFROTC Leadership Laboratory.** 1-0-0. Attain leadership and management competence through participation in advanced leadership experiences. General structure and progression patterns common to selected officer career fields. Application of physical fitness regimen to meet weight and fitness standards. (Pass/Fail)
- 352: AFROTC Leadership Laboratory.** 1-0-0. Continuation of advanced leadership experiences to attain leadership and management competence. Application of procedures for evaluating cadets. Application of physical fitness regimen to meet weight and fitness standards. (Pass/Fail)
- 353: AFROTC Leadership Laboratory.** 1-0-0. Continuation of advanced leadership experiences to attain leadership and management competence. Comprehension of special summer training programs available to cadets. Application of physical fitness regimen to meet weight and fitness standards. (Pass/Fail)
- 431: National Security Policy and Professionalism. (POC).** 0-2-2. Examination of the national security policy process and all of the key participants. Military professionalism and officership will also be examined as to their impact on patterns of civil-military relations. Must be taken concurrently with AFAS 451.
- 432: Defense Strategy, Policy and Military Law (POC).** 0-2-2. Examination of the methods of managing conflict to include arms control and the threat of war. The military justice system and professionalism will be covered as topics of special interest. Must be taken concurrently with AFAS 452.
- 433: Regional Studies and Preparation for Active Duty. (POC).** 0-2-2. Examination of sensitive areas of the world and their impact on American National Security and what the new officer may expect on his/her initial assignment. Must be taken concurrently with AFAS 453.
- 451: AFROTC Leadership Laboratory.** 1-0-0. Application of effective leadership and management techniques with individuals and groups. Comprehension of special education programs available to senior cadets. Application of physical fitness regimen to meet weight and fitness standards. (Pass/Fail)
- 452: AFROTC Leadership Laboratory.** 1-0-0. Continuation of the application of effective leadership and management techniques with individuals and groups. Comprehension of Communications and Operations Security programs. Application of physical fitness regimen to meet weight and fitness standards. (Pass/Fail)
- 453: AFROTC Leadership Laboratory.** 1-0-0. Continuation of effective leadership and management techniques with individuals and groups. Comprehension of active duty service commitments incurred throughout an officer's career. Understanding factors which facilitate a smooth transition from civilian to military life. Application of physical fitness regimen to meet weight and fitness standards. (Pass/Fail)

#### ANIMAL SCIENCE (ANSC)

- 111: Introduction to Animal Science.** 0-3-3. Introduction to the field of Animal Science with emphasis on breeds, terminology and basic husbandry practices of dairy and beef cattle, horses, swine, sheep and poultry.
- 113: Introduction to Animal Science Laboratory.** 3-0-1. Practical application and study of the different areas of animal science.

- 201: Introduction to Poultry Science.** 3-2-3. The principles and practices of breeding, incubation, nutrition, disease control, management practices and marketing of poultry.
- 202: Introduction to Dairy Science.** 3-2-3. Preq., ANSC 111. Principles and practices of breeding, feeding and managing dairy cattle for maximum productivity with an introduction to processing and manufacturing.
- 204: Meat Animal and Carcass Evaluation.** 3-2-3. Selection of carcasses and wholesale cuts of beef, pork, and lamb; factors influencing grades, yields, and values in cattle, hogs, and sheep.
- 211: Introduction to Equine Science.** 0-3-3. A general survey of principles of horse management and husbandry, to include anatomy, unsoundness, nutrition, health and reproduction.
- 220: Introductory Horsemanship.** 3-1-2. Introduction to methods and techniques for controlling and influencing the performance of horses.
- 301: Principles of Animal Nutrition.** 0-3-3. Preq., ANSC 111 and CHEM 100 or 130. The source, chemical composition, and nutritive value of farm animal feedstuffs.
- 302: Testing Dairy Products.** 3-2-3. Preq., BISC 214. A chemical and bacterial test of milk and milk products.
- 304: Dairy Manufacturing-Fluid Milk Products.** 3-2-3. The sanitary production, transportation, processing, distribution, and public health inspection of milk and related products.
- 305: Dairy Manufacturing-Frozen Dessert Production.** 3-2-3. The manufacture of ice cream and frozen dairy products.
- 306: Dairy Manufacturing-Cultured Dairy Products.** 6-1-3. Manufacture of butter, various types of cheese, and other cultured products. Defects, packaging, and merchandising of butter and cheese.
- 307: Endocrinology and Milk Secretion.** 0-3-3. Development, structure and functional processes of the endocrine and mammary systems.
- 309: Anatomy and Physiology of Animals.** 3-2-3. Preq., BISC 130. The structures and functions of the tissues and organs of animals.
- 315: Meats.** 6-1-3. Methods and practices involved in the processing and preservation of meats.
- 318: Physiology of Reproduction.** 0-2-2. Preq., ANSC 111. Physiology of reproduction of domestic farm animals. Embryology and anatomy of reproductive systems; gametogenesis, fertilization, gestation and parturition.
- 322: Horse Behavior/Training I.** 5-1-3. Horse behavior and application of principles of psychology to halter breaking, lead training and grooming weanlings/yearlings; preparation of horse for competition.
- 324: Yearling Foal Management.** 8-1-2. Preq., ANSC 111 or 211. Techniques of halter breaking, lead training and grooming weanling/yearling foal using pressure-release behavior modification techniques.
- 330: Intermediate Horsemanship.** 3-1-2. Preq., ANSC 220 or equivalent experience. Intermediate methods and techniques for controlling and influencing the performance of horses.
- 340: Horse Evaluation.** 3-1-2. Preq., ANSC 111 or 211. Detailed evaluation of the horse. Influence of conformation and performance. Use of oral and written defense of judgements.
- 401: Animal Breeding.** 0-2-2. Principles and application of animal breeding, including gene frequencies, heritabilities, inbreeding coefficients, selection and mating systems. (G)
- 405: Applied Animal Nutrition.** 3-2-3. Preq., ANSC 301. A review of applied nutritional practices and management, and ration formulation for beef and dairy cattle, horses, swine and poultry. (G)
- 407: Dairy Production.** 3-3-4. Preq., ANSC 202. Principles and practices in breeding, feeding and management of dairy cattle.
- 408: Swine Production.** 3-2-3. Principles and practices of breeding, feeding, marketing and management of swine. (G)
- 409: Animal Pathology.** 3-2-3. Preq., BISC 214 or 260 and ANSC 307 or 309. The etiology, symptoms, prevention, control and eradication of the major diseases of farm animals. (G)
- 410: Beef Production.** 3-3-4. Preq., ANSC 301 or 405. Breeding, feeding, marketing and management of beef cattle. (G)
- 411: Horse Production.** 3-3-4. Preq., ANSC 111 or 211, and 318. Principle and practices in breeding, feeding, and management of horses. (G)
- 418: Assisted Reproduction Techniques.** 3-2-3. Preq., ANSC 318. Application of assistive reproductive techniques in animals. Includes semen evaluation, processing, and preservation, artificial insemination, embryo transfer, pregnancy diagnosis, and other management techniques. (G)
- 420: Horse Behavior/Training II.** 5-1-3. Preq., ANSC 322 or equivalent experience. Horse behavior and application of principles of psychology to

ground driving, breaking and training 2- and 3-year old horses; preparation of horses for competition.

- 425: Special Problems in Animal Science.** 1-4 hours credit (8). Preq., Written consent of instructor. Foal management and sale preparation; steer fitting and showing; or topic selected with consent of adviser.
- 430: Dairy Plant Management.** 6-1-3. Preq., ANSC 302, 304, 305. The management problems of dairy processing and manufacturing plants.
- 440: Equine and Livestock Operations.** 0-3-3. Preq., ANSC 111 or 211. Study of unique aspects of procuring and operating different categories of horse units and relationships of such units to other livestock and farm enterprises. (G)
- 450: Advanced Animal Breeding.** 0-3-3. Preq., ANSC 401 or consent of instructor. Advanced Quantitative Genetics principles applied to horses and livestock. Emphasis on theory and application of variance, selection, inbreeding and crossbreeding, scale, threshold and correlated characters. (G)
- 460: Advanced Horsemanship.** 3-1-2. Preq. ANSC 330 or equivalent experience. Advanced methods and techniques for controlling and influencing the performance of horses.
- 470: Veterinary Techniques.** 4-2-3. Preq., ANSC 309, 409, or special permission. Applications of veterinary diagnostic, therapeutic, and prophylactic techniques used in control of animal diseases. (G)

#### APPLIED & NATURAL SCIENCES (ANS)

- 189: Special Topics:** 1-4 hours credit. Selected topics in an identified area of study. May be repeated for credit.
- 194: Special Topics:** 1-4 hours credit. Selected topics in an identified area of study. May be repeated for credit.
- 289: Special Topics:** 1-4 hours credit. Selected topics in an identified area of study. May be repeated for credit.
- 294: Special Topics:** 1-4 hours credit. Selected topics in an identified area of study. May be repeated for credit.
- 389: Special Topics:** 1-4 hours credit. Selected topics in an identified area of study. May be repeated for credit.
- 394: Special Topics:** 1-4 hours credit. Selected topics in an identified area of study. May be repeated for credit.
- 489: Special Topics:** 1-4 hours credit. Selected topics in an identified area of study. May be repeated for credit.
- 494: Special Topics:** 1-4 hours credit. Selected topics in an identified area of study. May be repeated for credit.
- 589: Special Topics:** 1-4 hours credit. Preq., Graduate standing. Selected topics in an identified area of study in the College of Applied & Natural Sciences.
- 594: Special Topics:** 1-4 hours credit. Preq., Graduate standing. Selected topics in an identified area of study in the College of Applied and Natural Sciences.

#### APPLIED COMPUTATIONAL ANALYSIS & MODELING (ACAM)

- 610: Current Topics in Research.** 0-3-3. May be repeated. Required for ACAM doctoral students each quarter. Non-degree credit. Research Methodology, current research of doctoral candidates, faculty, invited lecturers.
- 620: Special Topics in Computational Science and Engineering.** 1-3 hours credit. May be repeated for 1-3 hours credit each time.
- 690: Dissertation Research.** 0-3-3. Doctoral students only. Registration in any quarter may be for three semester hours credit or multiples thereof, up to a maximum of nine semester hours credit per quarter. Maximum total credit allowed is thirty hours.

#### ARCHAEOLOGY (ARCE)

- 401: Introduction to Archaeology.** 4-2-3. An introduction to the techniques of research and field work in Archaeology. (G)
- 410: Selected Topics in Archaeology.** 0-3-3. Seminar in archaeology with topic designated by instructor. May be repeated for credit as topic changes.(G)
- 420: Indians of the Southwest.** 4-2-3. A survey of Indian Archaeology in the southwestern United States. (G)
- 462: Christian Archaeology.** 3-2-3. Preq., HIST 101 or consent of instructor or junior standing. A study of the archaeology, architecture, and inscription in early Christian sites in and nearby Rome. (G)
- 463: Etruscan Archaeology.** 3-2-3. Preq., HIST 101 or consent of the instructor or junior standing. A study of the art, architecture, archaeology, history and inscriptions of the Etruscans. (G)

- 464: Roman Archaeology.** 3-2-3. Preq., HIST 101 (or equivalent). A study of the monuments and antiquities of Classical Rome. (G)
- 466: Egyptian Archaeology.** 3-2-3. Preq., HIST 101. The study of the archaeology, art, architecture, history, and inscriptions of the ancient Egyptians. (G)

#### ARCHITECTURE (ARCH)

- 110: Foundation Design I.** 6-0-2. Empirical studies of the principles and processes related to the poetic and tectonic aspects of making architectural form.
- 112: Communication Skills.** 6-0-2. An introduction to the principles and techniques of visualization and representational drawing with an emphasis on the development of freehand skills.
- 120: Foundation Design II.** 6-0-2. Preq., ARCH 110. Continuation of ARCH 110. Empirical studies of the principles and processes related to the poetic and tectonic aspects of making architectural form.
- 130: Foundation Design III.** 6-0-2. Preq., ARCH 120. Culmination of a three-course sequence studying the principles and processes related to the poetic and tectonic aspects of making architectural form.
- 131: Architectural Theory.** 0-2-2. An examination of architecture as a language system, involving the investigation of its basic vocabulary and grammar and their development and refinement in the history of architecture.
- 132: Advanced Communication Skills.** 6-0-2. Advanced techniques for presentational and representational communication are explored through studio problems requiring sophisticated graphic or non-verbal communication techniques.
- 200: Issue Investigation.** 0-1-1. A synoptic examination of the principles of site analysis and planning as related to building.
- 210: Foundation Design IV.** 6-0-2. Preq., ARCH 130, 131, and 132. Exploratory studies of strategies for combining and composing the fundamental elements of architecture.
- 211: Architectural History.** 0-2-2. An examination of the classical language of architecture with specific reference to the contributions of the social, cultural, intellectual, technological contexts to its development.
- 220: Foundation Design V.** 6-0-2. Preq., ARCH 210. A continuation of ARCH 210 emphasizing the influences of contextual, functional, and ideological constraints on the combination and composition of the fundamental elements of architecture.
- 221: Building Systems I.** 0-3-3. Introduction to the concepts, principles, and conventions associated with a building's structural and envelope systems.
- 222: Architectural History.** 0-2-2. Preq., ARCH 211. An examination of the modern language of architecture with specific reference to the social, cultural, intellectual, and technological contexts to its developments.
- 230: Foundation Design VI.** 6-0-2. Preq., ARCH 220. A culmination of a three-course sequence exploring strategies and constraints related to combining and composing the fundamental elements of architecture.
- 231: Contemporary Architectural History.** 0-2-2. Preq., ARCH 222. An examination of the various movements that have emerged since 1960 with reference to the social, cultural, intellectual, and technological contexts that fostered their developments.
- 232: Building Systems II.** 0-3-3. Study of environmental and physical systems' impact on building envelope and interior space design emphasizing passive energy techniques, daylight, electrical lighting and acoustics.
- 300: Introduction to Building, Accessibility, and Life Safety Codes.** 0-1-1. A synoptic examination of model building codes, Americans with Disabilities Act, and Life Safety Code as they influence the internal logic of buildings.
- 301: Computer Applications Colloquium.** 6-0-2. Introduction to software applications that facilitate research, communication, drafting, and modeling in the discipline of architecture.
- 310: Architectural Design I.** 9-0-3. Preq., ARCH 230. Examination of theoretical issues and historical antecedents through diagrammatic studies and analysis of organizational strategies with an emphasis on masonry construction and its supporting technologies.
- 311: Built Form and Behavior.** 0-2-2. A critical analysis of the psychological, social and cultural factors that are manifest in and influenced by architectural form.
- 320: Architectural Design II.** 9-0-3. Preq., ARCH 310. Examination of the relationship between architecture and its physical context with emphasis on site analysis, design methodology, light frame construction, and passive/sustainable systems.
- 321: Architectural History Seminar.** 0-2-2 (6). Examination and investigation of selected topics associated with architectural history and theory.
- 331: Theories of Architecture.** 0-2-2. Preq., ARCH 231. A study and evaluation of the architectural profession, its intentions, and its cultural relevance.
- 332: Building Systems III. 0-3-3.** A study of service systems' impact on building envelope and interior spaces emphasizing plumbing, mechanical, electrical, and vertical transportation systems.
- 350: Visual Studies.** 9-0-3-(6). Studies of the art and craft of building through the design and fabrication of architectonic objects.
- 380: Applied Studio Practices.** 6-0-2 (4). Practical problems in graphic and visual communications.
- 400: Studio Problems.** 6-0-2 (4). Specialized studio problems in aqueous media on paper.
- 402: Field Travel.** 0-1-1 (3). The examination and analysis of contemporary architectural works and urban environments through participation in supervised travel.
- 403: Project Documentation.** 9-0-3 (6). Preq., ARCH 301. The full documentation of a project of historic or architectural significance in Historic American Buildings Survey format.
- 407: Computerized Construction Documentation.** 0-2-2. Preq., ARCH 474. Development of architecture details, systems, and techniques in the preparation of contract documents.
- 410: Architectural Design III.** 9-0-3. Preq., ARCH 320. Examination of site selection and program definition within varying contexts through schematic design studies emphasizing steel or concrete structural systems and active mechanical/electrical systems.
- 411: Planning and Urban Design Theory.** 0-2-2. An examination of the process of design and change in urban environments, with discussion of strategies and processes for intervening in the development of these environments.
- 417: Internship in Architecture.** 20-0-4 (8). Preq., Senior Standing. Supervised experience in the office of a registered architect, interior designer, engineer or landscape architect. A minimum of 20 hours per week. (Pass/Fail).
- 420: Architectural Design IV.** 9-0-3. Preq., ARCH 410. Examination of the relationship between architecture and the public realm through detailed design and development emphasizing the integration of structural material and building system technologies.
- 421: Building Systems IV.** 0-3-3. Study of the principles of structural behavior and varied building material assemblies through technical documentation.
- 431: Architectural Seminar I.** 0-2-2 (6). Examination and investigation of selected topics associated with the internal logic of buildings: codes, building systems, construction materials, and assemblies.
- 436: Written Contract Documents.** 0-2-2. Preq., Senior standing. Construction specification writing principles using the CSI format and procedures.
- 445: Professional Problems.** A(4 1/2-0-1); B(9 1/2-0-2); C(13 3/4-0-3). Individual study with variable credit of selected professional problems having educational significance. Topic and credit by agreement with the Department Head.
- 450: Related Readings.** A(4 1/2-0-1); B(9 1/2-0-2); C(13 3/4-0-3). Guided readings in a specific aspect of architectural theory or practice under the supervision of a faculty member. Credit and topic by agreement with the Department Head.
- 471: Professional Practice I.** 0-2-2. Architect's role and responsibility in the project process of predesign, design, construction documents, and the administration of the construction contract.
- 472: Architectural Seminar II.** 0-2-2 (6). Examination and investigation of selected topics associated with the practice of architecture: ethics, management, marketing, services, and finances.
- 473: Design Research.** 0-2-2. A study of research method for the architect including the execution of scholarly research and programming as related to the degree design project.
- 474: Computers for Designers.** 6-0-2. Development of fundamental skills in software applications associated with architectural production and project delivery.
- 480: Degree Design Project I.** 12-0-4. Preq., ARCH 473. Initiation of the degree design project through multiple schematic design iterations that reconcile and resolve contextual, formal, functional, and ideological issues.

- 481: Professional Practice II.** 0-2-2. Preq., ARCH 471. The business of architecture with an emphasis on practice trends of the future in respect to project and design management.
- 482: Architectural Programming.** 0-2-2. Advanced techniques of research, analysis and programming through which the effect of pre-design issues and constraints are examined.
- 490: Degree Design Project II.** 12-0-4. Preq., ARCH 480. A continuation of ARCH 480 emphasizing the detailed design development of the previously resolved schematic design.
- 491: Professional Practice III.** 0-2-2. Preq., ARCH 481. The legal, ethical and moral issues of architectural practice as related to the changing professional context.
- 556: Problems.** 12-2-6. Preq., fifth year classification in Architecture. Special projects in architecture and landscape. Department Head must approve projects.
- 559: Specialized Individual Studio Problems.** 6-1-3-(9). Permission and project approval must be obtained from Department Head.

#### ART (ART)

- 115: Design.** 6-1-3. Formal problems of the theory and practice in the elements and principles of design.
- 116: Color Design.** 6-1-3. Preq., ART 115 or ARCH 110. The study of color and the interaction of color in design.
- 117: Conceptual Design.** 6-1-3. Preq., ART 116. A materials and techniques course with the emphasis on experimental investigations which combines both traditional and contemporary approaches.
- 118: 3-D Design.** 6-1-3. Preq., ART 115. Problems in three-dimensional design and increased emphasis on the development of individual ideas through various materials such as clay, plaster, fiberglass, wood, and plastics.
- 119: Introduction to Graphic Design Software.** 6-1-3. Preq., ART 115 and 116. Survey of the fundamentals of using graphics-creating software. Students will gain a working knowledge of the applications of specific software programs through design assignments.
- 125: Drawing.** 6-1-3. A study of the principles underlying all creative and representation drawing.
- 126: Drawing.** 6-1-3. Preq., ART 125. A continuation of ART 125.
- 160: Introduction to Graphic Design.** 6-1-3. Preq., ART 116 and 126. An Introduction to the methods, processes, and principles of graphic design.
- 170: Introduction to Photography.** 6-1-3. An introduction to the photographic medium through an exploration of basic tools, techniques, and aesthetics of 35mm black and white photography.
- 173: Intermediate Photographic Practices.** 6-1-3. Preq., ART 170. Advanced black and white techniques covering exposure, development, and printing of small format negatives, with special emphasis on the use of the Zone System.
- 202: Woodshop Orientation.** 3-0-1. A familiarization course for students, preparatory to their use of the woodshop. The course will be a hands-on introduction to all the equipment available for student use.
- 220: Painting.** 6-1-3. Preq., ART 116 and 126. Creative approach to the problems in painting with emphasis on observation and representation.
- 221: Painting.** 6-1-3. Preq., ART 220 and 225. Creative approach to the problems in painting with emphasis on the human figure.
- 225: Drawing.** 6-1-3. Preq., ART 125 and 126. The study of human anatomy as related to problems of art.
- 228-229: Figure Drawing.** 6-1-3 each. Preq., ART 125 and 126. Drawing in media from models.
- 240: Ceramics.** 6-1-3. Introductory course on methods of ceramic construction with emphasis on the creative aspects of pottery.
- 241: Ceramics.** 6-1-3. Emphasis on the use of the potter's wheel.
- 260: Intermediate Graphic Design.** 6-1-3. Preq., ART 160. Studio projects emphasizing problem-solving and introducing use of computers in layout/imaging. Includes a pass/fail portfolio requirement for entry into the major. A specific laptop computer is required for this course.
- 261: Production.** 6-1-3. Preq., ART 160. Introduction to the techniques and technology involved in preparing graphic design projects for printing.
- 262: Layout.** 6-1-3. Preq., ART 260. Studio projects exploring contemporary graphic design formats and techniques. Utilization of the creative process in problem solving is emphasized.
- 263: Illustration.** 6-1-3. Preq., ART 260. Exploration of the media and techniques of contemporary illustration. Emphasis also on creative problem solving.
- 266: History of Art I.** 0-3-3. A survey of the painting, sculpture, architecture, and minor arts of ancient and medieval societies.
- 267: History of Art II.** 0-3-3. A survey of the painting, sculpture, architecture, and minor arts from the Renaissance to the present.
- 270: Concepts of Photographic Imagery.** 6-1-3. Preq., ART 173. An introduction to the many facets of contemporary photography from documentary to conceptual. An overview of approaches to problem solving with the camera.
- 271: Alternative Photographic Processes.** 6-1-3. Preq., ART 173. Alternative processes associated with the photographic medium. Creative approach to various techniques involving ortho films, toning, liquid emulsions, pinhole cameras, and hand-coloring applications.
- 290: Art Appreciation.** 0-3-3. Study and enjoyment of art in its various expressions. Principles for critical judgment. Art in dress, the home, furniture, textiles, pottery, painting, graphic arts, and civic art. (non-art majors only)
- 301: Appreciation and Application of Elementary Art Structure.** 0-3-3. Preq., consent of instructor. Theory and practice using the principles of design as basis for appreciation of the visual arts.
- 320: Painting.** 6-1-3. Preq., ART 221. Creative approach to the problems in painting with emphasis on experimentation in various media, subjects, and techniques.
- 321: Painting.** 6-1-3. Continuation of ART 320.
- 331: Introduction to Printmaking.** 6-1-3. Preq., ART 116 and 126. A basic survey of printing techniques in linoleum cut, wood cut, collograph, dry point, etching and lithography.
- 346: Ceramics.** 6-1-3. Preq., ART 240 and 241. An Advanced course in ceramic design and construction with the introduction to the construction and use of ceramic kilns.
- 347: Ceramics.** 6-1-3. Preq., ART 346. A continuation of ART 346.
- 360: Typography.** 6-1-3. Preq., ART 262. Emphasis on problems in typography with special uses of the computer.
- 361: Art Direction.** 6-1-3. Preq., ART 261, 262, and 263. Advanced studio projects emphasizing problem-solving within a creative team and utilizing multiple design and imaging media and techniques.
- 362: Computer Graphics.** 6-1-3 (9). Preq., ART 260. Exploration of the uses of contemporary computer software and hardware for the creation of graphic design projects.
- 363: Ad Campaign.** 6-1-3. Preq., ART 261, 262. Advanced studio projects exploring advertising graphic design and utilizing contemporary advertising media formats.
- 370: Color Photography.** 6-1-3. Preq., ART 173. An introduction to printing film negatives and transparencies onto color photographic papers.
- 372: Studio Photography.** 6-1-3. Preq., ART 173. Problems in controlled lighting for portraiture, figure, fashion, product, and introduction to view camera operation.
- 373: Commercial Photography.** 6-1-3. Preq., ART 372. An introduction to commercial applications of photography. Large format camera operation is studied with assignments covering a wide range of topics from Architecture to Fashion.
- 374: Commercial Portfolio.** 6-1-3. Preq., ART 373. A concentrated study in one area of interest and production of a portfolio suitable for presentation. Large format color will be used extensively.
- 390: Sculpture.** 6-1-3-(9). Preq., ART 118. Investigations in sculptural processes, materials, and techniques.
- 391: Sculpture.** 6-1-3-(9). Preq., ART 118. Creative approach to problems in metal casting, fabrication, welding, mold technology, and foundry procedures.
- 415: Studio Problems.** 6-1-3 (9). Preq., Permission of instructor. Advanced problems in design. (G)
- 420: Studio Problems.** 6-1-3-(9). Preq., ART 320. Advanced problems in painting. (G)
- 427: Advanced Drawing.** 6-1-3-(9). Preq., ART 228. Interpretive approach to drawing. (G)
- 430: Studio Problems.** 6-1-3-(9). Preq., ART 331. Advanced problems in printmaking. (G)
- 440: Studio Problems.** 6-1-3 (9). Preq., ART 347. An elective course in advanced crafts. (G)
- 459: Women and the Arts.** 0-3-3. Survey of women's involvement with the visual arts. Major emphasis upon anonymous "female" crafts and leading women artists, 1600 to present. (G)
- 460: Monuments of Non-Western Art.** 0-3-3. Survey of monuments of architecture, sculpture, painting, etc. from the most glorious epochs of selected Asian, African, Pre-Columbian, and Oceanic cultures. (G)
- 461: American Art, 1929-1990.** 0-3-3. Survey of major monuments, artists, styles, and changes in modern American art. (G)

- 462: History of Graphic Design.** 0-3-3. Preq., ART 260. Survey of the history of Graphic Design and its influence on today's practice of the profession. (G)
- 463: Portfolio I.** 6-1-3. Preq., ART 260. Advanced projects for the professional graphic design portfolio. (G)
- 464: Computer Graphics for Portfolio.** 6-1-3 (6). Preq., ART 362. Advanced uses of contemporary computer hardware and software for the creation of the graphic design portfolio. (G)
- 465: American Art in the Age of Expansion, 1865-1893.** 0-3-3. A survey of leading artists, styles, movements and changing attitudes about art. It stresses socioeconomic aspects of art making and patronage. (G)
- 466: History of Modern Art.** 0-3-3. Historical and critical appraisal of art in the 19th and 20th centuries. (G)
- 467: History of the Arts.** 0-3-3. A survey of the arts: furniture; weaving and textiles; tools and weapons; ornament, both domestic and personal; artifacts of daily life such as painting, sculpture, etc.
- 468: History of American Art.** 0-3-3. Historical and critical appraisal of art in America from the colonial era to the present. (G)
- 469: History of Italian Art.** 0-3-3. A survey and analysis of the painting, sculpture, and architecture produced in Italy between 1260 and 1600. (G)
- 471: Studio Problems in Graphic Design.** 6-1-3 (9). Preq., ART 260. Advanced projects in graphic design for the professional portfolio, emphasizing concentration in techniques and problem-solving projects. (G)
- 472: History and Aesthetics of Photography.** 0-3-3. A survey of the photographic image from 1839 to the present, with special emphasis on the development of photographic seeing. (G)
- 473: Image Manipulation with Computers for Artists.** 6-1-3-(9). Preq., ART 115, 116, and 125. The use of software and computers in digital imagery using photographic resources. Criticism of individual projects and group discussions. (G)
- 474: Senior Exhibition.** 6-1-3 (9). Senior Standing. One quarter prior to graduation the student must present an exhibition of sufficient quality to warrant exiting the program.
- 475: Senior Portfolio.** 6-1-3. Preq., ART 463 and 464, taken only in the quarter of graduation. Preparation of the professional graphic design portfolio and resume. Course culminates in graded exhibition. Samples of portfolio work for departmental archives are required.
- 490: Sculpture.** 6-1-3-(9). Preq., ART 390 or 391. Creative approach to the problems in sculpture with individually directed experiments in the various sculptural processes. (G)
- 499: Issues in the Arts.** 0-3-3. A seminar for undergraduate senior and graduate students in the arts. This course will cover verbal and written interchange of ideas and issues in the arts. Seniors and graduate students only. (G)
- 510: Graduate Design.** 6-1-3-(6). Studio work varying with the student's project, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 511: Graduate Design.** 6-1-3-(6). Studio work varying with the student's project, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 512: Graduate Design.** 6-1-3-(6). Studio work varying with the student's project, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 513: Master's Project.** 6-1-3-(6). Original, independent studio work approved by the Art Graduate Committee as appropriate for presentation as a one-man exhibition of final project, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 514: Master's Project.** 6-1-3-(6). Original, independent studio work approved by the Art Graduate Committee as appropriate for presentation as a one-man exhibition of final project, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 515: Master's Project.** 6-1-3-(6). Original, independent studio work approved by the Art Graduate Committee as appropriate for presentation as a one-man exhibition of final project, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 520: Advanced Studio Problems.** 6-1-3-(6). Projects, plus inclusion of the collective graduate seminar in Fall and Winter Quarters
- 521: Advanced Studio Problems.** 6-1-3-(6). Projects, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 522: Advanced Studio Problems.** 6-1-3-(6). Projects, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 540: Advanced Crafts.** 6-1-3-(6). Studio work involving the design and construction of two-dimensional and three-dimensional problems. Choice of media with consent of Art Graduate Committee, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 541: Advanced Crafts.** 6-1-3-(6). Studio work involving the design and construction of two-dimensional and three-dimensional problems. Choice of media with consent of Art Graduate Committee, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 542: Advanced Crafts.** 6-1-3-(6). Studio work involving the design and construction of two-dimensional and three-dimensional problems. Choice of media with consent of Art Graduate Committee, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 550: Photographic Projects.** 6-1-3-(9). Advanced photographic project in field of special interest, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 564: Graduate Seminar.** 6-1-3. Guided study, discussion, and reading in art related to college level teaching.
- 565: Art History.** 6-1-3-(6). Guided and/or independent research related to the History of Art.
- 566: Art History.** 6-1-3-(6). Guided and/or independent research related to contemporary developments in art.
- 567: Graduate Exhibition.** 6-1-3-(6). Preparation for and installation of graduate exhibition, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 570: Photographic Projects.** 6-1-3-(9). Advanced photographic concepts and techniques. Practical and expressive application of photographic processes to the applied and fine arts, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 571: Photographic Seminar.** 6-1-3. Research paper with supportive audio slide presentation.
- 572: Portfolio.** 6-1-3-(9). Preparation of a portfolio, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 573: Photographic Exhibition.** 6-1-3. Preparation of an exhibit, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 574: Directed Projects in Graphic Design & Digital Imaging.** 6-1-3 (9). Design project assigned by the Art Graduate Committee. Emphasis on development of practical experience in designer-client relationships and the use of advanced digital design technology to create and disseminate project work, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 575: Directed Projects in Graphic Design & Digital Imaging.** 6-1-3 (9). Design project assigned by the Art Graduate Committee. Emphasis on development of practical experience in designer-client relationships and the use of advanced digital design technology to create and disseminate project work, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 576: Directed Projects in Graphic Design & Digital Imaging.** 6-1-3 (9). Design project assigned by the Art Graduate Committee. Emphasis on development of practical experience in designer-client relationships and the use of advanced digital design technology to create and disseminate project work, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 577: Directed Research in Graphic Design & Digital Imaging.** 6-1-3 (9). Research project developed by student with the Art Graduate Committee. Emphasis on advanced application of abilities pertinent to contemporary graphic design such as use of digital design technology, expertise in traditional media imaging, and the creation of visual communications for corporations, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 578: Directed Research in Graphic Design & Digital Imaging.** 6-1-3 (9). Research project developed by student with the Art Graduate Committee. Emphasis on advanced application of abilities pertinent to contemporary graphic design such as use of digital design technology, expertise in traditional media imaging, and the creation of visual communications for corporations, plus inclusion of the collective graduate seminar in Fall and Winter Quarters.
- 579: Graduate Seminar in Graphic Design Education.** 0-3-3 (6). Discussion and guided research concerning college classroom and computer laboratory instruction in graphic design education.
- 580: Master's Thesis & Exhibition in Graphic Design.** 0-3-3. Preparation of a thesis paper for submission to the Art Graduate Committee and a public exhibition of thesis visual works in graphic design.

**BIOLOGICAL SCIENCES (BISC)**

- 101: Fundamentals of Biology I.** 0-3-3. Introduction to biological concepts of cell structure and physiology, genetics, evolution, and ecology.
- 102: Fundamentals of Biology II.** 0-3-3. Preq., BISC 101. Continuation of biological topics including origin of life, survey of the five kingdoms, plant and animal structure.
- 130: Biological Principles.** 0-3-3. Coreq., BISC 131. Designed for students majoring in science. Introduction to biomolecules, cells, metabolism, genetics, evolution, and ecology.
- 131: Biological Principles Laboratory.** 3-0-1. Coreq., BISC 130. Student-oriented experiments and demonstrations emphasizing biomolecules, cells, metabolism, genetics, evolution, and ecology.
- 132: Biological Diversity.** 0-3-3. Preq., BISC 130; Coreq., BISC 133. An introduction to the classification, anatomy, and physiology of prokaryotes and eukaryotes.
- 133: Biological Diversity Laboratory.** 3-0-1. Coreq., BISC 132. Investigations of the classification, anatomy, and physiology of prokaryotes and eukaryotes.
- 134: Botany.** 0-3-3. Introduction to botany, including the biology of plants, fungi, bacteria, and viruses.
- 150: Phlebotomy.** 0-2-2. Principles of specimen collection, techniques, and processing with emphasis on related issues of patient relations, medical terminology, anatomy and physiology, quality assurance, safety and compliance.
- 151: Phlebotomy Laboratory.** 10-0-2. Preq. or Coreq., BISC 150. A laboratory to accompany BISC 150. Instruction and practicum concerning specimen collection techniques of both routine and special considerations.
- 200: Principles of Genetics.** 0-3-3. Fundamental laws of heredity as applied to plants, animals, and humans.
- 201: Scientific Principles.** 0-3-3. A general course embracing the principles of the biological and physical sciences, incorporating teacher demonstration and laboratory activities.
- 205: Plant Anatomy.** 3-2-3. Preq., BISC 132, 133. A comparative study and interpretation of the internal structure of vascular plants.
- 212: Conservation and Management of Natural Resources.** 0-3-3. An introduction to the wildlife resources of North America and their interrelations with other natural resources.
- 214: Survey of Microbiology.** 4-3-4. Fundamental concepts of microbiology, emphasizing techniques and laboratory procedures used in medically related studies.
- 216: Plant Biology.** 0-3-3. Preq., BISC 130, 131. Introduction to the biology of plants including growth, morphology, physiology, genetics, diversity, and propagation.
- 217: Plant Biology Laboratory.** 3-0-1. Preq. or Coreq., BISC 216. Exploration and application of plant biology concepts and processes.
- 221: Taxonomy and Morphology of Vascular Plants I.** 3-2-3. Preq., BISC 132, 133. Survey of plant morphology, classification, identification, and field techniques. Includes a survey of common families in the SE USA.
- 222: Taxonomy and Morphology of Vascular Plants II.** 3-2-3. Preq., BISC 221. Survey of taxonomy to include a local project. Additional common vascular plant families and identification of plants in winter condition will also be included.
- 224: Human Anatomy and Physiology.** 0-3-3. Preq., Consult with your advisor. The structure and functions of the organ systems of the human body, including anatomy of the vocal and hearing mechanisms.
- 225: Human Anatomy and Physiology.** 0-3-3. Preq., Consult with your advisor. Introduction to human anatomy and physiology including structure and function of cells, tissues, organs and the integumentary, skeletal, muscular, and nervous systems.
- 226: Anatomy and Physiology Laboratory.** 3-0-1. Preq., BISC 225, or concurrent enrollment. Specially designed exercises permitting students to observe the physiology and anatomy of mammals.
- 227: Human Anatomy and Physiology.** 0-3-3. Preq., BISC 225 or equivalent. A continuation of 225. Including structure and function of circulatory, respiratory, digestive, excretory, endocrine and reproductive systems.
- 228: Anatomy and Physiology Laboratory.** 3-0-1. Preq., BISC 227, or concurrent enrollment. Additional laboratory exercises to illustrate the anatomy and physiology of animals.
- 242: Histological Sectioning.** 8 1/2-0-2. Preq., 8 semester credits of BISC. Methods of preparing tissues for microscopic examination.
- 245: Clinical Analysis.** 4 1/4-3-4. Preq., CHEM 104. Study of the laboratory methods used to evaluate the physiochemical state of the body, including a computer assisted approach to laboratory mathematics and quality assurance.
- 250: Introduction to Clinical Laboratory Sciences.** 4-1-2. Introduction to the curriculum and profession including computer utilization in problem solving, professional awareness, pre-clinical/clinical articulations, and information sources in medical technologies.
- 260: Microbiology.** 4-3-4. Preq., CHEM 100, 101; BISC 130, 131. Designed for students majoring in science. Course will cover topics in clinical, applied, environmental, and eukaryotic microbiology.
- 262: Bacterial Identification Methods and Applications.** 0-3-3. Preq., BISC 260. Course covers principles of physical, biochemical, and molecular methods in identifying bacteria.
- 275: Aquatic Bioassays.** 0-1-1. Internet-based course centering on governmental regulations concerning bioassays to test for toxicity in waste effluents released into natural waters in the United States. Also listed as ENSC 275.
- 284: Introduction to Marine Science.** 8-3-4. Preq., BISC 132, 133. Introduction to chemical, geological, and biological processes in the oceans and coastal environments; interrelationships of humans and the marine environment. Five weeks spent at the Louisiana Universities Marine Consortium Coastal Laboratory.
- 285: Introduction to Marine Zoology.** 8-3-4. Preq., BISC 132, 133. Survey of marine animals, particularly those of the Louisiana Gulf Coast, including classification, morphology, physiology, and ecology. Five weeks at the Louisiana Marine Consortium Coastal Laboratory.
- 290: Comparative Anatomy of Vertebrates.** 8 1/2-2-4. Preq., BISC 132, 133. Comparative anatomy and evolution of the vertebrates.
- 310: Genetics:** 4 1/4-2-3. Preq., BISC 132, 133. Principles of inheritance in plants and animals at the biochemical, cellular, organismal, and population levels.
- 313: Ecology.** 4 1/4-2-3. Preq., BISC 132, 133. An overview of the interactions of plants, animals, and non-living factors as they influence individuals, populations, communities, and ecosystems.
- 315: Cell Biology.** 0-3-3. Preq., BISC 132, 133. Detailed study of the structural and functional organization of the cell and the interactions of the organelles with respect to metabolism and heredity.
- 317: Wildlife Management Principles.** 4 1/4-2-3. Preq., BISC 132, 133, and computer literacy. A review of the techniques used in the identification, study, and management of wildlife and their habitat.
- 320: Animal Physiology.** 0-3-3. Preq., BISC 132, 133. (BISC 290 strongly recommended). A general and comparative approach to the principles and concepts of physiology which apply to animal systems.
- 321: Animal Physiology Laboratory.** 4-0-1. Laboratory studies in animal physiology.
- 330: Plant Pathology.** 3-2-3. Preq., BISC 132, 133. A study of plant diseases and disorders.
- 335: Microbial Physiology.** 3-3-4. Preq., BISC 260 and CHEM 250. Basic biochemical and physiological activities of microorganisms.
- 341: Hematology.** 4 1/2-2-3. 8 semester credits of BISC. Quantitative and qualitative methods for determining the condition of cellular blood and a study of its histology, morphology and physiology.
- 346: Medical X-Ray Technology.** 3-1-2. Preq., BISC 130. Methods of obtaining routine radiographs, stressing proper positions and darkroom techniques.
- 360: Biological Problems.** 1 - 3 hour(s) credit (6). Preq., Junior standing and written permission of instructor. An introduction to the principles of research.
- 361: Laboratory Assisting.** 1-3 hour(s) credit (3). Preq., Junior standing and written permission of instructor. Experience in biological science laboratory assisting in student instruction and practice.
- 401: Parasitology.** 3-2-3. Preq., BISC 132, 133. Protozoan and helminthic parasites of medical and veterinary importance to humans with emphasis on morphology, life cycles, pathogenesis, diagnosis, and control.
- 402: Immunology.** 0-3-3. Preq., BISC 260. A study of antigens and antibodies including the chemical basis of antigen-antibody specificity, mechanisms of hypersensitivity, immunological modulators, and immunological diseases.
- 404: Immunology Laboratory.** 3-0-1. Preq. or Coreq., BISC 402. Laboratory exercises in immunology to include precipitation, agglutination procedures, isotopic and nonisotopic immunoassays, reagent preparation and validation.
- 405: Plant Physiology.** 3-2-3. Preq., BISC 132, 133, CHEM 102 or 121. Study of life processes and functions of plants. (G)

- 406: Pathogenic Bacteriology.** 3-3-4. Preq., BISC 260. Bacteria pathogenic to humans; principles of infection and immunity in humans and other animals.
- 407: Histology.** 8 1/2-1-3. Preq., BISC 320, 321, or equivalent. Microscopic study of animal tissues with emphasis on functional and structural interrelationships. (G)
- 408: Bacterial Genetics.** 3-2-3. Preq., BISC 260, 310. Topics include nucleic acid effectors in prokaryotes, mutations, phage genetics, and molecular methods of studying gene structure/function.
- 409: Virology.** 3-2-3. Preq., CHEM 250. Viruses and their relationship to disease in plants, animals, and bacteria. (G)
- 410: Advanced Genetics.** 4 1/4-2-3. Preq., BISC 310 or consent of the instructor. Principles and methods for analyzing biochemical and chromosomal polymorphisms, metabolic pathways, pedigrees, and population differentiation with emphasis on humans. (G)
- 411: Developmental Biology.** 6-2-3. Preq., BISC 132, 133. A study of gametogenesis, fertilization, and the embryological development of organisms using descriptive and experimental approaches. (G)
- 412: Environmental Plant Physiology.** 0-3-3. Preq., BISC 132 or equivalent. Study of the plant's response to the biotic and abiotic environment. Topics include the plant environment, phytoremediation, and the physiology of plant stress. (G)
- 413: Advanced Ecology.** 0-3-3. Preq., BISC 313. An in-depth study of the interactions of the plant and animal communities with their environments. (G)
- 414: Entomology.** 3-2-3. Preq., BISC 101, or 102, or 130. Study of insect structure, classification, life cycles, and control practices, with emphasis on economic pests. (G)
- 420: Environmental Animal Physiology.** 0-3-3. Preq., 12 hours of BISC including 320. Functional adaptations of animals to their environments, with emphasis on vertebrates. (G)
- 421: Mycology.** 4 1/4-2-3. Preq., BISC 132, 133. A survey of the Kingdom Fungi with emphasis on Ascomycete and Basidiomycete anatomy, morphology, and field identification. (G)
- 422: Molecular Biology.** 0-3-3. Preq., BISC 132, 133. Emphasis on eukaryotic DNA, RNA structures, mechanisms of replication, transcription, translation, regulation, and control of gene expression.
- 424: Medical Mycology.** 0-2-2. Preq., BISC 132, 133. A study of yeast, molds, and other fungi pathogenic to humans and animals. (G)
- 426: Evolution.** 0-3-3. Preq., BISC 130, 131, or equivalent. A study of the concepts, problems, and methods involved in the formulation of modern evolutionary theory.
- 428: Wetland Ecology.** 0-3-3. Study of wetland characteristics and the ecological processes occurring within wetlands. Wetland delineation, restoration, construction and regulation will also be covered. Also listed as FOR 428.
- 429: Ichthyology.** 4 1/4-2-3. Preq., BISC 132, 133. Systematics, anatomy, and ecology of fish with emphasis on local freshwater species. (G)
- 430: Herpetology.** 4 1/4-2-3. Preq., BISC 132, 133. The taxonomy, distribution, life histories, and ecology of the herpetiles, with special emphasis on those species found in Louisiana. (G)
- 432: Mammalogy.** 4 1/4-2-3. Preq., BISC 132, 133. The identification, taxonomy, characteristics, and general biology of mammals with emphasis upon those of North America. (G)
- 433: Ornithology.** 4 1/4-2-3. Preq., BISC 132, 133. Identification, taxonomy, characteristics, and general biology of birds, with emphasis upon those of North America. (G)
- 434: Limnology.** 4 1/4-2-3. Preq., BISC 132, 133. The study of the chemical, physical, and biotic aspects of freshwater environments. (G)
- 435: Pond Management.** 4 1/4-2-3. Preq., BISC 132, 133, 434. A detailed study of biotic adaptations and biotic and chemical controls in pond ecosystems with emphasis on aquatic vertebrates. (G)
- 436: Field Botany Problems.** 30-0-3. Preq., Junior standing and permission of instructor. A field trip experience for study of aquatic and terrestrial plant communities. Offered on demand. (G)
- 437: Field Zoology Problems.** 30-0-3. Preq., Junior standing and permission of instructor. A field trip experience for studying the natural history of animal species. Offered on demand. (G)
- 438: Marine Microbiology.** 8-3-4. Preq., BISC 130, 131, 132, 133. Introduction to the marine and estuarine microbes, especially bacteria and fungi; covers classification, methodology, role in marine ecosystems, biogeochemical cycles and diseases of marine animals. Five weeks at a Louisiana Universities Marine Consortium coastal laboratory.
- 439: Marine Science for Teachers.** 2-8-3. Survey of the marine sciences, techniques for teaching marine science at secondary and elementary school levels. Five weeks at the Louisiana Universities Marine Consortium Coastal Laboratory.
- 441: Wildlife Management Internship.** 3 hours credit, 40 hours per week. Work experience in the use of the equipment, materials, and procedures in wildlife management.
- 442: Wildlife Management Internship.** 3 hours credit, 40 hours per week. Work experience in the use of the equipment, materials, and procedures in wildlife management.
- 443: Wildlife Management Internship.** 3 hours credit, 40 hours per week. Work experience in the use of the equipment, materials, and procedures in wildlife management.
- 444: Environmental Microbiology.** 4-2-3. Preq., BISC 260. Basic and contemporary aspects of soil, water, and industrial microbiology.
- 445: Immunohematology.** 3-1-2. Preq. BISC 402 or consent of instructor. Principles of donor screening, immunological testing for compatibility, tests for infectious agents and record keeping associated with transfusion medicine.
- 446: Instrumentation.** 3-2-3. Preq. 12 SCH of biological or chemical sciences. Emphasizes the operational theory, use, and maintenance of instruments appropriate to biological investigation through didactic and laboratory exercises.
- 447: Principles of Pharmacology.** 0-3-3. Preq. 8 credit hours of biological and/or chemical sciences. The classification, modes of action, and therapeutic utility of common pharmacological agents are described.
- 449: Biological and Clinical Applications of Radioisotopes.** 3-1-2. Preq., CHEM 104. Intensive training in the use of specialized equipment for measuring ionizing radiations used in biological systems.
- 450: Biological Topics.** 1-4 hour(s) credit (8). An opportunity to observe and discuss topics of current interest in the biological and/or medical sciences. Offered on demand.
- 455: Wildlife Diseases.** 0-3-3. Preq., BISC 132, 133. Study of viral, bacterial, fungal, and metazoan causative agents of disease of wildlife. (G)
- 458: Environmental Law.** 0-3-3. Preq., BISC 130, 131, or approval instructor. A review and analysis of state and federal laws, conventions, and international treaties that influence natural resource management. (G)
- 459: Food and Dairy Microbiology.** 3-3-4. Preq., BISC 260. Microorganisms of importance in the food and dairy industry including methods for rapid detection of food borne pathogens.
- 460: Analytical Thinking.** 0-3-3. Development of skills for science problem-solving, critical thinking, and communication. (G)
- 465: Forensic Anthropology.** 0-3-3. Introduction to forensic anthropology, including intensive study of human skeletal anatomy and variation, archaeological and taphonomic methods and techniques, and crime scene investigation.
- 466: Medical Anthropology.** 0-3-3. Introduction to medical anthropology, including non-western perspectives on disease causation and curing, paleopathology, ethnomedicine, ethnopsychiatry, shamanism, alternative medicine and biocultural approaches to health problems.
- 467: Biological Anthropology.** 0-3-3. Introduction to physical anthropology, including primate anatomy and behavior, human origins and evolution, human adaptation and variation, applied anthropology, and the interrelationship between biology and culture.
- 470: Medical Ethics.** 0-3-3. Reading and discussions of the application of various principles of ethics to questions of medical practice. (G)
- 475: Scientific Inquiry.** 0-2-2. Focus will be on the pursuit of scientific knowledge, emphasizing materials and methods employed. A chronological approach will correlate historical settings with the persons who experienced triumph and tragedy in their endeavors.
- 477: Practica/Internship/Cooperative Education in Biological Sciences.** 1-3 hours credit. May be repeated once. (Pass/Fail). On site, supervised, structured work experiences located within a 100 mile radius of Ruston. Application and supervision fee required.
- 478: Practica/Internship/Cooperative Education in Biological Sciences.** 1-3 hours credit. May be repeated once. (Pass/Fail). On site, supervised, structured work experiences located within a 101-200 mile radius of Ruston. Application and supervision fee required.
- 479: Practica/Internship/Cooperative Education in Biological Sciences.** 1-3 hours credit. May be repeated once. (Pass/Fail). On site, supervised, structured work experiences located beyond a 201-mile radius of Ruston. Application and supervision fee required.

**480: Undergraduate Seminar.** 0-1-1. Preq., Senior standing. Required of all senior BISC majors. Supervised study, reports, and discussion of current biological literature.

**483: Marine Botany.** 8-3-4. Preq., BISC 132, 133. Study of marine and coastal algae and vascular plants including classification, morphology, life cycles, and ecology. Five weeks at the Louisiana Universities Marine Consortium Coastal Laboratory.

**484: Marine Vertebrate Zoology.** 8-3-4. Preq., BISC 132, 133, plus 8 additional hours of biology. General study of the marine chordates with particular emphasis on fishes, including classification, structure, function, and ecology. Five weeks at the Louisiana Universities Marine Consortium Coastal Laboratory.

**485: Marine Ecology.** 8-3-4. Preq., BISC 132, 133; CHEM 102, 104. Relationships of marine estuarine organisms to environmental factors; interactions among organisms, communities and ecosystems of the Louisiana coastal zone. Five weeks at the Louisiana Universities Marine Consortium Coastal Laboratory.

**486: Marine Invertebrate Zoology.** 8-3-4. Preq., BISC 132, 133. General study of the classification, structures, function, and ecology of marine and estuarine invertebrates, emphasizing those of the Louisiana Gulf Coast. Five weeks at the Louisiana Universities Marine Consortium Coastal Laboratory.

**501: Graduate Parasitology.** 3-2-3. Biology, physiology, morphology, and ecology of the major parasites of humans and domestic animals.

**502: Research Methods in Biological Sciences.** 0-3-3. Preq., graduate status. An introduction for graduate students to basic methods used in research in the biological sciences.

**504: Advanced Microbial Physiology.** 3-3-4. Preq., BISC 335. An advanced course on the physiology of bacteria, including bacterial growth and variation, cytology, nutrition, respiration, and temperature effects.

**505: Advanced Plant Physiology.** 3-2-3. Preq., BISC 405. Principles that underlie interpretation of the physical and metabolic processes of plants. Offered on demand.

**509: Biological Sciences Seminar.** 0-1-1 (2). Survey of literature on current topics in either Bacteriology, Botany, Microbiology, or Zoology, where appropriate.

**512: Advanced Immunology.** 6-1-3. Preq., consent of the instructor. An advanced study of the activities of antigens and antibodies.

**513: Ecological Topics.** 0-3-3 (6). Preq., BISC 313, or 413. An advanced study of selected ecological topics. Offered on demand.

**516: Contemporary Topics.** 1-4 hour(s) credit. An opportunity to examine and discuss a variety of timely topics pertaining to the biological sciences. May be repeated with a change in subject matter.

**517: Applied Biological Sciences Research.** 6-1-3. Preq., BISC 502. Laboratory or field studies for non-thesis Master of Science students in the biological sciences. Provides graduate training in applied research skills.

**522: Graduate Molecular Biology.** 0-3-3. Emphasis on protein structure and function, DNA and RNA, replication, transcription, translation, and control of gene expression. Molecular techniques including transformation, plasmids, PCR, and blotting.

**524: Advanced Plant Taxonomy.** 3-2-3. Preq., BISC 222. Problems of nomenclature and recent concepts of plant classification. Offered on demand.

**526: Graduate Histology.** 8 ½-3. Microscopic study of animal tissues with an emphasis on structural and functional relationships.

**528: Advanced Wetland Ecology.** 0-3-3. Study of wetland characteristics and the ecological processes occurring within wetlands. Wetland delineation, restoration, construction, and regulation will also be covered. Cross-listed as FOR 528.

**530: Biological Sciences Special Problems.** 1-6 hours. Preq., written permission of instructor and Advisory Committee Chairperson. No more than 6 hours credit combined with BISC 540 and 541.

**535: Current Topics in Biological Sciences.** 0-1-1 (4). Preq., graduate status. An interactive discussion of current issues and problems in the biological sciences. May be repeated for credit with change of course content.

**540: Biological Sciences Internship.** 40-0-3. Preq., Graduate standing, consent of Advisory Committee Chairperson and Instructor. Career-oriented job experiences. No more than 6 hours credit combined with BISC 530, 540, or 541.

**541: Biological Sciences Internship.** 40-0-3. Preq., Graduate standing, consent of Advisory Committee Chairperson and Instructor. Career-oriented job experiences. No more than 6 hours credit combined with BISC 530, 540, or 541.

**545: History of Zoology.** 0-3-3. The historical development of the science of zoology, the persons who contributed to this development, and the nature of the times which produced them. Offered on demand.

**551: Research and Thesis.** Registration in any quarter may be for 3 semester hours credit or multiples thereof. Maximum credit allowed is six hours.

**565: Graduate Forensic Anthropology.** 0-3-3. Introduction to forensic anthropology, including intensive study of human skeletal anatomy and variation, archaeological and taphonomic methods and techniques, and crime scene investigation.

**566: Graduate Medical Anthropology.** 0-3-3. Anthropology of medicine emphasizing non-western perspectives of disease causation and curing, ethnic psychoses, ethnobotany, human disease history, alternative medicine and biocultural approaches to health issues.

**567: Graduate Biological Anthropology.** 0-3-3. Biological anthropology emphasizing primate anatomy, behavior and systematics, the human fossil record, evolution of human behavior, human adaptation, and the relationship of biology to culture.

**570: Graduate Medical Ethics.** 0-3-3. Intensive discussions, presentations, and readings concerning the theories of ethics and their applications to the practices of the health professions.

#### BIOMEDICAL ENGINEERING (BIEN)

**100: Introduction to Biomedical Engineering.** 3-0-1. Development of the field of Biomedical Engineering, including job opportunities, the Biomedical Engineering Curriculum, professionalism and ethics, dimensions and units, Biomedical Engineering analysis and design.

**202: BME Principles I.** 0-1-1. Coreq., CHEM 102, BISC 225; Preq., MATH 240. Basic qualitative and quantitative principles of biomedical engineering are presented. The general field of biomedical engineering is reviewed with introduction of conservation and modeling concepts.

**203: BME Principles II.** 0-1-1. Coreq., BISC 227; Preq., BIEN 202. An introduction to the role of engineering in analyzing physiological systems and in designing devices and instrumentation to study and treat biomedical problems.

**204: BME Principles III.** 0-1-1. Preq., BIEN 203. A continued introduction to the role of engineering in analyzing physiological systems and in designing devices and instrumentation to study and treat biomedical problems.

**225: Biomedical Systems.** 0-3-3. Preq., ENGR 221 and credit or registration in MATH 243. Analysis techniques for frequency and time domain signals that occur in linear and non-linear physiological systems. Lumped modeling of physiological phenomena.

**230: Biomaterials.** 0-2-2. Preq., BIEN 203. Compatibility of materials for use in biomedical applications.

**301: Biomedical Fluid Mechanics and Biomedical Energy Transport.** 0-3-3. Preq., BIEN 202, MATH 245, PHYS 202, BISC 321, and ENGR 222. The principles of fluid mechanics and thermal energy exchange (momentum and energy balances) in biomedical systems. Analysis of engineering and physiological systems and incorporation of these principles into design of such systems.

**303: Biomedical Systems & Controls.** 0-3-3. Preq., BIEN 204, ELEN 223, MATH 244, PHYS 202. Frequency domain transformation and analyses, control mechanisms, physiological control systems.

**310: Introduction to Clinical Engineering.** 3-2-3. Preq., BIEN 202. A foundation course in medical and clinical terminology, medical instrumentation, medical sciences, hospital procedure and medical practice from an engineering perspective.

**320: Bioenergetics.** 0-3-3. Preq., MATH 242, PHYS 201, BIEN 204. The student is introduced to the concept of bioenergetics—the thermodynamics of living systems. The laws of thermodynamics are emphasized and applied to biological systems.

**325: Bioinstrumentation.** 3-2-3. Preq., BIEN 225, PHYS 202, BISC 227, Coreq. or credit for MATH 243. Analysis and design of biomedical instrumentation. Basic circuitry, electronics and laboratory techniques including transducers, biopotentials, amplifiers, measurement and safety.

**400: Biomedical Engineering Seminar.** 3-0-1. Preq., Senior standing. Instruction and practice in conference-type discussions of technical and professional matters of interest to biomedical engineers.

**401: Biomedical Mass Transport.** 0-3-3. Preq., BIEN 301. The principles of mass balances and transport phenomena in biomedical systems. Analysis of engineering and physiological systems and incorporation of these principles into the design of such systems.

**402: Biomedical Engineering Design I.** 0-2-2. Preq., BIEN 325, 400, 401, 420; ENGL 303. Individualized design projects requiring integration and

- synthesis of prior engineering, life science, design and analytical skills. Utilization of the engineering design process and consideration of biomaterials, biomechanics, human factors, ethical and legal concerns, and oral and written communication skills.
- 403: Analysis and Design of Physiological Control Systems.** 0-3-3. Preq., BIEN 325, 401, ELEN 321. Methods for analyzing and designing linear feedback systems. Physiological control mechanisms presented qualitatively and quantitatively. Design of systems involving physiological systems.
- 404: Biomedical Engineering Design II.** 0-2-2. Preq., BIEN 402. A continuation of BIEN 402.
- 410: Clinical Engineering Internship.** 20-20-6. Preq., BIEN 310 or equivalent and consent. A practical exposure to the health care delivery system. Application of engineering principles to problems unique to that system.
- 420: Biomaterials and Biomechanics.** 0-3-3. Preq., BIEN 301, ENGR 220. Properties of living tissue. Biocompatibility. polymers, metals, and ceramics as biomaterials. Implants for hard and soft tissue. Fundamentals of biomechanics.
- 425: Advanced Biomedical Instrumentation Systems.** 3-2-3. Preq., BIEN 325, or consent. Further analysis and design of biomedical instrumentation. Practical aspects of ideal and real operational amplifiers, and an introduction to microprocessor interfacing.
- 430: Biomechanics.** 0-3-3. Preq., BIEN 230, 301. Mechanical properties and reactions of biological tissues and organs. Analysis of stress, strain and strain rate for biological and bio-artificial components.
- 435: Senior Biomedical Engineering Laboratory.** 3-0-1. Preq., BIEN 401, 403, and 430. Laboratory experiments that demonstrate concepts and techniques in biofluid mechanics, biomechanics, biological mass transport and tissue engineering.
- 440: Computer Applications for Biomedical Engineers.** 0-3-3. Preq., BIEN 202, ENGR 102. The course is designed specifically to training the student in the use of the digital computer for the solution of problems related to Biomedical Engineering. (G)
- 450: Special Topics.** 1-4 semester hours credit. May be repeated for credit. Preq., senior standing and consent of instructor. Problems covering selected topics of current importance or special interest or need.
- 455: Biotechnology and Bioprocesses.** 0-3-3. Preq., BIEN 301, 401. Introduction to biotechnology and bioprocesses. Microbiology and biochemical reactions are reviewed. Enzyme kinetics, microbial growth transport phenomena, and design of biochemical reactors are studied. Cross-listed with CHEN 455. (G)
- 500: Systems Physiology for Biomedical Engineers.** 0-4-4. Preq. Graduate standing and permission of the instructor. Principles of human physiology, including cellular physiology, and the nervous, muscular, cardiovascular, and respiratory systems for engineers. Graduate core course.
- 501: Physiological Modeling I.** 0-3-3. Preq., BIEN 500 and Differential Equations, or consent of instructor. Principles and applications of transport phenomena to biomedical systems and devices. Distributed, lumped, and lumped-distributed modeling. Graduate core course.
- 502: Biotransport Phenomena.** 0-3-3. Preq., BIEN 501. A continuation of BIEN 501.
- 503: Physiological Modeling II.** 0-3-3. Preq., BIEN 501 or consent of instructor. Application of mathematical modeling and engineering analysis to physiological components and systems. Feedback mechanisms for homeostasis. Computer project implementation. Graduate core course.
- 510: Bioinstrumentation.** 0-4-4. Preq., Graduate standing and consent of instructor. Introduction to medical instrumentation systems, biosensors, biopotentials, signal conditioning, analog-to-digital conversion, and signal processing. Graduate core course.
- 515: Biosensors and Their Applications.** 4-2-3. Permission of instructor. Introduction to biosensors in general with special emphasis on oxygen biosensors and their development. Surgical techniques and laboratory procedures for animal experimentation.
- 540: System Analysis and Mathematical Modeling of Physiological Phenomena.** 0-3-3. Preq., permission of instructor. The course deals with the analysis of biological systems and the theory behind the development and solution of mathematical models for the description of biological system behavior.
- 550: Special Topics.** 3 hours credit. Preq., Permission of instructor. May be repeated for credit. Selected topics dealing with advanced subjects in Biomedical Engineering.

- 551: Research and Thesis in Biomedical Engineering.** 0-0-3. Preq., open to M.S. Graduate Students in Biomedical Engineering. Registration in any quarter may be for 3 semester hours credit or multiples thereof. Maximum credit allowed is six semester hours.
- 555: Practicum.** 0-3-3 (6). Preq., 12 semester hours of graduate work. Analytical and/or experimental solution of an engineering problem; technical literature survey required; development of engineering research techniques.
- 556: Biomedical Engineering Internship.** 20-0-6. Preq., permission of instructor. Graduate level internship emphasizing application of engineering design principles in a research, health care or rehabilitation setting.
- 557: Special Topics: Biomedical Engineering.** 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of biomedical engineering. May be repeated as topics change.
- 560: Review of Assistive Technology in Rehabilitation.** 0-3-3. Preq., permission of instructor. Study of physical disabilities and the rehabilitation process.
- 562: Rehabilitation Engineering & Assistive Technology I.** 3-2-3. Preq., BIEN 560. Assessment and the development of engineering solutions in rehabilitation. Emphasis on seating and positioning, mobility, work, and activities of daily living.
- 563: Rehabilitation Engineering & Assistive Technology II.** 3-2-3. Preq., BIEN 560. Assessment and the development of engineering solutions in rehabilitation. Emphasis on transportation and augmentative communication.
- 570: Artificial Intelligence Applications in Biomedical Engineering.** 0-3-3. Preq., Prior introduction to artificial intelligence fundamentals. Artificial intelligence and expert systems application in medical and biomedical problems. Fundamental contributions of medical expert systems.
- 575: Artificial Neural Networks.** 0-3-3. Presentation of foundational concepts and constructs used to analyze and characterize artificial neural network paradigms, their attributes, their applications and their implementations.
- 599: Graduate Seminar.** 0-1-1. (Pass/Fail). Issues in graduate education. Presentations of current topics in research, teaching, and practice. May be repeated for credit.
- 651: Special Topics: Research.** 0-0-3. Preq., open to Ph.D. candidates in Biomedical Engineering who have not completed their academic language and General Comprehensive Examination requirements. This course represents a limited research project, which will lead to a comprehensive and well-designed dissertation research proposal. A grade will be submitted at the end of each quarter for this course.

#### BUSINESS COMMUNICATION (BSCM)

- 305: Communication.** 0-3-3. Preq., ENGL 102. Theory and nature of communication in organizational settings, interpersonal communication, written business communication, listing, communications. Analysis of business problems and preparation of written/oral solutions.
- 435: User Interfacing.** 0-3-3. Preq., BSCM 305, and CIS 310, 339. The unique interpersonal skills of a system analyst are explored throughout the life cycle of a system development.
- 520: Directed Research and Readings.** 0-3-3. Research methodology; problems requiring independent organization of research, implementation, outline of solution, and preparation of reports. Emphasis placed on problem solving for policy-making decisions.
- 620: Business Research Methods.** 0-1-1. A study of research methodology used in business administration, a review of research completed in respective DBA areas, and the development of a dissertation proposal. (May be repeated for a total of 3 hours credit.)

#### BUSINESS LAW (BLAW)

- 255: Legal Environment of Business.** 0-3-3. Studies relations and effect of law on business, society, and the individual, including ethical considerations, history, court system, torts, government regulation, contracts, and business organization.
- 356: Commercial Law.** 0-3-3. A study of specific topics of law essential to the business decision-making process. Areas of law covered include contracts, commercial paper, agency, and sales.
- 410: Business Law for Accountants.** 0-3-3. Preq., BLAW 255 and senior standing. A concentrated study of all topical areas of business law. Coverage includes contracts, credit transactions, governmental

regulations, business organizations, bankruptcy, and property and related topics. (G)

**441: Real Property.** 0-3-3. Preq., BLAW 255. Estates in land, titles, deeds, mortgages, leases, land contracts, minerals, easements and successions.

**445: Legal Aspects of Government and Business.** 0-3-3. Preq., BLAW 255 or special permission of the instructor. A study of landmark law cases with special emphasis placed on guideline interpretive decisions of significance to management.

#### CHEMICAL ENGINEERING (CMEN)

**202: Chemical Engineering Calculations.** 3-2-3. Coreq., ENGR 122, MATH 242. Problems and recitation in material and heat balances involved in chemical processes. Application of Chemical Engineering and chemistry to manufacturing in chemical industries.

**213: Unit Operations-Design I.** 0-3-3. Preq., CMEN 202, 254, MATH 244. Design procedures for equipment and processes involving fluid flow and fluid mixing, with emphasis on computer assisted design techniques.

**254: Laboratory Measurements and Report Writing.** 3-0-1. Preq., CMEN 202 and completion of integrated freshman engineering curriculum. A study of applied analytical and statistical procedures and measurement of process variables in chemical processing and an introduction to technical report writing.

**304: Transport Phenomena.** 0-3-3. Preq., CMEN 213, 313, 413, MATH 245. Fundamental principles of energy, mass, and momentum transfer and transport processes.

**313: Unit Operations-Design II.** 0-3-3. Preq., CMEN 213 or consent of instructor. Design procedures for equipment and processes involving heat transfer, with emphasis on computer assisted design techniques.

**332: Chemical Engineering Thermodynamics II.** 0-3-3. Preq., ENGR 222. Estimation of thermodynamic properties from equations of state. Application of thermodynamic equilibria to physical and chemical equilibria. Energy analysis of processes.

**353: Chemical Engineering Junior Laboratory.** 3-0-1. Preq., CMEN 254, 313, and ENGL 303. Laboratory study of fluid phenomena, heat transfer processes and equipment, and evaporation.

**402: Chemical Reaction Engineering.** 0-3-3. Preq., CHEM 312; senior standing in CMEN. Homogeneous and heterogeneous chemical reaction kinetics, applications to ideal and real reactor types. (G)

**407: Instrumentation and Automatic Process Control.** 3-2-3 Preq., senior standing in CMEN. Survey of process instrumentation methods, and the analysis and design of feedback, feed forward, and cascade control systems. (G)

**408: Pulp and Paper Processes.** 0-3-3. Preq., senior standing in CMEN. Introduction to the pulp and paper industry, its terminology, technology and economics. Conversion of various cellulosic materials into unbleached pulp and paper products. (G)

**411: Environmental Chemodynamics.** 0-3-3. Preq., CMEN 413 and senior standing in CMEN. A study of the modeling and prediction of the movement and fate of synthetic chemicals in the air-water-earth environments. Cross-listed with CVEN 411. (G)

**413: Unit Operations-Design III.** 0-3-3. Preq., CMEN 313. Application of design procedures for equipment and processes involving evaporation, distillation, leaching, extraction, gas absorption and desorption, with emphasis on computer assisted design techniques.

**415: Theory and Practice of Radiation Protection and Shielding.** 0-3-3. Preq., senior standing. An introduction to principles of dosimetry. The concepts of probability of causation, risk assessment, and methods of establishing exposure limits will be discussed. (G)

**430: Chemical Plant Design I.** 0-2-2. Preq., senior standing in CMEN, ECON 215. An introduction to applied process economics and to process hazards, their identification and reduction.

**432: Chemical Plant Design II.** 0-2-2. Preq., senior standing in CMEN and CMEN 430. Comprehensive problems are assigned, the solution of which enables one to calculate dimensions and capacities of required plant equipment. Computer applications.

**434: Chemical Plant Design III.** 0-2-2. Preq., CMEN 432. CMEN 432 continued.

**435: Polymer Engineering.** 0-3-3. Preq., Senior standing in CMEN or consent of the instructor. Polymer technology and processes including polymer structure, states, and transitions; kinetics of polymerization; molecular weight determination; viscous flow; mechanical properties; polymer degradation; analysis and identification. (G)

**442: Process Optimization.** 0-3-3. Preq., senior standing in CMEN. An objective study of the present status of optimization methodology as

applied to the chemical process industries. Both deterministic and non-deterministic systems are considered. (G)

**443: Air Pollution Control Design.** 0-3-3. Preq., Senior standing in CMEN or consent of instructor. An overview of the air pollution problem. Design of devices to control emissions (VOC's, NO<sub>x</sub>, SO<sub>2</sub>, particulates, etc.) Cost estimation of air pollution control systems. (G)

**450: Special Problems.** 1-4 semester hours credit. Preq., senior standing in CMEN. Problems covering selected topics of current importance or special interest or need. (G)

**451: Senior Chemical Engineering Laboratory.** 6-0-2. Preq., CMEN 353 and 413 or consent of instructor. Laboratory work in humidification, drying, distillation, absorption, extraction, and kinetics.

**452: Special Projects Laboratory.** 1 hour credit. Preq., senior standing in CMEN. Selected comprehensive problems. Study and/or laboratory development of: industrial unit operations; new chemical processes; improvement of established processes; economic evaluations. Theoretical studies.

**455: Biochemical Engineering.** 0-3-3. Preq., CMEN 402 or consent of instructor. Introduction to biotechnology and bioprocesses. Microbiology and biochemical processes are reviewed. Enzyme kinetics, microbial growth transport phenomena, and design of biochemical reactors are studied. Cross-listed with BIEN 455. (G)

**456: Hazardous Waste Management.** 0-3-3. Preq., senior standing in CMEN. A study of the legislation, regulation, technology, and business matters relating to hazardous waste management. (G)

**475: Combustion, Fires and Explosions.** 0-3-3. Preq., senior standing in CMEN. Nature of combustion, controlled and free burning fires, and evaluation of explosion hazards. (G)

**501: Advanced Unit Operations.** 0-3-3. Design calculations applicable to various unit operations including drying, humidification, absorption, adsorption, distillation, heat exchangers, ion exchange, cooling towers and filtration.

**504: Advanced Chemical Engineering Kinetics.** 0-3-3. Homogeneous reactions. Catalytic reactions. Mass and heat transfer in catalytic beds. Catalytic reactor design. Uncatalyzed heterogeneous reactions.

**513: Transport Phenomena.** 0-3-3. A course in which advanced concepts on momentum, energy, and mass transport is explored. Emphasis is placed on unsteady state behavior, turbulence, and recent developments in the literature.

**521: Energy Analysis of Industrial Processes.** 0-3-3. Preq., An undergraduate course in thermodynamics. The application of the concept of exergy, or energy availability, to the systematic analysis of processes and plants to make most efficient use of limited energy resources.

**522: Advanced Thermodynamics.** 0-3-3. The relations of thermodynamic properties are developed. Problems on the expansion and compression of non-gases, liquefaction, low temperature separation are studied.

**524: Seminar.** 0-1-1 each. Surveys, investigations, and discussions of current problems in Chemical Engineering.

**550: Special Problems.** 1-4 semester hours. Preq., consent of instructor. Selected topics dealing with advanced problems in chemical engineering and design of equipment. The problems and projects will be treated by current methods used in professional practice.

**551: Research and Thesis in Chemical Engineering.** Registration in any quarter may be for three semester hours credit or multiples thereof. Maximum credit allowed is six semester hours.

**555: Practicum.** 0-3-3 (6). Preq., 12 semester hours of graduate work. Analytical and/or experimental solution of an engineering problem; technical literature survey required; development of engineering research techniques.

**557: Special Topics: Chemical Engineering.** 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of chemical engineering. May be repeated as topics change.

#### CHEMISTRY (CHEM)

**100: General Chemistry.** 0-2-2. Preq., or Coreq., MATH 101, or 111, or 240. Fundamental principles of chemistry: Chemistry and measurement, atomic symbols and chemical formulas, stoichiometry, gases and thermochemistry.

**101: General Chemistry.** 0-2-2. Preq., CHEM 100. Continuation of CHEM 100: Atomic and molecular structure, theories of molecular bonding, liquids, solids and solutions.

**102: General Chemistry.** 0-2-2. Preq., CHEM 101. Continuation of CHEM 101: Rates of reaction, study of chemical equilibria including those

- involving acids, bases, sparingly soluble salts and complex ions, thermodynamics of equilibrium and introductory electrochemistry.
- 103: General Chemistry Laboratory.** 4 1/4-0-1. Coreq., CHEM 101. Laboratory practice in general chemistry.
- 104: General Chemistry Laboratory.** 4 1/4-0-1. Preq., CHEM 103. Continuation of CHEM 103.
- 107: General Chemistry.** 0-3-3. Preq., or Coreq., MATH 101, or 111, or 240. Fundamental principles of chemistry; chemistry and measurement, atomic symbols and chemical formulas, stoichiometry, gases and thermochemistry. Atomic and molecular structure, theories of molecular bonding.
- 108: General Chemistry.** 0-3-3. Preq., CHEM 107. Continuation of CHEM 107. Liquids, solids, and solutions. Rates of reaction, study of chemical equilibria including those involving acids, bases, sparingly soluble salts and complex ions, thermodynamics of equilibrium and introductory electrochemistry.
- 120: An Introduction to Inorganic Chemistry.** 0-3-3. Topics covered will include scientific units, states of matter, the electronic structure of atoms, the chemical bond, solutions, reaction kinetics, acid-base theory, and buffers.
- 121: An Introduction to Organic Chemistry and Biochemistry.** 0-3-3. Preq., CHEM 120 or 102. Survey of hydrocarbons and their derivatives; biomolecules including proteins, sugars, lipids, and nucleic acids. Not to be used as a prerequisite for advanced chemistry courses.
- 122: Chemistry Laboratory.** 4-0-1. Preq., CHEM 120. Basic laboratory experiments in inorganic, organic, and biochemistry.
- 205: Analytical Chemistry.** 4 1/4-3-4. Preq., CHEM 102. Theory and practice of analytical Chemistry.
- 250: Organic Chemistry.** 0-2-2. Preq., CHEM 102. Introduction to organic chemistry with emphasis on structure and reactivity of aliphatic hydrocarbons and alkyl halides.
- 251: Organic Chemistry.** 0-2-2. Preq., CHEM 250; Coreq., CHEM 253. Continuation of CHEM 250 with emphasis on aromatic hydrocarbons, alcohols, aldehydes, ketones, and related reaction mechanisms and spectroscopy.
- 252: Organic Chemistry.** 0-2-2. Preq., CHEM 251; Coreq., CHEM 254. Continuation of CHEM 251 with emphasis on carbonyl compounds, aliphatic and aromatic amines, phenols, carbohydrates and related reaction mechanisms.
- 253: Organic Chemistry Laboratory.** 4 1/4-0-1. Preq., CHEM 102; Coreq., CHEM 251. Selected experiments emphasizing both laboratory operations and related basic principles and mechanisms.
- 254: Organic Chemistry Laboratory.** 4 1/4-0-1. Preq., CHEM 253; Coreq., CHEM 252. Introduction to multi-step organic syntheses and related reaction mechanisms.
- 281: Inorganic Chemistry.** 4 1/2-2-3. Preq., CHEM 102 and 104. Introduction to inorganic chemistry, including a systematic study of the periodic table with emphasis on structure, properties and reactivity of the elements of inorganic compounds.
- 301: Introductory Physical Chemistry.** 0-3-3. Preq., CHEM 102 and MATH 112 or 241. An introduction to physical chemistry, with emphasis on properties of gases, thermodynamics, chemical equilibrium, ionic equilibria, chemical kinetics, and molecular spectroscopy.
- 311: Physical Chemistry.** 0-3-3. Preq., CHEM 102 and 252, MATH 231 and PHYS 202 or 209. Basic theories of chemistry with emphasis on gases, chemical thermodynamics and phase equilibria.
- 312: Physical Chemistry.** 0-3-3. Preq., CHEM 311. Basic theories of chemistry with emphasis on chemical kinetics, quantum theory, statistical thermodynamics and molecular spectroscopy.
- 313: Physical Chemistry Laboratory.** 4 1/4-0-1. Coreq., CHEM 311. Laboratory experiments in physical chemistry.
- 314: Physical Chemistry Laboratory.** 4 1/4-0-1. Preq., CHEM 311; Coreq., CHEM 312. Continuation of CHEM 313.
- 351: Biochemistry.** 0-3-3. Preq., CHEM 252, 254. The chemistry of biologically important compounds including fats, carbohydrates, proteins, enzymes, vitamins, and hormones.
- 352: Biochemistry.** 0-3-3. Preq., CHEM 351. Intermediary metabolism and molecular biology of the gene.
- 353: Biochemistry Laboratory.** 4 1/4-0-1. Coreq., CHEM 351. Techniques applicable to current biochemistry with emphasis on basic research procedures.
- 354: Biochemistry Laboratory.** 4 1/4-0-1. Preq., CHEM 351 and CHEM 353. Techniques applicable to current biochemistry with emphasis on metabolism and molecular biology.
- 409: Advanced Organic Chemistry.** 0-3-3. Preq., CHEM 381 and 312. Introduction to theoretical organic chemistry with emphasis on carbocation chemistry and pericyclic reactions.
- 420: Chemical Thermodynamics.** 0-3-3. Preq., CHEM 312. An introduction to chemical thermodynamics.
- 424: Advanced Physical Chemistry.** 0-3-3. CHEM 312 or PHYS 410 and MATH 245. A continuation of CHEM 311-312, including an introduction to quantum chemistry, and a quantum mechanical approach to the study of the structure of atoms and molecules.
- 450: Chemical Topics.** 1-4 hour(s) credit (8). Preq., CHEM 312 and consent of instructor. An opportunity to observe and discuss topics of current interest in the chemical sciences. Offered on demand.
- 466: Instrumental Analysis.** 8 1/2-2-4. Preq., CHEM 312. Theory and practice of optical methods of analysis, advanced electrical techniques, and modern separation methods. (G)
- 470: Methods, Materials and Activities for Teaching Chemistry.** 0-3-3. Preq., CHEM 102 and instructor permission. A course especially designed for the high school chemistry instructor.
- 471: Methods, Materials and Activities for Teaching Chemistry.** 4 1/2-3-4. Preq., CHEM 102 and instructor's permission. A continuation of CHEM 470.
- 481: Advanced Inorganic Chemistry.** 4 1/2-2-3. Preq., CHEM 252, 312. An advanced study of the periodic classification of elements, their reactions, and other inorganic principles. (G)
- 490: Chemistry Seminar.** 0-1-1 (3). Preq., Senior or graduate standing. Required of chemistry graduate students. Supervised organization and presentation of topics from the chemical literature. (G)
- 498: Undergraduate Research.** 1-3 hours credit (6). Preq., consent of instructor. Introduction to methods of research and completion of a basic research problem.
- 501: Physical Organic Chemistry.** 0-3-3. Preq., CHEM 409. An advanced study of the mechanisms of organic methodology used in their investigations, and organic quantum chemistry.
- 502: Selected Topics in Organic Chemistry.** 0-3-3 (6). Preq., CHEM 409. Areas covered will vary; however they will generally include advanced organic synthesis and related structure identification with emphasis on spectroscopic techniques.
- 503: Topics in Chemistry.** 1-3 hours credit (6). Independent study. Topics arranged to meet the needs of the student.
- 520: Molecular Spectroscopy.** 0-3-3. Preq., CHEM 312. The relationship between molecular spectra and molecular structure.
- 523: Special Topics in Physical Chemistry.** 0-3-3. Preq., CHEM 312. Topics will vary and will include kinetic theory of gases, molecular structure, phase rule, photochemistry, nuclear chemistry, chemical kinetics, or statistical thermodynamics.
- 524: Quantum Chemistry.** 0-3-3. Preq., CHEM 312 or PHYS 410. Physical and chemical applications of quantum theory.
- 549: Practicum in Chemistry.** 0-3-3 (6). Preq., 12 semester hours of graduate work. Experimental or computational study of a problem in chemistry. A survey of the relevant literature and a formal written report are required.
- 551: Research and Thesis in Chemistry.** Registration in any quarter may be for three-semester hours credit or multiples thereof. Maximum credit allowed is six semester hours.
- 555: Special Topics in Biochemistry.** 0-3-3 (9). Preq., CHEM 352. Topics covered will vary and may include toxicology and clinical biochemistry.
- 556: Protein Chemistry.** 0-3-3. Preq., CHEM 351. The chemical nature and physiology of both structural and metabolic proteins.
- 563: Advanced Analytical Chemistry.** 0-3-3. Preq., CHEM 466. Theoretical aspects of the optical, chemical, and separation techniques of analytical chemistry.
- 564: Selected Topics in Analytical Chemistry.** 0-3-3. The topic or topics will be selected in the general areas of chemical separations or spectroscopy by the instructor. (TECH-NLU Collaborative).
- 584: Chemistry of Coordination Compounds.** 0-3-3. Preq., CHEM 481. A study of the structure, preparation, and properties of coordination compounds.
- 586: Special Topics in Inorganic Chemistry.** 0-3-3. Preq. CHEM 584 or instructor's permission. A topic will be selected on a rotating basis from the following: magnetic and electric properties, solid state structures, catalysis, and group theory applications of inorganic materials.

**CIVIL ENGINEERING (CVEN)**

- 202: Civil Engineering Materials Laboratory.** 4-0-1. Coreq., concurrent with MEMT 201. Introduction to laboratory testing of aggregates, concrete, asphalt, steel, and other materials used by civil engineers.
- 254: Plane Surveying.** 4-2-3. Preq., MATH 112 or 240. Theory, field measurements, and computation and error analysis associated with land, traverse, and topographic surveys.
- 291: Civil Engineering Computations.** 3-1-2. Preq., MATH 241. Application of microcomputers in civil engineering. Numerical techniques and statistical applications, personal productivity tools, application software.
- 300: The Civil Engineering Profession.** 0-3-3. Preq., sophomore standing. Open only to civil engineering students. The civil engineering profession and its effect on society. History and heritage, current professional practices and techniques, concepts and challenges for the future.
- 304: Remote Sensing.** 4-1-2. Preq., MATH 112 or 241. Basic introduction to remote sensing. Measurements and mapping from aerial photographs. Photo interpretation. Height determination by parallax.
- 310: Water Resources I.** 0-3-3. Preq., MEMT 313. Hydrologic and hydraulic analysis of precipitation and runoff, storm water management, detention basin design, and flood frequency analysis.
- 314: Environmental Engineering.** 3-2-3. Preq., ENGL 303, CHEM 103, . Introduction to the unit operations and processes most often encountered in water and wastewater treatment.
- 324: An Introduction to Soils Engineering.** 4-1-2. Preq., ENGL 303, MEMT 211. Introduction to soil mechanics and its application to civil engineering. A presentation of soil properties and characteristics pertinent to an evaluation of various engineering situations, problems and designs.
- 325: Introduction to Foundation Engineering.** 0-3-3. Preq., CVEN 324. Consideration of bearing capacity, settlement of structures, slope stability, foundation design requirements, subsurface exploration, regional soil conditions, footings, mats, and retaining walls.
- 332: Transportation Engineering I.** 0-3-3. Preq., ENGR 122. Introduction to transportation facilities; urban transportation planning; traffic, design, safety, and the environment.
- 333: Transportation Engineering II.** 3-2-3. Preq., CVEN 332. Design of highway and airport runway elements in a laboratory and field environment.
- 340: Structural Analysis & Design.** 3-2-3. Preq., MEMT 211. Analysis of simple and continuous structures using classical and matrix methods. Introduction to structural design concepts.
- 341: Steel & Reinforced Concrete Design.** 3-2-3. Preq., CVEN 340. Design of steel and reinforced concrete structures with emphasis on behavior of tension and compression members, beams, and slabs. Steel connections in elementary structures.
- 355: Advanced Surveying.** 4-2-3. Preq., CVEN 254. Advance error propagation theory, including an introduction to least squares. Various horizontal/vertical high precision surveys; geodetic concepts and surveys; Global Positioning Systems.
- 357: Engineering and Construction Surveying.** 4-1-2. Preq., CVEN 254. Horizontal/vertical curves; earthwork; topographic/planimetric surveys for map/drawing construction; engineering use of State Plane Coordinate System; surveys for buildings, pipelines, and others.
- 410: Air Pollution Fundamentals.** 0-3-3. Preq., Senior standing in an engineering curriculum, or consent of instructor. History of air pollution legislation, sources, and effects of major air pollutants, and predictive capabilities with regard to air pollution. (G)
- 411: Water Resources II.** 3-2-3. Preq., CVEN 310. Computer modeling of precipitation and runoff, open channel hydraulics, flood profiles, pipe networks. Applications of modeling software for hydrologic and hydraulic design.
- 412: Environmental Impact Analysis.** 0-3-3. Preq., Senior standing in Civil Engineering or the consent of the instructor. Definition and quantification of environmental impact. Types of environmental impact studies. (G)
- 414: Bituminous Mixture Design.** 3-2-3. Preq., senior standing. Selection of binders and aggregates for mixture design processes. Methods include Marshall, Hveem and SUPERPAVE. Laboratory mixes will be designated and tested. (G)
- 416: Hydraulic Facilities Design.** 0-3-3. Preq., MEMT 313. Basic concepts of open channel flow. Computation of uniform and non-uniform flow. Hydraulic design of spillways, stilling basins, canals, transitions, culverts, and bends. (G)
- 417: Groundwater Hydrology.** 0-3-3. Preq., CVEN 310. Groundwater occurrence, movement and quality, well hydraulics, basin development, and model studies. (G)
- 421: Portland Cement Concrete.** 0-3-3. Preq., consent of instructor. Production, testing, uses, and performance of Portland cement and Portland cement concrete (PCC). Detailed investigation into PCC components. Admixtures and special concretes. (G)
- 422: Geometric Design.** 0-3-3. Preq., CVEN 332. Functional design of highways, railroads and runways with emphasis on safety and efficiency of flow set intersections, curves, and interchanges. (G)
- 423: Introduction to Asphalt Technology.** 3-2-3. Preq., senior standing, or consent of instructor. Production and uses of asphalt; measurement and significance of laboratory properties including viscosity, penetration, flash point, ductility, solubility, thin film oven test and specific gravity. (G)
- 424: Seminar.** 0-1-1. Preq., Senior standing. Reading and discussion of assigned papers, informal talks by instructors and professional engineers, debates on matters of current interest.
- 425: Traffic Engineering.** 0-3-3. Preq., CVEN 332. Traffic characteristics, vehicle operating characteristics, traffic control, and design of traffic facilities. Basic traffic studies, capacity, signing and signalization, speed regulation and parking. (G)
- 427: Design of Highway Pavements.** 0-3-3. Preq., CVEN 324. Flexible and rigid pavement types. Factors affecting stresses and strains in pavement layers. Design criteria and structural design methods for highway pavements. (G)
- 436: Construction Equipment and Methods.** 0-3-3. Preq., Junior standing, and ENGR 122 or INEN 300. Study of economics and functional applications of construction equipment. Operation characteristics are identified for selected equipment items, and are applied to typical construction situations. (G)
- 437: Contracts and Specifications.** 0-2-2. Preq., CVEN 439. Legal documents of construction contracts. (G)
- 438: Estimating.** 0-3-3. Preq., CVEN 254 and junior standing. Types of estimates. Material takeoff from blueprints and specifications. Detailed estimates of labor and materials. Approximate estimates. (G)
- 439: Construction Planning, Contracts and Specifications.** 0-3-3. Preq., Junior standing and either INEN 300 or ENGR 122. Introduction to methods for planning, estimating, and controlling projects, construction contracts, specifications and cost impacts. Term projects required. Team efforts on problems and case studies. (G)
- 440: Foundation Engineering.** 0-3-3. Preq., CVEN 325 or consent of instructor. Theory and applications in foundation engineering design; application of soil mechanics. (G)
- 443: Analysis of Continuous Structures.** 0-3-3. Preq., CVEN 340; Slope-deflection, moment distribution plastic design, matrix applications, STRUDEL language.
- 450: Special Problems.** 1-4 hours credit. Preq., senior standing and consent of instructor. Planning, organization, and solution of problems in Civil Engineering.
- 456: Legal Aspects of Boundary Surveying.** 0-3-3. Preq., CVEN 254 or consent of instructor. Legal aspects of various boundary systems. Legal principles of boundary surveys: common statute law, written/unwritten rights and rules of evidence, property descriptions/layout.
- 457: Practical Surveying.** 40-0-3. Preq., CVEN 355, 357, or 456. An on-the-job training program; student is employed by registered professional surveyor for 300 working hours (minimum); work to be approved by program chair.
- 458: Introduction to Geographic Information Systems.** 0-3-3. Preq., senior standing, or approval of instructor. Basic principles, functions, and engineering applications of spatial information systems; introduction to databases. Team case studies using GIS software. (G)
- 459: Introduction to Infrastructure Management.** 0-3-3. Preq., junior standing. Lifecycle approach to planning, designing, and managing infrastructure (highways, streets, utilities); infrastructure decision support systems; performance measures and prediction; computer applications; case studies. (G)
- 464: Advanced Design of Concrete Structures.** 0-3-3. Preq., CVEN 341. Advanced topics in the design of reinforced and prestressed concrete structures. (G)
- 466: Advanced Structural Design.** 0-3-3. Preq., CVEN 341. Advanced topics in the design of steel and timber structures. Load and resistance factor design. (G)

- 468: Computational Structural Design.** 0-3-3. Preq., CVEN 341. An introduction to the use of computational techniques for designing structures. Finite element method. Structural optimization. (G)
- 480: Introduction to Trenchless Technology.** 0-3-3. Preq., CVTE 210 or MEMT 313. Basic technologies, design considerations and construction practices for underground infrastructure construction and rehabilitation with minimal ground surface disturbance.
- 492: Civil Engineering Design I.** 3-0-1. Preq., senior standing and within 3 quarters of graduation. Open-ended design problems typical of those encountered in the Civil Engineering profession and calling for the integration of geotechnical, structures, transportation and water resources.
- 493: Civil Engineering Design II.** 3-0-1. Preq., Coreq., CVEN 492. A continuation of CVEN 492.
- 494: Civil Engineering Design III.** 3-0-1. Preq., CVEN 492; Coreq., CVEN 493. A continuation of CVEN 493.
- 495: Computer-Aided Civil Engineering Design.** 4-2-3. Preq., Senior standing in Civil Engineering or consent of instructor. Integration of computers in civil engineering design applications. Emphasis is on design methodologies. Specific software applications vary. (G)
- 501: Frame Analysis.** 0-3-3. Preq., CVEN 340. Single and multi-story frames by moment distribution, slope deflection and column analogy methods. Frames and beams with variable cross-section. Secondary stresses in trusses. Dimensional analysis and theory of models.
- 509: Dynamic Analysis of Structures.** 0-3-3. Preq., MATH 245. Analysis of structures (SDOF and MDOF) under wind, wave, earthquake and impact forces.
- 510: Advanced Soil Mechanics.** 0-3-3. Preq., CVEN 324. Evaluation of subsoil conditions, theory of consolidation and bearing capacity of soils; selection application and design of foundation elements of structures.
- 512: Design of Deep Foundations.** 0-3-3. Preq., CVEN 440. Analysis and design of pile foundations, drilled shafts, piers and sheeting support systems.
- 514: Bituminous Mixture Design.** 3-2-3. Selection of binders and aggregates for mixture design processes. Methods include Marshall, Hveem and SUPERPAVE. Laboratory mixes will be designed and tested.
- 517: Advanced Pavement Design.** 0-3-3. Preq., CVEN 427 or consent of instructor. Traffic and loading considerations for airfield pavements. Structural design methods for highway and airfield pavements, with emphasis on computerized design and analysis techniques.
- 519: Techniques for Pavement Rehabilitation.** 0-3-3. Evaluation of roadway distress, roughness, friction, drainage and structural surveys will be discussed. Survey results used to identify cost-effective techniques for pavement rehabilitation.
- 522: Design of Temporary Structures.** 0-3-3. Advanced topics in the design of temporary structures required for complex construction projects.
- 527: Statistical Methods in Hydrology.** 0-3-3. Preq., CVEN 310. Frequency analysis, extreme value distribution, error analysis, and multiple regression analysis associated with making engineering decisions using hydrologic data.
- 530: Water Quality Improvement.** 3-2-3. Preq., CVEN 314 or consent of instructor. Stream self-purification processes. Pollution abatement methods. Industrial waste surveys. Principles of treatment for domestic and industrial wastewaters.
- 531: Contaminant Transport.** 0-3-3. Preq., CVEN 314, 310, or consent of instructor. Mathematical modeling of contaminant transport in surface and ground water systems.
- 536: Wastewater Disposal Systems.** 3-2-3. Preq., CVEN 314. Advanced problems in design of domestic and industrial waste treatment systems.
- 550: Special Problems.** 1-4 hours credit. Advanced problems in Civil Engineering will be assigned according to the ability and requirements of the student. An opportunity will be afforded to plan, organize, and complete solutions in problems of considerable magnitude with a view toward developing confidence and self-reliance.
- 551: Research and Thesis in Civil Engineering.** Registration in any quarter may be for three semester hours credit or multiples thereof. Maximum credit allowed is six semester hours.
- 555: Research and Communications Seminar.** 0-3-3. Preq., 12 semester hours of graduate work. Oral and written communication of literature search.
- 557: Special Topics: Civil Engineering.** 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of civil engineering. May be repeated as topics change.

- 560: Transportation Systems Planning.** 4-2-3. Preq., CVEN 332. A study of transportation systems as they affect travel behavior of a populace and the location of economic activities.
- 561: Traffic Engineering Characteristics.** 0-3-3. Preq., consent of instructor. Traffic laws, ordinances, and control devices; intersection characteristics, pretimed control, traffic actuated control, arterial and network progression.
- 564: Feasibility Analysis of Transportation Systems.** 0-3-3. Preq., consent of instructor. Goals, objectives and criteria used for decision making for transportation investments; economic analysis and treatment of intangibles and risk; non-users impact analysis.
- 578: Applications of Nonlinear Finite Element Analysis to Civil Engineering Problems.** 0-3-3. Preq., MEMT 508 or consent of instructor. Application of the theory of the finite element method to nonlinear problems in Civil Engineering.
- 579: Advanced Structural Dynamics.** 0-3-3. Advanced studies of the dynamic response of structures including experimental, analytical and computational procedures. Particular emphasis is given to Civil Engineering applications with a consideration of multiple degrees-of-freedom and continuous systems.
- 580: Trenchless Technology.** 0-3-3. Preq., MEMT 313 and CVEN 324. Survey of trenchless technologies, underground infrastructure management, cured-in-place, slip lining and fold and form rehabilitation, horizontal directional drilling, pipe jacking and microtunneling. Credit will not be given for both CVEN 480 and 580.
- 599: Graduate Seminar.** 0-1-1. Issues in graduate education. Presentations of current topics in research, teaching and practice. May be repeated for credit. (Pass/Fail).

#### CIVIL TECHNOLOGY (CVTE)

- 100: Introduction to Construction.** 3-2-3. An introduction to the construction industry, the work of professional construction managers and technologies, the curriculum, and the reading of building and highway plans.
- 210: Basic Hydraulics.** 4-2-3. Preq., MEMT 206. Physical phenomena of hydraulics with application of the fundamental laws and empirical formulae. Pressure forces on submerged areas, buoyancy, flow in closed conduits and open channels and fluid measurements.
- 372: Structural Mechanics and Analysis.** 0-3-3. Preq. MEMT 206 and MATH 220. Theory of the mechanics of structural analysis and design. Not open to Civil Engineering majors.
- 373: Construction Materials.** 4-2-3. Preq., ENGL 303 and MEMT 206. Mechanical behavior of engineering materials, determination of strength and other properties of materials, and construction applications.
- 424: Seminar.** 3-0-1. Preq., senior status. Reading and discussion of assigned papers, presentation of current issues in construction, and discussions with professional construction personnel.
- 471: Reinforced Concrete, Foundations, and Formwork.** 0-3-3. Preq., CVTE 372. Analysis and design of reinforced concrete structures, slabs, and footings. Design and selection of formwork and shoring.
- 473: Design of Structures.** 3-2-3. Preq., CVTE 372. Design of elementary structures in timber and steel.
- 475: Soils in Construction.** 0-3-3. Preq., MEMT 206. The nature of soils, earthwork in construction and soils testing methods.
- 492: Construction Project Bid Planning.** 6-0-2. Preq., CVEN 439 and senior standing. Capstone construction experience that includes planning the sequence of construction operations, creating a bill of materials, and estimating the cost of a small construction project by student teams.

#### CLINICAL LABORATORY SCIENCE (CLAB)

- 450: Pathophysiology.** 0-3-3. A case history approach is taken in the correlation of laboratory data with clinical observation to diagnose disease.
- 451: Laboratory Studies in Pathophysiology.** 4 1/4-0-1. Preq., or Coreq., CLAB 450. Student application of modern laboratory techniques used in the clinical pathology laboratory with emphasis on clinical hematology, clinical chemistry, urodynamics and clinical immunology.
- 457: Professional Practices.** 0-2-2. Healthcare administration, educational techniques, career opportunities/ development, QA/QA, ethics, interview techniques, plus credentialing and accreditation in medical technology are discussed.

- 460: Clinical Hematology.** 2-6 semester credit hours. Preq., consent of instructor. Advanced concepts in the theory, application and medical interpretation of hematological and hemostatic mechanisms and methods.
- 461: Clinical Hematology Laboratory.** 1-5 semester credit hours. Preq., consent of instructor. Instruction and laboratory practice in the development and use of advanced analytical procedures and instrumentation in clinical hematology and hemostasis.
- 462: Clinical Serology and Immunology.** 1-4 semester credit hours. Preq., consent of instructor. Advanced concepts in the theory, application and medical interpretation of serological and immunological mechanisms and methods.
- 463: Clinical Serology and Immunology Laboratory.** 1-4 semester hours credit. Preq., consent of instructor. Practical instruction and laboratory practice in the performance of serological and immunological procedures.
- 464: Clinical Bacteriology.** 2-5 semester credit hours. Preq., consent of the instructor. Advanced concepts in the use and interpretation of medical bacteriological procedures and data.
- 465: Clinical Bacteriology Laboratory.** 3-6 semester credit hours. Preq., consent of the instructor. Instruction and laboratory practice in the development and use of advanced analytical procedures and instrumentation in clinical bacteriology.
- 466: Clinical Immunohematology.** 1-4 semester credit hours. Preq., consent of the instructor. An advanced study of the principles of immunohematology necessary to provide a patient with a safe blood transfusion.
- 467: Clinical Immunohematology Laboratory.** 1-4 semester credit hours. Preq., consent of instructor. Practical instruction and laboratory practice in immunohematological procedures utilized in a hospital blood bank.
- 468: Clinical Chemistry.** 3-6 semester credit hours. Preq., consent of the instructor. Advanced concepts in the theory application, and medical interpretation of clinical biochemical mechanisms and methods.
- 469: Manual Clinical Chemistry Lab.** 1-3 semester credit hours. Preq., consent of instructor. Practical instruction and laboratory practice in the performance of manual clinical chemistry procedures.
- 470: Special Clinical Chemistry Laboratory.** 1-3 semester credit hours. Preq., consent of instructor. Practical instruction and laboratory practice in the performance of special clinical chemistry procedures.
- 471: Automated Clinical Chemistry Lab.** 1-2 semester credit hours. Preq., consent of instructor. Practical instruction and lab practices in the performance of automated clinical chemistry procedures.
- 472: Clinical Chemistry Toxicology Laboratory.** 1-2 semester credit hours. Preq., consent of instructor. Practical instruction and laboratory practice in the performance of toxicological procedures.
- 473: Clinical Chemistry Radioimmunoassay Laboratory.** 1 semester credit hour. Preq., consent of instructor. Practical instruction and laboratory practice in the performance of radioimmunoassay procedures.
- 474: Clinical Urinalysis.** 1-3 semester credit hours. Preq., consent of instructor. Advanced concepts in the use and interpretation of urinalysis procedures and data.
- 475: Clinical Urinalysis Laboratory.** 1-3 semester credit hours. Preq., consent of instructor. Practical instruction and laboratory practice in the performance of urinalysis procedures.
- 476: Clinical Parasitology, Mycology and Mycobacteriology.** 1-2 semester credit hours. Preq., consent of instructor. Advanced concepts in the use and interpretation of procedures and data in clinical parasitology, mycology, and mycobacteriology.
- 477: Clinical Parasitology, Mycology and Mycobacteriology Laboratory.** 1-2 semester credit hours. Preq., consent of instructor. Instruction in laboratory practice in the development and use of advanced analytical procedures in clinical mycology, parasitology, and mycobacteriology.
- 478: Clinical Laboratory Administration.** 1-2 semester credit hours. Preq., consent of instructor. Modern management concepts for the clinical laboratory.
- 479: Clinical Histopathology.** 1-5 semester credit hours. Preq., consent of instructor. Advanced concepts in the use and interpretation of histotechnological procedures and findings.
- 480: Clinical Medical Technology Problems.** 1-8 semester credit hours. Preq., consent of instructor. An introduction to emerging medical technologies.
- 483: Clinical Parasitology.** 1-2 semester credit hours. Identification, clinical significance, and methods of prevention of parasitic infections.
- 484: Clinical Parasitology Laboratory.** 1-2 semester credit hours. Instruction and laboratory practice in the development and application of medical parasitology laboratory methods.

- 485: Clinical Mycology.** 1-2 semester credit hours. Identification, clinical significance and methods of prevention of mycotic infection.
- 486: Clinical Phlebotomy and Specimen Procurement.** 1-3 semester credit hours. Preq., consent of instructor. Instruction and laboratory practice in phlebotomy and the collection of other specimens for clinical analysis. Specimen preservation and safe lab practices are included.
- 487: Clinical Hemostasis.** 1-4 semester hours credit. Preq. consent of instructor. The theory of the coagulation cascade, analytical procedures that monitor this process and the clinical significance of coagulopathies are discussed.
- 488: Clinical Hemostasis Laboratory.** 1-4 semester hours credit. Laboratory procedures which assess the coagulation cascade and related processes.
- 489: Clinical Chemistry Laboratory.** 3-8 semester hours credit. Practical instruction and laboratory practice in clinical chemistry procedures, including associated instrumental analysis.

#### COMPUTER INFORMATION SYSTEMS (CIS)

- 102: Typewritten Communication.** 0-3-3. Preq., Basic knowledge in typewriting/keyboarding. Emphasis on formatting and production of typewritten communications including business forms, internal and external correspondence, and complicated reports. (Meets intermediate typewriting requirements for Business Education majors.)
- 110: Computer Tools for Business.** 1-2-3. The development and enhancement of computer skills and knowledge using current business software.
- 310: Principles of Information Systems.** 0-3-3. Preq., CIS 110, junior standing. Introduction to concepts and principles of information system resources, analysis, development, management, and applications.
- 323: Database System Management.** 0-3-3. Preq., CIS 310, 339. Managing and communicating the data resource using database principles and user-oriented data languages.
- 335: Application Development for the Internet.** 0-3-3. Preq., CIS 310, 339. Programming for Internet- and Intranet-based business applications. The principles of good software engineering and program clarity will be stressed.
- 337: Business Applications Development: Current Programming Techniques.** 0-3-3. Preq., CIS 310, 339. Provides overview of business application development, using program development methodology. Emphasizes object-oriented and data-driven languages for business students with limited programming background.
- 339: Business Applications with COBOL.** 0-3-3. Preq., CIS 110. Applying program and file structures to design programs for business applications. Development of COBOL language skills for coding the designs.
- 401: Internship in CIS I.** 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 402: Internship in CIS II.** 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 444: Network Design & Implementation.** 0-3-3. Preq., CIS 310, 339. Issues of designing, implementing, and managing computer networks, including both Local Area Networks (LANs) and Wide Area Networks (WANs). (G)
- 450: Systems Analysis, Design, & Implementation.** 0-3-3. Preq., CIS 323, 444. An in-depth life cycle approach to information systems analysis, design, and implementation. (G)
- 510: Information Resource Management.** 0-3-3. Attention is given to strategic implementation of technology, secure and effective systems, externally focused systems, along with the historical and social environment of information systems.
- 515: Decision Support Systems.** 0-3-3. Information technology in the firm and non-profit organization with a focus on using computers, data bases, knowledge bases, graphics, and models to support decision making.
- 535: Advanced Computer Applications.** 0-3-3. Study of the development and application of Expert Systems and use of development shells. Topics include: Knowledge Acquisition, System Development, and Validation/Verification.
- 550: Directed Study in Computer Information Systems.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of computer information systems.
- 615: Decision Support Systems.** 0-3-3. Requires Doctoral standing. May require additional class meetings. Information technology in the firm and non-profit organization with a focus on using computers, data bases,

knowledge bases, graphics, and models to support decision making. Credit will not be given for CIS 615 if credit is given for CIS 515.

- 625: Information Systems Project Management.** 0-3-3. Preq., DBA student or consent of instructor. Intensive review of theories and literature on information systems (IS) project development and management. IS project management techniques and managerial issues will be examined. A research project proposal in IS management will be developed and completed.
- 630: Seminar in Computer Information Systems.** 0-3-3. Study of current topics in the discipline of Computer Information Systems. In-depth analysis of a specialized research field along with an investigation of the literature.
- 635: Advanced Computer Applications.** 0-3-3. Requires Doctoral standing. May require additional class meetings. Study of the development and application of Expert Systems and use of development shells. Topics include: Knowledge Acquisition, System Development, and Validation/Verification. Credit will not be given for CIS 635 is credit is given for CIS 535.
- 650: Directed Study in Computer Information Systems.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of computer information systems.
- 685: Comprehensive Exam in Computer Information Systems.** No credit. Doctoral standing required. Required for all business administration doctoral students seeking to take the comprehensive exam in CIS. Successful completion is a prerequisite to the oral comprehensive exam for those seeking a primary field or examined minor in CIS. Requires consent of graduate director.

#### COMPUTER SCIENCE (CSC)

- 100: Overview of Computer Science.** 0-3-3. Preq., MATH 101 or equivalent. An overview of the field of computing; history, impact on society, and current trends; together with an introduction to operating systems, editors, and rudimentary programming.
- 102: Programming with FORTRAN.** 0-3-3. Preq., Eligible for MATH 111 or 240. Problem analysis, algorithm development, data and control structures, and interpretation of results, with emphasis on numerical applications.
- 109: Computer Programming.** 0-3-3. (cannot be taken for credit toward any Computer Science degree) Fundamentals of computer programming. Emphasis is placed on problem analysis, algorithm development, and data and control structures.
- 120: Introduction to Computer Programming.** 0-3-3. Preq., CSC 100 or equivalent and MATH 111 or 240. An introduction to program development. Emphasis is placed on problem analysis, algorithm development, data and control structures.
- 210: Discrete Mathematics for Computer Scientists.** 0-3-3. Preq., CSC 120 and MATH 112 or 241. An overview of the mathematical foundations of computing. Topics include sets, symbolic logic, relations, functions, combinatorics, induction, trees, graphs, and Boolean algebra.
- 220: Data Structures.** 0-3-3. Preq., CSC 120. The definition, representation, and manipulation of basic data structures such as arrays, stacks, queues, trees, and graphs. Practical applications of these structures will be emphasized.
- 230: Software Design.** 0-3-3. Preq., CSC 220. Design, construction and maintenance of large software systems. Topics include project planning, requirements analysis, software design methodologies, software implementation and testing, maintenance.
- 240: Introduction to Concurrent Programming.** 0-3-3. Preq., CSC 220. Fundamentals of concurrent, parallel, and distributed computing. Topics include semaphores, monitors, rendezvous, remote procedure calls, and asynchronous message passing, SIMD model, MIMD architectures.
- 251: Computer Organization & Assembly Language.** 0-3-3. Preq., CSC 220. Introduction to computer organization and operation, data representation and manipulation, assembly language programming, register level operations, peripheral device interfaces.
- 265: Introduction to Digital Design.** 0-2-2. Preq., CSC 251; Coreq., CSC 269. Introduction to digital design techniques, Boolean algebra, combinational logic, minimization techniques, simple arithmetic circuits, programmable logic, sequential circuit design, registers and counters.
- 269: Digital Design Lab.** 3-0-1. Coreq., CSC 265. Laboratory for digital design techniques, combinational and sequential logic design, registers and counters.

- 299: Cooperative Education Applications.** 40-0-1 (7). Preq., Admission to the College of Engineering and Science Cooperative Education Program. Pass/Fail.
- 310: Theory of Computing.** 0-3-3. Preq., CSC 220 and MATH 311. An overview of formal languages, the abstract models of computing capable of recognizing those languages, and the grammar used to generate them.
- 325: Advanced Data Structures and Algorithms.** 0-3-3. Preq., CSC 220. Advanced data structures and algorithm design. Topics include specialized trees, graphs, sets and tables, advanced searching and sorting, complexity analysis, and algorithm design techniques.
- 330: Programming Languages.** 0-3-3. Preq., CSC 240, 325. Techniques for specifying the syntax and semantics of programming languages. Language concepts; execution environments; comparative analysis of programming languages.
- 345: Operating Systems.** 0-3-3. Preq., CSC 240 & 265. An introduction to operating systems concepts. Topics include processor management, storage management, device management, performance, security, and case studies of common operating systems.
- 364: Computer Architecture.** 0-3-3. Preq., CSC 265 & 269. Architecture and organization of computer systems. Topics include the processor, control unit and microprogramming, computer arithmetic, memory hierarchy and memory management, input/output, instruction sets.
- 404: Senior Capstone.** 0-3-3. Preq., CSC 325 & senior standing. This course provides a forum for discussion of the social and ethical aspects of computing. Communication skills will be emphasized through professional presentations and formal written essays.
- 419: Special Topics in Theory of Computing.** 0-3-3. Preq., consent of instructor. Selected topics in the area of computing theory that are of current importance or special interest.
- 420: Design and Analysis of Algorithms.** 0-3-3. Preq., CSC 325 or consent of instructor. Design and analysis of efficient algorithms. Topics include complex data structures, advanced searching and sorting, algorithm design techniques, and complexity analysis.
- 425: Discrete Mathematics, Data Structures and Algorithms.** 0-4-4. Preq., Consent of instructor (cannot be applied for credit toward any Computer Science degree). Mathematical foundations of computer science; definition, application and implementation of abstract data types; algorithm design and analysis techniques. (G)
- 429: Special Topics in Software Development.** 0-3-3. Preq., consent of instructor. Selected topics in the area of software design that are of current importance or special interest.
- 430: Database Management Systems.** 0-3-3. Preq., CSC 325 or consent of instructor. Database concepts, organizations and applications; database management systems; implementation of a simple database. (G)
- 436: Compiler Design.** 0-3-3. Preq., CSC 310, 330 or consent of instructor. Principles of compiler design; assembler design; lexical analysis; syntax analysis; automatic parser generations; error detection and recovery. (G)
- 437: Programming Language Paradigms and Software Development.** 0-4-4. Preq., CSC 425 and consent of instructor (cannot be applied for credit toward any Computer Science degree). Imperative, functional, logical and object-oriented paradigms; programming language semantics and language translation; specification, design, implementation, validation, and maintenance of large software systems. (G)
- 439: Special Topics in Programming Environments.** 0-3-3. Preq., consent of instructor. Selected topics in the area of programming environments that are of current importance or special interest.
- 445: Architecture and Operating Systems; Parallel Computing.** 0-4-4. Preq., CSC 425 and consent of instructor (cannot be applied for credit toward any Computer Science degree). Digital logic, instruction set architectures, microprocessor design; storage management, process synchronization and communications, device management; introduction to parallel architectures, languages and algorithms. (G)
- 449: Special Topics in Operating Systems.** 0-3-3. Preq., consent of instructor. Selected topics in the area of operating systems that are of current importance or special interest.
- 450: Computer Networks.** 0-3-3. Preq., CSC 345 or consent of instructor. An overview of computer networks. Topics include network topologies, layers, local area networks, and performance measurement and analysis. (G)
- 464: Advanced Digital Design.** 0-3-3. Preq., CSC 265. Synchronous sequential circuits, FSM optimization and implementation, testing, level-mode sequential design, race and hazards, advanced ALU, programmable logic devices, CAD tools and HDLs.

**466: Microprocessor Systems Design.** 0-3-3. Preq., CSC 364. Microprocessor-based system design, bus design, memory systems, input/output interfacing and DMA, microprocessor-based laboratory project.

**468: Introduction to VLSI.** 0-3-3. Preq., CSC 265. VLSI design methodologies, fabrication and layout, combinational and sequential design in VLSI, subcell design, system design, advanced design techniques.

**469: Special Topics in Computer Architecture.** 0-3-3. Preq., consent of instructor. Selected topics in the area of computer architecture that are of current importance or special interest.

**470: Computer Graphics.** 0-3-3. Preq., CSC 325 or consent of instructor. Fundamentals of two and three dimensional computer graphics. Topics include line drawing, polygon rendering, clipping algorithms, two and three dimensional transformations, and projection techniques. (G)

**472: Human-Computer Interface.** 0-3-3. Preq., CSC 230 and 325. Theory, design, and implementation of graphical human-computer interface strategies. Topics include interface layout, visualizing knowledge, comparison of user interfaces, and hypertext/hypermedia.

**475: Artificial Intelligence.** 0-3-3. Preq., CSC 330 or consent of instructor. The design and implementation of artificially intelligent programs. Topics include game playing, heuristic search, logic, knowledge representation, and reasoning strategies. Social implications are also discussed. (G)

**479: Special Topics in Computer Applications.** 0-3-3. Preq., consent of instructor. Selected topics in the area of computer applications that are of current importance or special interest.

**490: Applied Computing Project.** 1-3 hours credit. Preq., junior standing in Computer Science or equivalent. Independent investigation of a problem in computing.

**499: Special Topics in Computer Science.** 0-3-3. Preq., consent of instructor. Selected topics of current importance or special interest.

**505: Expert Systems.** 0-3-3. Preq., CSC 475 or consent of instructor. Current topics in expert system design, knowledge acquisition, explanation generation and knowledge representation. A substantial expert system design, implementation and testing project is required.

**512: Programming Language Semantics.** 0-3-3. Preq., CSC 310 or CSC 436 or consent of instructor. Syntax specification using attribute grammars and two level grammars, operational semantics, translational semantics, formal semantic techniques such as denotational semantics, algebraic specification, and axiomatic semantics.

**520: Advanced Analysis of Algorithms and Complexity.** 0-3-3. Preq., CSC 420 or consent of instructor. Formal analysis of time and space requirements of various algorithms, greedy algorithms, divide-and-conquer, dynamic programming, P and NP algorithms; Turing machines and unsolvability.

**521: Advanced Computer Architectures.** 0-3-3. Preq., CSC 364. Topics include: pipeline systems design, processor design techniques (concepts, analysis, performance comparison, implementation, commercial processors), memory system design, interconnection media.

**530: Database Theory.** 0-3-3. Preq., CSC 430 or consent of instructor. Data models, relational algebra and relational calculus, data dependencies and schema normalization, Datalog, recovery and concurrency control, distributed database environments.

**532: Advanced Topics in Software Engineering.** 0-3-3. Preq., CSC 230 or consent of instructor. Readings in requirements analysis, formal specification techniques, software design techniques, CASE tools, software metrics, software verification and validation, quality assurance and software safety.

**534: Performance Measurement and Evaluation.** 0-3-3. Preq., CSC 345 or consent of instructor. Computer systems performance; analysis techniques; data acquisition methods; simulation techniques; interpretation of results.

**541: High Performance Computer Architecture.** 0-3-3. Preq., CSC 364. Topics include: principles of scalable performance, multiprocessor system design, message-passing systems, vector computers, data flow computers, and multithreaded architecture.

**550: Special Problems.** 1-4 semester hour credit. Individual research and investigation of a problem in computer science or computing practice.

**551: Research and Thesis in Computer Science.** Registration in any quarter may be for three semester hours credit or multiples thereof. Maximum credit allowed is six semester hours.

**554: Advanced Networking.** 0-3-3. Preq., CSC 450 or consent of instructor. May be repeated with change in subject matter. Selected research topics of current interest in the field of computer communications and networks.

**555: Practicum.** 0-3-3 Maximum credit allowed is three semester hours. Preq., 12 semester hours of graduate work. Analytical and/or experimental solution of a problem in computer science; technical literature survey required; development of a computer-based solution.

**557: Special Topics: Computer Science.** 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of computer science. May be repeated as topics change.

**570: Advanced Topics in Computer Graphics.** 0-3-3. Preq., CSC 470 or consent of instructor. Techniques used to produce realistic images of three-dimensional objects on computer graphics hardware. Topics include: reflection models, shading techniques, ray tracing, texture and animation.

**575: Advanced Topics in Artificial Intelligence.** 0-3-3. Preq., CSC 475 or consent of instructor. Advanced topics in artificial intelligence including: problem-solving systems, natural language understanding, intelligent tutoring systems, learning and neural networks.

**581: Parallel Algorithms.** 0-3-3. Preq., CSC 240. Models of parallel computers, basic communications operations, algorithms for searching, sorting, graph structures, and systolic systems, dynamic programming, performance and scalability of parallel systems.

**582: Parallel Computational Methods.** 0-3-3. Preq., CSC 240, MATH 415. Parallel implementations of FFT, interpolation, integration, Eigensystems, matrix maximization, ODEs, PDEs.

**583: Computational Solutions for PDE I.** 0-3-3. Preq., MATH 414. Finite difference schemes and their accuracy, stability, and convergence. Schemes for parabolic and hyperbolic PDEs. Emphasis on program implementation.

**584: Computational Solutions for PDE II.** 0-3-3. Preq., CSC 583 or MATH 574. Finite difference schemes for elliptic PDEs, iterative methods, and introduction to finite element methods and multigrid methods. Emphasis on program implementation.

#### COUNSELING (COUN)

**400: Introduction to Counseling.** 0-3-3. Introductory course for professional workers. Includes purposes and scope of counseling service, concepts, principles and basic techniques of counseling. (G)

**401: Student Personnel Services.** 0-3-3. A study of student personnel programs in colleges and universities. This course may not be taken for graduate credit.

**460: Behavioral Counseling.** 0-3-3. A non-cognitive approach to counseling that presents the necessary attitudes, concepts, principles, and skills for individual counseling.

**500: Principles and Administration of Guidance Services.** 0-3-3. An overview of the current principles and practices involved in various types of guidance and counseling services.

**505: Analysis of the Individual.** 3-2-3. Preq., PSYC 542 or equivalent. This course offers students an orientation to psychological testing procedures, their interpretation, evaluations and use in the understanding of clients.

**506: Introduction to Rehabilitation Counseling.** 0-3-3. Philosophical, social, psychological and legislative bases of rehabilitation; nature and scope of the process and functions of rehabilitation counselors.

**507: Case Management in Rehabilitation Counseling.** 0-3-3. Development of case management in procedures and skills: integration of theory and practice.

**508: Introduction to Counseling Theories.** 0-3-3. A detailed study of a selection of the best known schools of counseling theory.

**510: Counseling the Elderly.** 0-3-3. Dynamic and therapeutic models for counseling the aged and their families; focus on matching interventions to lifestyles.

**512: Counseling the College Student.** 0-3-3. An emphasis on development in young adulthood; historical, philosophical, and practical aspects of personnel services for college students.

**513: Career Information and Career/Life Style Development.** 0-3-3. Provides an understanding of career development; occupational/educational information sources and systems; career and lifestyle counseling; career decision-making and instruments relevant to career planning.

**514: Career Education: Vocational Guidance.** 0-3-3. A course in career guidance designed to provide an overview of career development and its applications within the high school setting.

**515: Career Education: Orientation of the World of Work.** 0-3-3. A course in career guidance designed to provide an overview of career development and its applications within the elementary school setting.

- 516: An Introduction to Group Processes.** 0-3-3. Preq., COUN 508. Emphasis is on providing students with a knowledge of group dynamics, and learning basic group counseling techniques under supervision.
- 518: Techniques of Counseling.** 3-2-3. Preq., COUN 508. Provides an overview of counseling techniques and interview methods.
- 520: Case Studies in Counseling.** 1-3 hours credit. Preq., COUN 508 and consent of instructor. Preparation and use of case studies in counseling.
- 521: Seminar: Current Psychological Literature.** 1-3 hours credit. May be repeated. Preq., COUN 508 and consent of instructor. Students are required to do extensive reading on selected topics in psychology.
- 522: Field Work in Counseling.** 3 hours credit (6). Preq., COUN 518 and consent of instructor. Supervised study, observation, and practice in selected employment settings.
- 523: Elementary School Guidance.** 0-3-3. A review of the principles and organizational patterns of guidance services at the elementary school level.
- 525: Advanced Techniques of Counseling.** 3-2-3. Preq., COUN 518 and consent of instructor. Further experiences in advanced counseling techniques appropriate to various counseling theories.
- 526: Problems in Guidance.** 3 hours credit (6). Special conferences, workshops, and seminars as requested by elementary and secondary school personnel. May be repeated for a maximum of 6 hours credit.
- 527: Addiction Counseling.** 0-3-3. An introduction to the field of Addiction Counseling. Emphasis is placed on recognition and identification of the addicted as well as basic treatment techniques.
- 528: Advanced Addiction Counseling.** 3-2-3. Preq., COUN 527. A methods course intended to equip the student with a basic conception of various therapeutic modalities.
- 529: Cross-cultural Counseling.** 0-3-3. Investigation of the development of cultural identity and techniques for appropriate interactions with clients from different cultural groups.
- 530: Practicum.** 5-1-3. Open only by application. Supervised professional activity in the student's major field. (Minimum 3.0 GPA required)
- 531: Internship.** 20-1-3 (6). Preq., COUN 530 or equivalent and permission of adviser. Advanced supervised counseling practice in a setting appropriate to the student's professional development.
- 532: School Counseling Practicum.** 5-1-3. Open only by application. Supervised professional activity in a school setting. (Minimum 3.0 GPA is required)
- 590: Ethics and Professional Practice.** 0-3-3. Preq., COUN 508. An in-depth investigation of ethical and legal issues, as well as technical concerns, related to the professional practice of counseling.

#### ECONOMICS (ECON)

- 201: Economic Principles and Problems.** 0-3-3 each. A study of basic economic principles and problems, with particular reference to the operation and social implications of the American economic system. (201-Macro).
- 202: Economic Principles and Problems.** 0-3-3 each. A study of basic economic principles and problems, with particular reference to the operation and social implications of the American economic system. (202-Micro).
- 215: Fundamentals of Economics.** 0-3-3. (Not open to students who have had ECON 201-202.) A survey of the major principles of economics designed for the student whose curriculum requires only one quarter of economic principles.
- 312: Monetary Economics.** 0-3-3. Preq., ECON 202 or 215. A study of the causes of changes in the supply of money and rate of spending and the effects of these changes on production, employment and the price level.
- 344: International Economics.** 0-3-3. Preq., ECON 201 or 215 or consent of instructor. Introduction to modes of business operations and the economic factors which affect international trade. Study of principles, practices, and theory of how and why nations trade.
- 401: Internship in Economics I.** 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 402: Internship in Economics II.** 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 403: Economics of Industrial Organization.** 0-3-3. Preq., ECON 202 or 215. Relationships between structure, conduct and performance of industries using theoretical and empirical material: Antitrust and environmental regulation, R&D, product advertising and pricing are examined. (G)

- 406: Comparative Economic Systems.** 0-3-3. Preq., ECON 202 or 215. A study of alternative economic systems such as capitalism, socialism, communism, and "mixed" in theory and practice.
- 408: Intermediate Economic Theory.** 0-3-3. Preq., ECON 202 or 215, or consent of instructor. Microeconomics; intensive study of price, production, and distribution theories. (G)
- 409: Managerial Economic Analysis.** 0-3-3. Preq., senior standing or consent of instructor. Lectures and cases emphasizing economic principles as used in managerial decision-making. Includes analysis of demand, cost and price relationships, price decision, risk and uncertainty, and capital investment. (G)
- 410: Public Finance.** 0-3-3. Preq., ECON 202 or 215. An introduction to the principles and theory of financing local, state, and federal governments.
- 418: Labor Economics.** 0-3-3. Preq., ECON 202 or 215 or consent of the instructor. Fundamentals of labor market operations, economic analysis of labor legislation; impact of American unions upon the firm's decision making and the national economy. (G)
- 437: Aggregate Economic Analysis.** 0-3-3. Preq., ECON 312. Macroeconomics; intensive study of economic theory of national income analysis, interest, employment, and fiscal policy. (G)
- 510: Managerial Economics.** 0-3-3. Analysis and cases; actual case studies in the application of price and distribution theory to problems of the firm.
- 512: Current Economic Policies.** 0-3-3. An investigation of modern economic concepts in the United States through a study of policies advanced by various economic groups tending to shape economic action.
- 513: Macroeconomic Theory I.** 0-3-3. Preq., ECON 437 or other acceptable background course(s). Analysis of monetary factors and government revenue-expenditure factors affecting the general level of prices, investment decisions, interest rates, national income and employment.
- 520: Advanced Microeconomic Theory.** 0-3-3. Preq., ECON 408 or other acceptable course(s). Value and distribution theory emphasizing applications to business operations and public policy issues.
- 532: Econometric Methods.** 0-3-3. Preq., QA 432 or other acceptable courses. The use of statistical techniques in economic research including estimation and interpretation of parameters of economic models.
- 540: Macroeconomics: Business Conditions Analysis.** 0-3-3. Preq., ECON 510. Detailed review of techniques, procedures and data sources used by business economists to gather, analyze, interpret, and forecast macroeconomic variables.
- 541: Microeconomics: Business Conditions Analysis.** 0-3-3. Preq., ECON 510. Detailed review of techniques, procedures, and data sources used by business economists to gather, analyze, interpret and forecast microeconomic variables.
- 542: Seminar on Business Economics Problems.** 0-3-3. Preq., ECON 510 or equivalent or consent of instructor. Students will develop and present an analytical study in micro- or macroeconomics in a form expected of a business economist's presentation to corporate management.
- 550: Directed Study in Economics.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of economics.
- 613: Macroeconomic Theory I.** 0-3-3. Preq., ECON 437 or other acceptable background course(s). Requires Doctoral standing. May require additional class meetings. Analysis of monetary factors and government revenue-expenditure factors affecting the general level of prices, investment decisions, interest rates, national income and employment. Credit will not be given for ECON 613 if credit is given for ECON 513.
- 620: Advanced Microeconomic Theory.** 0-3-3. Preq., ECON 408 or other acceptable course(s). Requires Doctoral standing. May require additional class meetings. Value and distribution theory emphasizing applications to business operations and public policy issues. Credit will not be given for ECON 620 if credit is given for ECON 520.
- 632: Econometric Methods.** 0-3-3. Preq., QA 432 or other acceptable courses. Requires Doctoral standing. May require additional class meetings. The use of statistical techniques in economic research including estimation and interpretation of parameters of economic models. Credit will not be given for ECON 632 if credit is given for ECON 532.
- 641: Microeconomics: Business Conditions Analysis.** 0-3-3. Preq., ECON 510. Requires Doctoral standing. May require additional class meetings. Detailed review of techniques, procedures, and data sources used by business economists to gather, analyze, interpret and forecast microeconomic variables. Credit will not be given for ECON 641 if credit is given for ECON 541.

**650: Directed Study in Economics.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of economics.

**685: Comprehensive Exam in Economics.** No credit. Doctoral standing required. Required for all business administration doctoral students seeking to take the comprehensive exam in economics. Successful completion is a prerequisite to the oral comprehensive exam for those seeking a primary field or examined minor in economics. Requires consent of graduate director.

#### EDUCATION (EDUC)

**430: Internship in Teaching.** 35-0-3 (9). Preq., twelve semester hours professional education. Supervised teaching experience in area(s) of certification in education. (G)

**431: School Readiness.** 1-3-3. Preq., PSYC 204 and Upper Division standing. Designed to acquaint the student with the appropriate theory, understanding, and methods necessary for beginning school success. Particular emphasis will be on holistic developmental readiness. (G)

**460: Methods for Teaching and Testing in ESL.** 0-3-3. Preq., Senior standing. Theories and techniques for teaching English as a Second Language and evaluating student performance; emphasis on communicative competence. Also listed as ESL 460.

**462: Principles and Problems of Cooperative Education.** 0-3-3. Preq., Upper Division standing. The basic principles and philosophies of cooperative vocational education. History and development of cooperative education. (G)

**463: Materials and Methods in Teaching Art.** 0-3-3. Preq., EDUC 480, Upper Division standing. The planning of a course of art and the methods of presentation of such a course in the elementary and high schools. (G)

**466: Materials and Methods of Teaching Instrumental Music.** 0-3-3. Preq., EDUC 480. See EDUC 465 for description; emphasis on the instrumental aspects.

**472: Individually Guided Education.** 0-3-3. Presents the essential concepts principles, and skills of several individualized instruction models and teacher roles as designers, managers, and evaluators of the teaching-learning process.

**501: Problems in Teaching Elementary Science.** 0-3-3. A survey of research bearing on problems of organizing, developing, and evaluating the curriculum in science.

**502: Problems in Teaching Language Arts in the Elementary School.** 0-3-3. A study of the principles, research, methods and materials needed for teaching written and oral forms of communication in elementary and junior high schools.

**503: Problems in Teaching Reading.** 0-3-3. A study of problems in the teaching of reading in elementary schools. Special emphasis will be given to the development of a reading program, diagnosis, and care of individual needs of pupils, use of materials, research findings, and their applications to methods of instruction.

**504: Problems in Teaching Mathematics in the Elementary School.** 0-3-3. A study of the needs and problems of teachers of mathematics in the elementary school. An introduction to modern arithmetic with emphasis on newer teaching methods.

**506: Improving Instruction in English.** 0-3-3. A study of the methods of teaching usage and literature, analyses of curricula, selection of materials, research in recent studies in the teaching of English. Special attention will be given to planning units of work, to creative teaching and to a consideration of the needs of youth in area of reading, writing, speaking, and listening.

**507: Improving Instruction in High School Mathematics.** 0-3-3. The place of mathematics in general education and in specialized fields; professionalized subject matter; modern methods of teaching. Students will become familiar with teaching aids, long-unit assignments, and the construction and use of standardized and teacher-made tests.

**508: Improving Instruction in Science.** 0-3-3. A study of present-day trends in the teaching of science, content, organization of materials, methods of instruction, student activities, objectives, observation trips, use of textbooks, laboratory work and equipment, evaluation, preparation of unit and lesson plans, projects and student guidance.

**509: Improving Instruction in the Social Studies.** 0-3-3. A study of the selection and organization of subject matter in social studies, the planning of student activities, the use of instructional materials. Students will prepare unit and lesson plans utilizing community resources.

**512: Philosophy of Education.** 0-3-3. Designed to trace some of the more important educational problems as they have been affected by social and political facts of history, by contributions of leading educational theorists and by institutional practice.

**513: Philosophy of Music Education.** 0-3-3. A review of the historical development of music education in America and an analysis of trends in music education from 1930 to the present time.

**514: The Learner in Adult Education.** 0-3-3. The learner in adult education programs will be examined. Emphasis will be given to the teaching-learning process and the uniqueness of adult learning situations.

**515: Administration and Supervision of Adult Education.** 0-3-3. General administrative processes, emphasizing program planning and evaluation.

**516: Seminar: Crucial Issues in Secondary Education.** 0-3-3. Selected readings and research on current, crucial issues in secondary education. Topics will vary from quarter to quarter.

**518: History of American Education.** 0-3-3. A survey of the development and growth of elementary, secondary, and higher education with emphasis upon American education.

**519: Contemporary Issues in Adult Education.** 0-3-3. Investigates current problems and future trends in the broad field of lifelong learning.

**520: Education for the Older Adult.** 0-3-3. Designed as a study of the elderly as a unique group of learners, defining specific needs of the elderly.

**521: Assessment of Students and Programs.** 0-3-3. Diagnosing and evaluating students and programs within the framework of instruction; emphasis on problem solving in order to improve learning and teaching.

**522: Instructional Theory and Practice.** 0-3-3. Exploration and investigation of methods and paradigms of instructional theory and delivery; emphasis on creative application of instructional technology and processes that create learning opportunities.

**524: Supervision of Student Teaching.** 0-3-3. Designed for experienced teachers who are interested in serving as supervising teachers in teacher-education programs.

**526: Curriculum Development.** 0-3-3. Application of theory and research of curriculum; issues and trends in curriculum; strategies and techniques for planning curriculum; value and empirical bases for curriculum decisions.

**528: Evaluating Pupil Growth.** 0-3-3. Methods and procedures in test development, administration, validation, and interpretation.

**529: Educational Planning and Accountability.** 0-3-3. A survey of planning and accountability models in education while emphasizing the essential principles and skills necessary for designing, implementing, and evaluating education plans.

**530: Internship in Teaching.** 35-0-3 (9). Preq., registration by application only, requires approval of academic advisor and Director of Laboratory Experiences. Supervised teaching experience in area(s) of certification in education. (Pass/Fail)

**531: Foundations of Reading.** 0-3-3. An in-depth examination of the processes involved in language development from pre-reading through advanced reading skills.

**532: Reading Curriculum and Materials Development.** 0-3-3. Analysis of reading curriculum and development of instructional materials for various levels of reading ability.

**533: Problems in Education.** 1-4 hours credit (9). Preq., Consent of the instructor. An advanced course dealing with special problems in the different fields of education.

**534: Diagnosis and Evaluation of Reading Difficulties.** 0-3-3. Preq., EDUC 503. Causes, diagnosis, evaluation and correction of reading disabilities.

**535: Clinical Reading.** 7-1-3. Clinical experience in diagnosing reading problems of school children.

**536: Clinical Reading.** 7-1-3. Preq., EDUC 535. Practicum in remedial reading for school children.

**537: Seminar, Problems in Reading.** 0-3-3. Preq., consent of instructor. Recent issues, theories, studies and research findings in teaching reading.

**538: Supervision and Curriculum Development in Reading.** 0-3-3. Construction of an innovative curriculum in reading, plans for implementation of new curriculum, and supervision of the reading program.

**539: Advanced Laboratory Practicum in Reading.** 7-1-3. Supervised internship in reading.

**540: Comparative Education.** 0-3-3. A study of the educational systems in Europe, the Orient, and South America.

- 541: Introduction to Graduate Study and Research.** 0-3-3. Experience is gained in the application of techniques of educational research, in writing in acceptable form, and in evaluating research. Required of all master's candidates in education and should be scheduled during the first six hours of graduate work.
- 542: Statistical Methods in Education.** 0-3-3. A study of the statistical methods used by school personnel in the study of educational problems.
- 543: Adjudication of Instrumental Ensembles.** 0-2-2. This course examines in detail a philosophy of the phenomenon of adjudication. It includes practical aspects of evaluation.
- 544: Reading in the Content Areas.** 0-3-3. Provides teaching methods and research findings related to the reading process as it applies to the various content areas of the curriculum.
- 545: The New Media in Education.** 2-2-3. A study of the uses of new technology with some practical experience in the use of these educational aids.
- 546: Instructional Media Design and Development.** 2-2-3. An investigation of the systems approach to instructional media design, organization, and application.
- 551: Research and Thesis.** Three hours or multiples thereof. Maximum credit allowed is six hours.
- 561: Research Design and Analysis.** 0-3-3. Preq., EDUC 542. A study of the techniques involved in the analysis of selected experimental designs in educational research.
- 562: Elementary School Curriculum.** 0-3-3. A study of principles of curriculum construction in the elementary school. Emphasis is upon selection, organization and evaluation of materials suitable to the elementary school.
- 563: Secondary School Curriculum.** 0-3-3. A study of the principles of curriculum development in the secondary school.
- 564: The Reading Process.** 0-3-3. An analysis of the physiological, psychological, and neurological foundations of the reading process.
- 566: Improving Instruction in Remedial Education.** 2-2-3. Focuses on improvement of college level instruction at the remedial/developmental level.
- 567: Teaching Methods for Language Arts.** 0-3-3. Provides an in-depth study of the elements of lesson planning and design with emphasis in the teaching of written and oral communication (other than reading).
- 568: Teaching Methods for Effective Instruction of Reading.** 0-3-3. An in-depth study of reading programs and materials, diagnosis and instruction for individual needs, research findings, and their applications to methods of instruction.
- 569: Teaching Methods for Effective Instruction of Mathematics and Educational Technology.** 0-3-3. An in-depth study of mathematics curriculum, instructional methods and materials, and research findings with an investigation of technology usage in the content fields.
- 570: Field Problem and Internship.** 0-3-3. Preq., approval of the Dept. Head, Computer Information Systems and Analysis. The provision of supervised professional activities in business education directed by the business education faculty. Selection of one major area of business education for intensive study in terms of methods, materials, research, and curricular problems.
- 571: Change Theory & Innovation in Education.** 0-3-3. Preq., Graduate Standing. A study of change theory and how varying factors and circumstances influence the extent of success or failure of planned innovations in public education.
- 572: Educational Foundations and Public Policy.** 0-3-3. An analysis of the links between educational policy and school history with particular emphasis on the historical, philosophical, social, and legal foundations of education.
- 573: School Principles and Curriculum.** 0-3-3. An analysis of the curriculum and principles of learning with additional emphasis on multicultural education, "at risk" students, and classroom management.
- 574: Teaching Methods for Effective Secondary School Instruction.** 0-3-3. An examination of research, resources, and advanced techniques of teaching in secondary schools.
- 575: Practicum in Education.** 10-1-3. Preq., Consent of Director of Laboratory Experiences. Structured laboratory experiences in education. (Pass-Fail)
- 576: Internship in Education.** 9 hours credit. Advanced internship in area(s) of specialization. Minimum of 180 clock hours in direct teaching.
- 577: Teaching Methods for Effective Instruction of Science and Social Studies.** 0-3-3. An examination of curriculum, instructional methods and

materials, and research findings related to the teaching of science and social studies.

- 580: Specialist Research and Thesis.** Three hours credit or multiples thereof. Maximum credit allowed is six hours.
- 589: Special Topics.** 1-4 hours credit. Preq., graduate standing. Selected topics in an identified area of study in the College of Education.
- 594: Special Topics.** 1-4 hours credit. Preq., graduate standing. Selected topics in an identified area of study in the College of Education.

#### EDUCATIONAL COMPUTER TECHNOLOGY (ECT)

- 445: Introduction to Technology for Teachers.** 4-1-3. This course is for preservice and inservice teachers who want to develop proficiency in using technology to support classroom learning. (G)
- 500: Technology Leadership to Support Standards-Based Teaching & Learning.** 4-1-3. Preq., ECT 445 or equivalent. Exploration of ways to use technology to support standards-based teaching and learning in the classroom.
- 501: Educational Telecommunications, Networks, & the Internet.** 4-1-3. Preq., ECT 500 or equivalent. Examination of methods and resources for integrating the Internet into content area learning.
- 502: Design & Development of Multimedia Instructional Units.** 4-1-3. Preq., ECT 500 and 501. Design and development of multimedia products to facilitate student learning.
- 510: Technology for Teaching Reading/Language Arts.** 4-1-3. Preq., ECT 445 or equivalent. Exploration of a variety of technology to support reading/language arts instruction. Includes the design and development of multimedia products.

#### EDUCATION CURRICULUM AND INSTRUCTION (EDCI)

- 100: Early Experiences in Education.** 0-1-1. Designed to give high school seniors an overview of the teaching profession from the perspectives of Teacher Education, Health and Physical Education, and Special Education.
- 102: Reading Skills for College Freshmen.** 9-0-3 (9). The course provides individually prescribed instruction in reading skills for college freshmen. The course objective is to help alleviate reading deficiencies, which inhibit effective learning. Non-degree credit.
- 125: Introduction to Teaching.** 1-1-1. An overview of the teaching profession from various perspectives supplemented with structured observations in elementary, middle, and secondary classrooms.
- 189: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Education. May be repeated for credit.
- 194: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Education. May be repeated for credit.
- 205: The Computer: A Tool for the Teacher.** 0-1-1. Instructional, utility, and management software applications for school use. Development of instructional materials, incorporation of commercially available software into lesson and unit structure.
- 245: Microcomputer Applications: Tools for Lifelong Learning.** 0-3-3. Designed to introduce students to the microcomputer and a variety of software applications that may be useful for study, research, and educational preparation.
- 289: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Education. May be repeated for credit.
- 294: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Education. May be repeated for credit.
- 300: Driver Education and Highway Safety.** 0-3-3. Investigation of the problems facing drivers, traffic design problems, and the study of the philosophy of driver education.
- 310: Instructional Technology.** 1-3-3. Introduction to instructional media for the classroom. Students evaluate and use computer software and other audio-visual media to develop and support classroom instruction.
- 320: Materials and Methods for Elementary Science and Social Studies.** 0-3-3. Preq., PSYC 204. A course for the study of curriculum, organization and teaching in elementary science and elementary social studies.
- 351: Materials and Methods in Teaching Modern Language.** 0-3-3. Preq., 12 hours of modern languages and EDUC 480. The student will be introduced to the latest techniques of organizing materials and presenting them to high school pupils.
- 389: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Education. May be repeated for credit.

- 394: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study. May be repeated for credit.
- 401: Directed Observation and Pre Student Teaching Experiences.** 3 3/4-1-1. Preq., 90 semester hours including professional preparation courses and taken in quarter prior to student teaching. Directed observation, participation, and critique related to the field in which the student plans to student teach.
- 402: Measurement in Education.** 0-2-2. Includes principles of measurement and evaluation, construction of teacher-made tests, and utilization of standardized tests.
- 403: Materials and Methods of Teaching Reading.** 0-3-3. Preq., EDUC 480. Instructional techniques designed to assist the secondary teacher in implementing reading strategies in content courses.
- 404: Reading Strategies for Secondary School Teachers.** 0-3-3. Instructional techniques designed to assist the secondary teacher in implementing reading strategies in content courses.
- 405: Materials and Methods in Teaching Agricultural Education.** 0-3-3. Preq., AGED 460 or consent of instructor. Techniques, requirements, and organization of state curriculum guides and course requirements in agricultural education in public schools. Requirements of the FFA advisor/agriculture teacher. (G)
- 406: Education Innovations in the Current and Emerging Schools.** 0-3-3. Study of educational innovations and their implications.
- 409: Materials and Methods in Teaching Business Education.** 0-3-3. Preq., Upper Division and ACCT 202. A course designed to acquaint the student with the best practices in teaching business subjects. (G)
- 410: Business and Office Operations.** 0-3-3. Methods and procedures in developing and coordinating a cooperative office education program in the secondary school. (G)
- 415: Multicultural Education.** 0-3-3. Preq., Upper Division and PSYC 204. This course provides K-12 education students with the culturally inclusive awareness, skills, and knowledge to meet the diverse needs of learners. (G)
- 416: Student Teaching.** 6-9 hours credit. Meet all qualifications identified in this catalog for teaching level or area of specialization. Student receives appropriate supervised experiences. Total clock hours determined by program. Two hours of seminar. (Pass-Fail)
- 417: Diagnosis and Correction of Reading Difficulties.** 11/4-2-3. Preq., Upper Division, EDUC 424, and PSYC 204. Field-based experience in diagnosing reading problems and recommending appropriate instructional interventions for school children. (G)
- 420: Practica in Education.** 10-1-3. Preq., Consent of Director of Laboratory Experience. Structured laboratory experiences in area(s) of specialization in education. May be repeated for credit. (Pass/Fail)
- 422: Materials and Methods for Elementary/Middle Mathematics.** 0-3-3. Preq., Upper Division and PSYC 204. An examination of the characteristics and objectives of the modern elementary mathematics program combined with experiences in content, methods, and organizations. (G)
- 423: Materials and Methods for Elementary/Middle Language Arts.** 0-3-3. Preq., Upper Division and PSYC 204, concurrent enrollment required with EDUC 424. A course to enable students to use current principles, research, methods and materials to teach oral, written and reading communication skills. (G)
- 424: Materials and Methods for Elementary/Middle Reading.** 0-3-3. Preq., Upper Division, Reading Methods, and PSYC 204, concurrent enrollment required with EDUC 423. Principles, methods, and research pertaining to the teaching of reading will be emphasized. (G)
- 425: Materials and Methods for Elementary/Middle Science.** 0-3-3. Preq., Upper Division and PSYC 204. A course for the study of curriculum, organization, and teaching of elementary/middle science. (G)
- 426: Materials and Methods for Elementary/Middle Social Studies.** 0-3-3. Preq., Upper Division and PSYC 204. A course for the study of curriculum, organization, and teaching elementary/middle social studies. (G)
- 431: Literacy for Emergent Learners.** 2-1-3. Preq., Upper Division. Designed to acquaint students with appropriate theory, understanding, and methods necessary for the emergent learner with emphasis on holistic aspects of effective instruction. (G)
- 432: Kindergarten Education.** 1-3-3. Preq., PSYC 204 and Upper Division standing.. Course will involve curriculum planning based on principles of child development. Students will become familiar with the curriculum development process by using curriculum documents including instructional units. (G)
- 433: Special Problems in School Curriculum.** 1-4 hours credit. (9). Preq., consent of instructor. Course is designed to deal with selected problems in elementary and secondary schools.
- 434: Diverse Learners.** 2-1-3. Preq., Upper Division. This course provides P-12 teaching candidates with the awareness, knowledge, skill, and disposition to identify, assess, teach, accommodate, and manage the instructional needs of diverse learners. (G)
- 435: Trends and Issues in Education.** 2-1-3. Preq., Upper Division. This course provides PK-12 teacher candidates with the awareness, knowledge, skill, and disposition to identify, assess, teach, and accommodate the changing needs of all learners. (G)
- 436: Braille I.** 1-3-3. Preq., Upper Division or consent of instructor. Students develop proficiency in reading and writing the Braille literary code while developing an understanding of which visually impaired children benefit from Braille reading instruction. (G)
- 437: Reading/Language Arts Methods.** 2-1-3. Preq., Upper Division. Principles, methods, and research pertaining to the teaching of reading and language arts will be emphasized. (G)
- 438: Instructional Design, Strategies, and Assessment.** 2-1-3. Preq., Upper Division. This course will be a generic methods course which explores methods and procedures to assess and facilitate student academic growth. (G)
- 441: Methods of Teaching Kindergarten Children.** 1-3-3 Preq., LSCI 201, EDUC 432, PSYC 408, and Upper Division standing.. Practical problems in the selection and organization of the curriculum to promote children's learning. Emphasis on planning, selecting equipment, teaching aids, and teaching procedure. (G)
- 445: Using the Microcomputer in the Classroom.** 0-3-3. Operating and using microcomputers for classroom instruction. Computer literacy concepts, and software evaluation are included. (G)
- 447: Software Application, Teaching Methods, and Intermediate Programming for Teachers.** 0-3-3. Preq., a course in BASIC programming. Computer-assisted instructional software, authoring packages, LOGO, and intermediate programming skills for classroom instruction. (G)
- 448: Instructional Software Design and Development.** 0-3-3. Preq., A course in BASIC programming. Methods for teaching computer-related topics and programming techniques for designing instructional modules. (G)
- 449: Administrative Applications of the Microcomputer in Schools.** 0-3-3. A course to provide information concerning the administrative users of computers in schools, hardware/software/consultant resources, and methods for developing effective in-service programs. (G)
- 450: Improving Instruction in Art.** 0-3-3. Identification of problems of teaching art. Emphasis upon philosophy, art materials and techniques, evaluation and curriculum planning.
- 451: Software Applications in the Teaching of Reading.** 1-3 hours credit. (3). The microcomputer is used to prepare software for use in content reading applications and test construction. (G)
- 452: Administration of Instructional Materials Centers.** 0-3-3. Techniques organization, management and selection of printed and non-book materials in multi-media instructional materials centers.
- 453: Foreign Language Teaching Methods.** 0-3-3. Preq., 12 hours of a foreign language. Study of a broad range of foreign language teaching methods; examination of underlying theories and practical applications. Also listed as FLNG 453. (G)
- 454: English Grammar in ESL Teaching.** 0-3-3. Preq., Senior standing. An analysis of English grammar specifically for developing instructional techniques used in teaching grammar for communicative competence in ESL. Also listed as ESL 454.
- 455: Improving Instruction in the Middle Grades.** 0-3-3. A study of the history, philosophy, and nature of the middle school with emphasis on early adolescent physical and educational development and social/emotional problems.
- 456: Materials and Methods in Teaching Mathematics.** 0-3-3. Preq., EDUC 480 and MATH 241, Upper Division standing. The nature of mathematics and methods of teaching. Special emphasis will be placed on the interpretation and solving of reading problems. (G)
- 457: Materials and Methods in Teaching English.** 0-3-3. Preq., EDUC 480, Upper Division standing. The student will be introduced to the best techniques of organizing and presenting English material. (G)
- 458: Materials and Methods in Speech, Language and Hearing in the Public Schools.** 0-3-3. Practical problems in the identification, diagnosis, and treatment of communication disorders in school children,

with emphasis on materials, organization of therapy program and teaching procedures. (G)

- 459: Materials and Methods in Teaching Social Studies.** 0-3-3. Preq., EDUC 480, Upper Division standing. An examination of the character and purpose of social studies is followed by presentation of appropriate teaching suggestions. (G)
- 460: Internship in Teaching.** 35-0-1. Preq., Upper Division and permission of Director of Professional Experiences (Pass/Fail). Teacher candidates meet the student teaching requirement while employed in a teaching position. Supervision by the school principal and university supervisor are required. (G)
- 461: Performance Based Seminar I.** 0-2-2. Preq., concurrent enrollment in EDCI 460. Teacher candidates will meet weekly to address topics responding to observed needs of candidates. (G)
- 462: Performance Based Seminar II.** 0-2-2. Preq., concurrent enrollment in EDCI 460. Teacher candidates will meet weekly to address topics responding to observed needs of candidates. (G)
- 463: Performance Based Seminar III.** 0-2-2. Preq., concurrent enrollment in EDCI 460. Teacher candidates will meet weekly to address topics responding to observed needs of candidates. (G)
- 464: Materials and Methods in Teaching Science.** 0-3-3. Preq., EDUC 480, Upper Division standing. A careful examination of the most advanced methods of organizing the presenting materials in sciences for the secondary school. (G)
- 465: Materials and Methods of Teaching Vocal Music.** 0-3-3. Examines problems which confront the teacher and supervisor of vocal music; e.g., program building, contests, festivals, requisitions, grading, materials, scheduling, and rehearsing.
- 466: Adaptive Technology for the Visually Impaired.** 1-1-1. Preq., Upper Division or consent of instructor. Through demonstrations, hands-on projects, and various guest lectures, student learn to use state of the art technology designed for the blind and/or visually impaired learner. (G)
- 467: Materials and Methods in Teaching Speech.** 0-3-3. Preq., EDUC 480, Upper Division standing. An examination of materials and methods for teaching speech in elementary and secondary schools. (G)
- 470: Curriculum Development and Design for ESL.** 0-3-3. Preq., Senior standing. Selection of objectives, content, task implementation, and pedagogy for teachers of English as a Second Language. Also listed as ESL 470.
- 471: Classroom Management.** 1-3-3. Course emphasizes the application of concepts, principles, and skills necessary for designing, implementing, evaluating, and revising plans for classroom management. (G)
- 472: Transition and Vocational Procedures.** 2-1-3. Preq., Upper Division. Emphasizes transition and vocational models, curricula, strategies, and services. Field-based experiences focus on career exploration, planning, inter-agency collaboration, research, and family involvement. (G)
- 473: Educational Strategies and Methods for Students with Mild/Moderate Disabilities.** 2-1-3. Preq., Upper Division. Procedures, methods, materials, and research-based strategies for students with disabilities (1-12) with emphasis on accommodations, modifications, and Individualized Education Programs (I.E.P.s). (G)
- 475: Foundations of Education.** 0-2-2. An interdisciplinary survey of the development of educational institutions and practices with particular focus upon the influences of social, legal, historical and philosophical thought. (G)
- 477: Teaching Methods for Effective Instruction of Science and Social Studies.** 2-1-3. Preq., Upper Division and PSYC 204. A course for the study of curriculum organization, instructional strategies and materials, and research findings related to PK-8 science and social studies. (G)
- 480: Principles of Teaching.** 0-3-3. An investigation of the principles of teaching as related to the student, curriculum, and the teaching-learning process. (G)
- 489: Special Topics.** 1-4 hours credit (9). Selected topics in an identified area of study in the College of Education. May be repeated for credit. (G)
- 490: Introduction to Adult Education.** 0-3-3. A study of the history, philosophy, objectives and nature of adult and continuing education; emphasis given to the adult as a learner. (G)
- 491: Reading in Adult Education.** 0-3-3. Examines the characteristics of the functionally illiterate adult. (G)
- 492: Materials and Methods in Adult Education.** 0-3-3. Examination of characteristics unique to the adult with emphasis on analysis of the methods and materials available for working with adults. (G)
- 493: Cross-Cultural Communication for ESL Teaching.** 0-3-3. Preq., Senior standing. Concepts of culture and the relationship of language

acquisition to the cultural setting with specific application to the teaching of ESL. Also listed as ESL 493.

- 494: Special Topics.** 1-4 hours credit (9). Selected topics in an identified area of study in the College of Education. May be repeated for credit. (G)
- 495: Social and Psychological Aspects of Blindness.** 1-2-3. Preq., Upper Division or consent of instructor. Course explores social and psychological implications of blindness and provides an overview of current and historical practices in the rehabilitation and education of blind individuals. (G)
- 499: Instructional Strategies and Materials for Teaching Blind Students.** 0-3-3. Preq., Upper Division or consent of instructor. Methods and materials for teachers teaching blind children to read. Students will increase personal Braille reading speed, proficiency, and knowledge of the literary Braille code. (G)

#### EDUCATION LEADERSHIP (EDLE)

- 527: Public School Organization and Administration.** 0-3-3. Introduction to national, state, and local administration; public school finance; principles and practices of administration; administration of special services; national and state legal aspects of public school administration, and administration of school-community relations.
- 550: Supervision of Child Welfare & Attendance.** 0-3-3. Preq., Graduate status. Principles and practices of census, child welfare, and attendance for the supervisor of child welfare and attendance or visiting teacher.
- 552: Supervision of Instruction in Elementary and Secondary Schools.** 0-3-3. A course designed to aid prospective elementary and secondary administrators in theories, principles, and concepts of supervision.
- 555: School and Community Relations.** 0-3-3. Principles of school relations applied to education and the development of school and community understandings.
- 556: School Law.** 0-3-3. State and national aspects and implications of public school law. Special attention is given to cases in both state and federal courts.
- 557: Elementary School Principalship.** 0-3-3. Duties and responsibilities in organization, leadership, administration and supervision in the elementary school.
- 558: Secondary School Principalship.** 0-3-3. Duties and responsibilities in organization, leadership and administration of the secondary school.
- 559: School Finance.** 0-3-3. An in-depth survey into the financial and business management in public education.
- 560: School Personnel Administration.** 0-3-3. A course to equip the new principal to administrate all school personnel.
- 565: Differentiated Supervision.** 0-3-3. Focuses on improvement of classroom instruction through the building of the relationship between supervision and teaching.

#### EDUCATIONAL PSYCHOLOGY (EPSY)

- 472: Vocational Procedures and Practices for Exceptional Students.** 0-3-3. Experience-based vocational education; process-oriented curriculum development; planned learning activities; formal assessment procedures; utilization of community resources; occupational preparation; review of exemplary programs. (G)
- 475: Advanced Procedures in Special Education.** 0-3-3. Preq., approval of instructor. Individually supervised and systematically organized observation and participation in evaluative and educational procedures with exceptional students. (G)
- 480: Introduction to Orientation and Mobility.** 0-3-3. Provides an examination and application of the fundamental principles and theories of orientation & mobility. Students will progress through a graduated travel curriculum. (G)
- 502: Psychosocial and Educational Appraisal of Exceptional Students.** 7-1-3. Preq., approval of instructor. Administration and interpretation of specialized individual tests, infant development scales, non-verbal tests for linguistically impaired, verbal tests for sensory handicaps, and accelerated academic assessment.
- 504: Human Exceptionalities Seminar.** 0-3-3. An overview of special education emphasizing social, physical, emotional, and educational components of exceptional students including history and current legislation.
- 511: Advanced Educational Psychology.** 0-3-3. An in-depth study of the major theories of learning with an emphasis on reviewing contemporary research relating to human learning and the application of psychological principles to instructional technology.

- 512: Consulting Strategies for Assessment Teachers.** 0-3-3. Preq., SPED 490. Development of teacher and parent consultation skills, coordination and interaction of the education assessment teacher with classroom programs, and available community resources.
- 515: Gifted/Talented Individuals.** 0-3-3. The nature and needs of exceptionally able students with emphasis on curriculum adjustment and research in the field.
- 516: Gifted/Talented Psychoeducational Materials and Methods.** 0-3-3. Preq., consent of area coordinator. Process of materials utilization and development for teacher of gifted/talented students, including procedures for implementing creativity, problem solving activities, and higher levels of cognition.
- 550: Field Work in Human Exceptionalities.** 12-0-3 (6). Internship in the application of principles of learning and child development from a behavioral approach to the educational needs of exceptional students.
- 561: Diagnostic/Prescriptive Psychoeducational Strategies and Materials for Exceptional Students.** 0-3-3. Individualized interfacing of learning characteristics of exceptional students with curriculum requirements and environmental structure; emphasis on individualized prescriptive strategies and programs.
- 581: Blindness Rehabilitation Systems and Issues.** 0-3-3. Presents an overview of rehabilitation history, concepts, programs and services; professional responsibilities and ethics with field experience utilizing techniques for working with rehabilitation agencies, school systems, organizations and public or private programs serving blind and visually impaired individuals.
- 583: Advanced Orientation & Mobility.** 0-3-3. Provides instruction for teaching techniques of independent mobility to individuals who are blind/visually impaired. Curriculum includes strategies and techniques for rural environments, special travel situations, and use of public transportation and applications to daily living vocational environments. Special techniques used by O&M instructors who are blind/visually impaired are emphasized.
- 584: Internship in Orientation & Mobility.** 0-3-3 (6). Preq., enrollment in Educational Psychology (Visual Impairments - Orientation & Mobility) program and EPSY 583. Intensive experience in teaching Orientation and Mobility skills to visually impaired students. Field experience at the Louisiana Center for the Blind, Ruston, LA. (Pass/Fail)
- 599: Master's Thesis.** 0-3-3. (6 hours minimum). Original research conducted under the supervision of a departmental faculty member in the student's program area. Student must be enrolled whenever university facilities or faculty are used. (Pass/Fail).

#### ELECTRICAL ENGINEERING TECHNOLOGY (ELET)

- 100: Introduction to Electrical Engineering Technology.** 3-0-1. A survey of topics to introduce the student to the profession, the department and the curricula.
- 160: Basic Electricity.** 0-3-3. An introduction to the fundamental concepts of electricity.
- 161: Basic Electricity Lab.** 3-0-1. Coreq., ELET 160. Practical laboratory exercises to illustrate the material in ELET 160.
- 170: Basic Circuit Theory.** 0-3-3. Preq., Concurrent registration in ELET 171 and MATH 111. Introduction to DC circuit theory; loop equations, node equations and major network theorems. Single time constant transients.
- 171: Basic Circuit Lab.** 3-0-1. Concurrent registration in ELET 170. Laboratory companion to ELET 170.
- 180: AC Circuits.** 0-3-3. Preq., ELET 170, Coreq., MATH 112. Concurrent registration in ELET 181. An extension of the concepts developed in ELET 170, to include alternating current circuits for sinusoidal steady-state analysis.
- 181: AC Circuits Laboratory.** 3-0-1. Concurrent registration in ELET 180. Laboratory companion to ELET 180.
- 196: AC & DC Analysis.** 0-2-2. Preq., MATH 111, 112, and some experience with AC and DC Circuits. Mathematical principles with underlie circuit analysis. Mesh and nodal analysis, network theorems, Kirchoff's laws, Thevenin's and Norton's equivalents for both AC and DC circuits.
- 197: Electronic Analysis.** 0-3-3. Preq., ELET 180, and some experience with electronic circuits transistors and operational amplifiers. Mathematical principles which underlie electronic analysis. Amplifiers and feedback circuits.
- 198: Instrumentation.** 0-2-2. Preq., ELET 180 or 196, and some experience with instrumentation circuits. Mathematical principles which instrumentation.
- 260: Electronics.** 0-3-3. Preq., ELET 180. Concurrent registration in ELET 261. An introductory treatment of solid state devices, concentrating on the ordinary diode and the bipolar and field effect transistors.
- 261: Electronics Laboratory.** 3-0-1. Preq., Concurrent registration in ELET 260. Introductory electronics laboratory, a companion to ELET 260.
- 270: Instrumentation.** 0-3-3. Preq., ELET 180 or consent of the instructor. Basic measuring devices, meters, bridges, etc. An introduction to the methods used in making accurate measurements.
- 271: Instrumentation Laboratory.** 3-0-1. Preq., Concurrent registration in ELET 270. Laboratory for the study of electrical and electronic controlled instrumentation.
- 272: Electronics Applications.** 0-3-3. Preq., ELET 260. Concurrent registration in ELET 273. Continuation of ELET 260. The study of semiconductor devices imbedded in passive RLC networks, and their applications in practical situations.
- 273: Electronics Applications Laboratory.** 3-0-1. Concurrent registration in ELET 272. Training in the construction and troubleshooting of solid state electronics circuits.
- 274: Computer Programming.** 0-1-1. The logic of computer solutions to problems. Basic programming utilizing a higher level programming language. Applications of computer usage in Electrical Engineering Technology. Also listed as ELEN 243.
- 275: Computer Programming.** 0-1-1. Preq., ELET 274. A continuation of ELET 274. Applications of computer usage in Electrical Engineering Technology.
- 280: Electrical Power.** 0-3-3. Preq., ELET 180. A survey of the power field; the aims, problems and techniques. Future trends.
- 284: Computers.** 0-3-3. Preq., ELET 260. Concurrent registration in ELET 285. Digital and analog computer systems, circuits, and maintenance.
- 285: Computers Laboratory.** 3-0-1. Preq., Concurrent registration in ELET 284. Practical laboratory exercises in computer circuitry and maintenance techniques.
- 360: Electrical Power.** 0-3-3. Preq., ELET 180 and 270. Concurrent registration in ELET 361. Study of techniques and solution to fundamental problems in the electric power industry. Emphasis on practical applications.
- 361: Electrical Power Laboratory.** 3-0-1. Concurrent registration in ELET 360. Companion laboratory to 360.
- 370: Integrated Circuits.** 0-3-3. Preq., ELET 260. Concurrent registration in ELET 371. Applications of integrated circuits, both linear and discrete, in a variety of amplifiers, switching circuits and functional operations.
- 371: Integrated Circuits Laboratory.** 3-0-1. Concurrent registration in ELET 370. Practical laboratory work in the utilization of integrated circuits in active networks, both linear and discrete.
- 382: Computer Servicing.** 0-2-2. Preq., ELET 284. Techniques of fault isolation and repair of digital and analog computers. Preventive maintenance techniques. The theory of maintainability.
- 383: Computer Servicing Laboratory.** 3-0-1. Coreq., ELET 382. Practical troubleshooting of computer systems.
- 390: Electrical Drafting.** 0-3-3. A course in mechanical drafting with emphasis on schematic diagrams, wiring diagrams, circuit boards, and electrical standards and codes.
- 460: Communication Circuits.** 0-3-3. Preq., ELET 260. Concurrent registration in ELET 461. The study of circuits used in AM and FM radio, television, and digital data transmission.
- 461: Communication Circuits Laboratory.** 3-0-1. Concurrent registration in ELET 460. Companion laboratory to lecture ELET 460. Construction of RF amplifiers, modulators, etc.
- 465: Circuit Design and Fabrication.** 3-1-2. Preq., ELET 370 and ELET 390. A student project course in design, layout and fabrication of printed circuits.
- 468: Electronic Motor Control.** 0-3-3. Preq., ELET 260, 360. Concurrent registration in ELET 469. Application of solid-state devices to the control of power in static and dynamic energy conversion systems. Methods of control in DC and AC systems.
- 469: Electronic Motor Control Laboratory.** 3-0-1. Preq., Concurrent registration in ELET 468. Companion laboratory to ELET 468.
- 470: Control Systems.** 0-3-3. Preq., ELET 260. Concurrent registration in ELET 471. Introductory control systems. A survey of the field, with emphasis on the problems, current solutions, and analytical methods.
- 471: Control Systems Laboratory.** 3-0-1. Concurrent registration in ELET 470. Field trips and laboratory experiments in principles of automatic control systems.

- 472: Seminar.** 0-1-1. Preq., senior standing. Discussion of employment, current job market, preparation of personal data sheets, application forms, other placement activities.
- 480: Electronic Computers.** 0-3-3. Preq., ELET 284. Concurrent registration in ELET 481. Organization, operation, and programming of digital computers on a more advanced level. Basic numerical techniques.
- 481: Electronic Computers Laboratory.** 3-0-1. Concurrent registration in ELET 480. A workshop in computer methods intended to provide applications of the theory in ELET 480 lecture.
- 490: Special Problems.** 1-4-(9) hours credit. Preq., consent of instructor. A course to be arranged for the purpose of covering a selected topic of current importance or special interest.

#### ELECTRICAL ENGINEERING (ELEN)

- 223: Electrical Circuits II.** 3-2-3. Preq., ELEN 221 or ELEN 326 and credit or registration in MATH 242. Transient analysis of source-free and high order systems, complex frequency, and resonance phenomena. Computer solution of circuits. Electrical instruments, devices, and design for measurements in electrical networks.
- 232: Introduction to Digital Design.** 0-2-2. Introduction to digital design techniques, Boolean algebra, combinational logic, minimization techniques, simple arithmetic circuits, programmable logic, sequential circuit design, registers and counters.
- 241: Introduction to Microcomputers.** 0-3-3. Introduction to computer organization and operation, data representation and manipulation, assembly language programming, register level operations, peripheral device interfaces.
- 242: Introduction to Microprocessors.** 3-2-3. Preq., ELEN 232. Introduction to microprocessor organization and operation, data manipulation, assembly language programming, register level operations, and device interfacing.
- 243: Computer Programming.** 0-1-1. The logic of computer solutions to problems. Basic programming utilizing a higher level programming language. Applications of computer usage in Electrical Engineering. Also listed as ELET 274.
- 311: Introduction to Electric & Magnetic Fields.** 0-2-2. Preq., PHYS 202. Vector analysis. Energy and potential. Static magnetic fields. Magnetic circuits and inductance.
- 321: Linear Systems.** 0-3-3. Preq., ELEN 222 and credit or registration in MATH 245. Fourier Series. Fourier Transform. Laplace Transform. Convolution and the system function. Filters. State variable representation and solution.
- 326: Theory and Applications of Electrical Engineering.** 0-3-3. Preq., MATH 242 (this course for non-Electrical Engineering majors). Solutions of circuits and networks. Magnetic circuits and devices. Applications to transformers connections, motors, and systems. Power distribution and electrical safety.
- 334: Solid State Electronics.** 0-3-3. Preq., MATH 244, and PHYS 202. Fundamentals of solid state electronic materials and devices, emphasizing semiconductors and principles of operation of ULSI devices.
- 335: Analog Electronics.** 3-2-3. Preq., ENGR 221. Diode and transistor characteristics and models. Design of power supplies, single- and multiple-stage amplifiers. Design and application of operational amplifiers.
- 381: Electrical Machinery.** 0-3-3. Preq., ELEN 311. Electromagnetic energy storage and conversion. Principles of electromechanical energy conversion. Power transformers. Design of electromechanical devices. Analysis of rotating machines.
- 386: Electrical Equipment for Buildings.** 0-3-3. Preq., MATH 220 and PHYS 210. Not available for electrical engineering majors. A study of the problems of the design and application of electrical wiring and lighting systems for building.
- 402: Electrical Design.** 3 hours credit. Preq., written consent of supervising instructor. Closely supervised design of electrical engineering problem. Opportunity for individual investigation, design, and fabrication of electrical apparatus.
- 403: Electrical Design.** 1 hour credit. Preq., Written consent of supervising instructor. Closely supervised design of electrical engineering problem. Opportunity for individual investigation, design and construction of electrical apparatus or system.
- 404: Electrical Design.** 2 hours credit, Preq., written consent of supervising instructor. Closely supervised design of electrical engineering problem. Opportunity for individual investigation, design, and construction of an electrical apparatus or system.

- 406: Electrical Engineering Design I.** 3-1-2. Preq., ELEN 331, 339, 389 and senior standing. Design problems requiring the integration of circuits, electronics, field theory, controls, energy conversion, power systems, and economics.
- 407: Electrical Engineering Design II.** 3-0-1. Preq., ELEN 406. A laboratory for the continuing development of the senior design project started in ELEN 406.
- 408: Electrical Engineering Design III.** 3-0-1. Preq., ELEN 407. A laboratory for the continuing development and implementation of the senior design project started in ELEN 406 and continued in ELEN 407.
- 411: Electric and Magnetic Fields.** 0-3-3. Preq., ELEN 311, and MATH 244. Capacitance. LaPlace's Equation. Maxwell's equations. Time-varying electromagnetic fields. Plane waves. Transmission lines. Design of impedance-matching devices. (G)
- 412: Signal Transmission.** 0-3-3. Preq., ELEN 411. Transmission lines and distributed parameters. Wave-guides, traveling electromagnetic wave analysis, and boundary value problems. Impedance matching, graphical solutions, and microwave networks. Laboratory applications and design. (G)
- 422: Introduction to Discrete Time Systems.** 0-3-3. Preq., ELEN 321 or permission of instructor. Discrete signals, LTI systems, discrete Fourier analysis, discrete filters, sampling, Z-transforms. (G)
- 435: Electronics.** 0-3-3. Preq., ELEN 335. Feedback amplifiers, integrated circuit analysis, operational amplifier applications in the areas of nonlinear circuits, active filters, switching circuits, controls, and communications. (G)
- 437: Microfabrication Principles.** 0-3-3. Preq., MATH 244, and PHYS 202. Fundamentals of microfabrication processes necessary for the realization of ULSI and other technologies. (G)
- 438: Microelectronic Applications & Device Fabrication.** 3-2-3. Microfabrication process integration and applications to the realization of ULSI and other technologies. (G)
- 441: Computer Systems Interfacing.** 3-2-3. Preq., consent of instructor. Topics useful in integrating multi-component systems of manufacturing with computer-based monitoring, control and communication. (G)
- 450: Selected Topics.** 0-2-2. Preq., permission of instructor. Work in an area of recent progress in electrical engineering of immediate interest or need. Topic selected will vary from term to term.
- 451: Special Topics.** 0-3-3. Preq., consent of instructor. Study in an area of recent progress in electrical engineering of immediate interest or need. Topic selected will vary from term to term. (G)
- 461: Communication Systems.** 0-3-3. Preq., ELEN 321 and 335. Evaluation and design of communication systems utilizing Fourier and random-signal analysis. Amplitude, frequency, pulse, pulse-code modulation and demodulation. Multiplexing. (G)
- 462: Digital Communication Systems.** 0-3-3. Preq., ELEN 461 or consent of instructor. Analysis and design of digital communication systems. Signals and spectra. Digital base band and carrier systems, digital networks, introduction to emerging technologies. (G)
- 463: Optical Communication Systems.** 0-3-3. Preq., ELEN 411. Optical waveguides, mode theory and ray optics. Transmission losses and signal distortion. Optical sources, detectors and transmission link analysis.
- 469: Communications Laboratory.** 3-0-1. Coreq., ELEN 461. Communications laboratory to accompany ELEN 461. Fourier Spectrum, AM systems, FM systems, and Time Division Multiplex.
- 471: Automatic Control Systems.** 0-3-3. Preq., ELEN 321, MATH 244. Analysis and design of linear feedback systems. Mathematical modeling. Transfer functions and signal-flow graphs. State variable analysis. Time domain analysis and design of linear control systems. Frequency domain analysis and design of linear control systems. (G)
- 472: Introduction to Digital Control.** 0-3-3. Preq., ELEN 321, 471 or consent of instructor. An introduction to the theory of linear discrete control systems. Time-domain analysis of discrete systems. Z-transform. Sampling. Discrete-time signal analysis. Sampled data control systems. (G)
- 479: Automatic Control Systems Laboratory.** 3-0-1. Credit or registration in ELEN 471. Laboratory design, simulation and testing of automatic control systems. (G)
- 481: Power Systems.** 0-3-3. Preq., ELEN 381 or consent of instructor. Per-unit notation. The design and analysis of balanced power systems including load flow, economic dispatch, short circuit and over current device coordination and control of watts and vars. (G)
- 482: Power Systems Design and Analysis.** 0-3-3. Preq., ELEN 481 or consent of instructor. Review of three-phase short circuits. Symmetrical

- components. Analysis of power systems in the transient state. Control of frequency and power flow in interconnected systems. (G)
- 483: Motor Control.** 0-3-3. Preq., ELEN 481. Speed control. Reduced voltage starting techniques. Classical relay ladder logic. Modern programmable logic control device applications. Power electronic applications. (G)
- 489: Electrical Energy Conversion Laboratory.** 3-0-1. Preq., ELEN 381; Coreq., registration in ELEN 481. Laboratory design and testing of basic electromechanical devices and machines.
- 491: Machine Vision.** 3-2-3. Preq., Senior or Graduate status and permission of instructor. Machine Vision systems applied to Manufacturing. Content includes lighting, optics, vision hardware and software. (G)
- 512: Electromagnetic Waves.** 0-3-3. Preq., ELEN 411 or permission of instructor. Propagation, reflection and refraction of electromagnetic waves. Guided waves and power flow. Boundary-value problems.
- 513: Antennas and Radiation.** 0-3-3. Preq., ELEN 512 or permission of instructor. Channel effects and types of propagation. Theory and practice in antenna design.
- 533: Optoelectronics.** 0-3-3. Preq., Permission of instructor. Modulation of light, display devices, lasers, photodetectors, optical transistors, logic gates, Waveguides, transmitter and receiver design.
- 535: Advanced Topics in Microelectronics.** 0-3-3 (6). Preq., consent of instructor. May be repeated with change in subject matter. Selected topics of current research interest in the field of microelectronics.
- 537: Advanced Microfabrication with Computer-Aided Design.** 0-3-3. Preq., ELEN 438 or consent of instructor. Advanced microfabrication process development and integration with the aid of computer process modeling and simulation.
- 538: Advanced Microelectronic Devices with Computer-Aided Design.** 0-3-3. Preq., ELEN 537 or consent of instructor. Principles of operation and analysis of advanced microelectronic devices with the aid of computer device modeling and simulation.
- 543: Microcomputer Design.** 0-3-3. Preq., ELEN 331 and 442 or consent of instructor. Study of microcomputer design. Microcomputer Development System and Logic Analyzer. Design of control processors.
- 545: Computer Architecture.** 0-3-3. Preq., CME 460 or graduate standing. An introduction to current machine architectures. Topics include memory design, pipeline processing, vector machines, multiprocessor architectures and parallel algorithm design techniques and evaluation methods.
- 550: Special Problems.** 1-4 semester hours. Advanced problems in electrical engineering. The problems and projects will be treated by current methods used in professional practice.
- 551: Research and Thesis in Electrical Engineering.** Registration in any quarter may be for three semester hours credit of multiples thereof. Maximum credit allowed is six semester hours.
- 555: Practicum.** 0-3-3 (6). Preq., 12 semester hours of graduate work. Analytical and/or experimental solution of an engineering problem; technical literature survey required; development of engineering research techniques.
- 557: Special Topics: Electrical Engineering.** 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of electrical engineering. May be repeated as topics change.
- 561: Random Signals and Systems.** 0-3-3. Preq., ELEN 461 and 471 or permission of instructor. Random signal analysis. Correlation and power spectrum analysis. Stochastic communication and control systems.
- 565: Digital Signal Processing.** 0-3-3. Preq., ELEN 461 or permission of instructor. Review of discrete linear signals and systems theory. Design/Implementation of FIR and IIR digital filters. Quantization and finite word length effects. Spectrum estimation.
- 566: Estimation Theory.** 0-3-3. Preq., ELEN 561 or permission of instructor. Estimation, based on noise-corrupted observations, of unknown system states. Maximum-likelihood and least square estimation; matched filters. Wiener and Kalman filtering.
- 572: Digital Control Systems I.** 0-3-3. Preq., ELEN 471 or permission of instructor. Sampling Theory. Data reconstruction. Z-transforms. Stability analysis. Time-domain analysis. Frequency domain analysis. Introduction to Digital Control Systems.
- 573: Digital Control Systems II.** 0-3-3. Preq., ELEN 572 or permission of instructor. Review of Z-transforms. State variable techniques. Controllability and observability. Design of digital control systems with state variable techniques. Digital state observer. Microprocessor control.
- 581: Computer Applications to Power Systems.** 0-3-3. Preq., ELEN 481 or permission of instructor. The study of algorithms for power network matrices, three-phase networks, fault, load flow and stability problems solution by computer methods.
- 582: Motor Control and Power Electronics.** 0-3-3. Preq., ELEN 381 or permission of instructor. Electronic and electromagnetic motor control devices; programmable controllers; motor protection; solid state power device application to DC and AC power conversion.
- 583: Electric Power Distribution System Design.** 0-3-3. Preq., ELEN 481 or permission of instructor. Design of utility distribution systems. Substation layout, switching devices, aerial and underground lines and cables, code requirements, development of standards.
- 584: Electromechanical Energy Conversion.** 0-3-3. Preq., ELEN 381 or permission of instructor. Equations of motion of electromechanical systems. Analytical techniques for solution of equation. Typical transducers. The generalized machine system dynamics.
- 588: Advanced Topics in Power Systems.** 0-3-3. Preq., consent of instructor. May be repeated with change in subject matter. Selected topics of current research interest in the field of power systems engineering.
- 641: Advanced Topics in Computer Systems.** 0-3-3. Preq., ELEN 543 or permission of instructor. Topics on the latest advancements in computer systems and computer design.
- 665: Multidimensional Signal Processing.** 0-3-3. Preq., ELEN 565 or permission of instructor. Representations of signals which are functions of several variables. Multidimensional Z-Transforms and discrete Fourier Transforms. 2-D FIR and IIR filter design and implementation.
- 672: Optimal Control Systems.** 0-3-3. Preq., ELEN 571 or permission of instructor. Linear system theory. Statistics of random variables. Response to distributed inputs. System analysis and optimum design with multiple inputs and outputs. Optimum inputs.
- 673: Nonlinear Control Systems.** 0-3-3. Preq., ELEN 571 or permission of instructor. Mathematical models of nonlinear systems. Phase-space analysis. Critical point characterization. Describing functional Sub-harmonic generation. Stability determination. General solution methods.
- 681: Advanced Topics in Power Systems.** 0-3-3. Preq., ELEN 581 or permission of instructor. May be repeated with a change in subject matter. Selected topics of current research interest in the field of power systems engineering.

#### ENGINEERING (ENGR)

- 120: Engineering Problem Solving I.** 3-1-2. Coreq., MATH 240, CHEM 100. The engineering profession, engineering problem solving, computer applications.
- 121: Engineering Problem Solving II.** 3-1-2. Preq., ENGR 120; Coreq., MATH 241, CHEM 101. Introduction to engineering design, engineering problem solving, computer applications.
- 122: Engineering Problem Solving III.** 3-1-2. Preq., ENGR 121; Coreq., MATH 242, CHEM 102. Engineering design, engineering problem solving, computer applications.
- 189: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Engineering and Science. May be repeated for credit.
- 194: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Engineering and Science. May be repeated for credit.
- 220: Statics & Mechanics of Materials.** 3-2-3. Preq., ENGR 122, PHYS 201, MATH 242. Resultants and equilibrium of force systems, stress and strain, truss and frame analysis, torsion, bending, deflections of beams, combined loading.
- 221: Electrical Engineering and Circuits I.** 3-2-3. Preq., MATH 243, and credit or registration in MATH 244. Fundamental concepts, units and laws. Network theorems, network simplification, phasors and AC solution of circuits, power and electronic applications.
- 222: Thermodynamics.** 3-2-3. Preq., ENGR 122, MATH 242. Fundamental concepts, properties of pure substance, work, heat, first and second laws of thermodynamics, entropy, cycle analysis.
- 289: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Engineering and Science. May be repeated for credit.
- 294: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Engineering and Science. May be repeated for credit.
- 299: Cooperative Education Applications.** 40-0-1 (7). Preq., Admission to the College of Engineering and Science Cooperative Education Program.
- 300: European Influence on Engineering.** 7-1-3. Preq., Sophomore standing or consent of instructor. European influence on Engineering theory and

practice. Engineering accomplishments in Europe. Impact of engineering on western civilization.

- 389: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Engineering and Science. May be repeated for credit.
- 394: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Engineering and Science. May be repeated for credit.
- 401: Engineering Economy.** 0-2-2. Preq., MATH 220 or 242. Economic analysis of engineering design alternatives.
- 431: Contracts and Specifications.** 0-2-2. Preq., junior standing or consent of instructor. Legal documents of construction contracts.
- 489: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Engineering and Science. May be repeated for credit.
- 494: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in the College of Engineering and Science. May be repeated for credit.
- 530: Engineering Experimentation and Research.** 4-2-3. Preq., Working knowledge of statistics. The purpose of this course is to prepare graduate students to conduct experimental research. This interdisciplinary course introduces students to the topics needed in order to design experiments and measurement systems successfully.
- 566: Quality in Engineering.** 0-3-3. Preq., STAT 400. Principles of quality as applied to engineering processes. Applications to the engineering workplace and industrial/academic research will be emphasized.
- 589: Special Topics.** 1-4 hours credit. Preq., graduate standing. Selected topics in an identified area of study in the College of Engineering and Science.
- 590: Application of Artificial Intelligence Techniques.** 3-2-3. Preq., Permission of instructor. Introduction to artificial intelligence agents and technologies and their applications in industrial, mechanical, and manufacturing engineering systems.
- 592: Engineering Computational Methods.** 0-3-3. Preq., Consent of instructor. Solution of linear and nonlinear systems of equations, roundoff errors, stability, convergence, interpolation and extrapolation, finite difference, approximation of functions, DFT/FFT radix 2, random numbers.
- 594: Special Topics.** 1-4 hours credit. Preq., graduate standing. Selected topics in an identified area of study in the College of Engineering and Science.
- 622: The Academic Enterprise.** 0-1-1. Topics include college teaching, proposal preparation and research, scholarly activities, service, record keeping, and maintaining balance between professional and personal life.
- 631: Global Competitiveness and Management of Technology.** 0-3-3. Preq., Consent of instructor. Principles of technology development and management in a global context, and their applications in the planning and implementation of new technological capabilities.
- 641: Formulation of Solutions to Engineering Problems.** 0-3-3. Preq., Consent of instructor. Approaches used to formulate solutions to physical engineering problems, mathematical representation of physical laws, boundary value problems, variational methods, common mathematical approaches to solutions, approximate solutions, validity of solutions.
- 651: Research and Dissertation.** Doctoral students only. Registration in any quarter may be for three semester hours credit or multiples thereof, up to a maximum of nine semester hours credit per quarter. Maximum total credit allowed is thirty hours.

#### ENGLISH AS A SECOND LANGUAGE (ESL)

- 103: ESL Grammar Laboratory.** 3-0-1 (3). Sentence pattern exercises for non-native speakers.
- 104: ESL Pronunciation Laboratory.** 3-0-1 (3). Pronunciation and vocabulary exercises for non-native speakers.
- 111: Level I English Grammar.** 0-3-3. High beginning grammar in context for non-native speakers.
- 112: Level I Writing.** 0-3-3. Basic sentence patterns and paragraph structure for non-native speakers.
- 113: Level I Vocabulary/Conversation.** 0-3-3. Pronunciation, word study, and contextual practice for non-native speakers.
- 114: Level I Reading.** 0-3-3. For non-native speakers at the 1,000-word vocabulary level.
- 121: Level II English Grammar.** 0-3-3. Low intermediate grammar in context for non-native speakers of English.

- 122: Level II Writing.** 0-3-3. A continuation of beginning writing skills for non-native speakers. Emphasis on paragraph organization and structure.
- 123: Level II Vocabulary/Conversation.** 0-3-3. Word study through contextual readings and teacher/test guided conversational practice for non-native speakers.
- 124: Level II Reading.** 0-3-3. For non-native speakers at the 1,500-word vocabulary level.
- 203: ESL Listening Comprehension Laboratory.** 3-0-1 (3). Exercises in listening comprehension skills for non-native speakers.
- 204: ESL Conversation Laboratory.** 3-0-1 (3). Exercises for developing conversation skills for non-native speakers.
- 231: Level III English Grammar.** 0-3-3. High intermediate grammar in context for non-native speakers.
- 232: Level III Writing.** 0-3-3. High intermediate writing skills for non-native speakers. Emphasis on paragraphs and short compositions.
- 233: Level III Vocabulary/Conversation.** 0-3-3. Listening comprehension, auditory cues, vocabulary study and conversational exercises for non-native speakers.
- 234: Level III Reading.** 0-3-3. Reading skills for non-native speakers at the 3,000-word vocabulary level and above.
- 241: Level IV English Grammar.** 0-3-3. Advanced grammar in context for non-native speakers.
- 242: Level IV Writing.** 0-3-3. Advanced composition skills for non-native speakers. Emphasis on essay writing and elementary research techniques.
- 243: Level IV Vocabulary/Conversation.** 0-3-3. Advanced word study to assist non-native speakers in isolating and contextualizing problems within a specific written passage.
- 244: Level IV Reading.** 0-3-3. Reading skills for non-native speakers at the university level.
- 305: Level V Communication Skills.** 0-3-3 (9). Advanced listening, speaking, and body language techniques for non-native speakers studying in the university or assisting or teaching in the American classroom.
- 454: English Grammar in ESL Teaching.** 0-3-3. Preq., Senior standing. Analysis of English grammar specifically for developing instructional techniques used in teaching grammar for communicative competence in ESL. Also listed as EDUC 454. (G)
- 460: Methods for Teaching and Testing in ESL.** 0-3-3. Preq., Senior standing. Theories and techniques for teaching English as a Second Language and evaluating student performance; emphasis on communicative competence. Also listed as EDUC 460. (G)
- 470: Curriculum Development and Design for ESL.** 0-3-3. Preq., Senior standing. Selection of objectives, content, task implementation, and pedagogy for teachers of English as a Second Language. Also listed as EDUC 470. (G)
- 493: Cross-Cultural Communication for ESL Teaching.** 0-3-3. Preq., Senior standing. Concepts of culture and the relationship of language acquisition to the cultural setting with specific application to the teaching of ESL. Also listed as EDUC 493. (G)

#### ENGLISH (ENGL)

- 099: Preparation for College English.** 0-3-3. Required if English ACT score is less than 17, or Verbal SAT score is less than 430. Grammar, punctuation, spelling, and vocabulary, with the development of writing skills. Special emphasis on the sentence and paragraph. (Pass/Fail)
- 100: Freshman Composition I.** 1-3-4. Preq., English ACT score between 17 and 18 inclusive, or Verbal SAT score between 430 and 450 inclusive, or English 099. Standard course for first-year college students; the three stages of writing (prewriting, writing, and rewriting); writing essays in various modes; grammar review. Includes 1 hour weekly tutorial lab. Credit will not be given for both ENGL 100 and ENGL 101.
- 101: Freshman Composition I.** 0-3-3. Preq., English ACT score is greater than or equal to 19, or Verbal SAT score is greater than or equal to 460. Standard course for first-year college students; the three stages of writing (prewriting, writing, and rewriting); writing essays in various modes; grammar review. Credit will not be given for both ENGL 100 and ENGL 101.
- 102: Freshman Composition II.** 0-3-3. Preq., ENGL 101. Continues work of Composition I; includes preparation of a research paper from library sources.
- 103: Foundations of Ancient Civilization.** 0-3-3. Interdisciplinary study of major works of ancient Greek and Roman civilization. For HONORS Program students only. Satisfies course work in ENGL 101, or 102. Also listed as HIST 103.

- 104: Foundations of Medieval and Renaissance Civilization.** 0-3-3. Interdisciplinary study of major works of Medieval and Renaissance civilization. For HONORS Program students only. Satisfies course work in ENGL 101, or 102, or 201. Also listed as HIST 104.
- 200: Poetry Appreciation.** 0-3-3. Preq., ENGL 102. Introduction to poetry designed for students seeking to fulfill General Education requirements under Humanities.
- 201-202: Sophomore English-Introduction to British and American Literature.** 0-3-3 each. Preq., ENGL 101 and 102.  
**ENGL 201 is a prerequisite for advanced courses in British literature; ENGL 202 is a prerequisite for advanced courses in American literature.**
- 203: Foundations of Modern Civilization.** 0-3-3. Interdisciplinary study of major works of modern civilization. For HONORS Program students only. Satisfies course work in ENGL 102, or 201. Also listed as HIST 203.
- 204: Foundations of American Civilization.** 0-3-3. Interdisciplinary study of major works of American civilization. For HONORS Program students only. Satisfies course work in ENGL 102, or 202. Also listed as HIST 204.
- 303: Technical Writing.** 0-3-3. Preq., ENGL 102. Development of technical writing skills and styles; various technical writing assignments, including a technical report.
- 308: The Short Story.** 0-3-3. Preq., ENGL 201 or 202. Study of the form and development of the short story.
- 325: Contemporary English and American Poetry.** 0-3-3.
- 332: Advanced Grammar.** 0-3-3. Preq. ENGL 102. Study of descriptive grammar with some prescriptive grammar and introduction to transformational grammar.
- 336: Advanced Composition.** 0-3-3 (6). Preq., ENGL 102. Writing longer essays in various rhetorical modes, with attention to appropriate writing styles.
- 384: Introduction to Creative Writing.** 0-3-3. Preq., ENGL 201 or 202. Introduction to traditional and contemporary forms of short fiction and poetry through study of selected models. Students required to write in both genres.
- 400: Theories of Composition.** 0-3-3. A course designed to familiarize prospective English teachers with theories of teaching composition. (G)
- 401: The American Mind.** 0-3-3. Important currents of ideas that have found expression in American literature. (G)
- 403: Chaucer.** 0-3-3. (G)
- 404: Milton.** 0-3-3. (G)
- 406: World Masterpieces.** 0-3-3. Survey of major non-English literary texts in the Western Tradition. (G)
- 407: Principles and Techniques of Literary Criticism.** 0-3-3. (G)
- 408: American Poetry.** 0-3-3. Preq., ENGL 202. Study of major poets from the Puritans to the contemporary period.
- 409: American Fiction of the Nineteenth Century.** 0-3-3. Study of the rise of American fiction through Henry James. (G)
- 410: The Eighteenth-Century British Novel.** 0-3-3. Study of the rise of the British novel from its inception to the end of the 18th century. (G)
- 411: The Nineteenth-Century British Novel.** 0-3-3. Preq., ENGL 201. Study of the development of the British novel from Austen to the end of the nineteenth century. (G)
- 412: The Twentieth-Century British Novel.** 0-3-3. Preq., ENGL 201. Study of the development of the British novel from the Edwardian Period to the present. (G)
- 413: The Romantic Period.** 0-3-3. Study of the major writers of the age. (G)
- 414: The Victorian Period.** 0-3-3. Study of the major writers of the age. (G)
- 415: Shakespeare.** 0-3-3. The major plays and the poems. (Same as SPTH 415.) (G)
- 416: American Literature: Beginnings to 1865.** 0-3-3. Study of American writing from the Colonial period through the Civil War. (G)
- 417: American Literature: 1865 to Present.** 0-3-3. Study of American writing from Reconstruction to the contemporary period. (G)
- 418: The American Renaissance.** 0-3-3. Preq., ENGL 202. Study of the major authors and cultural contexts of the American Renaissance, 1830-1860.
- 419: Contemporary Drama.** 0-3-3. American, English, and European. (G)
- 420: The Continental Novel.** 0-3-3. (G)
- 421: History and Philosophy of Rhetoric.** 0-3-3. Survey of the development of rhetoric from Ancient Greece and Rome to current theories and practice. (G)
- 422: The English Language.** 0-3-3. Primarily a course in the history of the language. (G)
- 423: English Words and Idioms.** 0-3-3. Rhetoric and logic as applied to critical thinking. Semantics. Exercises in propaganda analysis and identification of fallacies. (G)
- 424: Southern Literature.** 0-3-3. Study of the works of writers who have interpreted the American South, with emphasis on the authors of the Southern Renaissance. (G)
- 425: Russian Literature in English Translation.** 0-3-3 (6). Representative works of Russian literature from the 19th and 20th centuries; repeatable for credit with different course content. May not be counted towards a minor in Russian. Also listed as RUSS 425. (G)
- 426: Spanish Literature in English Translation.** 0-3-3 (6). Representative works of Spanish literature from the Middle Ages to the 20th century; repeatable for credit with different course content. May not be counted towards a major or minor in Spanish. Also listed as SPAN 426. (G)
- 427: Latin American Literature in English Translation.** 0-3-3 (6). Representative works of 20th-century Latin American literature; repeatable for credit with different course content. May not be counted towards a major or minor in Spanish. Also listed as SPAN 427. (G)
- 428: French Literature in English Translation.** 0-3-3 (6). Representative works of French literature from the Middle Ages to the 20th century; repeatable for credit with different course content. May not be counted towards a major or minor in French. Also listed as FREN 428. (G)
- 429: American Fiction of the Twentieth Century.** 0-3-3. Study of the "American Century" as reflected in representative novels and short stories. (G)
- 430: African American Literature.** 0-3-3. Study of the development of African American writing, with emphasis on the period from the Harlem Renaissance to the present. (G)
- 438: Sixteenth Century English Literature (excluding Shakespeare).** 0-3-3. (G)
- 439: Seventeenth Century English Literature (excluding Milton).** 0-3-3. (G)
- 440: Eighteenth Century English Literature.** 0-3-3. (G)
- 452: The Literature of the Bible.** 0-3-3. A survey of literary genres of the Old and New Testaments, focusing on the poetic and/or narrative art of each. (G)
- 455: Modern British Literature.** 0-3-3. Preq., ENGL 201 or 202. Study of the poetry, plays, and fiction from the early 20<sup>th</sup> century to World War II. (G)
- 456: Contemporary British Literature.** 0-3-3. Preq., ENGL 201 or 202. Study of the poetry, plays, and fiction from World War II to the present. (G)
- 459: Technical Writing and the Scientific Method.** 0-3-3. Preq., ENGL 303. Study of scientific thought, methodologies, and rhetorical strategies; application to style and structure in technical discourse. (G)
- 460: Advanced Technical Writing.** 0-3-3. Preq., ENGL 303. Emphasis on longer reports and specialized forms of technical writing, such as manuals. (G)
- 461: Technical Writing for Publication.** 0-3-3. Preq., ENGL 303. Writing articles for scientific and technical journals, with emphasis on audience analysis and appropriate style. (G)
- 462: Technical Editing.** 0-3-3. Preq., ENGL 303. The work of an editor, including editing a text, planning projects, and working with authors, illustrators, and production workers. (G)
- 463: Scientific and Technical Presentations.** 0-3-3. Preq., ENGL 303. Presenting technical information to specialized and non-technical audiences; emphasis on organization, support, and clarity of presentation; effective use of visual materials. (G)
- 464: Occupational Technical Writing.** 0-3-3. Preq., ENGL 303. Preparing the technical writer to plan and conduct training sessions within the organization and to supervise others engaged in writing tasks. (G)
- 465: Specification, Bid, Grant, and Proposal Writing.** 0-3-3. Preq., ENGL 303. Writing specifications, bids, grants, and proposals; emphasis on audience analysis, organization, and writing style. (G)
- 466: Technical Writing Internship.** 9-0-3 (6). Preq., permission of Department Head. On-the-job experience for the technical writing student; intended to give supervised practice under realistic working conditions. Internships are to be arranged individually. (G)
- 467: Special Problems in Technical Communication.** 3 hours credit (6). Preq., Permission of Department Head. The selection, study and writing of special problems. Students will work on individual projects under direct supervision. (G)

- 468: Readings in Scientific and Technical Communications.** 0-3-3. Preq., ENGL 303. Study of the current material written about technical communication, with a reading and critical analysis of various technological journals. (G)
- 469: Graphics in Technical writing.** 0-3-3. Preq., ENGL 303. Theory and practice of illustrating texts, with emphasis on electronic media to integrate nonverbal and written materials.
- 470: Linguistics.** 0-3-3. Preq., ENGL 201 or 202. Systematic study of language acquisition, change, and variation; application to teaching grammar, writing, and/or literature. Also listed as FLNG 470. (G)
- 475: Special Topics.** 0-3-3 (6). Seminar with topic to be designated by the instructor. (G)
- 480: Science Fiction.** 0-3-3. Study of science fiction within the context of modern literature, including short stories, novels, and films. (G)
- 482: Folklore Studies.** 0-3-3. Study of folklore theory and genres in culture and literature with topics ranging from verbal arts to ritual and belief. (G)
- 484: Advanced Creative Writing.** 0-3-3. Preq., ENGL 384 or instructor's permission. Workshop format includes intensive criticism of student writing in short fiction and/or poetry with emphasis on submission for publication. (G)
- 491: Advanced Expository Writing.** 0-3-3. Writing essays and reports for professional publication; focus on style, format, and editing manuscripts. (G)
- 500: Teaching College Composition.** 0-3-3. Preparation for teaching Developmental English and Freshman English; includes theory, research, technology, and pedagogy related to college composition.
- 515: Shakespeare Seminar.** 0-3-3 (6). Preq., ENGL 415 or its equivalent. Study of Shakespeare texts and background writings of the Elizabethan and Jacobean Periods; repeatable once for credit with different instructor and/or course content.
- 520: Seminar in Composition.** 0-3-3 (6). Selected reading and research topics in composition studies; repeatable for credit with different instructor and/or course content.
- 560: Seminar in Technical Writing.** 0-3-3 (6). Preq., ENGL 303 or equivalent. Selected reading and research topics in technical writing theory and practice; repeatable once for credit with different instructor and/or course content.
- 575: Special Topics.** 0-3-3 (6). Graduate seminar with topic to be designated by instructor.
- 583: Seminar in British Literature.** 0-3-3 (6). Reading and research topics in British Literature; repeatable once for credit with different instructor and/or course content.
- 584: Seminar in American Literature.** 0-3-3 (6). Reading and research topics in American Literature; repeatable once for credit with different instructor and/or course content.
- 585: English Teachers' Workshop.** 0-3-3. A course designed primarily for school teachers of English.
- 591: Literary Research and Bibliography.** 0-3-3. Focuses upon methodology of scholarship, stressing various kinds of literary problems and approaches to their solutions; emphasis on descriptive and analytical bibliography.

#### ENVIRONMENTAL SCIENCE (ENSC)

- 200: Introduction to Environmental Sciences.** 0-3-3. Basic laws, principles and issues related to the causes, effect and controls of environmental problems. Man-environment interaction.
- 275: Aquatic Bioassays.** 0-1-1. Internet-based course centering on governmental regulations concerning bioassays to test for toxicity in waste effluents released into natural waters in the United States. Also listed as BISC 275.
- 300: Agricultural Pollution.** 0-3-3. Study of various agricultural practices as they relate to the causes and solutions to environmental impact of agriculture on the air, water, and soil.
- 310: Soil Science.** 0-3-3. Preq., CHEM 100, 101, 102. A general study of soil science, emphasizing the relation of soil properties and processes to plant growth. Also listed as PLSC 310.
- 311: Soil Science Laboratory.** 3-0-1. Preq. or Coreq., ENSC 310. Laboratory exercises to elaborate fundamental principles of soil properties, soil testing, and soil survey reports. Also listed as PLSC 311.
- 313: Ecology.** 4 1/4-2-3. Preq., BISC 132, 133. An overview of the interactions of plants, animals, and non-living factors as they influence individuals, populations, communities, and ecosystems.
- 400: Environmental Science Seminar.** 0-1-1(3). Reviews, reports, and discussions of current problems relating to environmental science.

- 421: Epidemiology.** 0-3-3. Methods of data collection and analysis to determine the frequency, distribution and cause of disease and/or injury in human and non-human populations.
- 422: Occupational Health and Safety.** 0-3-3. The design and implementation of occupational health and safety services to including fitness-to-work evaluations, health monitoring, hazard evaluation and response to emergencies involving hazardous substances. (G)
- 444: Environmental Microbiology.** 4-2-3. Preq., BISC 260. Basic and contemporary aspects of soil, water, and industrial microbiology.
- 446: Instrumentation.** 3-2-3. Preq. 12 hours of BISC or CHEM. Emphasizes the operational theory, use, and maintenance of instruments appropriate to biological investigation through didactic and laboratory exercises.
- 456: Environmental Chemistry.** 0-3-3. Preq., one year of college chemistry and junior standing. Chemical principles that regulate and affect the environment. (G)
- 458: Environmental Law.** 0-3-3. Preq., BISC 130, 131, or approval of instructor. A review and analysis of state and federal laws, conventions, and international treaties that influence natural resource management. (G)
- 477: Cooperative Education Work Experience.** 1-6 hours credit (9). (Pass/Fail). On site, supervised, structured work experiences located within a 100 mile radius of Ruston. Application and supervision fee required.
- 478: Cooperative Education Work Experience.** 1-6 hours credit (9). (Pass/Fail). On site, supervised, structured work experiences located within a 101-200 mile radius of Ruston. Application and supervision fee required.
- 479: Cooperative Education Work Experience.** 1-6 hours credit (9). (Pass/Fail). On site, supervised, structured work experiences located beyond a 201 mile radius of Ruston. Application and supervision fee required.

#### FAMILY & CHILD STUDIES (FCS)

- 100: Marriage and Family Relations.** 0-3-3. Significant factors for successful marriage, marital adjustment, and family relations.
- 101: Skills for Marriage.** 0-3-3. Designed to provide students with information and skills necessary to facilitate an enduring and satisfying marriage.
- 200: Parenting.** 0-3-3. Study of the parenting role. Emphasis on parent-child interaction as it influences child growth and development.
- 201: Introduction to Child and Family Development.** 0-3-3. Basic principles and sequences in human development from prenatal period through aging years. Emphasis on developmental tasks, forces influencing development, and the family life cycle.
- 210: Family Interpersonal Relationships.** 0-3-3. The study of interaction between individuals with application to family dynamics, personal relationships, professional interaction, and job competency.
- 221: Parent Involvement in Preschool Education.** 0-2-2. Introduction to the theories and methods of parent involvement in early childhood (preschool) education.
- 276: Children's Near Environments.** 0-3-3. An examination of issues related to the near environment of children including child nutrition, food preparation and activities, housing, equipment, and clothing needs.
- 277: Guiding Infants and Young Children.** 0-2-2. Principles and techniques of positive guidance emphasizing a problem solving philosophy and a child-centered approach.
- 280: Hospitalized Children and Youth.** 0-3-3. Study of issues involved in childhood illnesses and hospitalization.
- 291: Orientation to Child Life Programs.** 0-3-3. A study tour of child life programs and services.
- 301: Early Childhood Development.** 3-2-3. Preq., FCS 201. The development of young children. Theory and practice are correlated through readings, class discussions, and nursery school laboratory experiences.
- 311: Literacy Development in Early Childhood Education.** 0-3-3. Preq. or Coreq., Admission to Teacher Education Upper Division or consent of instructor. Development of early language skills. Emphasis on the preschool language arts curriculum as preparation for language development.
- 320: Family Theory.** 0-3-3. Preq., FCS 100, 201 or consent of instructor. An overview of theoretical frameworks in family science with primary emphasis given to application of constructs.
- 321: Methods in Early Childhood Education.** 3-2-3. Preq., Admission to Teacher Education Upper Division and FCS 301 or consent of instructor.

Important factors in planning for preschool children. Emphasis on objectives, planning nursery school experiences, and evaluation.

- 331: Infant Development.** 3-2-3. Preq., FCS 201 or consent of instructor. Survey of influences on prenatal and infant development. Theory and practice correlated through readings, class discussion and laboratory experiences.
- 341: Issues and Applications in Middle Childhood and Early Adolescence.** 3-2-3. Preq., FCS 201 or consent of instructor. A survey of middle childhood and early adolescent years as they relate to children's development and family interaction; includes observation and laboratory experiences.
- 355: Advanced Interpersonal Skills for the Family & Child Advocate.** 0-3-3. Preq., FCS 100, 210. Examination of interpersonal skills for the family and child helping professional or advocate. Discussion of traditional helping paradigms.
- 361: Observation and Assessment Techniques of Children.** 0-2-2. Preq., FCS 201, or consent of instructor. Skills and strategies needed to observe and assess children's development in a clinical setting.
- 380: Understanding Childhood Diseases and Disorders.** 0-3-3. Overview of childhood diseases/disorders, diagnostic tests, and treatment, with emphasis on effects of illness on normal growth and development and family functioning.
- 395: Research Methods in Family and Child Studies.** 0-3-3. Preq., FCS 201 or consent of instructor. Examination of methods, implications, and ethics of child and family research. Theory based research and competency in reading empirical studies will be emphasized.
- 400: Contemporary Family Issues.** 0-3-3. Selected issues related to family interaction and adjustment from an ecosystem perspective.
- 401: Curriculum and Organization of Early Childhood Education Programs.** 0-3-3. Preq., Admission to Teacher Education Upper Division and FCS 321 or consent of instructor. Organization of preschool programs with emphasis on creative activities, materials and facilities. (G)
- 410: Multi-Cultural Family Studies.** 0-3-3. Cross-cultural survey of family patterns and their implications for professionals in the community and workplace.
- 420: Issues in Family Life Education.** 0-3-3. Preq., FCS 321, or consent of instructor. Methodology of teaching current family issues in family education programs. Development of family life educator skills with emphasis on parent education and marital enrichment. (G)
- 421: Student Teaching in Early Childhood Education: Nursery School.** 16-1-6. Preq., Admission to Teacher Education Upper Division and FCS 321, consent of instructor, preregistration and application required. An intensive practical experience in supervised nursery school teaching.
- 432: Children Under Stress.** 0-3-3. Preq., FCS 301 or consent of instructor. In-depth study of issues relating to the identification, understanding, and intervention in childhood stress.
- 435: Family Coping.** 0-3-3. Designed to help students recognize and adapt to stressors of everyday living. Particular attention is placed on understanding family involvement in coping with stress. (G)
- 447: Issues in Gerontology.** 0-3-3. Preq., FCS 201 or PSYC 408 or consent of instructor. Issues that impact older age adults including public policy, close relationships, sexuality, housing, nutrition and apparel. (G)
- 451: Theory, Guidance, and Therapeutic Value of Play.** 0-3-3. Preq., FCS 301 or consent of instructor. Study of play in teaching, therapy, and creativity for children and youth.
- 461: Administration of Programs for Young Children.** 0-2-2. Preq., FCS 301 and 331 or consent of instructor. Planning and administration of programs for young children.
- 471: Family Law and Public Policy.** 0-3-3. Preq., FCS 100 and 400 or consent of instructor. The study of the legal system and public policy as they relate to family structure and function. (G)
- 480: Families with At Risk Children, Birth Through Preschool.** 0-3-3. Preq., FCS 320 or consent of instructor. Application of family theory to families with special needs children, birth through preschool. Appropriate for child life, early childhood education, early intervention professionals. (G)
- 481: Team Functioning for Family and Child Studies Professionals.** 0-3-3. Team development and functioning including processes, barriers and interdisciplinary collaborations. (G)
- 482: Nutrition and Medical Management of Infants At Risk.** 0-3-3. Preq., FCS 331 or consent of instructor. Overview of nutritional and medical care issues associated with infants and young children at risk for or with disabilities. (G)

- 490: Perspectives in Family and Child Studies.** 0-3-3 (9). Preq., FCS 201 and 210 or consent of instructor. An in-depth study of current trends and issues that relate to strengthening children and families.
- 501: Contemporary Issues in Infancy and Preschool Years.** 0-3-3. Seminar in current research in child development with emphasis on the infancy and preschool years.
- 502: Advanced Child Development.** 0-3-3. An in-depth exploration into social/emotional, cognitive and physical development of children from birth to 8 years of age.
- 510: The Family in Middle and Later Years.** 0-3-3. Study of changes, needs and adjustments during the middle and later years of the family.
- 520: Interpersonal and Family Dynamics.** 0-3-3. Study of dynamics of family interaction and relationship functioning. Emphasis on current research and issues confronting contemporary families.
- 521: Family Crisis.** 0-3-3. Origins, development, and coping responses to predictable and unexpected crises of family systems in varied ecological settings.
- 522: Family Life Education Programs.** 0-3-3. Study of theory and methods used in developing programs to reduce mental health risks and build strengths of families.
- 530: Early Childhood Programs.** 0-3-3. Survey of early childhood program models.
- 540: Parent Involvement.** 0-3-3. Theories, issues and public policy of parent involvement in the educational process of children.
- 561: Advanced Administration of Early Childhood Programs.** 0-3-3. An in-depth study of administering and organizing programs serving young children.

#### FINANCE (FINC)

- 100: Family Financial Management.** 0-3-3. Specific family financial decisions, including budgeting, insurance, home purchase or rent, consumer rent, personal income tax, lifetime financial planning.
- 318: Business Finance.** 0-3-3. Preq., ECON 202 or 215, ACCT 202, and junior standing. An introduction to the principles of financial management including the role of the financial manager, problems of liquidity vs. profitability, budgeting of capital expenditures, management of short-term and long-term funds, and management of assets.
- 319: Intermediate Financial Management.** 0-3-3. Preq., FINC 318. Advanced practices of financial management are developed. Financial models used in decision-making and their application to major areas of business finance are emphasized.
- 330: Risk and Insurance.** 0-3-3. A comprehensive study of riskbearing, including insurance and non-insurance methods of handling a risk; introduction to the fields of life, disability, property, and casualty insurance.
- 401: Internship in Finance I.** 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 402: Internship in Finance II.** 3 hours credit. (Pass/Fail) Preq. consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 412: International Finance.** 0-3-3. Preq., FINC 318. A study of the various modes of financing international trade, including international financial organizations, an analysis of exchange rates, foreign investments, multinational firms, and international banking. (G)
- 414: Investments.** 0-3-3. Preq., FINC 318. Analyses of investments in common stocks, bonds, and other financial assets; sources of information for the investor; analysis of firms' financial statements; classes of investments. (G)
- 421: Portfolio Risk Management.** 0-3-3. Preq., FINC 414. Examine concepts in portfolio theory. Evaluate the implications of portfolio building, security selection, and risk-management techniques, including the use of derivatives.
- 422: Bank Management.** 0-3-3. Preq., FINC 318. Problems in organization, operation, and management of commercial banks, with special emphasis on credit banking. (G)
- 423: Bank Management: Cases, Policies and Practices.** 0-3-3. Preq., FINC 318. Application of decision-making procedures to bank financial management situations, including evaluation of bank performance, capital acquisition, liquidity, and loans.
- 425: Money Markets, Capital Markets and Financial Institutions.** 0-3-3. Preq., FINC 318. A survey of the markets in which funds are traded; a survey of the lending and investing characteristics of selected financial institutions. (G)

- 430: Advanced Financial Management.** 0-3-3. Preq., FINC 318. The case method is used to apply decision-making procedures to realistic problems in financial management.
- 431: Life Insurance.** 0-3-3. A comprehensive study of personal and group life, accident and health, hospitalization, old age, survivors and disability insurance and annuities.
- 432: Property Insurance.** 0-3-3. A comprehensive study of fire, burglary, robbery, forgery, liability, inland and ocean marine insurance, and surety and fidelity bonds.
- 435: Private Pensions, Group Insurance and Estate Planning.** 0-3-3. Analysis of pension regulations, design, and funding, actuarial considerations, integration with Social Security benefits, survey of group insurance, and implications for estate planning.
- 442: Principles of Real Estate and Land Economics.** 0-3-3. Land utilization, city growth, land development, legal processes and transactions, real estate marketing, financing and financial institutions, taxes, condemnation, planning and zoning.
- 443: Appraisal.** 0-3-3. Application of value theory and principles to real estate values; professional appraisal principles methodology. Corresponds to Appraisal I, the Appraisal Institute.
- 444: Appraisal of Urban Properties.** 0-3-3. Preq., FINC 443. Appraisal case studies and practices in appraisal of commercial and industrial properties; generally corresponds to Appraisal II, Urban Properties, and the Appraisal Institute.
- 445: Real Estate Finance.** 0-3-3. Preq., FINC 318. Finance principles applied to real estate. Sources of funds, legal and financial instruments, and analytical methods for decision-making. (G)
- 511: Risk Management.** 0-3-3. The economic concept of risk and various techniques utilized in the discovery, evaluation and treatment of a business pure risk.
- 515: Financial Management.** 0-3-3. Preq., ACCT 505 or consent of instructor. The study of a financial manager's role in financial planning, acquisition and management of funds for a business firm.
- 516: Financial Management: Policies and Practices.** 0-3-3. Preq., FINC 515 or consent of instructor. Application of decision-making procedures to financial management problems. Student is required to solve case problems and manage the financial affairs of computer simulated firm.
- 517: Capital Budgeting Seminar.** 0-3-3. Preq., FINC 515 or consent of instructor. A systematic and thorough treatment of the theory and practice of capital expenditure management, emphasizing financial modeling and employing a quantitative format.
- 518: Advanced Commercial Banking.** 0-3-3. FINC 515 or consent of instructor. Advanced studies in contemporary banking practices with special emphasis in credit analysis. Structuring of loans in specialized commercial lending areas as well as the entire credit granting decision process will be examined.
- 525: Seminar in Investments.** 0-3-3. FINC 515 or consent of instructor. Study of the theories and techniques of investment analysis for purposes of evaluation and selection of investments.
- 550: Directed Study in Finance.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of finance.
- 610: Seminar in Financial Theory I.** 0-3-3. Preq., FINC 515 (also, desirable that student has had an intermediate or advanced economics course). Examination and application of contemporary financial theory and analysis relating to business finance.
- 611: Risk Management.** 0-3-3. Requires Doctoral standing. May require additional class meetings. The economic concept of risk and various techniques utilized in the discovery, evaluation and treatment of a business pure risk. Credit will not be given for FINC 611 if credit is given for FINC 511.
- 615: Seminar in Financial Theory II.** 0-3-3. Preq., FINC 610. Requires Doctoral standing. Detailed study of both classic and contemporary literature that provides students with a cross-section of modern theoretical developments in the field of business finance.
- 616: Financial Management: Policies and Practices.** 0-3-3. Preq., FINC 515 or consent of instructor. Requires Doctoral standing. May require additional class meetings. Application of decision-making procedures to financial management problems. Student is required to solve case problems and manage the financial affairs of computer simulated firm. Credit will not be given for FINC 616 if credit is given for FINC 516.
- 617: Capital Budgeting Seminar.** 0-3-3. Preq., FINC 515 or consent of instructor. Requires Doctoral standing. May require additional class meetings. A systematic and thorough treatment of the theory and practice

of capital expenditure management, emphasizing financial modeling and employing a quantitative format. Credit will not be given for FINC 617 if credit is given for FINC 517.

- 618: Advanced Commercial Banking.** 0-3-3. FINC 515 or consent of instructor. Requires Doctoral standing. May require additional class meetings. Advanced studies in contemporary banking practices with special emphasis in credit analysis. Structuring of loans in specialized commercial lending areas as well as the entire credit granting decision process will be examined. Credit will not be given for FINC 618 if credit is given for FINC 518.
- 625: Seminar in Investments.** 0-3-3. FINC 515 or consent of instructor. Requires Doctoral standing. May require additional class meetings. Study of the theories and techniques of investment analysis for purposes of evaluation and selection of investments. Credit will not be given for FINC 625 if credit is given for FINC 525.
- 650: Directed Study of Finance.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of finance.
- 685: Comprehensive Exam in Finance.** No credit. Doctoral standing required. Required for all business administration doctoral students seeking to take the comprehensive exam in finance. Successful completion is a prerequisite to the oral comprehensive exam for those seeking a primary field or examined minor in finance. Requires consent of graduate director.

#### FOOD & NUTRITION (FNU)

- 103: Human Nutrition and Weight Control.** 0-1-1 (3) Pass/Fail. Personalized weight control program based on recommended nutrients, behavior modification and energy balance.
- 203: Human Nutrition.** 0-3-3. Functions of various nutrients and their interrelationships in children and adults with emphasis on personal food habits and selection.
- 220: Life Cycle Nutrition.** 0-3-3. Evaluation of variations in nutrition requirements in all stages of the life cycle, including prenatal, infant, childhood, adolescent, adult, and geriatric nutrition.
- 223: Nutrition Education.** 0-2-2. Basic principles of nutrition with special emphasis on the school-age child. Techniques of presenting nutrition information to children (Planned for non-majors).
- 232: Basic Food Science.** 3-2-3. Use of food science principles in food selection and preparation procedures. Introduction to food science research.
- 233: Creative Experiences in Nutrition.** 3-0-1. Preq., or Coreq., FNU 223 or 203. Food preparation and nutrition activities for young children.
- 253: Sports Nutrition.** 0-3-3. Nutrient needs and food related issues in exercise for wellness and training for competitive athletes.
- 274: Introduction to Dietetics.** 0-3-3. An introduction to dietetics, trends affecting the profession, and the research process, including computer applications.
- 302: Quantity Foods Field Experience.** 4-2-3. Preq., BISC 214, FNU 352. Equipment and production in the food service industry; field experience in food service facilities.
- 305: Nutrition Education Methods.** 0-2-2. Preq. or Coreq., FNU 203 or 253. Principles and methods of teaching in nutrition education.
- 343: Health Care Delivery Systems.** 0-2-2. Preq., upper division standing or permission of instructor. Aspects of current health care delivery systems in the United States, with a focus on the delivery of nutrition care services.
- 352: Food Systems Management I.** 0-3-3. Preq., BISC 214, FNU 232, dietetic major or consent of the instructor. Study of the principles of organization and management applied to institutional food service.
- 402: Human Nutrition Biochemistry I.** 0-3-3. Preq., FNU 203, BISC 227 and 228, CHEM 252. Food sources and utilization of carbohydrates, proteins, and fats in humans.
- 403: Community Nutrition.** 0-3-3. Preq., FCS 201; FNU 203. Prevention and treatment of nutrition problems common to individuals, families, and communities. Includes survey of federal, state, and local nutrition programs for various age groups.
- 404: Human Nutritional Biochemistry II.** 0-3-3. Preq., FNU 402. Food sources and utilization of vitamins, minerals, and water in humans.
- 412: Advanced Food Science.** 3-2-3. Preq., FNU 232, CHEM 252 or consent of instructor. Study of the chemical and physical nature of foods. Individual investigations of selected problems.

- 414: Nutrition Assessment.** 3-2-3. Preq., FNU 402. Planning, implementation, and evaluation of nutrition needs and provision of individualized client care.
- 423: Medical Nutrition Therapy I: Diabetes, Cancer, & Heart Disease.** 3-2-3. Preq. or Coreq., FNU 414. Medical nutrition therapy for cardiovascular disease, diabetes, cancer, food allergies, and AIDS.
- 443: Medical Nutrition Therapy II: GI, Renal Disease, and Nutrition Support.** 3-2-3. Preq. or Coreq., FNU 423. Enteral and parental nutrition; medical nutrition therapy for gastrointestinal, liver, and kidney diseases.
- 463: Medical Nutrition Therapy III: Clinical Applications.** 3-2-3. Preq. or Coreq. FNU 443. Structured experiences in nutrition and dietetics to develop assessment, interviewing, and nutrition education skills.
- 472: Food Systems Management II.** 0-3-3. Preq., FNU 302 and 352. Study of the principles of organization and management applied to institutional food service.
- 480: The Art & Science of Italian Cuisine.** 0-3-3. A survey of Italian foods, from the marketplace to the table.
- 492: Supervised Practice in Nutrition-Dietetics.** 3-8 hours credit (27). Preq., Completion of approved didactic program in dietetics. Application required.
- 503: World Nutrition Problems.** 0-3-3. A study of world wide nutritional problems with special emphasis on recent research and contributing factors. Open to non-majors.
- 512: Food Science and Technology.** 0-3-3. Recent developments in science and technology underlying current practices in quality preservation, and problems in nonbacterial spoilage mechanisms of food. Includes survey of freeze-drying, irradiation, antibiotics, antioxidants, enzymes, food additives, and packaging.
- 517: Graduate Seminar for Supervised Practice Students.** 3-0-1 (3). Co-requisite, FNU 492. Seminar designed to promote effectiveness of professional written and oral communications, increase knowledge of research, and review content information in selected topics in dietetics.
- 523: Recent Advances in Medical Nutrition Therapy.** 0-3-3 (12). Preq., FNU 443 or consent of instructor. Current developments in normal nutrition, nutrition assessment, and diet therapy.
- 525: Nutrition for Educators.** 0-3-3. U.S. Dietary Guidelines based nutrition information and resources for preschool through high school age individuals. No prerequisites.
- 526: Maternal & Infant Nutrition.** 0-3-3. A study of current nutritional issues related to pregnancy, lactation, and infancy.
- 527: Issues in Weight Management.** 0-3-3. Critical thinking applied to the issues of weight and health.
- 528: Nutritional Management of Cardiovascular Disease.** 0-3-3. The role of diet in the prevention, development, and treatment of cardiovascular disease.
- 529: Nutritional Management of Diabetes.** 0-3-3. Preq., FNU 443 or consent of instructor. Study of issues related to diabetes including assessment and the role of diet in diabetes management.
- 530: Nutritional Assessment.** 0-3-3. Nutritional assessment of patient with medical problems.
- 531: Nutrition & Renal Disease.** 0-3-3. A study of nutritional issues related to renal disease.
- 532: Nutrition & Aging.** 0-3-3. A study of the nutritional issues related to the aging process.
- 533: Vitamins and Minerals in Human Nutrition.** 0-3-3. Preq., FNU 404 or consent of instructor. Sources, properties and functions of vitamins and minerals in human nutrition.
- 543: Nutrition and Worksite Wellness.** 0-3-3. The role of wellness programs in community and clinical settings, including assessment, planning, implementation, and evaluation of programs.
- 553: Clinical Management and Private Practice in Dietetics.** 0-3-3. Techniques in dietetics-nutrition service settings to develop, manage, and evaluate private practice.
- 562: Trends in Food Systems Administration.** 0-3-3 (12). Preq., FNU 472 or consent of instructor. Seminar on current topics in food systems administration with emphasis on student's area of interest.
- 603: Nutritional Diagnosis Theory.** 0-3-3. Preq., FNU 523 or consent of instructor. Application of outcome-based research and medical nutrition theory as it applies to the nutritional diagnosis of clients.
- 604: Research Methods in Dietetics and Human Nutrition Services.** 0-3-3. Preq., HEC 504 or the equivalent. Study of quantitative and qualitative research methods, design, and analysis in dietetic research.

- 613: Clinical Nutritional Diagnosis.** 3-2-3. Preq., FNU 603. Case study approach to the nutritional assessment, diagnosis, and documentation of nutritional problems.
- 651: Research and Dissertation.** 0-3-3 (12). Preq., FNU 604 and STAT 507.

#### FOREIGN LANGUAGES (FLNG)

- 101: Special Offerings in Less Commonly Taught Languages: Elementary 1.** 0-3-3. Introduction to a foreign language not listed in other departmental offerings; emphasis on communicative competence for contemporary languages and on reading competence for classical languages.
- 102: Special Offerings in Less Commonly Taught Languages: Elementary 2.** 0-3-3. Preq., FLNG 101. Introduction to a foreign language not listed in other departmental offerings; emphasis on communicative competence for contemporary languages and on reading competence for classical languages.
- 201: Special Offerings in Less Commonly Taught Languages: Intermediate 1:** 0-3-3. Preq., FLNG 102. The more complex structures of a language not listed in other departmental offerings; emphasizes communicative competence for contemporary languages and reading competence for classical languages.
- 202: Special Offerings in Less Commonly Taught Languages: Intermediate 2:** 0-3-3. Preq., FLNG 201. The more complex structures of a language not listed in other departmental offerings; emphasizes communicative competence for contemporary languages and reading competence for classical languages.
- 203: Special Offerings in Less Commonly Taught Languages: Intermediate 3:** 0-3-3. Preq., FLNG 202. The more complex structures of a language not listed in other departmental offerings; emphasizes communicative competence for contemporary languages and reading competence for classical languages.
- 453: Foreign Language Teaching Methods.** 0-3-3. Preq., 12 hours of a foreign language. Study of a broad range of foreign language teaching methods; examination of underlying theories and practical applications. Also listed as EDUC 453. (G)
- 470: Linguistics.** 0-3-3. Preq., ENGL 201 or 202. Systematic study of language acquisition, change, and variation; application to teaching grammar, writing, and/or literature. Also listed as ENGL 470. (G)
- 489: Special Topics.** 0-3-3 (6). Preq., advanced standing and permission of Department Head. Topic to be designated by the instructor. (G)
- 494: Independent Studies in Foreign Languages.** 1-3 credit hours (9). Preq., advanced standing and permission of Department Head. Topics in foreign languages, literature and linguistics for independent study in the student's curriculum specialty.

#### FOREIGN STUDIES (FSTU)

- 101: Special Academic Studies.** 1-3 hours. Special academic studies conducted in foreign countries.
- 201: Special Academic Studies.** 1-3 hours. Special academic studies conducted in foreign countries.
- 301: Special Academic Studies.** 1-3 hours. Special academic studies conducted in foreign countries.
- 401: Special Academic Studies.** 1-3 hours. Special academic studies conducted in foreign countries.
- 501: Special Academic Studies.** 1-3 hours. Special academic studies conducted in foreign countries.

#### FORESTRY (FOR)

- 101: Introduction to Forest Resources.** 4-0-1. An introduction to forest resources management and utilization.
- 201: Microcomputer Applications.** 0-3-3. Introduction to microcomputers with specific applications in filing conventions, word processing, spreadsheets, electronic communications, and other topics.
- 202: Forest Fire.** 0-2-2. Fire; its' role in ecosystems, use in management, and control.
- 205: Dendrology.** 3-1-2. Preq., BISC 130 or 134. The identification, classification, characteristics, and distribution of the principal forest trees of the United States, with emphasis on conifers.
- 206: Dendrology.** 4-0-1. Preq., FOR 205. A continuation of FOR 205, with emphasis on hardwoods and spring and summer characteristics.
- 211: Forest Recreation.** 0-2-2. Forestry and non-forestry majors. Recreational use of forests and wild lands. Social, physical, and spiritual

- benefits of forest recreation. Forest recreation in the economy of the nation.
- 215: Forests and Society.** 0-3-3. For non-forestry majors. Forestry and its role in today's economic and environmental issues; factors influencing the future of forest resources in the region and nationally.
- 301: Forestry Ecology.** 4-2-3. Preq., FOR 205. Ecological factors affecting the growth and development of trees and stands.
- 302: Silviculture.** 4-2-3. Preq., FOR 301 or BISC 313. An in-depth study of practices used in forest stands to regenerate, cultivate, and harvest them.
- 303: Regional Silviculture.** 0-2-2. Preq., FOR 302. An assessment of the significant biological, physical and economic qualities of the forest regions of the U.S. and their effect on silvicultural practices.
- 306: Forest Measurements.** 4-2-3. Preq., MATH 101 or higher. Principles of sampling and measuring trees, area, forest stands, growth, and land productivity.
- 312: Forest and Forest Products Entomology.** 0-2-2. Study important insects affecting pine, hardwood, and urban trees in the South, including a basic overview of insects in relation to the Animal Kingdom.
- 313: Forest and Forest Products Pathology.** 4-2-3. The important diseases of forests and forest products.
- 314: Wildlife Habitat Evaluation and Management.** 4-2-3. Habitat requirements, evaluation, and management for wildlife.
- 315: Forest Measurements.** 3 credit hours. Preq., FOR 306 and MATH 212. Execution of forest surveys; techniques of growth measurement; determination of volume of trees and stands.
- 317: Aerial Photo Interpretation.** 0-2-2. Principles of recognition and classification of vegetative types on large-scale imagery, including forest inventory techniques.
- 318: Forest Operations.** 3-2-3. Study of mechanized forest operations including all functions from timber felling to delivery of product to mill. Logging safety. Machinery costs. Forest road engineering.
- 319: Forest Products Manufacturing.** 3-0-1. An in-depth look at the manufacturing processes used to produce the major forest products and tours of selected production facilities.
- 320: Field Silviculture.** 8-0-2. Preq., FOR 302. The practice of silviculture field procedures used in the southern forest to regenerate and grow tree stands.
- 322: Bottomland Hardwoods.** 4-1-2. Preq., FOR 320. Silviculture and utilization of bottomland hardwoods.
- 324: GPS in Natural Resource Management.** 4-1-2. Preq., Junior standing or consent of instructor. Introduction to GPS applications in natural resource management.
- 340: Wood Machining Processes.** 3-2-3. Preq., FOR 404 or consent of instructor. Machinery, milling methods, and methods for conversion of trees into usable products.
- 341: Bonding and Finishing of Wood** 3-2-3. Preq., FOR 404 or consent of instructor. Adhesive and cohesive properties of glues and finishes and their use in the forest products manufacturing.
- 355: Introduction to Geographic Information Systems (GIS).** 3-2-3. Preq., junior standing or above or consent of instructor. An introduction to geographic information systems focusing on geographic concepts, spatial data manipulation and analysis, and understanding and application of GIS software.
- 401: Forest Management.** 4-2-3. Preq., Forestry Field Session excluding FOR 319. Managing forest properties to meet landowner objectives using growth and yield models, optimization techniques, best management practices, and sound business principles.
- 402: Watershed Management.** 3-2-3. Preq., FOR 301 and 405, or permission of instructor. Water resources and problems. Emphasis on the forest hydrologic system and its management. (G)
- 404: Wood Technology and Products.** 3-2-3. Preq., BISC 130 or 134; FOR 205. Formation, structure, identification and properties of commercial woods plus an overview of the manufacturing processes used to produce the major forest products. (G)
- 405: Forest Soils.** 3-2-3. Preq., CHEM 100 or 120, or permission of instructor. Physical, chemical and biological properties of forest soils and associated management problems with an emphasis on site productivity and sustainability. (G)
- 406: Forest Economics/Valuation.** 4-3-4. Preq., ECON 201/202 or 215, and junior standing. Economics and financial principles as a basis for decision making in forestry. (G)
- 408: Seasoning and Preservation.** 3-2-3. Preq., FOR 404. Theory and practice of air seasoning and kiln drying of forest products. The basis of wood preservation, preservatives, and methods of application. (G)

- 410: Forest Policy.** 0-3-3. Preq., Forestry Field Session excluding FOR 319. The basic principles, policies, and professional ethics of federal, state, and private forestry. (G)
- 412: Forest Tree Improvement.** 0-2-2. Methods of improvement of forest trees by use of modern plant breeding techniques. (G)
- 413: Professional Practice.** 6-0-2. Preq., Forestry Field Session and FOR 401. Data accumulation and analysis; development of forest resource management alternatives and recommendations. A comprehensive state licensure examination or the GRE is mandatory.
- 414: Wood Products Processing.** 3-2-3. Preq., FOR 404. Hardwood and softwood lumber grades. Manufacture of lumber, veneer, plywood, laminated products and reconstituted panels. (G)
- 418: Land Resource Management.** 0-3-3. The socioeconomic-political policies and programs concerning the allocation of land and the management of natural resources. (G)
- 420: Problems.** 1-3 semester hours credit (9). Special problems in forestry and wood utilization correlated with management of land and natural resources.
- 422: Seminar** 0-1-1. Preq., Senior standing. Development of professional oral communication skills.
- 425: Forest Growth & Yield Modeling.** 0-2-2. Preq., FOR 306, MATH 212, and AGSC 320 or QA 233, or MATH 200 or PSYC 300. Concepts, theories, and parameters involving the development and use of forest growth models; emphasizing applications to forest growth projections and management.
- 428: Wetland Ecology.** 0-3-3. Study of wetland characteristics and the ecological processes occurring within wetlands. Wetland delineation, restoration, construction and regulation will also be covered. Also listed as BISC 428.
- 445: Forest Ecosystem Management.** 4-2-3. Preq., junior standing or higher, or consent of instructor. Forest ecosystems of the South, their history, function, components, protection, and management. (G)
- 450: Natural Resource Economics.** 0-3-3. Tools for economic decision-making applied to the use and allocation of natural resources associated with agriculture. Costs and benefits of various approaches to natural resource management. (G)
- 455: Intermediate Geographic Information Systems.** 4-2-3. Preq., FOR 355 or consent of instructor. Intermediate geographic information systems technology focusing on theoretical, technical, and applied aspects of analytical GIS.
- 477: Practica/Internship/Cooperative Education in Forestry.** 1-9 hours credit (9). (Pass/Fail). Preq., Sophomore standing, 2.0 cumulative GPA, and approval of Forestry Experiential Education Coordinator. On site, supervised, structured work experiences located within a 100 mile radius of Ruston. Application and supervision fee required.
- 478: Practica/Internship/Cooperative Education in Forestry.** 1-9 hours credit (9). (Pass/Fail). Preq., Sophomore standing, 2.0 cumulative GPA, and approval of Forestry Experiential Education Coordinator. On site, supervised, structured work experiences located within a 101-200 mile radius of Ruston. Application and supervision fee required.
- 479: Practica/Internship/Cooperative Education in Forestry.** 1-9 hours credit (9). (Pass/Fail). Preq., Sophomore standing, 2.0 cumulative GPA, and approval of Forestry Experiential Education Coordinator. On site, supervised, structured work experiences located beyond a 201-mile radius of Ruston. Application and supervision fee required.
- 526: Rocky Mountain Forest Resource Management.** 4-2-3. Preq., consent of instructor. A study of ponderosa pine and spruce-fir ecosystems with respect to issues unique to the Central Rocky Mountains.
- 528: Advanced Wetland Ecology.** 0-3-3. Study of wetland characteristics and the ecological processes occurring within wetlands. Wetland delineation, restoration, construction and regulation will also be covered. Cross-listed as BISC 528.

#### FRENCH (FREN)

- 101: Elementary French.** 0-3-3 each. Conversation, reading and grammar.
- 102: Elementary French.** 0-3-3 each. Preq., FREN 101. Conversation, reading and grammar.
- 201: Intermediate French.** 0-3-3 each. Preq., FREN 102 or equivalent. Conversation, reading, grammar and culture.
- 202: Intermediate French.** 0-3-3 each. Preq., FREN 201 or equivalent. Conversation, reading, grammar and culture.
- 301: French Conversation and Composition.** 0-3-3 each. Preq., FREN 202 or permission of department head. Required for major in French.

- 302: French Conversation and Composition.** 0-3-3 each. Preq., FREN 202 or permission of department head. Required for major in French.
- 304: Survey of French Literature.** 0-3-3. Preq., FREN 202 or permission of department head. Required for major in French. A survey of French literature from the Middle Ages.
- 305: Survey of French Literature.** 0-3-3. Preq., FREN 202 or permission of department head. Required for major in French. A survey of French literature from the Middle Ages.
- 308: French Civilization.** 0-3-3. Preq., FREN 202 or permission of department head. Lectures and reading in history, geography, language, arts, general culture of French lands.
- 390: Francophone Children's Literature.** 0-3-3. Preq., FREN 304 or 305 or permission of department head. A study of French-speaking children's stories, songs, rhymes and games.
- 400: The Drama in France.** 0-3-3. Preq., FREN 304 or 305 or permission of department head. A study of the drama in France up to 1914, with reading of selective works.
- 404: Contemporary French Literature.** 0-3-3. Preq., FREN 304 or 305 or permission of department head. A study of French literature from 1914 to the present with reading of selective works.
- 417: The Novel in French.** 0-3-3. Preq., FREN 304 or 305 or permission of department head. A study of the novel in France, with reading of selective works.
- 428: French Literature in English Translation.** 0-3-3 (9). Representative works of French literature from the Middle Ages to the 20th century; repeatable for credit with different course content. May not be counted towards a major or minor in French. Also listed as ENGL 428. (G)
- 450: The French Language.** 0-3-3. Preq., 21 hours French or consent of instructor. General characteristics of the language and intense review of grammar.
- 470: French Phonetics and Oral Reading.** 0-3-3. Preq., FREN 301-302 or permission of department head. Required for major in French.
- 480: Commercial French.** 0-3-3. Preq., FREN 450 or consent of instructor. Study of business practices and regulation of France and Canada with emphasis on common commercial forms.

#### GEOGRAPHY (GEOG)

- 203: Physical Geography.** 0-3-3. Fundamentals of physical and biogeography. Topics include surface and fluvial geomorphology, weather, climate, and biogeography.
- 205: Cultural Geography.** 0-3-3. Discussion of the spatial patterns of the human world; people, their culture, their livelihoods, and their imprints of the landscape.
- 210: World Regional Geography.** 0-3-3. Introduction to place and spatial relationships around the globe, with an emphasis on the developing world.
- 290: Geography of Popular Culture.** 0-3-3. Examines the patterns and processes of American popular culture. Topics include the geography of sports, music, television, movies, and popular architecture.
- 300: Historical Geography of the United States.** 0-3-3. Preq., Sophomores, Juniors, and Seniors. Study of the evolution of the cultural landscape of the United States during the historical period.
- 307: Geography of the Western United States.** 0-3-3. Field and classroom study of the physical and human geography of the western half of the United States.
- 310: Geography of Louisiana.** 0-3-3. Open only to junior, senior and graduate students. The climate, natural regions, and resources of Louisiana; cultural development, sources and distribution of the population; settlements and agriculture.
- 321: American Landscapes.** 0-3-3. Folk, vernacular, and popular landscape items are explored. Special attention is given to developing student's ability to "read" the American landscape as text.
- 380: Geographic Information Systems (GIS) and Computer Cartography.** 0-3-3. Elements of map interpretation and construction; creation, manipulation, and analysis of spatially defined data.
- 440: Economic Geography.** 0-3-3. A spatial perspective is used to examine economic principles. Topics include transportation, retail and industrial site location analysis, and the political/space economy.
- 470: Urban Geography.** 0-3-3. Patterns and processes of large North American cities are examined. Topics covered include urban politics, race, government housing policy, urban revitalization and gentrification.
- 480: Advanced Geographic Information System and Spatial Analysis.** 0-3-3. Preq., GEOG 380 or permission of instructor. Advanced techniques

in Geographic Information Systems, integrated with intermediate level spatial analysis.

- 490: Perspectives on Place and Space.** 0-3-3. Preq., GEOG 205 or 290, or permission of instructor. This course introduces advanced students in the social sciences to "new cultural geography" perspectives, critical theory, and cultural studies approaches to place and space.
- 501: Physical and Cultural Elements of Geography.** 0-3-3.

#### GEOLOGY (GEOL)

- 111: Physical Geology.** 0-3-3. Igneous, sedimentary, and metamorphic rocks; erosion of the earth by streams, oceans, winds, glaciers; phenomena of mountains, volcanoes, earthquakes; and the earth's interior.
- 112: Historical Geology.** 0-3-3. Preq., GEOL 111. History of the earth as revealed in the character and fossil content of rocks.
- 121: Physical Geology Laboratory.** 3-0-1. Preq., registration or credit in GEOL 111. Identification of minerals and rocks. Study of topographic maps and physiographic features shown thereon.
- 122: Historical Geology Laboratory.** 3-0-1. Preq., registration or credit in GEOL 112 and 121. Introduction to fossils, geologic maps, and the geologic history of selected portions of North America.
- 200: Introduction to Oceanography.** 0-3-3. A survey of the oceans; their nature, structure, origin, physical features, circulation, composition, natural resources, and relationship to the atmosphere and solid earth.
- 201: Physical and Historical Geology of the National Parks.** 0-3-3. Physical processes and earth history of the U. S. National Parks. Topics include: rock types, volcanism, plate tectonics, glaciation, shoreline processes, weathering, erosion, and cave formation.
- 209: Mineralogy.** 3-2-3. Preq., GEOL 111, 121, CHEM 102, 103. Crystallography and descriptive mineralogy. Occurrence, associations, and uses of minerals.
- 211: Petrology.** 3-2-3. Preq., GEOL 210. Introduction to the formation and classification of rocks. Identification of rock types in hand specimen and in thin section under the petrographic microscope.
- 289: Special Topics.** 1-4 hours credit. Selected topics in an identified area of geology. May be repeated for credit.
- 299: Cooperative Education Applications.** 40-0-1 (7). Preq., Admission to the College of Engineering and Science Cooperative Education Program.
- 302: Introduction to Paleocology.** 3-2-3. Preq., GEOL 112, 122. Survey of invertebrate paleontology, phylum Protozoa through phylum Arthropoda. History of the science, rules of nomenclature, and environment of lower animals.
- 303: Sedimentology** 3-2-3. Preq., GEOL 111, 112, 121. Origin, composition, properties and classification of sediments and sedimentary rocks. Fluid flow, sedimentary structures and diagenesis.
- 305: Stratigraphy.** 0-3-3. Preq., GEOL 303. Depositional environments, sedimentary facies, correlations, basin analysis and plate tectonics.
- 315: Structural Geology.** 3-2-3. Preq., GEOL 111, 112, 121, MATH 112 or 241, and ENGR 151. The recognition, representation, interpretation, and mechanics of rock deformation.
- 316: Map Interpretation.** 6-0-2. Preq., GEOL 305 and 315. Interpretation of topographic maps, aerial photographs, geologic maps and geologic cross sections.
- 318: Environmental Geology.** 0-3-3. Preq., GEOL 111 or consent of instructor. Discussion of natural and human hazards affecting the environment, including flooding, slope stability, earthquakes, coastal hazards, resource development, water pollution, and waste disposal.
- 320: Summer Field Course.** 6 hours credit. Preq., GEOL 211, 302 and 316, ENGL 303. Course work at the Louisiana Tech Geology Camp.
- 420: Directed Study of Geologic Problems.** 1-3 hrs credit. Preq., senior standing. Special topics within the student's field of interest. Maximum 3 hours credit.
- 421: Micropaleontology.** 3-2-3. Preq., GEOL 302. Study of microfossils used in correlation of well cuttings and outcrop samples, especially foraminifera.
- 422: Environmental Remediation.** 0-3-3. Evaluation of alternative surface and subsurface cleanup technologies with emphasis on site assessments, pilot studies, treatment techniques, and the preparation of corrective action plans. (G)
- 442: Geophysical Methods.** 3-2-3. Preq., PHYS 210, GEOL 305, 315, 408, MATH 241. Introduction to the elementary theory, computation fundamentals, and basic field practice for gravity, seismic, magnetic, and electrical methods of geophysical exploration.
- 450: Seminar.** 0-1-1. Preq., senior standing in geology. Written or oral reports in various phases of geology.

- 460: Hydrogeology.** 0-3-3. Preq., GEOL 111, 121, and MATH 220- or 241. Effect of geologic materials and processes on availability and movement of ground water with emphasis on collecting and interpreting hydrogeologic data.
- 485: Coastal Marine Geology.** 8-3-4. Preq., GEOL 111, 121 or 112, 122, CHEM 101, 102, 103, 104. Geomorphological features of estuarine, coastal and continental shelf environments, erosional, depositional and geochemical processes, field and laboratory methods. Five weeks at a Louisiana Universities Marine Consortium coastal laboratory.

#### GERMAN (GERM)

- 101: Elementary German.** 0-3-3 each. Conversation, reading, and grammar.
- 102: Elementary German.** 0-3-3 each. Preq., GERM 101. Conversation, reading, and grammar.
- 201: Intermediate German.** 0-3-3 each. Preq., GERM 102. Conversation reading, grammar, and culture.
- 202: Intermediate German.** 0-3-3 each. Preq., GERM 201. Conversation reading, grammar, and culture.
- 301: Survey of German Literature to 1800.** 0-3-3. Preq., GERM 202 or permission of department head.
- 302: Survey of German Literature from 1800.** 0-3-3. Preq., GERM 202 or permission of department head.
- 303: Classical German Literature.** 0-3-3. Preq., GERM 202 or permission of department head. A study of German classicism, including Lessing, Goethe, Schiller.
- 305: Advanced German Grammar.** 0-3-3. Preq., GERM 202 or permission of department head. An intensive course in German grammar with special attention to technical German.
- 307: German Conversation.** 0-3-3. Preq., GERM 202 or permission of department head.
- 308: German Composition.** 0-3-3. Preq., GERM 202 or permission of department head.
- 309: German Civilization.** 0-3-3. Preq., GERM 202 or permission of department head. Lectures and readings in history, geography, language, arts and general culture.

#### HEALTH AND PHYSICAL EDUCATION (HPE)

**Health and Physical Education 100 to 199 activity courses will stress basic techniques, rules and participation.**

- 100: Special Group Activities.** 3 3/4-0-1 (2). (Pass/Fail).
- 101: Flag Football and Basketball.** 3 3/4-0-2.
- 102: Volleyball and Softball.** 3 3/4-0-2.
- 107: Aerobic Running.** 3 3/4-0-2. (4).
- 110: Adapted Physical Education.** 3 3/4-0-2. For students not physically able to participate in regular activity courses. Statement from physician listing restrictions is required. (Pass/Fail)
- 112: Practicum.** 3 3/4-0-1 (4). HPE Fitness/Wellness majors. Students assist a master teacher to learn proper methods of teaching aerobic, weight training, senior adult activities.
- 114: Varsity Sport Participation.** 3 3/4-0-2 (6). Credit for varsity participation in a sport. May be repeated for up to 6 hours credit. Will not count for HPE majors/minors.
- 115: Varsity Sport Participation.** 3 3/4-0-2 (6). Credit for varsity participation in a sport. May be repeated for up to 6 hours credit. Will not count for HPE majors/minors.
- 116: Varsity Sport Participation.** 3 3/4-0-2 (6). Credit for varsity participation in a sport. May be repeated for up to 6 hours credit. Will not count for HPE majors/minors.
- 117: Varsity Sport Participation.** 3 3/4-0-2 (6). Credit for varsity participation in a sport. May be repeated for up to 6 hours credit. Will not count for HPE majors/minors.
- 119: Basketball and Volleyball.** 3 3/4-0-2.
- 132: Beginning Tap Dance.** 3 3/4-0-2.
- 134: Developmental Conditioning.** 3 3/4-0-2 (6). Designed to improve and maintain a desirable level of aerobic fitness by various forms of appropriate physical activity.
- 141: Beginning Golf.** 3 3/4-0-2. Learning basic golf skills and rules with limited play for beginning student with no experience.
- 143: Fencing.** 3 3/4-0-2.
- 145: Social Dance.** 3 3/4-0-2.
- 150: First Aid.** 0-2-2. Lectures, discussions, and practical demonstrations of Red Cross methods in First Aid.
- 161: Square, Folk, and Country/Western Dance.** 3 3/4-0-2.

- 181: Beginning Swimming.** 3 3/4-0-2. Open to students who are unable to swim in deep water.
- 201: Soccer and Volleyball.** 2 3/4-1-2.
- 202: Foundations of Health and Physical Education, Fitness Wellness, and Sports Science.** 0-3 3/4-3. Preq., Sophomore Standing. Designed to provide physical education students with information in the professional areas of HPE, Fitness/Wellness, and Sports Science.
- 206: Fitness for the Senior Adult.** 2 3/4-1-3. May be taken by senior adults for repeated credit. Senior adult exercise programs are designed utilizing chair and water exercises, strength machines, and walking.
- 207: Principles and Practices of Coaching Minor Sports.** 0-2-2. Preq., Sophomore standing. Study of minor sports from viewpoint of teacher and coach.
- 210: Beginning Weight Training.** 2 3/4-1-2 (4).
- 211: Powerlifting.** 2 3/4-1-2 (4).
- 213: Fishing and Boating Safety.** 2 3/4-1-2.
- 214: Hunting and Gun Safety.** 2 3/4-1-2.
- 218: Beginning Karate.** 2 3/4-1-2 (4).
- 221: Light Backpacking.** 3-1-2 (6). Equipment selection, maintenance, and use; first aid and accident prevention; and basic skills for light backpacking, plus participation in three off-campus, outdoor activity sessions.
- 222: Outdoor Adventure.** 3-1-2 (6). Equipment selection, maintenance, and use; first aid and accident prevention; and skills for selected outdoor, adventure activities, plus participation in three off-campus, outdoor activity sessions.
- 231: Beginning Modern Dance.** 2 3/4-1-2.
- 235: Beginning Racquetball.** 2 3/4-1-2.
- 241: Intermediate Golf.** 2 3/4-1-2. Review of strokes, rules, and strategies. Tournament play.
- 250: Gymnastics.** 2 3/4-1-2. HPE Majors Only.
- 251: Materials and Methods in Teaching Elementary School Physical Education.** 1-2 3/4-3. Preq., Sophomore standing, HPE majors and minors only. Methods and materials used in teaching elementary school physical education with practical application.
- 255: Lifetime Sports Series A - Racquet Sports.** 2 3/4-1-2. HPE majors/minors only. Emphasis on learning and teaching the fundamental skills/techniques, rules, and strategies in racquet sports.
- 256: Lifetime Sport Series B - Aerobic Conditioning/Strength Conditioning/Aquatics.** 2 3/4-1-2. HPE majors/minors only. Emphasis on learning and teaching the fundamental skills/techniques and physiological principles in aerobic, strength, and aquatic conditioning activities.
- 257: Lifetime Sport Series C - Selected Recreational Sports.** 2 3/4-1-2. HPE majors/minors only. Emphasis on learning and teaching the fundamental skills/techniques, rules, and strategies used in selected recreational sports.
- 262: Beginning Bowling.** 2 3/4-1-2.
- 263: Intermediate Bowling.** 2 3/4-1-2. Preq., HPE 262.
- 265: Team Sport Series A - Flag Football/Soccer.** 2 3/4-1-2. HPE majors/minors only. Emphasis on learning and teaching the fundamental skills/techniques, rules, and strategies in flag football and soccer.
- 266: Team Sport Series B - Volleyball/Basketball.** 2 3/4-1-2. HPE majors/minors only. Emphasis on learning and teaching the fundamental skills/techniques, rules, and strategies in volleyball and basketball.
- 267: Team Sport Series C - Softball/Track and Field.** 2 3/4-1-2. HPE majors/minors only. Emphasis on learning and teaching the fundamental skills/techniques, rules, and strategies in softball and track.
- 271: Beginning Tennis.** 2 3/4-1-2. Learning basic tennis skills, fundamentals, rules, and strategy for beginning players with limited or no experience.
- 272: Beginning Badminton.** 2 3/4-1-2.
- 274: Intermediate Tennis.** 2 3/4-1-2. Preq., HPE 271 or intermediate skill levels. Review of tennis skills, fundamentals, rules, and strategy. Conditioning and class competition.
- 275: Aerobic Dance and Conditioning.** 2-1-2 (4).
- 280: Dance Appreciation.** 0-3-3. An overview of the historical, cultural and social impact of dance. Includes classifications of major dance styles, interpretations of dance and major contributors to dance.
- 281: Intermediate Swimming.** 2 3/4-1-2. Open to students who can swim in deep water. Stroke development and endurance swimming are emphasized.
- 283: Lifeguard Training.** 1 3/4-2-3. Preq., Level V and VI Swimming Skills. American Red Cross Lifeguard Training. Prepares and certifies

- individuals to assume the duties and responsibilities of lifeguards at swimming pools and protected (non-surf) open water beaches.
- 289: Water Exercise for Fitness.** 2 3/4-1-2 (6). Individualized program to enhance fitness through aquatic activity.
- 290: Personal and Community Health.** 0-3-3. Designed to develop attitudes and practices which contribute to better individual and group health. Emphasis is placed upon major health problems of early adulthood.
- 292: Preventive Health and Wellness.** 0-3-3. Emphasis on chronic and degenerative diseases, mental health, preventing communicable and non-communicable diseases and the role of physical fitness in preventive health.
- 293: Consumer and Environmental Health.** 0-3-3. Directing the consumer in selection of health services and understanding the effect of environmental pollution.
- 294: The School Health Program.** 0-3-3. A study of the administration and organization of a school health program. Emphasis on establishing such a program and utilization of available resources in school health.
- 300: Safety Education.** 0-3-3. The social, emotional, economic, and legal impact of safety and accidents in the home, at work, and in leisure/sports activities.
- 301: Curriculum Innovations, Instructional Devices and Lab Instruction in Drivers Education.** 3 3/4-3-4. In-depth study of curriculum materials and instructional devices and techniques including Simulation, Multimedia Driving Range, On-Street instruction, and Motorcycle.
- 305: Materials and Methods in Health Education in Schools.** 0-3-3. Preq., HPE 290, 292, 293 and Upper Division. Includes information relative to school health education program with emphasis on methods of instruction and use of materials in schools.
- 306: Principles and Practices of Football Coaching.** 0-2-2. Preq., sophomore standing. Designed to familiarize the student with various defensive and offensive systems that contribute to a successful program.
- 307: Principles and Practices of Coaching Softball.** 1-2 1/2-2. Preq., Sophomore standing. Emphasis on coaching competitive softball. Fundamental skills of offense and defense, training principles, scouting, strategy, and organization of practice are stressed.
- 308: Principles and Practices of Coaching Baseball.** 0-2-2. Preq., sophomore standing. Emphasis on coaching competitive baseball. Fundamental skills of offense and defense, training principles, scouting, strategies, and organization of practice are stressed.
- 312: Principles and Practices of Basketball Coaching.** 0-2-2. Preq., sophomore standing. Fundamentals of team offense and defense. Training and practice; scouting and strategy; officiating.
- 313: Principles and Practices of Volleyball Coaching.** 0-2-2. Preq., sophomore standing. Fundamentals of team offense and defense. Training and practice; scouting and strategy; officiating.
- 314: Principles and Practices of Track and Field Coaching.** 0-2-2. Preq., sophomore standing. Fundamental movements involved in the different events: staffing for the different events; training and practice; officiating.
- 316: Exercise and Sport Psychology.** 3 3/4-0-3. Preq., junior standing, Upper Division. Psychological aspects of exercise and sport with emphasis on mental preparation for athletic performance.
- 326: Applied Anatomy and Kinesiology.** 0-3-3. Preq., junior standing, BISC 224, Upper Division. Analysis of movement based on a knowledge of anatomy and physiology as applied to the function of body mechanics.
- 340: Materials and Methods in Physical Education and Health Education for Elementary Schools.** 5-3-3. Preq., Upper Division. To prepare the teacher for the direction of children in physical education and for developing in children desirable knowledge, skills and attitudes in health.
- 350: Drugs and Sport.** 1-3 3/4-3. Preq., HPE majors or intercollegiate athletes. Develop a knowledge of drugs, effects, sound use, preventive drug abuse, effective programs for drug education and athletes.
- 383: Water Safety Instructor.** 1 3/4-2-3. Preq., HPE 281 or Level V, VI, and VII Swimming Skills. Certifies instructor candidates to teach water safety and swimming courses.
- 401: Recreation and Leisure for the Older Adult.** 0-3-3. Recreation and leisure in an aging society. Leadership, programming, and activities for older adults. Emphasis on programs in a variety of settings.
- 402: Measurement and Evaluation in Health and Physical Education.** 0-2 1/2-2. Preq., senior standing, Upper division. Designed to familiarize the physical educator with statistical methods, measurement of physical parameters, and procedures for effective written and skill test construction and evaluation.
- 405: Sports Medicine and First Aid.** 0-2-2. Preq., upper division. Prevention, treatment and rehabilitation of athletic injuries and first aid procedures.
- 406: Health Aspects of Aging.** 0-3-3. Preq., upper division. Provides an understanding of the health aspects of aging as it pertains to the biological, physiological, psychological, and sociological factors in mature adults. (G)
- 407: Exercise Prescription.** 2-2-3. Preq., upper division. Provides an understanding of individualized exercise prescription design in programs to develop and maintain physical fitness through testing and re-evaluation strategies. (G)
- 408: Physiology of Exercise.** 2-2-3. Preq., upper division. Basic human physiology with emphasis on the physiological changes and residues of exercise. Concurrent with HPE 409.
- 409: Measurement of Physiology Variables.** 2 1/2-0-1. Concurrent with HPE 408, upper division. Exercise physiology laboratory experience providing students with an opportunity to measure and evaluate selected physiological parameters.
- 410: The Designing, Building, and Maintenance of Sport and Physical Fitness Facilities.** 0-3-3. Preq., upper division. The equipping, designing, building, and maintenance of physical fitness and sports facilities. (G)
- 414: Introducing Adapted Physical Education.** 0-3-3. Preq., Upper Division. To familiarize the student with the role of adapted physical education and the physical, emotional, social and learning characteristics of exceptional children. (G)
- 415: Internship.** 15-3-6. Consent of department head and within two quarters of graduation. Requires 180 clock hours in practical experiences in approved programs with department approved supervisor.
- 416: Adult Fitness Programming.** 2 1/2-1-3. Preq., HPE 406, upper division. Course is designed to instruct individuals in implementation of fitness programs and management of the various facilities, which include fitness management. (G)
- 417: Motor Development, Health Processes, and Safety Procedures in Education of the Disabled.** 0-3-3. Emphasis on motor development and knowledge of basic health processes and safety procedures needed to work effectively with children and adults having serious disabling conditions.
- 418: Strength and Conditioning for Improved Performance.** 3 3/4-0-3. Preq., HPE 326, 407, 408, 409, upper division. Procedures to strengthen and condition individuals in aerobic and anaerobic activities. Exercise models, performance evaluations, exercise equipment, training ethics, and professional development are discussed. (G)
- 433: Special Problems in Health and Physical Education.** 1-3 hour(s) credit (9). Consent of Department Head. Designed for selected problems in Health and Physical Education.
- 457: Materials and Methods in Teaching Middle and Secondary School Physical Education.** 1-2 3/4-3. Preq., HPE 251, upper division-senior standing. Methods and materials used in teaching middle and secondary schools physical education with practical application. (G)
- 509: Tests and Measurement.** 0-3-3. Using current research to select the best procedures to measure and test the student's physical fitness, motor ability, sports skills, and cognitive knowledge.
- 515: Internship.** 15-3-6. Requires 220 to 240 clock hours in departmentally approved practical experiences in rehabilitation, corporate, community, educational, athletics, medical, or fitness/wellness programs.
- 516: Education for Physical Fitness.** 0-3-3. Factors involved in developing, maintaining and evaluating physical fitness. Emphasis is placed on individual exercise programs, cardiovascular risk factors, and the beneficial effects of exercise.
- 518: Recent Literature and Research in Physical Education, Physical Fitness and Wellness.** 0-3-3. Review and evaluation of reports of recent research in physical education. Review of research methodology for analysis of both qualitative and quantitative nature.
- 519: Alcohol and Narcotics Education.** 0-3-3. Research and evaluation of the effects of alcohol and narcotics.
- 520: Motor Development and Learning.** 0-3-3. Nature of motor learning and development, factors affecting success in skill learning and improving physical performance.
- 521: Behavior Impairment and Physical Education.** 0-2-2. Preq., HPE 414. Physical education for the severely disabled. Course focuses on disabled individuals with implications for teaching motor activities.
- 522: Observing and Teaching in Adapted Physical Education with the Behavior Impaired.** 3-0-1. Preq., Concurrent with 521. Practicum in physical education for the severely disabled.

- 523: Chronic Disability and Physical Education.** 0-2-2. Focus is on individuals with chronic and permanent physical disabilities, which affect motor performance with implications for selection of activities in physical education.
- 524: Observing and Teaching in Adapted Physical Education with the Chronically Disabled.** 3-0-1. Preq., Concurrent with HPE 523. Practicum in physical education for the chronically and permanently disabled.
- 526: Physiology of Exercise.** 0-3-3. Understanding the physiological responses of the body systems to exercise, the recovery process, and systematic training regimens.
- 529: Curriculum Construction in Physical Education.** 0-3-3. Basic principles of curriculum construction in the junior high and high school with special emphasis on current trends.
- 531: Physical Education Curriculum for the Handicapped.** 0-3-3. Needs of the physically and mentally handicapped as related to the physical education program. Study of specific activities, methods and evaluation.
- 532: Interscholastic Athletics.** 0-3-3. Prepares the interscholastic coach to understand the purposes of state and national athletic associations, legal issues in sports, and the administration of athletic programs.
- 533: Problems in Health, Physical Education, Recreation and Athletics.** 1-3 hour(s) credit (6). Consent of Department Head. Credit depends on the nature of the problem and work to be accomplished.
- 534: Mechanical Analysis of Motor Skills.** 0-3-3. Analysis of the various motor skills to determine their relationship to basic mechanical principles, anatomical and kinesiological factors, laws of physics, etc.
- 536: Physiology of Exercise II.** 0-3-3. Preq., HPE 526. A continuation of HPE 526 designed to enhance understanding of physiological responses to acute and chronic exercise as it relates to performance and health-related fitness.
- 539: Sports Psychology.** 0-3-3. Course designed to explore the behavior of individuals participating in play, game and sports.
- 540: Sport Impact on Society.** 0-3-3. The impact of sports upon the American culture with focus on competition, economics, mythology, race relations and the Olympic syndrome.
- 543: Physical Education and Sport Pedagogy.** 0-3-3. The study of the research on teaching, teacher education, and curriculum in physical education and sport.
- 544: Drug Abuse Prevention.** 0-3-3. Major drugs of abuse and the available alternatives to individuals involved in this behavior, particularly during pre-adolescence.
- 545: Health Promotion and Wellness.** 0-3-3. A multi-level approach toward implementing preventive health programs in school and organizational settings with emphasis on stress management, smoking cessation, and injury prevention.
- 549: Advanced Theory of Sports, Games, and Athletics.** 1-3 hours credit (3). Consent of instructor. Advanced theory of various sports, games, and athletics will be explored and analyzed.
- 550: Current Trends and Issues in Health, Physical Education, and Sport.** 0-3-3. A survey of recent literature and research to determine current trends and issues in health, physical education, and sports.

#### HEALTH INFORMATION MANAGEMENT (HIM)

- 103: Introduction to Medical Terminology.** 0-3-3. A basic study of the language of medicine including word construction, definition and use of terms and an elementary study of the human anatomy, structures and functions with medical terminology application.
- 107: Introduction to Health Information Management.** 0-3-3. Preq. or Coreq. HIM 103. An introduction to the field of Health Information Management (HIM), professional ethics, and the basic functions of the HIM department.
- 108: Laboratory Practice in Basic Health Information Management Procedures.** 3-0-1. Preq. or Coreq., HIM 107. An introduction to applications of modern technology and software for admissions, deficiency analysis, chart assembly, data retrieval and data storage.
- 115: Healthcare Delivery Systems.** 0-3-3. Preq. Minimum grade of "C" in HIM 107. An introduction to organization, financing, and delivery of health care services including accreditation standards, licensure, and regulatory agencies.
- 120: Health Records Professional Practice.** 3-0-1. Preq., Minimum grade of "C" in HIM 107, 108, and 115. Health records in hospitals, nursing homes, hospice, tumor registry, home health, mental health, and specialty hospitals.

- 200: Health Statistics.** 0-2-2. Preq., minimum grade of "C" in MATH 101, and HIM 107. Computation, presentation, and computer application of commonly reported healthcare statistics; vital statistics; and introduction to data collection methods, analysis, and presentation.
- 204: Medical Transcription.** 3-1-2. Preq., a minimum grade of "C" in HIM 103. Introduction to transcription of record forms and supervision of the medical transcription function.
- 207: Coding and Classifying Diseases and Procedures.** 0-3-3. Preq. HIM 280. Basic coding using the latest edition of the International Classification of Diseases.
- 208: Laboratory Practice in Coding.** 3-0-1. Coreq., HIM 207. Practical application and laboratory practice in coding using ICD-9-CM.
- 217: Healthcare Reimbursement.** 0-3-3. Preq., or Coreq., HIM 218 and 219. A study of systems used for professional and institutional reimbursement in various healthcare settings.
- 218: Intermediate Coding/Classification Systems.** 0-3-3. Preq., Minimum grade of "C" in HIM 207 and 208. Other classifications, nomenclatures, and medical vocabularies. Application of coding principles as they affect reimbursement, the prospective payment system, and ethical issues related to reimbursement.
- 219: Intermediate Coding Laboratory.** 3-0-1. Coreq., HIM 218. Practice in coding inpatient and outpatient records, case-mix analysis, and PPS reimbursement methods.
- 224: Continuous Quality Improvement, Risk Management, and Utilization Review.** 0-3-3. Preq. Minimum grade of "C" in HIM 107. Techniques of continuous quality improvement, utilization review, risk management, and case management.
- 226: Legal Aspects of Health Information Management.** 0-2-2. Preq. HIM 107. A study of the principles of law as applied to the health field and medical record practice.
- 228: Health Information Services.** 0-2-2. Preq. HIM 115, 224 and MGMT 201 or 310. Application of supervisory techniques to health information services.
- 229: Introduction to Health Information Technology.** 0-2-2. Preq., HIM 107. Concepts of computer technology related to healthcare and the tools and techniques for collecting, storing, and retrieving healthcare data.
- 234: Quality Improvement Laboratory.** 3-0-1. Preq., HIM 115, and 224. Practical application of healthcare statistics, quality assessment tools, and accreditation standards.
- 235: Advanced Coding Laboratory.** 6-0-2. Preq., Minimum of 2.25 GPA in the HIT curriculum. Coreq., HIM 277, 278, or 279. All other HIT course work must be complete. Intensive study of the principles of various coding systems through practical application.
- 277: Practica/Internship/Cooperative Education in Health Information Management.** 40-0-6. Preq., Minimum of 2.25 GPA in curriculum and course work complete. Scheduled in the quarter of graduation. On site, supervised, structured work experiences located within a 100-mile radius of Ruston. Application and supervision fee required
- 278: Practica/Internship/Cooperative Education in Health Information Management.** 40-0-6. Preq., Minimum of 2.25 GPA in curriculum and course work complete. Scheduled in the quarter of graduation. On site, supervised, structured work experiences located within a 101-200 mile radius of Ruston. Application and supervision fee required
- 279: Practica/Internship/Cooperative Education in Health Information Management.** 40-0-6. Preq., Minimum of 2.25 GPA in curriculum and course work complete. Scheduled in the quarter of graduation. On site, supervised, structured work experiences located beyond a 201-mile radius of Ruston. Application and supervision fee required
- 280: Introduction to Medical Science.** 0-3-3. Preq., BISC 225 and 227, and minimum grade of "C" in HIM 103. A study of the nature and cause of disease.
- 299: Special Problems.** 1-4 semester credit hours. Preq., consent of instructor. Selected topics in an identified area of study in Health Information Management.
- 312: Health Data Content & Structure.** 0-3-3. Preq., Jr. standing. Introduction to health information systems with an emphasis on healthcare vocabulary, standards and models, and on the computer-based patient record.
- 318: Data Management in Healthcare.** 0-3-3. Preq., HIM 312. Techniques employed to manage health data using computers.
- 319: Data Management in Healthcare Laboratory.** 3-0-1. Preq., HIM 312. Coreq., HIM 318. Practical application of data management techniques in healthcare.

- 330: Systems Analysis In Healthcare.** 0-3-3. Preq., HIM 312. Study of the clinical and business information applications in health care. Concepts, techniques, and tools associated with the systems development life cycle are included.
- 417: Healthcare Research.** 0-3-3. Preq., HIM 430 and Coreq. QA 233. An introduction to the application of the scientific method and research design to health information management.
- 418: Healthcare Research Laboratory.** 3-0-1. Preq. or Coreq., HIM 417. Practice in abstracting medical information from healthcare records, designing data collection instruments, statistical analysis, and basic research methods used for health services and clinical research.
- 425: Information Systems in Healthcare.** 0-2-2. Preq., HIM 330, HIM 318 and 319. Design, development, and implementation of health information systems.
- 430: Health Information Management.** 0-3-3. Preq., MGMT 310, 470, and a minimum grade of "C" in all HIM 100- and 200-level courses in curriculum. Management principles applied to the administration of health information systems.
- 431: Laboratory Practice in Administration of the Health Information System.** 3-0-1. Preq. or Coreq., HIM 430. Laboratory practice using evaluation procedures to assist in problem-solving and decision-making.
- 477: Practica/Internship/Cooperative Education in Health Information Management.** 40-0-8. Preq., Minimum of 2.25 GPA in curriculum and course work complete. Scheduled in the quarter of graduation. On site, supervised, structured work experiences located within a 100-mile radius of Ruston. Application and supervision fee required
- 478: Practica/Internship/Cooperative Education in Health Information Management.** 40-0-8. Preq., Minimum of 2.25 GPA in curriculum and course work complete. Scheduled in the quarter of graduation. On site, supervised, structured work experiences located within a 101-200 mile radius of Ruston. Application and supervision fee required
- 479: Practica/Internship/Cooperative Education in Health Information Management.** 40-0-8. Preq., Minimum of 2.25 GPA in curriculum and course work complete. Scheduled in the quarter of graduation. On site, supervised, structured work experiences located beyond a 201-mile radius of Ruston. Application and supervision fee required
- 499: Special Problems:** 1-4 semester credit hours. Preq., Junior standing and consent of the instructor. Selected topics in an identified advanced area of study in Health Information Management.

### HISTORY (HIST)

- HIST 101 and 102 are normally regarded as prerequisites for advanced non-American history courses. HIST 201 and 202 are normally regarded as prerequisites for advanced American history courses. Exceptions can be made with permission of the department head.**
- 101: World History to 1500.** 0-3-3. A survey of civilization of the world to 1500. Major emphasis on Western Civilization.
- 102: World History since 1500.** 0-3-3. A survey of civilization of the world since 1500. Major emphasis on Western Civilizations.
- 103: Foundations of Ancient Civilization.** 0-3-3. Interdisciplinary study of major works of ancient Greek and Roman civilization. For HONORS Program students only. Satisfies course work in HIST 101. Also listed as ENGL 103.
- 104: Foundations of Medieval and Renaissance Civilization.** 0-3-3. Interdisciplinary study of major works of Medieval and Renaissance civilization. For HONORS Program students only. Satisfies course work in HIST 102. Also listed as ENGL 104.
- 201: History of the United States, 1492-1877.** 0-3-3. A survey of American history from discovery through Reconstruction.
- 202: History of the United States, 1877 to the Present.** 0-3-3. A survey of American history from Reconstruction to the present.
- 203: Foundations of Modern Civilization.** 0-3-3. Interdisciplinary study of major works of modern civilization. For HONORS Program students only. Satisfies course work in HIST 102. Also listed as ENGL 203.
- 204: Foundations of American Civilization.** 0-3-3. Interdisciplinary study of major works of modern civilization. For HONORS Program students only. Satisfies course work in HIST 201 or 202. Also listed as ENGL 204.
- 333: History of Rome.** 0-3-3. A survey of the political, economic, social, and cultural history of Rome from earliest beginnings through the fifth century AD.
- 360: History of Louisiana.** 0-3-3. A study of Louisiana history from early explorations to the present.

- 395: Junior Seminar in History.** 0-3-3 (6). Introduction to the sources and methods of historical inquiry through in-depth group study of a specific topic, problem, or era. May be repeated for credit as topic changes.
- 402: History of American Foreign Policy.** 0-3-3. A study of the development and expansion of American foreign policy from colonial beginnings to the present. (G)
- 403: History of England to 1688.** 0-3-3. A study of the development of the English people from the earliest times to the accession of William and Mary. (G)
- 404: History of England since 1688.** 0-3-3. A study of English political, social, and economic institutions and policies in the eighteenth, nineteenth, and twentieth centuries. (G)
- 408: Hitler's Germany.** 0-3-3. A study of German history since 1862 with special emphasis on the rise and impact of Adolph Hitler and National Socialism. (G)
- 410: History of Modern Russia.** 0-3-3. A survey of Russian history with special emphasis on twentieth century developments.
- 413: Medieval Europe.** 0-3-3. A survey of Europe from the decline of Rome to the advent of the Renaissance. (G)
- 414: Renaissance and Reformation.** 0-3-3. A study of the political, economic, and cultural evolution of Europe from 1300 to 1648. (G)
- 415: History of the Christian Church.** 0-3-3. A study of the rise and expansion of the Christian Church and its enormous influence on world history. (G)
- 418: Europe in the Era of the French Revolution and Napoleon.** 0-3-3. A study of early modern Europe during the transition from the aristocratic era of the Old Regime to the Age of Revolutions. (G)
- 419: Nineteenth Century Europe.** 0-3-3. A survey of political, economic, and cultural developments in Europe from the defeat of Napoleon I to the outbreak of World War I. (G)
- 420: Twentieth Century Europe.** 0-3-3. A survey of political, economic, and cultural developments in Europe since the outbreak of World War I. (G)
- 423: The Civil War and Reconstruction.** 0-3-3. A study of American history from the beginning of the Civil War to 1877. (G)
- 430: History of the Ancient Near East.** 0-3-3. A survey of the civilizations of the Near East from earliest beginnings to 330 B. C. (G)
- 431: History of Greece.** 0-3-3. A political, economic, social, and cultural study of Greek history from earliest beginnings through the Hellenistic era. (G)
- 432: The Roman Republic.** 0-3-3. A study of the political, cultural, economic, and social history of Rome from earliest beginnings to the end of the Republic. (G)
- 433: The Roman Empire.** 0-3-3. A study of the political, cultural, economic, and social history of Rome during the period of the Empire. (G)
- 436: History of the Modern Near East.** 0-3-3. A history of the Arabic world from the fifteenth century to the present. (G)
- 440: History of Latin America to 1824.** 0-3-3. A survey of Latin American history from European and Indian backgrounds to 1824. (G)
- 441: History of Latin America since 1824.** 0-3-3. A survey of political, economic and social developments in Latin America since 1824. (G)
- 442: History of Mexico.** 0-3-3. A survey of the political, economic, and social evolution of the Mexican nation from its Indian origins to the present. (G)
- 444: History of Central America and the Caribbean.** 0-3-3. The history of Central America and the islands of the Caribbean from 1492 to the present, with emphasis on the historical roots of contemporary problems. (G)
- 447: History of China.** 0-3-3. Traces the development of Chinese civilization from its earliest origins to the present.
- 450: History of the Old South.** 0-3-3. A study of the political, economic, and social development of the antebellum South. (G)
- 451: History of the New South.** 0-3-3. A survey of the major topics of the history of the American South from Reconstruction to the present day. (G)
- 465: Early 20th Century America.** 0-3-3. A study of the social, political and economic development of the United States from 1900 to the end of the New Deal. (G)
- 466: Contemporary America.** 0-3-3. An examination of United States history from World War II to 1960, emphasizing the expansion of America's role in world affairs.
- 467: Vietnam, Watergate and After: America, 1960 to the Present.** 0-3-3. An intensive study of United States history from the troubled 60's to the present. (G)

- 472: History of American Ideas.** 0-3-3. A survey of the major forces and ideas that have shaped American history. (G)
- 474: The American Frontier.** 0-3-3. A study of the American frontier from the colonial period to 1890, with special emphasis on social and economic growth. (G)
- 475: Women in American History.** 0-3-3. A study of women's contributions to American history with special emphasis on the role of women in contemporary society. (G)
- 478: African-American History.** 0-3-3. A survey of how African Americans have contributed to US history and culture from 1500 to the present. (G)
- 480: History of Science.** 0-3-3. Preq., advanced history courses and six hours of science. A descriptive survey of the history of science and its civilizational implications. (G)
- 481: The British Empire.** 0-3-3. A study of the rise and fall of the British Empire, with primary emphasis on South Africa, India, Canada, Australia, and New Zealand.
- 483: The Intellectual and Cultural History of the Western World from the Hellenic Era to the End of the Middle Ages.** 0-3-3. A survey of the philosophical, cultural, religious, scientific, artistic, and literary thought and achievement of western man from the Greeks to the beginning of the Renaissance. (G)
- 484: The Intellectual and Cultural History of the Western World in Modern Times.** 0-3-3. A survey of the philosophical, cultural, religious, scientific, artistic, and literary thought and achievement of western man from the Renaissance to the present. (G)
- 486: Introduction to Public History.** 0-3-3. Theoretical, practical, and career issues related to the practice of history in public venues, including museums, historical sites, and similar professional environments. (G)
- 490: Selected Topics in History.** 0-3-3 (6). Readings, discussions, and lectures in an area of current interest in the discipline of history, with topic designated by instructor. May be repeated for credit as topic changes. (G)
- 495: Senior Seminar in History.** 0-3-3 (6). Advanced consideration of the sources and methods of historical inquiry through in-depth group study of a specific topic, problem, or era. May be repeated for credit as topic changes.
- 505: Introduction to Historical Research and Writing.** 0-3-3. Lectures, readings, discussions, and practical exercises on the sources and methods of professional historical scholarship, with students producing papers based on original research.
- 506: Seminar in American History, to 1877.** 0-3-3 (6). Intensive study of a restricted topic in American history, to 1877 (excluding the American Civil War), with topic designated by instructor. May be repeated for credit as topic changes.
- 507: Seminar in American History, Since 1877.** 0-3-3 (6). Intensive study of a restricted topic in American history, since 1877, with topic designated by instructor. May be repeated for credit as topic changes.
- 510: Independent Study and Research.** 3 hours credit. Independent reading and research in selected history topics.
- 515: Seminar in Louisiana History.** 0-3-3. Selected reading and research in Louisiana History, with particular emphasis on the twentieth century.
- 516: Seminar in Southern History, to 1860.** 0-3-3 (6). Intensive study of a restricted topic in the history of the American South, to 1860, with topic designated by instructor. May be repeated for credit as topic changes. Collaborative: transmission originates @ Tech.
- 517: Seminar on the American Civil War.** 0-3-3. Lectures, readings, discussion, and research on the history of the American Civil War. Collaborative: transmission originates @ ULM.
- 518: Seminar in Southern History, Since 1860.** 0-3-3 (6). Intensive study of a restricted topic in the history of the American South, since 1860 (excluding the American Civil War), with topic designated by instructor. May be repeated for credit as topic changes. Collaborative: transmission originates @ ULM.
- 526: Seminar in American Civilization.** 0-3-3 (6). Intensive study of a restricted topic in the social, cultural, and intellectual history of the United States, with topic designated by instructor. May be repeated for credit as topic changes. Collaborative: transmission originates @ ULM.
- 528: Seminar on American Foreign Relations.** 0-3-3 (6). Intensive study of a restricted topic in the diplomatic history of the United States, with topic designated by instructor. May be repeated for credit as topic changes. Collaborative: transmission originates @ Tech.
- 530: Seminar in Ancient History.** 0-3-3. Selected reading and research topics in Ancient History.

- 535: Seminar in Medieval History.** 0-3-3. Selected reading and research topics in Medieval History.
- 540: Recent European History.** 0-3-3. An intensive study of a restricted subject in recent history (to be chosen by the instructor), with an introduction to scholarly research in this field.
- 543: Seminar in Latin American History.** 0-3-3. Lectures, reading and research on selected topic in Latin American history.
- 545: Seminar in Near East History.** 3 hours credit. Independent study, research, and writing in Near East History, with an introduction to scholarly research in this field.
- 548: Seminar in East Asian History.** 0-3-3. Selected reading and research topics in East Asian History.
- 551: European Traditions, to 1650.** 0-3-3 (6). Intensive study of a topic in the history of Western civilization and culture, with topic designated by instructor. May be repeated for credit as topic changes. Collaborative: transmission originates @ Tech.
- 552: European Traditions, Since 1650.** 0-3-3 (6). Intensive study of a topic in the history of Western civilization and culture, with topic designated by instructor. May be repeated for credit as topic changes. Collaborative: transmission originates @ ULM.
- 560: Seminar in Military History.** 0-3-3 (6). Intensive study of a topic in the history of military institutions, wars, and warfare, with topic designated by instructor. May be repeated for credit as topic changes. Collaborative: transmission originates @ ULM.
- 580: Seminar in the History of Science & Technology.** 0-3-3 (6). Intensive study of a topic in the history of science and technology, with topic designated by the instructor. May be repeated for credit as topic changes. Collaborative: transmission originates @ Tech.
- 595: Current Problems in History.** 0-3-3 (6). Intensive study of an issue, question, topic, or debate of current interest in the historical profession. May be repeated for credit as topic changes.

#### HUMAN ECOLOGY (HEC)

**Courses in the School of Human Ecology are also listed under: Family and Child Studies, Food and Nutrition, and Merchandising and Consumer Studies.**

- 127: Orientation.** 0-1-1 Introduction to roles and responsibilities of College students as preparation for professional careers.
- 267: Practica in Human Ecology.** 1-3 hours credit (3). (Pass/Fail). Preq., Consent of director of practica. Structured experiences in specialized areas of human ecology. Application required.
- 327: Professional Communication and Media Planning in Human Ecology.** 6-1-3. Preq., SPCH 110 or consent of instructor. Application of oral and written communication techniques and skills in promotion of products and services for a variety of publics.
- 398: Seminar in Human Ecology.** 0-1-1. A study of the diverse field of human ecology, including historical perspective, theoretical framework, career opportunities, and current and future trends.
- 405: Family and Consumer Sciences Methods.** 0-3-3. An understanding of the family and consumer sciences education programs with emphasis on philosophy, principles and methods of teaching in family and consumer sciences areas.
- 406: Special Problems in Human Ecology.** 1-3 hours credit (12). Special offerings selected by student with approval of adviser. May be repeated for credit with Dean's permission. (G)
- 415: Seminar in Family and Consumer Sciences Student Teaching.** 0-1-1. Coreq., EDUC 416. Investigation, analysis, and discussion of current problems, philosophy, and trends in family and consumer sciences education.
- 457: Issues in Professional Employment.** 0-1-1. Preparation to assume professional roles in the field of human ecology. Designed to be taken one or two quarters prior to graduation.
- 467: Professional Practica in Human Ecology.** 1-3 hours credit (6). (Pass/Fail). Preq., consent of instructor or director of practica. Structured experiences in specialized areas of human ecology. Application required.
- 477: Practica/Internship/Cooperative Education in Human Ecology.** 1-6 hours credit (9). (Pass/Fail). On site, supervised, structured work experiences located within a 100-mile radius of Ruston. Application and supervision fee required.
- 478: Practica/Internship/Cooperative Education in Human Ecology.** 1-6 hours credit (9). (Pass/Fail). On site, supervised, structured work experiences located within 101-200 mile radius of Ruston. Application and program fee required.

- 479: Practica/Internship/Cooperative Education in Human Ecology.** 1-6 hours credit (9). (Pass/Fail). On site, supervised, structured work experiences located beyond a 201-mile radius of Ruston. Application and program fee required.
- 504: Methodology in Human Ecology Research.** 0-3-3. Techniques and principles of design for experimental and educational research.
- 505: Family, Consumer Sciences, and Early Childhood Education Supervision.** 0-3-3. The value of supervision with emphasis on responsibilities and techniques desirable for effective working relationships with student teachers.
- 506: Special Problems in Human Ecology.** 1-3 hours credit (12). Multi-quarter project Preq. or Coreq., HEC 504 or Statistics. Directed study of adviser approved topics. May be repeated for credit with Dean's permission.
- 507: Graduate Seminar.** 0-1-1 (3). Seminar designed to increase effectiveness of professional written and oral communications, as well as increase knowledge of research.
- 515: Applied and Natural Sciences Teaching Practicum.** 10-1-3. Principles and techniques in teaching a specific area of applied and natural sciences at the post secondary level. Students work with faculty and undergraduate courses in area of specialty. Application required.
- 546: Microcomputer Applications in Professional Practice.** 0-3-3. Preq., one graduate-level statistics course, and M&CS 246 or satisfactory score on computer competency exam. Use of software programs in professional and research settings.
- 551: Research and Thesis.** 3 hours credit or multiples thereof. Maximum credit is 6 hours. Preq. or Coreq., HEC 504 and Statistics.
- 567: Advanced Practice in Human Ecology.** 15-0-3. Preq., graduate student in Human Ecology. Advanced practice experiences enabling students to apply theory in practice settings.

#### INDEPENDENT STUDY (ISTY)

- 498: Readings and Research.** 1-3 (6) hours credit. Preq., admission to Independent Study program. Departmental course for independent research and reading. Offered by each department in the College of Liberal Arts.
- 499: Readings and Research.** 1-3 (6) hours credit. Preq., admission to Independent Study program. Departmental course for independent research and reading. Offered by each department in the College of Liberal Arts.

#### INDUSTRIAL ENGINEERING (INEN)

- 100: Introduction to Industrial Engineering.** 3-0-1. Survey of topics to introduce the student to the profession, the program, and the curriculum.
- 101: Computers in Engineering.** 0-3-3. Functional characteristics of computers and the Internet; overview of programming languages and systems; HTML and JAVA applications; analysis and solution of engineering problems.
- 201: Industrial and Systems Engineering.** 0-3-3. Preq., sophomore standing. An overview of the application of engineering analysis and design principles to industrial and human activity systems.
- 300: Engineering Economics.** 0-2-2. Economic analysis of engineering design alternatives; present, annual, and future worth; internal rate of return and benefit/cost analysis; depreciation and tax consequences; equipment replacement.
- 301: Industrial Cost Analysis.** 0-2-2. Accounting, budgeting, and control of manufacturing costs.
- 400: Engineering Statistics I.** 0-3-3. Preq., MATH 242. Application of probability and distribution theory to various branches of engineering. Confidence intervals, hypothesis testing.
- 401: Engineering Statistics II.** 0-3-3. Preq., INEN 400. Regression analysis, analysis of variances, quality control.
- 402: Introduction to Operations Research.** 0-3-3. Coreq. INEN 400. Linear programming, dynamic programming, project scheduling, network flow, inventory control.
- 404: Operations Research.** 0-3-3. Preq., INEN 400, 402. Industrial engineering applications of queuing theory, critical path methods, project evaluation review technique (PERT), game theory, and inventory systems.
- 405: Industrial Scheduling.** 0-3-3. Techniques for scheduling machines, jobs, personnel, and material in industrial environment.
- 406: Computer Applications in Production Systems.** 0-3-3. Preq., INEN 402. The planning, analysis, and control of production systems. Emphasis is upon high volume discrete production and flexible manufacturing systems.
- 407: Simulation.** 0-3-3. Preq., INEN 400, 404. Discrete simulation methodology, emphasizing statistical basis for simulation modeling and modeling experimentation. Use of simulation modeling language to illustrate model architecture, inference, and optimization.
- 408: Manufacturing Facilities Planning.** 0-3-3. Preq., MEEN 321. Detail planning for facilities location, product development, equipment and manpower requirements, production line analysis, assembly line balancing.
- 409: Work Design.** 3-2-3. Preq., MEEN 321, INEN 400. Methods engineering, work measurement, production standards, workplace analysis and design, ergonomics.
- 410: Manufacturing Systems Management.** 0-3-3. Preq., INEN 400. Operations planning and productivity enhancement techniques for efficient management of manufacturing systems. This course will emphasize capacity planning, materials management, inventory control and warehousing.
- 411: Industrial Engineering Design I.** 0-2-2. Preq., INEN 405, 407, 408, 409, 410, or consent of program chair. Open-ended design problem using industrial engineering skills including work measurement, human factors, quality control, facilities planning, plant layout, operations research, etc.
- 412: Industrial Engineering Design II.** 0-2-2. Preq., INEN 411. Continuation of INEN 411.
- 413: Industrial Robotics and Automated Manufacturing.** 3-2-3. Background, structure, drive systems, effectors and the applications of robots in industrial systems.
- 424: Seminar.** 0-1-1. Instruction and practice in conference-type discussions of technical and professional matters of interest to industrial engineers.
- 425: Industrial Safety.** 0-3-3. Principles of domestic and industrial safety.
- 450: Special Problems.** 1-3 hours credit. Selected topics of current interest in Industrial Engineering not covered in other courses.
- 490: Applications of Artificial Intelligence and Expert Systems in Mechanical and Industrial Engineering.** 3-2-3. Introduction to artificial intelligence, expert systems and their applications in industrial, mechanical and manufacturing engineering systems. (G)
- 499: Technical Enrichment Course.** 3-0-1. Pass/Fail. Varying new technologies. Does not count towards graduation in Industrial Engineering. Contact the program chair for more information.
- 502: Operations Research.** 0-3-3. Applications of linear programming to industrial systems, such as production and inventory control. Sensitivity analysis. Transportation and transshipment algorithms. Parametric linear programming. Convex and integer programming.
- 504: Systems Simulation.** 0-3-3. The use of digital computer programs to simulate the operating characteristics of complex systems. Statistical considerations in sampling from a simulated process.
- 506: Dynamic Programming.** 0-3-3. The principles of optimality. One- and two-dimensional processes Markovian decision processes. Lagrange multiplier technique.
- 507: Engineering Administration.** 0-3-3. Organization of the engineering function. Measurement and evaluation of engineering activities. Project management and control. Development of engineering managers.
- 508: Human Factors in Engineering Systems.** 3-2-3. Testing and instrumentation of human response to environmental conditions. Designing equipment, work place and work environment for economy and effectiveness of human work systems.
- 509: Advanced Engineering Economy.** 0-3-3. Effect of income tax on decision making. Retirement and replacement analysis. Capital management. Elements of economic measurement, analysis and forecasting in the face of uncertainty.
- 510: Advanced Work Measurement.** 3-2-3. Advanced methods improvement and work measurement techniques. Design of complex work systems. Work sampling, construction of standard data and mathematical models of work systems.
- 512: Reliability Engineering.** 0-3-3. Application of statistical theory in engineering design. Testing methods for determining reliability. Design of components and assemblies for reliability.
- 513: Inventory Control.** 0-3-3. Analytical methods of determining reorder size and minimum points of various inventory system. Mathematical models with restrictions and quantity discount. Forecasting techniques and production smoothing.
- 514: Industrial Statistics.** 0-3-3. Application of statistical techniques to industrial problems, relationships between experimental measurements using regression, correlation theories and analysis of variance models.

- 516: Production Planning and Sequencing.** 0-3-3. Advanced methods in production planning. Sequencing criteria and algorithms. Job shop and flow shop sequencing. Computer application and simulation.
- 521: Methods of Optimization.** 0-3-3. District elimination methods of sequential search, even-block search, Fibonacci search and golden section and odd-block search. Pattern search, gradient method and geometric programming.
- 530: Advanced Topics in Manufacturing Automation and Robotics.** 3-2-3. Advanced issues in the strategic approach to product design and manufacturing systems design. Integration of islands of automation. Product design for automation.
- 550: Special Problems.** 1-4 hour(s) credit. Advanced problems in industrial engineering.
- 551: Research and Thesis in Industrial Engineering.** Registration in any quarter may be for three semester hours credit or multiples thereof. Maximum credit allowed is six semester hours.
- 555: Practicum.** 0-3-3 (6). Preq., 12 semester hours of graduate work. Analytical and/or experimental solution of an engineering problem; technical literature survey required; development of engineering research literature.
- 557: Special Topics: Industrial Engineering.** 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of industrial engineering. May be repeated as topics change.

#### INTERIOR DESIGN (IDES)

- 250: Introduction to Interior Design.** 0-2-2. Introductory examination of Interior Design with topical investigations into the process of design, design elements, lighting, color, surface treatments, and space planning.
- 352: Interior Design I.** 6-1-3. Coreq., IDES 350. Studio problems in the space planning and design of interior environments, emphasis on design methodology, materials, furnishing systems, detail drawing and presentation.
- 353: Interior Design II.** 6-1-3. Preq., IDES 352. Continuation of IDES 352. Studio problems in the space planning and design of interior environments, emphasis on design methodology, materials, furnishing systems, detail drawing and presentation.
- 354: Interior Design III.** 6-1-3. Preq., IDES 353. Continuation of IDES 353. Culmination of a three-course series. Studio problems in the space planning and design of interior environments, emphasis on design methodology, materials, furnishing systems, detail drawing and presentation.
- 355: Interior Design Theory & Issues I.** 0-1-1. Preq., Junior standing. Examination and analysis of the formal, contextual, conceptual, and/or operational issues associated with the use of textiles in residential and commercial interiors.
- 356: Interior Design Theory & Issues II.** 0-1-1. Preq., Junior standing. Examination and analysis of the formal, contextual, conceptual, and/or operational issues associated with the use of color in residential and commercial interiors.
- 357: Interior Design Theory & Issues III.** 0-1-1. Preq., Junior standing. Examination and analysis of issues associated with various specialized design practices.
- 451: Furniture Design.** 6-1-3. Original student furniture design concepts are developed through a coordinated study and analysis of function, anthropometric, structures, materials, construction, and industrial processes.
- 452: Interior Design IV.** 6-1-3. Preq., IDES 354. Examination of large scale commercial and/or residential interior projects through detailed design and development emphasizing the integration of interior environments with architectural envelopes.
- 453: Interior Design V.** 6-1-3. Preq., IDES 452. Examination of large scale commercial and/or residential interior projects through detailed design and development emphasizing the integration of interior environments with materials and systems.
- 454: Interior Design VI.** 6-1-3. Preq., IDES 453. Examination of large scale commercial and/or residential interior projects through detailed design and development emphasizing the formal and spatial articulation of interior environments.
- 456: Professional Practices.** 0-3-3. Preq., Junior standing. Preparation for entering the professional practice of interior design; includes office procedures, business ethics, contract documents, specifications, and market sources, etc.
- 457: History of Furniture I.** 0-3-3. Preq., ARCH 211, 222, and 231. History of periods of furniture design from antiquity to industrial revolution,

- including study of dominant influences and characteristics of historical interiors, furnishings, and ornamental design.
- 458: History of Furniture II.** 0-3-3. Preq., IDES 457. A history survey of the development of contemporary design from art Nouveau to the present, including architectural elements, furniture, lighting, wallcovering, flooring, and building materials.
- 500: Design Research Methods.** 0-3-3. Preq., Graduate standing or consent of instructor. An introduction to research methods applicable to the execution of scholarly investigations in the discipline of interior design.
- 510: Interior Design Graduate Studio.** 12-0-4 (12). Preq., Graduate standing. Guided studio projects involving exhibition, furniture, or universal design.
- 520: Interior Design Graduate Research.** 6-1-3 (9). Preq., IDES 500. Guided research projects into various aspects of interior design.
- 530: Interior Design Graduate Seminar.** 0-3-3 (9). Preq., Graduate standing. Reading and discussion of current topics associated with interior design education, research, or practice.
- 540: Graduate Interior Design Internship.** 20-0-6 (18). Preq., Graduate standing and consent of graduate program coordinator. Supervised interior design experience emphasizing application of principles in a research, manufacturing, or practice setting.
- 550: Research & Thesis in Interior Design.** 12-0-4 (12). Preq., IDES 500. Preparation, development, and execution of a well-designed thesis under the supervision of the student's graduate committee.
- 560: Research & Project in Interior Design.** 12-0-4 (8). Preq., IDES 500. Preparation, development and execution of a comprehensive design project under the supervision of the student's graduate committee.
- 570: Graduate Design Exhibition.** 12-0-4. Preq., IDES 560. Preparation and installation of an exhibition of a comprehensive design project or graduate design work.

#### JOURNALISM (JOUR)

- 101: News Writing.** 0-3-3. May be taken with ENGL 101. Beginning course in news writing. Work on "leads" and other newspaper writing basics. Typing ability required.
- 102: News Writing.** 0-3-3. Preq., JOUR 101. Involves principles of interviewing, advanced reporting and specialty writing such as police reporting, consumer reporting and coverage of public affairs.
- 222: Using the Internet for Research.** 0-3-3. Use of the Internet as a means of conducting research, with particular emphasis on the World Wide Web. Discussion and practical application of Internet-based research techniques.
- 310: Copy Editing.** 0-3-3. Preq., JOUR 101. Course dealing with methods of editing copy and the writing of headlines.
- 311: Advanced Copy Editing.** 0-3-3. Preq., JOUR 310. Techniques of newspaper makeup and layout; includes writing headlines, editing wire copy, cropping and sizing photography, principles of makeup and dummyping of pages.
- 320: Feature Writing.** 0-3-3. Preq., JOUR 101, 102. Practical instruction in gathering material for "human interest" and feature articles of various types for magazines as well as newspapers.
- 330: Editorial Writing.** 0-3-3. Preq., JOUR 101. Course in the study of fundamentals and practice in editorial writing. Course includes units on recent history and current events.
- 350: Practical Reporting.** 6-0-2 (4). Open only to journalism majors or minors. Preq., JOUR 101, 102, 310, 320. Writing of articles for the university newspaper upon assignment or consultation with faculty supervisor. May be repeated for two additional semester hours' credit.
- 353: General Newspaper Work.** 6-0-2 (4). Open only to journalism majors or minors. Preq., JOUR 101, 102, 310, 320. Practical lab work on university newspaper. May be repeated for two additional semester hours credit.
- 355: Practical Reporting.** 6-0-2. Open to majors and minors only. Preq., JOUR 101, 102, 310, 320. Practical lab work on "The Tech Talk." May be repeated for two additional semester hours credit.
- 360: Advertising.** 0-3-3. Fundamental study of advertising principles, including information on major media.
- 375: People and Events.** 0-3-3. Creative writing, as it applies to magazines and newspapers. A "how-to-get-published" primer, with oral and written critiques of work.
- 400: Media and the Law.** 0-3-3. Preq., 9 hours of JOUR. Emphasis on legal rights, responsibilities related to the media, and the public's right to know. Media court cases to be considered.

- 420: Civic Journalism.** 6-1-3. Introduction to concepts of engaging public in civic discussions and information flow using news media. Hands-on experience in news writing and data collection and analysis.
- 440: Media and Culture.** 3-2-3. Impact of mass media on culture through lectures and laboratory experiences. Examination of historical context and current processes that shape media and culture.
- 450: Public Relations.** 0-3-3. Comprehensive approach into diverse functions of the practitioner as a specialist, analyst and counselor relevant to public relations' role involving monitoring public opinion.
- 451: Advanced Practical Reporting.** 6-0-3. Junior and senior majors only and by permission of instructor. Consists of practical news work in professional media, work ranging from basic news beat coverage to news writing.

#### LIBERAL ARTS (LBAR)

- 189: Special Topics.** 1-4 hours credit (4). Selected topics in an identified area of study in the College of Liberal Arts. May be repeated for credit.
- 194: Special Topics.** 1-4 hours credit (4). Selected topics in an identified area of study in the College of Liberal Arts. May be repeated for credit.
- 289: Special Topics.** 1-4 hours credit (4). Selected topics in an identified area of study in the College of Liberal Arts. May be repeated for credit.
- 294: Special Topics.** 1-4 hours credit (4). Selected topics in an identified area of study in the College of Liberal Arts. May be repeated for credit.
- 389: Special Topics.** 1-4 hours credit (4). Selected topics in an identified area of study in the College of Liberal Arts. May be repeated for credit.
- 394: Special Topics.** 1-4 hours credit (4). Selected topics in an identified area of study in the College of Liberal Arts. May be repeated for credit.
- 435: Undergraduate Research.** 1 - 3 hours credit (6). Introduction to methods of research. Preq., consent of instructor. Credit depends on nature and depth of problem assigned.
- 489: Special Topics.** 1-4 hours credit (4). Selected topics in an identified area of study in the College of Liberal Arts. May be repeated for credit.
- 494: Special Topics.** 1-4 hours credit (4). Selected topics in an identified area of study in the College of Liberal Arts. May be repeated for credit.
- 500: Orientation to Professional Practice.** 0-3-3. This course will familiarize graduate students with the principal issues concerning professional practice in their chosen fields of study.
- 503: Special Problems.** 1-3 hours credit (6). Independent study. Topics arranged to meet the needs of the student.
- 551: Research and Thesis.** 3 hours credit or multiple thereof. Maximum credit allowed is 6 hours.
- 589: Special Topics.** 1-4 hours credit. Preq., graduate standing. Selected topics in an identified area of study in the College of Liberal Arts.
- 594: Special Topics.** 1-4 hours credit. Preq., graduate standing. Selected topics in an identified area of study in the College of Liberal Arts.

#### LIBRARY SCIENCE (LSCI)

- LSCI courses numbered 300 and 400 are open only to juniors and seniors.
- 201: Books and Materials for the Elementary School.** 0-3-3. A study of the reading interests of children. Selection and evaluation, sources and use of materials with children. Extensive reading of children's books.
- 210: Libraries and Librarianship.** 0-3-3. Introductory survey of libraries and librarianship designed for students entering the profession.
- 401: School Library Administration.** 0-3-3. Administration of the school library with emphasis on planning for effective use of library services and materials in cooperation with instructional staff. (G)
- 402: Acquisition and Organization of Library Materials.** 0-3-3. Preq., LSCI 401 or consent of instructor. Basic principles of cataloging and classifying print and non-print materials. Study of Dewey Decimal Classification System. (G)
- 403: Introduction to Reference Materials and Service.** 0-3-3. Selection, evaluation and use of basic reference works. Practice in solution of typical reference problems. Emphasis on school library as learning center. (G)
- 405: Books and Materials for the Young Adult.** 0-3-3. Selection, evaluation, and source utilization of print and non-print materials meeting the needs of the young adult. Extensive reading of books for the young adult. (G)
- 435: Internship in Library Science.** 1-3 hours credit (6). Preq., twelve semester hours of Library Science. Supervised library science experience in the elementary or secondary school. (Pass/Fail).

- 440: Library Automation.** 0-3-3. Preq., LSCI 210, 302 or consent of instructor. Planning and implementing automated library procedures using the most current technology. (G)
- 450: Literature for Children.** 0-3-3. Designed to relate understanding of child development to knowing and using print and non-print materials with children. Practical experience in story-telling and creative drama. (G)
- 451: Workshop in School Librarianship.** 0-3-3 (6). Preq., professional school experience and consent of instructor. An in-depth study of school library learning center programs. May be repeated for credit when topics vary. (G)

#### LOUISIANA EDUCATION CONSORTIUM (LEC)

- 700: Introduction to Doctoral Research Design.** 0-3-3. This course is designed to extend the student's knowledge of and expertise in areas of research design, style, and format of writing a dissertation as well as use of graduate electronic resources and statistical analysis.
- 701: Utilizing Technology for Statistical Analysis in Education.** 0-3-3. This course surveys procedures for using the computer in text editing, data management, and statistical processing of research data.
- 702: Evaluation Theory and Practice.** 0-3-3. This course investigates the theories and practices associated with performance evaluation, focusing on individual, instrument, and program evaluation and the decision-making processes associated with each.
- 703: Qualitative Research in Education.** 0-3-3. This course examines theories and methods of qualitative educational research, including ethnography, case studies, interview studies, and document analysis.
- 704: Sociocultural Issues in Education.** 0-3-3. This course examines and analyzes sociocultural issues relating to the delivery of educational services in school districts with diverse student populations.
- 705: Problem Solving and Decision-Making Processes.** 0-3-3. Applied strategies and techniques involved in problem-solving behaviors are presented. Models of decision-making are explored with emphasis on methods and processes in decision-making.
- 706: Interpersonal Communication and Conflict Resolution.** 0-3-3. Methods and styles of positive interpersonal communication and techniques and methods of conflict resolution utilized by administrators and faculty are presented.
- 707: Curriculum Theory and Design.** 0-3-3. This course focuses on school curriculum theory, design, revision, reform and critical issues.
- 708: Models of Teaching: Theories and Application.** 0-3-3. Preq., LEC 707 or concurrent enrollment. This course builds the requisite knowledge and skills for selecting and implementing various teaching models congruent with specific teaching and learning needs.
- 709: Research on Effective Teaching and Learning.** 0-3-3. This course examines research-based theories and practices of teaching and learning, including diagnosing student needs and selecting appropriate learning strategies.
- 710: Foundations and Procedures for Professional Development.** 0-3-3. This course focuses on analysis of the professional environment with emphasis on procedural strategies for professional development as evidenced by teaching, service, and research.
- 711: Advanced Theory and Research in Educational Leadership.** 0-3-3. Conceptual models used to define and explain learning organizations and the investigation of leadership roles, strategies, and methods.
- 712: Advanced Principles of Organization and Administration of Schools.** 0-3-3. Organization and administration of schools, including fundamental concepts of organization, administration, and management are explored.
- 713: Foundations of Human Resource Development.** 0-3-3. Theories of human resource development and exemplary models are identified and analyzed. Utilization of human resource information system technology is included.
- 714: Policy Analysis and Power Structure.** 0-3-3. Educational policy processes in school administration and supervision, authority and responsibility, public policy, power structure, school boards, principalships, and superintendency roles are presented.
- 715: Advanced Content Methodology and Techniques.** 0-3-3. This course analyzes and evaluates content-specific methods, techniques, and trends for early childhood, elementary, middle and secondary education.
- 716: Problems and Issues in Curriculum and Instruction.** 0-3-3. This course analyzes and evaluates current curriculum concepts and designs as well as major trends in curriculum and instruction for K - 12 settings.

- 717: Grants Planning and Management.** 0-3-3. Strategies are presented to identify relevant funding sources at the local, regional, and national levels and to prepare, submit, and manage effective proposals.
- 718: Principles and Practices in Instructional Supervision.** 0-3-3. Strategies and techniques of supervising instruction are presented and reviewed. Models of supervising instructional programs are analyzed, interpreted, and evaluated.
- 750: LEC Cognate/Elective.** 1-6 hours credit. Course number used to register and pay fees for cognates and approved electives, which are not listed in the respective course databases of LEC member institutions. Course number is replaced at the end of the enrollment period by actual cognates/electives titles.
- 776: Doctoral Internship Seminar.** 0-3-3. This seminar is designed to enable students to demonstrate and apply knowledge bases and dispositions acquired/refined in the other program components and courses and to share their internship experiences with other students.
- 777: Internship.** 3-6 hours credit (Pass/Fail). This course is a supervised on-site educational experience in curriculum, instruction, supervision, or administration.
- 788: Research Design Seminar.** 0-3-3 (6). This course is a research seminar concentrating on the selection and utilization of qualitative and quantitative field-based research designs.
- 799: Dissertation.** 3 hours credit (12).

#### MANAGEMENT (MGMT)

- 201: Supervisory Techniques.** 0-3-3. Basic supervision of small employee groups including employee hiring and dismissal, planning and organizing work assignments, evaluating performance, necessary records, and legal aspects.
- 310: Management of Organizations.** 0-3-3. Preq., junior standing. Introduction to fundamental principles of management practice with a particular emphasis on developing an understanding of human behavior in organizations.
- 333: Operations Management.** 0-3-3. Preq., QA 233. Concepts and strategies concerning the management of production and operations processes in manufacturing and service organizations; capacity; quality and inventory management; planning and control systems.
- 340: Small Business Management and Entrepreneurship.** 0-3-3. Organizing and operating the small business, with special attention to personal qualifications, capital requirements, location, sources of assistance. MGMT 350 at GSU.
- 400: Entrepreneurship/New Venture Creation.** 0-3-3. A study of the entrepreneur's role in business, including an introduction to the process of developing an idea into a feasible business plan.
- 401: Internship in Management I.** 3 hours credit. (Pass/Fail) Preq., consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 402: Internship in Management II.** 3 hours credit. (Pass/Fail) Preq., consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 419: Collective Bargaining.** 0-3-3. Preq., ECON 202 or 215 or consent of instructor. History of American labor union movement, collective bargaining, labor-management problems, and government and labor relations. Considerable emphasis is given to case studies. MGMT 320 at GSU. (G)
- 447: Personnel Law.** 0-3-3. A survey of landmark cases involving the labor movement, federal and state wage and hour laws, industrial relations and current issues in personnel law. (G)
- 460: Purchasing and Materials Controls.** 0-3-3. Preq., MKTG 300. Principles of procurement and analysis of purchasing problems, with emphasis on quality and quantity control, pricing policy inspection, and standards of performance. (G)
- 470: Personnel Management.** 0-3-3. A study of the functions and procedures in personnel management with emphasis on the procurement, development, maintenance and utilization of the work force. (G)
- 472: Compensation Systems.** 0-3-3. Design of total compensation systems with emphasis on compensation policies, programs, and practices including job analysis, position descriptions, job evaluation and job design.
- 475: Industrial Management.** 0-3-3. Preq., MGMT 333. Management principles as applied to industrial production with emphasis on manufacturing strategy, just in time, quality control, scheduling, plant layout, and supplier relations. (G)
- 476: Systems and Operations Management.** 0-3-3. Preq., MGMT 333. Advanced studies and problems in the planning, management, and control of industrial operations. Scheduling, capacity, and shop floor control are emphasized. (G)
- 478: Seminar in Personnel and Industrial Relations.** 0-3-3. Preq., MGMT 470. Readings, problems and cases in human resource management. Analysis of current problems and future prospects are emphasized. (G)
- 485: International Business Management.** 0-3-3. Readings and cases in international business: governmental activities, regionalism, market opportunities, structure of international companies, company intelligence, human relations, operating policies, procedures and problems. (G)
- 510: Contemporary Management.** 0-3-3. An analysis of management principles, functions, and practices with a particular emphasis on the application of theory to contemporary management issues and problems.
- 537: Human Resources Management.** 0-3-3. Preq., MGMT 510 or consent of instructor. An advanced course in human resource management with an emphasis on personnel functions, within the context of the strategy, structure, and environment of contemporary organizations.
- 539: Organization Theory.** 0-3-3. Preq., MGMT 510 or consent of instructor. A macro approach to the study of complex organization emphasizing current research findings.
- 544: Advanced Production and Operations Management.** 0-3-3. Preq., MGMT 510 or consent of instructor. An in-depth analysis of production/operations concepts, methods, and techniques from a systems perspective.
- 547: Seminar in Industrial Relations.** 0-3-3. Preq., MGMT 510 or consent of instructor. An in-depth study of current issues in the area of labor-management relations.
- 550: Directed Study in Management.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of management.
- 560: Materials Management.** 0-3-3. Preq., MGMT 510 or consent of instructor. Basic concepts of the materials management function including quality management, MRP II, scheduling, inventory management, purchasing, materials handling, JIT, and manufacturing strategy.
- 571: Organizational Behavior.** 0-3-3. Preq., MGMT 510 or consent of instructor. A seminar with emphasis on theories and concepts of the behavioral sciences relevant to the internal operations of the organization.
- 580: Seminar in Venture Assessment and Management.** 0-3-3. Preq., MGMT 510 or consent of instructor. An in-depth seminar applying the tools of analysis from functional business areas to the problems of proposed and existing firms utilizing actual cases.
- 595: Administrative Policy.** 0-3-3. Preq., ACCT 505, CIS 510, ECON 510, FINC 515, MGMT 510, MKTG 530, QA 525. A synthesis of the material covered in the courses required for the MBA. Specific problems and cases are used to develop executive decision-making.
- 601: Research Methods I.** 0-3-3. Preq., QA 605. An in-depth study of principles, theories, objectives, techniques, and problems as applied in social science research.
- 602: Research Methods II.** 0-3-3. Preq., QA 610 and MGMT 601 or MKTG 601. A course designed to introduce the student to the collection, analysis, and interpretation of survey research data with an emphasis on the application of multivariate statistical techniques.
- 610: Current Research Issues in Management.** 0-3-3. A seminar emphasizing the nature of theory and theory development and the analysis of current theoretical and empirical literature within the field of management.
- 615: Seminar in Behavioral Research Methodology.** 0-3-3. May repeat one time for credit. Analysis and intensive study of research and research methodology utilized in the behavioral sciences. The method of science as applied to management is emphasized.
- 620: Doctoral Seminar in Research.** 0-3-3 (6). May be repeated one time for credit. Research on individual topics. Should be taken near completion of course work.
- 629: Organization Theory.** 0-3-3. Preq., MGMT 510 or consent of instructor. Requires Doctoral standing. May require additional class meetings. A macro approach to the study of complex organization emphasizing current research findings. Credit will not be given for MGMT 629 if credit is given for MGMT 539.
- 637: Human Resources Management.** 0-3-3. Preq., MGMT 510 or consent of instructor. Requires Doctoral standing. May require additional class meetings. An advanced course in human resource management with an emphasis on personnel functions, within the context of the strategy,

structure, and environment of contemporary organizations. Credit will not be given for MGMT 637 if credit is given for MGMT 537.

- 639: Seminar in Strategy & Organizational Theory.** 0-3-3. Preq., MGMT 510 or consent of instructor. A doctoral seminar focusing on strategy and organization theory with emphasis on theoretical and empirical research and its application.
- 644: Advanced Production and Operations Management.** 0-3-3. Preq., MGMT 510 or consent of instructor. Requires Doctoral standing. May require additional class meetings. An in-depth analysis of production/operations concepts, methods, and techniques from a systems perspective. Credit will not be given for MGMT 644 if credit is given for MGMT 544.
- 645: Evolution of Management Thought.** 0-3-3. Preq., MGMT 510 or consent of instructor. Seminar with emphasis on important contributions to modern management thought as evidenced in the writings of major contributors.
- 647: Seminar in Industrial Relations.** 0-3-3. Preq., MGMT 510 or consent of instructor. Requires Doctoral standing. May require additional class meetings. An in-depth study of current issues in the area of labor-management relations. Credit will not be given for MGMT 647 if credit is given for MGMT 547.
- 650: Directed Study in Management.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of management.
- 660: Materials Management.** 0-3-3. Preq., MGMT 510 or consent of instructor. Requires Doctoral standing. May require additional class meetings. Basic concepts of the materials management function including quality management, MRP II, scheduling, inventory management, purchasing, materials handling, JIT, and manufacturing strategy. Credit will not be given for MGMT 660 if credit is given for MGMT 560.
- 671: Organizational Behavior.** 0-3-3. Preq., MGMT 510 or consent of instructor. Requires Doctoral standing. May require additional class meetings. A seminar with emphasis on theories and concepts of the behavioral sciences relevant to the internal operations of the organization. Credit will not be given for MGMT 671 if credit is given for MGMT 571.
- 680: Seminar in Venture Assessment and Management.** 0-3-3. Preq., MGMT 510 or consent of instructor. Requires Doctoral standing. May require additional class meetings. An in-depth seminar applying the tools of analysis from functional business areas to the problems of proposed and existing firms utilizing actual cases. Credit will not be given for MGMT 680 if credit is given for MGMT 580.
- 685: Comprehensive Exam in Management.** No credit. Doctoral standing required. Required for all business administration doctoral students seeking to take the comprehensive exam in management. Successful completion is a prerequisite to the oral comprehensive exam for those seeking a primary field or examined minor in management. Requires consent of graduate director.

#### MARKETING (MKTG)

- 235: Fundamentals of Retail Store Operation.** 0-3-3. An introduction to operation of retail stores; retail salesmanship, purchasing control, and supervision.
- 300: Marketing Principles and Policies.** 0-3-3. Preq., ECON 202 or 215 and junior standing. Marketing functions; institutions; policies and strategies with their business, economic, and social implications.
- 307: Salesmanship.** 0-3-3. Preq., junior standing. A study of the selling process with emphasis on the economic aspects of salesmanship and the role of the salesman in buyer-seller relationships.
- 320: Consumer Behavior.** 0-3-3. Preq., junior standing. A study of the consumer and the relation to the marketing process.
- 401: Internship in Marketing I.** 3 hours credit. (Pass/Fail) Preq., consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 402: Internship in Marketing II.** 3 hours credit. (Pass/Fail) Preq., consent of instructor and senior standing. On site, supervised, structured work experiences in the field of business.
- 420: Business Advertising.** 0-3-3. Preq., MKTG 300. A study of the analysis of principles of successful advertising enabling the student to appraise their effectiveness as marketing tools and their social and economic significance. (G)
- 425: Sales Management.** 0-3-3. Preq., MKTG 307 or consent of instructor. Relation of sales department to other departments; types of sales

organizations, management of sales force; market analysis; price policies, sales budgets; distribution costs.

- 435: Retailing Management.** 0-3-3. Preq., MKTG 300 and senior standing. Merchandise distribution by retail organization; emphasis on retailing in the distributive system and problems of management and control. (G)
- 473: Marketing Administration.** 0-3-3. Preq., MKTG 320, 420, or 435, or consent. An in-depth analysis and use of marketing principles to construct marketing plans and decisions utilizing current studies, readings, and simulations.
- 482: Marketing Research.** 0-3-3. Preq., QA 233. A consideration of marketing research as a management tool; application of research techniques to various marketing problems. (G)
- 485: International Marketing.** 0-3-3. Preq., MKTG 300 or consent of instructor. International marketing opportunities and principles; marketing tools as a means of adapting the individual domestic business firm and its marketing methods to the international environment. (G)
- 530: Marketing Management.** 0-3-3. A course to introduce the student to the role of the marketing manager in the development and implementation of strategies in the areas of products, pricing, channels, and promotion.
- 533: Advanced Marketing Research.** 0-3-3. Preq., MKTG 530 or consent of instructor. An in-depth study of research philosophy, theory, objectives, techniques, and problems as applied to marketing.
- 534: Marketing Dynamics.** 0-3-3. Preq., MKTG 530 or consent of instructor. A course designed to examine the marketing organism and its adjustments to the legal, political, economic, social, and cultural environment.
- 537: Seminar in Buyer Behavior.** 0-3-3. Preq., MKTG 530 or consent of instructor. An in-depth examination of the conceptual and theoretical foundations of consumer and industrial buyer behavior.
- 550: Directed Study in Marketing.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of marketing.
- 600: Survey of Marketing Theory & Practice.** 0-3-3. Preq., MKTG 530 or consent of instructor. A survey of marketing literature examining the evolution of marketing theory and theoretical and empirical research including the philosophy of science, promotion, buyer behavior, distribution, ethics, global marketing, pricing, product development, and marketing strategy.
- 601: Research Methods I.** 0-3-3. Preq., QA 605. An in-depth study of principles, theories, objectives, techniques, and problems as applied in social science research.
- 602: Research Methods II.** 0-3-3. Preq., QA 610 and MGMT 601 or MKTG 601. A course designed to introduce the student to the collection, analysis, and interpretation of survey research data with an emphasis on the application of multivariate statistical techniques.
- 610: Seminar in Price Policies.** 0-3-3. Problems and practices involved in formulating and administering price policies.
- 615: Seminar in Marketing.** 0-3-3 (6). May be repeated one time for credit. An examination of concepts and research findings related to selected topics in marketing. Presentation and critical evaluation of reports from related disciplines.
- 633: Advanced Marketing Research.** 0-3-3. Preq., MKTG 530 or consent of instructor. Requires Doctoral standing. May require additional class meetings. An in-depth study of research philosophy, theory, objectives, techniques, and problems as applied to marketing. Credit will not be given for MKTG 633 if credit is given for MKTG 533.
- 634: Marketing Dynamics.** 0-3-3. Preq., MKTG 530 or consent of instructor. Requires Doctoral standing. May require additional class meetings. A course designed to examine the marketing organism and its adjustments to the legal, political, economic, social, and cultural environment. Credit will not be given for MKTG 634 if credit is given for MKTG 534.
- 637: Seminar in Buyer Behavior.** 0-3-3. Preq., MKTG 530 or consent of instructor. Requires Doctoral standing. May require additional class meetings. An in-depth examination of the conceptual and theoretical foundations of consumer and industrial buyer behavior. Credit will not be given for MKTG 637 if credit is given for MKTG 537.
- 650: Directed Study in Marketing.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of marketing.
- 685: Comprehensive Exam in Marketing.** No credit. Doctoral standing required. Required for all business administration doctoral students seeking to take the comprehensive exam in marketing. Successful completion is a prerequisite to the oral comprehensive exam for those

seeking a primary field or examined minor in marketing. Requires consent of graduate director.

### MATHEMATICS (MATH)

**099: Preparation for College Mathematics.** 0-4-4. Required if Mathematics ACT score is less than 18, or Mathematics SAT is less than 430, unless a passing score is achieved on Placement Exam A. Real numbers; exponents; polynomials and factoring; algebraic fractions; linear equations and inequalities; quadratic equations; graphing; radicals. (Pass/Fail)

**100C/100B: College Algebra.** 0-5-5. Preq., Mathematics ACT score between 18 and 21 inclusive, or Mathematics SAT score between 430 and 510 inclusive, or Placement by Exam to bypass MATH 099, or successful completion of MATH 099. MATH 100B-C covers the same material as MATH 101 and includes additional supplementary review material. **Credit will not be given for MATH 100B-C if credit is given for MATH 101.**

**MATH100C:** 0-3-3. Radical expressions; rational exponents; complex numbers; quadratic, absolute value, rational equations; systems of linear equations; inequalities; functions; conics; graphs; inverse, exponential, logarithmic functions; applications. **Concurrent enrollment in the corresponding section of MATH 100B is required.**

**MATH100B:** 2-0-2. (Pass/Fail) Supplementary review material including rational exponents, integer exponents, multiplying polynomials, factoring, rational expressions. **Concurrent enrollment in the corresponding section of MATH 100C is required.** A grade of S will be assigned in MATH 100B if and only if the student earns a minimum grade of D in MATH 100C. A student who drops MATH 100C and wishes to continue attending class to be better prepared for repeating MATH 100B-C may remain enrolled in MATH 100B for the remainder of the quarter. Such a student who does continue to attend class will be assigned a grade of NC in MATH100B.

**101: College Algebra.** 0-3-3. Preq., Mathematics ACT score is greater than or equal to 22, or Mathematics SAT score is greater than or equal to 520. Radical expressions; rational exponents; complex numbers; quadratic, absolute value, rational equations; systems of linear equations; inequalities; functions; conics; graphs; inverse, exponential, logarithmic functions; applications. Credit will not be given for both MATH 100 and MATH 101.

**111: Precalculus Algebra.** 0-3-3. Preq., Mathematics ACT score is greater than or equal to 26, or Mathematics SAT score is greater than or equal to 590, or Placement by Exam, or MATH 101. Precalculus functions, graphs; miscellaneous equations, inequalities; polynomial functions; conic sections; exponential, logarithmic equations; systems of equations; matrices; determinants; sequences; series.

**112: Trigonometry.** 0-3-3. Preq., Mathematics ACT score is greater than or equal to 26, or Mathematics SAT score is greater than or equal to 590, or Placement by Exam or MATH 101. Solution of right triangles, reduction formulas, functions of multiple angles, trigonometric equations, inverse functions, and complex numbers. Credit will not be given for MATH 112 if credit is given for MATH 212 or 241.

**113: Plane Geometry.** 0-3-3. Preq., MATH 111 or 240. A course in plane Euclidean geometry for a student who is planning to teach high school geometry.

**125: Algebra for Management and Social Sciences.** 0-3-3. Preq., Mathematics ACT score is greater than or equal to 26, or Mathematics SAT score is greater than or equal to 590, or Placement by Exam or MATH 101. Linear and quadratic equations and functions, graphs, matrices, systems of linear equations, mathematics of finance, sets, probability and statistics, exponential and logarithmic functions.

**203: Introduction to Number Structure.** 0-3-3. Preq., MATH 101; Elementary Education majors only. Developing number sense and concepts underlying computation, estimation, pattern recognition, and function definition. Studying number relationships, systems, and theory. Applying algebraic concepts to solve problems.

**204: Conceptual Geometry and Quantitative Analysis.** 0-3-3. Preq., MATH 203; Elementary Education majors only. Studying the geometry of one, two, and three dimensions and applications to problems in the physical world. Exploring probability and statistics in real-world situations.

**212: Applied Technical Mathematics with Calculus.** 0-3-3. Preq., Mathematics ACT score greater than or equal to 26, or Mathematics SAT score is greater than or equal to 590, or Placement by Exam, or MATH

101. Applied trigonometry, vectors, basic applied differential calculus. Credit will not be given for MATH 212 if credit is given for MATH 112.

**220: Applied Calculus.** 0-3-3. Preq., MATH 101 and MATH 112 or Placement by Exam. Functions and graphs, the derivative, applications of derivatives, indefinite integrals, application of definite integrals. Credit will not be given for MATH 220 if credit is given for MATH 222 or 240 or 241 or 242.

**222: Calculus for Business Administration and Economics.** 0-3-3. Preq., MATH 111 or MATH 125 or Placement by Exam. Functions and graphs, the derivative, the indefinite integral and the definite integral; applications as applied to business and economics. Credit will not be given for MATH 222 if credit is given for MATH 220 or 240 or 241 or 242.

**223: Applied Calculus for Electrical Technology.** 0-3-3. Preq., MATH 220. Applications of calculus and differential equations to electrical technology; includes integration techniques, series, differential equations, and transforms.

**240: Mathematics for Engineering & Science I.** 3-2-3. Preq., Mathematics ACT score of 26 or better, or Mathematics SAT score of 590 or better, or Placement by Exam, or MATH 101. Functions, graphs, polynomial functions; trigonometric functions, exponential and logarithmic functions and equations; inverse functions; introduction to analytic geometry; limits; derivatives; continuity. Credit will not be given for MATH 240 if credit is given for MATH 220 or 222.

**241: Mathematics for Engineering & Science II.** 0-3-3. Preq., MATH 240. Differentiation rules; trigonometric reduction formulas, trigonometric equations, derivatives of algebraic, exponential, logarithmic, and trigonometric functions; application of differentiation. Credit will not be given for MATH 241 if credit is given for MATH 112 or 220 or 222.

**242: Mathematics for Engineering & Science III.** 0-3-3. Preq., MATH 241. Optimization, antidifferentiation, definite integrals, techniques of integration, separable differential equations and linear constant coefficient differential equations (homogenous and inhomogenous). Credit will not be given for MATH 242 if credit is given for MATH 220 or 222.

**243: Mathematics for Engineering & Science IV.** 0-3-3. Preq., MATH 242. Areas and volumes, numerical integration, improper integrals, single variable continuous statistics, vectors, three-dimensional coordinates, introduction to multivariate integration.

**244: Mathematics for Engineering & Science V.** 0-3-3. Preq., MATH 243. Triple integrals, space curves, differentiation of functions of several variables, vector calculus, Green's and Stokes' theorem.

**245: Mathematics for Engineering & Science VI.** 0-3-3. Preq., MATH 244. Infinite sequences, power series, Taylor series, elementary partial differential equations, use of series to solve differential equations, Laplace transforms.

**307: Fundamentals of Mathematics.** 0-3-3. Preq., MATH 243. Sets, relations, functions, equations, inequalities, proofs, development of the integers and rational numbers, evaluation of experimental programs in mathematics.

**308: Introduction to Linear Algebra.** 0-3-3. Preq., MATH 244. Matrices, systems of linear equations, vectors, vector spaces, linear transformations, eigenvalues and eigenvectors.

**311: Discrete Mathematics I.** 0-3-3. Preq., MATH 243. Logic, sets, functions, finite and infinite sets, permutations and combinations.

**312: Discrete Mathematics II.** 0-3-3. Preq., MATH 311. Binomial and Multinomial Theorems, principle of inclusion-exclusion, recurrence relations, directed graphs, network flows, and selected topics.

**313: Introductory Numerical Analysis.** 0-3-3. Preq. MATH 243 and knowledge of FORTRAN. Introduction to numerical techniques in finding roots of equations, solving systems of equations, approximating functions, derivatives and integrals.

**318: Introduction to Abstract Algebra.** 0-3-3. Preq., MATH 307. Fundamental set concepts, groups, rings, integral domains, fields, polynomials.

**340: Introduction to Real Analysis.** 0-3-3. Preq., MATH 244 and MATH 311 or 307. A rigorous introduction to the calculus of functions of one real variable.

**401: College Geometry.** 0-3-3. Preq., MATH 113 or equivalent, and MATH 243; or consent of instructor. Logical systems and basic laws of reasoning, axiomatic geometry, geometric transformations, selected Euclidean geometry, non-Euclidean and projective geometries. (G)

**405: Linear Algebra.** 0-3-3. Preq., MATH 308 or consent of instructor. Study of linear systems, matrices, and algebra of matrices, determinants, vector

- spaces and subspaces, linear transformations and representations by matrices. (G)
- 407: Partial Differential Equations.** 0-3-3. Preq., MATH 245. Solution of linear first order equations. Formation and solution of second order problems of parabolic, elliptic, and hyperbolic type. (G)
- 410: Advanced Engineering Mathematics.** 0-3-3. Preq., MATH 245. Mechanical systems and electrical circuits, Fourier series, Laplace transforms, partial differential equations. (G)
- 411: Advanced Engineering Mathematics.** 0-3-3. Preq., MATH 244. Vectors spaces and linear transformations, applications of matrices, vector analysis, calculus of variations. (G)
- 412: Vector and Tensor Analysis.** 0-3-3. Preq., MATH 411 or consent of instructor. The algebra of vectors, differential vector calculus, differential geometry, integration, static and dynamic electricity, mechanics, hydrodynamics, and electricity, tensor analysis and Riemann geometry, further applications of tensor analysis. (G)
- 413: Foundations and Fundamental Concepts.** 0-3-3. Preq., MATH 242, or consent of instructor. Mathematics before Euclid, Euclid's "elements," non-Euclidean geometry, Hilbert's "Grundlagen," algebraic structure, the modern mathematical method, sets, logic and philosophy. (G)
- 414: Numerical Analysis.** 0-3-3. Preq., MATH 308, Knowledge of FORTRAN, or consent of instructor. Roots of polynomial and other nonlinear equations. Solutions of systems of simultaneous equations. Numerical applications of matrix theory and linear algebra. Interpolating polynomials. (G)
- 415: Numerical Analysis.** 0-3-3. Preq., MATH 245 and 414, or consent of instructor. Curve fitting techniques. Function approximation techniques. Numerical differentiation. Numerical integration. Numerical solution of differential equations and systems of differential equations and boundary value problems. (G)
- 416: Abstract Algebra.** 0-3-3. Preq., MATH 318 or consent of instructor. Number theory, equivalences, and congruences, groups, ideals. (G)
- 430: Projective Geometry.** 0-3-3. Preq., MATH 244 and 308, or consent of instructor. Ideal elements, duality, harmonic sets, projectivity, projective theory of conics, theory of poles and polars. (G)
- 440: Linear Programming.** 0-3-3. Preq., MATH 241 and 308, or consent of instructor. Characteristics of linear programming problems, properties of linear programming solutions, the simplex method with variations, optimality analysis, the dual problem, the transportation problem. (G)
- 441: Non-linear Programming.** 0-3-3. Preq., MATH 440. Advanced topics in linear programming, quadratic programming, dynamic programming. (G)
- 445: Theory of Functions of Complex Variables.** 0-3-3. Preq., MATH 244. Complex numbers, analytic functions, elementary functions, mapping elementary functions, integrals, power series, residues, poles, conformal mappings, applications of conformal mappings. (G)
- 450: Ordinary Differential Equations.** 0-3-3. Preq., MATH 245 and 340, or consent. First-order equations, second-order linear equations, general linear equations and systems, existence and uniqueness theorems, plane autonomous systems. (G)
- 460: Number Theory.** 0-3-3. Preq., MATH 318. Divisibility properties of integers, prime numbers, congruences, number theoretic functions. (G)
- 470: Introduction to Topology.** 0-3-3. Preq., MATH 244, or consent of instructor. Introduction of concepts, metric spaces, countability axioms, separation axioms, connectedness, compactness, product spaces, continuous mappings and homeomorphisms, homotopy, quotient spaces. (G)
- 480: Introductory Analysis.** 0-3-3. Preq., MATH 340. A study of functions in metric spaces-limits, continuity, integration, uniform convergence, approximations. (G)
- 490: Topics in Mathematics.** 0-3-3 (6). Various topics in the field of Mathematics. May be repeated for credit. (G)
- 502: Special Functions in Applied Mathematics.** 0-3-3. Preq., MATH 245. Orthogonal functions, solutions of differential equations of Legendre, Gauss, Hermite, Tchebysheff, Laguerre, and Bessel, properties of these solutions, coordinate system, and boundary value problems.
- 507: Partial Differential Equations.** 0-3-3. Preq., MATH 407. Continuation of MATH 407. Existence, uniqueness, and representation of solutions, problems in higher dimensions, Green's formulas, multiple Fourier series, Fourier transforms, boundary value problems in infinite domains.
- 510: Functional Analysis.** 0-3-3. Preq., MATH 405, 470. Linear spaces, normed spaces, metric spaces, Banach spaces, Hilbert spaces.
- 511: Functional Analysis.** 0-3-3. Preq., MATH 510. Linear topological spaces, metric spaces, Banach spaces, Hilbert spaces.
- 515: Numerical Analysis.** 0-3-3. Preq., Consent of instructor. Numerical analysis of problems in linear algebra, norms for vectors and matrices, convergence properties of sequences and series of vectors and matrices, convergence of iterative techniques for linear systems. Numerical differentiation and integration. Numerical solutions of differential equations.
- 520: Theory of Ordinary Differential Equations.** 0-3-3. Preq., MATH 450. Existence and uniqueness theorems, dependence of solutions on a parameter, linear and nonlinear differential equations, differential inequalities, oscillation and comparison theorems, stability of solutions, perturbation theory.
- 530: Algebraic Topology.** 0-3-3. Preq., MATH 470 and 416. Categories and functors, Eilenberg-Steenrod axioms, construction of the homology and cohomology groups, homology of finite complexes, universal coefficient theorems, Eilenberg-Zilber theorem, the cohomology ring, the cross product operation, fundamental group, higher homotopy groups.
- 544: Modern Operational Mathematics.** 0-3-3. Preq., MATH 245. Theory and applications of transforms of Laplace and Fourier, inverse transforms by complex variable methods. Applications to analysis and linear operations.
- 545: Complex Analysis.** 0-3-3. Preq., MATH 445. Rigorous development of limits, continuity, analyticity, sequences, uniform convergence, power series, exponential and trigonometric functions, conformality, linear transformations, conformal mapping and elementary Riemann surfaces.
- 546: Complex Analysis.** 0-3-3. Preq., MATH 545. Continuation of MATH 545. Fundamental theorems in complex integration, local properties of analytic functions, calculus of residues, harmonic functions, entire functions, normal families, conformal mappings and Dirichlet's problem, elliptic and global analytic functions.
- 550: Algebraic Geometry.** 0-3-3. Preq., MATH 244 and 405, or consent. Homogeneous linear equations and linear dependence, projections and rigid motions, homogeneous cartesian coordinates, linear dependence of points and lines, point geometry and line geometry, harmonic division and cross ratio, one-and-two dimensional projective transformations.
- 551: Research and Thesis in Mathematics.** 3 credit hours (6). Registration in any quarter may be for three semester hours credit or multiples thereof. Maximum credit allowed is six semester hours.
- 562: Advanced Linear Algebra.** 0-3-3. Preq., MATH 405. Eigenvalues, linear functionals, bilinear and quadratic forms, orthogonal and unitary transformations, normal matrices.
- 566: Advanced Abstract Algebra.** 0-3-3. Preq., MATH 416. Concepts from set theory, groups, rings, integral domains, fields, extensions of rings and fields, modules, ideals.
- 574: Numerical Solution for PDE I.** 0-3-3. Preq., MATH 407, 414. Finite difference schemes and their accuracy, stability, and convergence. Schemes for parabolic and hyperbolic PDEs.
- 575: Numerical Solution for PDE II.** 0-3-3. Preq., MATH 407, 414, 574. Finite difference schemes for elliptic PDEs, iterative methods, and introduction to finite element methods and multigrid methods.
- 578: Probability Theory.** 0-3-3. Preq., MATH 480 or consent of instructor. Probability spaces and random variables, characteristic functions and distribution functions, probability laws and types of laws, limit distributions, independent and dependent sums of random variables.
- 580: Mathematical Analysis.** 0-3-3. Preq., MATH 480. Real number system, measures with emphasis on Lebesgue measure, abstract integration with emphasis on the Lebesgue integral.
- 581: Mathematical Analysis.** 0-3-3. Preq., MATH 580. Metric Spaces, Topological Spaces and Banach Spaces.
- 584: Topics in Algebra.** 0-3-3 (15). May be repeated for 3 hours credit each time.
- 586: Topics in Analysis.** 0-3-3 (15). May be repeated for 3 hours credit each time.
- 587: Topics in Applied Mathematics.** 0-3-3 (15). May be repeated for 3 hours credit each time.
- 588: Topics in Topology.** 0-3-3 (15). May be repeated for 3 hours credit each time.
- 599: Graduate Training Seminar.** 0-3-3 (15). Preq., Consent of instructor. Guided and/or directed study, readings, discussion, observation, and training in the teaching of college mathematics. (Pass/Fail)
- 655: Mathematical Modeling.** 0-3-3. Preq., MATH 245 and STAT 620, or consent of instructor. Building deterministic and probabilistic models; applications from physical and life sciences. Transient and stationary models, stability, and optimal solutions. Model validation: acceptance, improvement, or rejection.

**MECHANICAL ENGINEERING (MEEN)**

- 215: Engineering Materials Laboratory.** 3-0-1. Coreq., MEMT 201. A laboratory course studying the experimental behavior of engineering materials. Labs will include hardness testing, impact testing, tensile testing, and heat treating of materials.
- 292: Mechanical Engineering Computer Applications.** 0-3-3. Preq., credit or registration in MATH 245. Application of modern computer programming principles to mechanical engineering problems. Numerical solutions of linear and nonlinear algebraic equations, numerical quadrature problems, and ordinary differential equations.
- 321: Manufacturing Processes.** 3-1-2. Preq., MEMT 201 and MEEN 351. A study of the processes used in manufacturing machine parts. Designing for manufacturability. Laboratory is operational practice and demonstrations of machine tool, foundry, and welding.
- 334: Thermodynamics II.** 0-2-2. Preq., ENGR 222. Continuation of ENGR 222. Study of gas mixtures, thermodynamic property relations, chemical reactions, combustion, and thermodynamics of fluid flow.
- 351: Computer-Aided Modeling.** 3-1-2. Preq., MATH 244. Construction of virtual systems models using constructive solid geometry, swept volumes and trimmed parametric surfaces with engineering applications.
- 353: Heat Transfer.** 0-3-3. Preq., MEEN 292 and ENGR 222. Fundamental concepts of heat transfer including conduction, convection, and radiation. Introduction to thermal systems design.
- 361: Advanced Mechanics of Materials.** 0-3-3. Preq., MEMT 211, 312. Theories of stress and strain, failure criteria, energy methods, design for static strength, design for fatigue strength.
- 363: Dynamics of Machine Elements.** 0-3-3. Preq., MEMT 312. Kinematics and kinetics of machine elements such as linkages, cams, and gear trains.
- 371: Dynamic Systems.** 3-2-3. Preq., MEEN 292, MEMT 312; Coreq., ENGR 222. Modeling and design of dynamic mechanical and fluid systems. Introduction to linear vibrations and automatic controls. Numerical and Laplace transform solutions to ordinary differential equations.
- 382: Basic Measurements.** 3-1-2. Preq., ENGR 221. Techniques and instruments for making and analyzing measurements in engineering.
- 400: Mechanical Engineering Seminar.** 3-0-1. Preq., Senior standing. Professionalism, ethics, and service for mechanical engineers.
- 413: Composite Materials Design.** 0-3-3. Preq., MEEN 361. An introduction to modern composite materials. Application of lamination theory to analysis of composites. Deformation and failure of composites. Structural design using composite materials. (G)
- 414: Failure Analysis.** 0-3-3. Preq., MEEN 361. An introduction to failure analysis. Using analysis of failed parts to determine the cause of failure. Using failure analysis techniques to design to avoid failure.
- 432: Renewable Energy Design.** 0-3-3. Preq., MEEN 334 or equivalent. Analysis and design of systems, which utilize renewable energy sources, such as solar energy, wind energy and geothermal energy. (G)
- 434: Cryogenic Systems.** 0-3-3. Preq., MEEN 334 or equivalent. Analysis and design of systems which produce, maintain, or utilize low temperatures; liquefaction systems; refrigeration systems; separation and purification systems; storage systems. (G)
- 435: Internal Combustion Engines.** 0-3-3. Preq., MEEN 334. Theory of IC engines. Fuels, combustion and thermodynamics. Carburation and fuel injection. Lubrication. Mechanical design of a typical engine. (G)
- 436: Air Conditioning and Refrigeration.** 0-3-3. Preq., MEEN 334 and 353. Analysis and design of heating, ventilating and air conditioning systems for residential, commercial, and industrial applications. (G)
- 446: Advanced Fluid Mechanics.** 3-2-3. Preq., MEMT 313 and MATH 245. Principles of viscous fluid flow including dimensional analysis and similarity, duct flows, boundary layer flow, turbomachinery, flow measurement and control and design of fluid systems. (G)
- 448: Gas Dynamics.** 0-3-3. Preq., MEEN 334 and MATH 245. Study of the fundamental laws applied to compressible fluid flow. Isentropic flow, normal and oblique shocks, Prandtl-Meyer, Fanno, Rayleigh flow and supersonic design. (G)
- 450: Special Problems.** 1-4 hours credit. Preq., senior standing and consent of instructor. Topics selected will vary from term to term for the purpose of covering selected topics of current importance or special interest.
- 451: Thermal Design.** 3-2-3. Preq., MEEN 353 and MEMT 313. Design of thermal components and systems.
- 465: Machine Element Design.** 0-2-2. Preq., MEEN 292 and 361. Application of principles of strength of materials to the design of typical machine elements.
- 467: Computer-Aided Design.** 0-3-3. Preq., MEEN 465 or consent of instructor. An introduction to the application of several modern computing techniques and technologies to the mechanical engineering design process. (G)
- 469: Prevention of Mechanical Failure.** 0-3-3. Preq., MEEN 361. Analysis, prediction and prevention of failures in a structure or machine part during the design phase. (G)
- 475: Mechatronics.** 4-2-3. Preq., MEEN 292, MATH 245 or equivalent. A study of the interface between controllers and physical systems; principles of electromechanical design, digital and analog circuitry, actuation, sensing, embedded control, and real-time programming. (G)
- 476: Feedback Control Systems.** 3-2-3. Preq., MEEN 371. The analysis, design and synthesis of mechanical systems employing feedback control. Methods of determining system stability. Typical mechanical control elements and their transfer functions.
- 477: Mechanical Vibrations.** 3-2-3. Preq., MEEN 371. Introduction to free and forced linear vibration of discrete and continuous mechanical systems. Analysis of translational and rotational systems using analytical and numerical methods.
- 478: Engineering Acoustics.** 0-3-3. Preq., MATH 245. Analysis and design of systems for noise control, including vibration isolation, silencers, room acoustic treatment and acoustic barriers. (G)
- 486: Mechanical Engineering Laboratory.** 3-0-1. Preq., ENGL 463, MEEN 353, 361, 382, MEMT 313. Design and performance of laboratory experiments in mechanical engineering.
- 488: Solids Modeling in Engineering Design.** 0-3-3. Preq., Instructor's consent. Engineering design using 3-d graphics, constructive solid geometry, boundary representations, parametric surfaces and data exchange standards. (G)
- 490: Applications of Artificial Intelligence and Expert Systems in Mechanical and Industrial Engineering.** 3-2-3. Preq., permission of instructor. Introduction to artificial intelligence, expert systems and their application in industrial, mechanical and manufacturing engineering systems. (G)
- 492: Mechanical Engineering Design I.** 3-1-2. Preq., MEEN 215, 321, 451, 465, ENGL 463 and INEN 300. Open-ended design problems calling for the integration of thermal sciences, machine design, economics, etc.
- 494: Mechanical Engineering Design III.** 3-0-1. Preq., MEEN 492. A continuation of MEEN 492.
- 496: Computational Techniques in Mechanical Engineering.** 0-3-3. Preq., MEEN 292. The use of the digital computer in achieving numerical solutions to typical problems in the engineering design and analysis of thermal fluid and mechanical systems.
- 497: Finite Element Methods for Engineers.** 0-3-3. Preq., MEEN 334 and 361. Introduction to approximation methods in engineering using finite elements. Physical and mathematical theory, computer applications. (G)
- 499: Technical Enrichment Course.** 3-0-1. (6) Preq., consent of instructor. (Pass/Fail). May be repeated for a maximum of 6 hours of credit. Varying new technologies. Does not count toward graduation in Mechanical Engineering. Contact the department for more information.
- 500: Energy, Sources and Utilization.** 0-3-3. Energy sources, uses and conservation; physical laws governing energy conversion and energy transfer; economic, political and environmental problems related to energy.
- 502: Advanced Machine Design.** 0-3-3. The study of various topics from advanced mechanics as are applicable in the design of machines.
- 521: Machining Analysis.** 3-2-3. The force and power analysis of material removal processes; analytical and finite element modeling and experimentation to determine process variables and relation to part quality.
- 524: Graduate Seminar.** 0-1-1. Surveys, investigations, and discussions of current problems in mechanical engineering.
- 525: Graduate Seminar.** 0-1-1. Surveys, investigations, and discussions of current problems in mechanical engineering.
- 526: Graduate Seminar.** 0-1-1. Surveys, investigations, and discussions of current problems in mechanical engineering.
- 531: Advanced Thermodynamics.** 0-3-3. Fundamental laws of thermodynamics; entropy and entropy production; kinetic theory of gasses; statistical thermodynamics; quantum thermodynamics for various systems.
- 542: Advanced Heat Transfer I.** 0-3-3. Steady and transient conduction heat transfer; analytical solutions; approximate solutions; numerical methods.

- 543: Advanced Heat Transfer II.** 0-3-3. Continuation of MEEN 542. Principles of forced and natural convection in laminar and turbulent flow; thermal radiation.
- 545: Potential Flow.** 0-3-3. Basic principles and analytical methods for the motion of an inviscid, incompressible fluid. Eulerian equations. Conformal transformation. Mapping of flows. Rotation, circulation, and vorticity.
- 546: Viscous Flow I.** 0-3-3. Study of the governing principles and methods in viscous fluid flow. Solutions of the integral and differential equations for laminar flow. Digital computer applications.
- 547: Viscous Flow II.** 0-3-3. Preq., MEEN 546. Study of transition, turbulence, and compressibility in viscous flow. Theory of stability of laminar flows. Fundamentals of turbulent flow.
- 550: Special Problems.** 1-4 semester hours. Advanced problems in mechanical engineering. The problems and projects will be treated by current methods used in professional practice.
- 551: Research and Thesis in Mechanical Engineering.** 3 hours credit (6). Registration in any quarter may be for three semester hours credit or multiples thereof. Maximum credit allowed is six semester hours.
- 552: Heat Exchanger Design.** 0-3-3. A study of the thermal and mechanical design of heat exchangers, regenerators, and radiators.
- 553: Thermal Stresses.** 0-3-3. Thermal stresses in structures; plane stress problems; thermal stresses in plates and shells; thermoelastic instability; thermal fatigue, creep and inelastic thermal stresses at high temperatures.
- 555: Practicum.** 0-3-3 (6). Preq., 12 semester hours of graduate work. Analytical and/or experimental solution of an engineering problem; technical literature survey required; development of engineering research techniques.
- 557: Special Topics: Mechanical Engineering.** 0-3-3 (9). The topic or topics will be selected by the instructor from the various sub-areas of mechanical engineering. May be repeated as topics change.
- 566: Design Optimization.** 0-3-3. Preq., MEEN 467 or consent of instructor. Constrained nonlinear minimization algorithms applied to mechanical engineering design problems.
- 568: Advanced Vibrations.** 0-3-3. Analytical and numerical treatment of nonlinear and multidegree-of-freedom vibration problems in mechanical engineering.
- 569: Robot Manipulators.** 0-3-3. The application of the basic principles of kinematics, dynamics, automatic control, computer programming, and human factors to the development of general purpose, programmable robot manipulators.
- 571: Advanced Engineering Dynamics.** 0-3-3. Fundamentals of Newtonian dynamics principles of work and energy, D'Alembert's principle, Hamilton's principle, LaGrange equation. Central force motion, virial theorem. Rigid body motion and robotics.
- 575: Advanced Mechanical Systems Controls I.** 0-3-3. The analysis and design of controllers for dynamic mechanical systems. System identification and plant controller response matching. Controllers for typical thermal and mechanical systems.
- 589: Computer Animation in Engineering.** 0-3-3. Preq., MEEN 488. Computer generated animation for display of dynamic simulation or analysis results using solids models and color graphics.
- 591: Mechanical Engineering Analysis I.** 0-3-3. Mathematical modeling of engineering systems. Physical interpretation of ordinary and partial differential equations and methods of solution.
- 592: Mechanical Engineering Analysis II.** 0-3-3. A continuation of MEEN 591 with emphasis on approximate techniques for formulating and solving mathematical models of physical systems.
- 593: Advanced Finite Element Methods.** 0-3-3. Development of the finite methods element using the variational formulation. Applications in structures, fluid mechanics and heat transfer.
- 641: Aerothermodynamics.** 0-3-3. Preq., MEEN 543 and MEEN 547. Study of governing principles of hypervelocity flight. Laminar and turbulent flow of a dissociating gas. Shock-wave boundary-layer interaction. Slip flow. Free-molecular flow.
- 650: Special Problems.** 1-4 semester hours. Preq., Consent of department head. Advanced problems in mechanical engineering. Special problems suitable for doctoral-level work.
- 651: Advanced Cryogenics.** 0-3-3. Preq., MEEN 542. Study of mechanical regenerative cryocoolers and nonmechanical refrigeration systems used to achieve and maintain temperatures below 120 K.
- 672: Advanced Mechanical Systems Controls II.** 0-3-3. Preq., MEEN 575, ELEN 510, or consent of instructor. Control systems for complex,

compliant systems such as industrial robots. Adaptive systems and intelligent controllers.

#### MECHANICAL TECHNOLOGY (METE)

- 215: Thermal Science.** 0-3-3. Preq., MATH 112. Temperature; heat; work; first law of thermodynamics; basic principles of heat transfer.

#### MECHANICS AND MATERIALS (MEMT)

- 201: Engineering Materials.** 0-2-2. Preq., ENGR 122, PHYS 201. A study of the basic principles which relate the internal structure of materials to their mechanical, physical, and electrical properties.
- 206: Statics and Strength of Materials.** 3-2-3. Preq., PHYS 209. Mechanics of rigid and deformable bodies, force systems, stresses and strains, fundamental concepts of static equilibrium, centroids, moments of inertia, and friction, and basic beam design.
- 211: Intermediate Strength of Materials.** 3-1-2. Preq., ENGR 220. Mechanics of deformable bodies. Axial, shear, torsion and bending. Inelastic and indeterminate problems.
- 312: Dynamics.** 0-2-2. Preq., ENGR 220 and PHYS 201. Kinematics and kinetics of particles and solid bodies in rectilinear, rotational and plane motion, energy methods, linear impulse and momentum.
- 313: Elementary Fluid Mechanics.** 3-2-3. Preq., ENGR 220 and MATH 242. Properties of fluids, fluid statics. Continuity, energy, and impulse-momentum equations. Steady flow in pipes and open channels. Fluid measurements. General fluid mechanics/hydraulics laboratory.
- 411: Advanced Engineering Materials.** 0-3-3. Preq., MEMT 201 and MEEN 361 or consent of instructor. An introduction to modern engineering materials. Examination of newer materials such as high strength steels, polymers and composites.
- 508: Finite Element Analysis.** 0-3-3. Linear and nonlinear finite element analysis of continual and discretized structures; use of finite element computer programs to solve typical structural problems.
- 511: Modern Engineering Materials.** 0-3-3. An introduction to modern engineering materials with an emphasis on light weight or high strength materials such as polymers, composites, and high strength steels.
- 563: Theory of Elasticity.** 0-3-3. General equations of elasticity; plane stress and plane strain; torsion and flexure of bars; Hertz contact stresses.
- 564: Plates and Shells.** 0-3-3. Pure bending of plates; laterally-loaded plates; membrane theory of shells; bending of cylindrical and spherical shells.
- 565: Continuum Mechanics.** 0-3-3. Introductory treatment of the fundamental, unifying concepts of the mechanics of continua.
- 577: Advanced Strength of Materials.** 0-3-3. Energy methods, advanced bending theory, torsion, stress concentrations, failure theory and elastic stability.
- 588: Inelastic Deformation.** 0-3-3. Analytical and numerical modeling of inelastic deformation in metals, polymers and ceramics, including plasticity, creep, viscoelasticity, and viscoplasticity.

#### MERCHANDISING AND CONSUMER STUDIES (MCS)

- 108: Professional Career Orientation.** 0-2-2. Structured experiences in career assessment and exploration, leadership, and communication in the professional arena. Open to non-majors.
- 118: Pattern Design and Construction.** 6-1-3. Introduction to basic pattern making techniques, fit, and construction. Some emphasis on techniques, commercial patterns, and ready-to-wear construction.
- 146: Internet for Personal and Family Management.** 0-1-1. An introduction to the use of internet for personal and family activities.
- 218: Analysis of Children's Apparel.** 0-1-1. Analysis of apparel for infants and young children.
- 219: Textiles I.** 0-3-3. Study of fiber properties and production of textiles.
- 238: Apparel Selection and Analysis of Fashion.** 0-3-3. Contemporary apparel needs of individuals and families with recognition of cultural, economic, and psychological factors.
- 246: Microcomputers in Personal and Family Management I.** 3-2-3. An introduction to the use of microcomputers for more effective management of personal and family related tasks.
- 256: Individual and Family Management.** 0-3-3. A systems approach to the management of personal and family resources.
- 258: Professional Selling Experience.** 8.5-1-3. Preq., MCS 108 or consent of instructor. Supervised professional selling experience with emphasis on customer satisfaction and service. Field experience with cooperating firms.

- 268: Apparel Design I.** 3-2-3. Preq., MCS 219. Application of principles related to the creation, fabrication and execution of apparel design.
- 276: Environments for Young Children.** 0-1-1. Preq., FCS 201 or consent of instructor. Principles of housing and equipment applied to creating learning environments for infants and young children.
- 308: Buying.** 0-3-3. Preq., MCS 258. Buying function in retail organizations. Includes merchandising concepts essential for buyers.
- 338: Intermediate Apparel Construction.** 6-0-2. Preq., MCS 118 or consent of instructor. Emphasis on evaluation and use of advanced construction techniques including tailoring and couture methods.
- 348: Merchandising and Computer Management.** 1-2-2. Preq., MCS 246 and 308 or consent of instructor. Procedures and task management for the retailer through computer application.
- 356: Families as Consumers.** 0-3-3. Preq., ECON 215. Application of principles of consumerism to family decisions related to time and money use.
- 366: Consumer Issues.** 0-3-3. Issues that arise between sellers/government and consumers including legislation, regulation and safety issues.
- 388: Media Planning and Promotion.** 3-2-3. Preq., MCS 258 and 348. Study and application of principles of product promotion. Emphasis on coordination of customer targeting, communications, media presentation, and special events.
- 416: Interior Space Planning and Furnishings.** 0-3-3. Preq., MCS 219 or consent of instructor. Study of the furnishings, fixtures, and design components for residential and commercial interiors.
- 419: Textiles II.** 0-3-3. Preq., MCS 219 or consent of instructor. Study of textile products in relation to end-use, product quality, technology and trade regulations. (G)
- 426: Housing Policy.** 0-3-3. Social aspects of housing including zoning, government regulations, and purchase considerations. (G)
- 429: Issues in Merchandising.** 0-3-3. Preq., junior or senior standing. Domestic and international issues affecting merchandising and consumer studies. (G)
- 436: Advanced Individual and Family Management.** 4-2-3. Preq., MCS 256, and advanced junior standing. Planning, coordinating, and evaluating all phases of individual and family management.
- 439: Historic Costume I.** 0-3-3. Development of costume from ancient Egypt through the 17th century, with emphasis on social, economic, and aesthetic influences on its design.
- 440: Historic Costume II.** 0-3-3. Development of costume from 18th century until the present, with emphasis on social, economic, and aesthetic influences. (G)
- 446: Microcomputers in Personal and Family Management II.** 0-3-3. Preq., MCS 246. Advanced study in the use of microcomputers in personal and family management.
- 456: Consumer Decision Making.** 0-3-3. Behavior of the consumer with reference to economic decision making and expenditure patterns relevant to current lifestyles. (G)
- 466: Consumer Relations.** 0-3-3. Preq., HEC 327 or JOUR 450 or consent of instructor. Professional strategies and tactics in consumer studies programs. (G)
- 488: Visual Merchandising.** 3-2-3. Preq., MCS 466 or consent of instructor. Promotion of products through visual merchandising techniques including display and store layout and design.
- 498: Field Study Tour in Merchandising and Consumer Studies.** 3-1-3 (6). Structured educational experiences in major industry centers in the United States and abroad. Application required. (G)
- 516: Family and Consumer Economics Issues.** 0-3-3. (12) Analysis of family and consumer in the larger economic and political systems.
- 528: Consumer Motivation and Factors in Apparel.** 0-3-3. Relationship of consumer behavior to fashion; analysis of factors relative to production, distribution, and consumption of apparel and textiles.
- 536: Consumer Needs of Older Population.** 0-3-3. Issues facing consumer affairs professionals working with the older consumer.
- 556: Current Trends in Consumer Decision Making.** 0-3-3. (12) Preq., MCS 456 or consent of instructor. Recent advances and current research in behavior of the consumer with reference to economic decision making and expenditure patterns relevant to current lifestyles.

#### MICRO SYSTEMS ENGINEERING (MSE)

- 401: Microsystems Principles.** 0-3-3. Fundamentals of microsystems, emphasizing the basic principles, materials, fabrication, measurement, and applications of microsystems.

- 402: Microfabrication Principles.** 0-3-3. Preq., MSE 401. Fundamentals of microfabrication processes for the realization of microelectromechanical and microelectronic devices.
- 403: Microfabrication Applications and Device Fabrication.** 3-2-3. Preq., MSE 402. Microfabrication processes, process integration and applications for the realization of microelectromechanical and microelectronic devices.
- 501: Microsystems Principles.** 0-3-3. Fundamentals of microsystems, emphasizing the basic principles, materials, fabrication, measurement, and applications of microsystems.
- 502: Microfabrication Principles.** 0-3-3. Preq., MSE 501. Fundamentals of microfabrication processes for the realization of microelectromechanical and microelectronic devices.
- 503: Microfabrication Applications and Device Fabrication.** 3-2-3. Preq., MSE 502. Microfabrication processes, process integration and applications for the realization of microelectromechanical and microelectronic devices.
- 511: Vacuum Science & Technology.** 0-3-3. Fundamental and advanced practices of vacuum technology are treated. Ultra high vacuum is included as well as introductory material on thin films and plasma processes.
- 521: Fundamental Lithography Processes.** 0-3-3. A graduate level course in the fundamentals of optical lithography and electron beam lithography.
- 531: Electronic Materials.** 0-3-3. A graduate level course in electronic materials starting from the atomic theory of matter. Applications include the fundamentals of microelectronic and optoelectronic devices.
- 541: Thin Film Deposition & Etching Techniques.** 0-3-3. Fundamentals of deposition and processing of thin films for microstructure and microelectronics. Applications include micromechanical and microelectronic devices.
- 551: Material Analysis & Microstructure.** 0-3-3. A graduate level course in the characteristics of materials based on modern instrumental techniques. Bulk and surface characteristics are included.
- 561: Micro & Nano Scale Measurements.** 0-3-3. A graduate level course in measurements from the millimeter to the atomic scale. Applications include atomic manipulation and nanometer motion control.
- 641: Laser & Ion Beam Processing.** 0-3-3. Direct methods for material processing and microstructure fabrication using laser beams or ion beams are presented. Applications include electronic devices and characterization of materials.

#### MUSIC APPLIED, CLASSES & RECITALS (MUAP)

- 100: General Recital.** 1-0-0. A weekly, live performance laboratory for all music majors and minors taken concurrently with private lessons. Includes evening recital and concert attendance as required by the respective private lesson studio.
- 101: Class Piano-Major.** 2-0-1(3). Group instruction in the techniques of basic piano skills for the music major. A piano proficiency must be successfully passed within 3 quarters of study.
- 102: Class Voice.** 1-1-1. Group instruction in the techniques of the singing voice.
- 232: French Diction.** 1-1-1. Pronunciation of French art song (melodie).
- 233: Italian Diction.** 1-1-1. Pronunciation of Italian art song.
- 234: German Diction.** 1-1-1. Pronunciation of German art song (Lieder).
- 399: Undergraduate Recital.** 1-0-0. Preq., Recital Committee approval. For all music majors, preparation and performance of a degree recital of not less than 25 minutes of music.
- 499: Undergraduate Recital.** 1-0-0. Preq., Recital Committee approval. For Bachelor of Fine Arts in Music Performance degree candidates, preparation and performance of a degree recital of not less than 50 minutes of music.

#### MUSIC APPLIED, PRIVATE LESSONS (MUPV)

Music Applied courses refer to private lessons taken in the appropriate studio in an area declared by the student. In order to be eligible to register for 400-level courses a student must pass an upper-division jury. This is usually done in the Spring of the Sophomore year. This rule applies only to music majors. Non-music majors may enroll at the 100 level according to the limitation of the applied instructor's schedule. All students must have the approval of the applied music instructor before registering for private lessons.

#### Minor Level

These courses are designed for students electing to minor in music, majors studying a secondary instrument, and non-music majors. Students register in

the specific area or instrument as designated by the course number. Students minoring in music must also register for MUAP 100: General Recital concurrently with private study.

- 111: **Applied Piano - Minor.** 1-0-1.
- 121: **Applied Organ - Minor.** 1-0-1.
- 131: **Applied Voice - Minor.** 1-0-1.
- 151: **Applied Violin - Minor.** 1-0-1.
- 152: **Applied Viola - Minor.** 1-0-1.
- 153: **Applied Cello - Minor.** 1-0-1.
- 154: **Applied Bass - Minor.** 1-0-1.
- 155: **Applied Guitar - Minor.** 1-0-1.
- 161: **Applied Flute - Minor.** 1-0-1.
- 162: **Applied Oboe - Minor.** 1-0-1.
- 163: **Applied Bassoon - Minor.** 1-0-1.
- 164: **Applied Clarinet - Minor.** 1-0-1.
- 165: **Applied Saxophone - Minor.** 1-0-1.
- 171: **Applied Trumpet - Minor.** 1-0-1.
- 172: **Applied French Horn - Minor.** 1-0-1.
- 173: **Applied Trombone - Minor.** 1-0-1.
- 174: **Applied Euphonium - Minor.** 1-0-1.
- 175: **Applied Tuba - Minor.** 1-0-1.
- 181: **Applied Percussion - Minor.** 1-0-1.

#### Lower Division

These courses are designed for the music major studying privately at the lower division level whose declared major is in the specific area designated by the course number. The letter "A" is added to the end of the course number to indicate 1 hour of credit and the letter "B" indicates 2 hours of credit.

- 211: **Applied Piano - Major.** 1-2 semester hours.
- 221: **Applied Organ - Major.** 1-2 semester hours.
- 231: **Applied Voice - Major.** 1-2 semester hours.
- 251: **Applied Violin - Major.** 1-2 semester hours.
- 252: **Applied Viola - Major.** 1-2 semester hours.
- 253: **Applied Cello - Major.** 1-2 semester hours.
- 254: **Applied Bass - Major.** 1-2 semester hours.
- 255: **Applied Guitar - Major.** 1-2 semester hours.
- 261: **Applied Flute - Major.** 1-2 semester hours.
- 262: **Applied Oboe - Major.** 1-2 semester hours.
- 263: **Applied Bassoon - Major.** 1-2 semester hours.
- 264: **Applied Clarinet - Major.** 1-2 semester hours.
- 265: **Applied Saxophone - Major.** 1-2 semester hours.
- 271: **Applied Trumpet - Major.** 1-2 semester hours.
- 272: **Applied French Horn - Major.** 1-2 semester hours.
- 273: **Applied Trombone - Major.** 1-2 semester hours.
- 274: **Applied Euphonium - Major.** 1-2 semester hours.
- 275: **Applied Tuba - Major.** 1-2 semester hours.
- 281: **Applied Percussion - Major.** 1-2 semester hours.

#### Upper Division

These courses are designed for the music major studying privately at the upper division level whose declared major is in the specific area designated by the course number. Students must have passed the upper division exam to be eligible. The letter "A" is added to the end of the course number to indicate 1 hour of credit and the letter "B" indicates 2 hours of credit.

- 411: **Applied Piano - Major.** 1-2 semester hours.
- 421: **Applied Organ - Major.** 1-2 semester hours.
- 431: **Applied Voice - Major.** 1-2 semester hours.
- 451: **Applied Violin - Major.** 1-2 semester hours.
- 452: **Applied Viola - Major.** 1-2 semester hours.
- 453: **Applied Cello - Major.** 1-2 semester hours.
- 454: **Applied Bass - Major.** 1-2 semester hours.
- 455: **Applied Guitar - Major.** 1-2 semester hours.
- 461: **Applied Flute - Major.** 1-2 semester hours.
- 462: **Applied Oboe - Major.** 1-2 semester hours.
- 463: **Applied Bassoon - Major.** 1-2 semester hours.
- 464: **Applied Clarinet - Major.** 1-2 semester hours.
- 465: **Applied Saxophone - Major.** 1-2 semester hours.
- 471: **Applied Trumpet - Major.** 1-2 semester hours.
- 472: **Applied French Horn - Major.** 1-2 semester hours.
- 473: **Applied Trombone - Major.** 1-2 semester hours.
- 474: **Applied Euphonium - Major.** 1-2 semester hours.
- 475: **Applied Tuba - Major.** 1-2 semester hours.
- 481: **Applied Percussion - Major.** 1-2 semester hours.

#### MUSIC DIRECTED STUDIES (MUDS)

- 450: **Directed Studies.** 1-4 semester hours (6). Preq., consent of advisor. Selected study in an identified area in Music. Credit depends on the nature of problem and work accomplished. May be repeated for credit.
- 550: **Directed Studies.** 1-4 semester hours (6). Preq., consent of advisor. Selected study in an identified area in Music. Credit depends on the nature of the problem and work accomplished. May be repeated for credit.

#### MUSIC ENSEMBLE (MUEN)

- Students of Freshman or Sophomore standing sign up for 200 level. Students who have achieved Junior or Senior level standing sign up for 400 level.
- 200/400: **Chamber Ensemble.** 1-0-1 (6). Instruction and performance in small instrumental or vocal ensembles.
  - 231/431: **University Concert Choir.** 4-0-1 (12). Preq., audition. Major Ensemble. Instruction and performance in large vocal ensemble.
  - 232/432: **Chamber Singers.** 2-0-1 (12). Preq., audition. Major Ensemble. Instruction and performance in advanced vocal ensemble.
  - 233/433: **Gospel Choir.** 2-0-1 (6). Instruction and performance in vocal ensemble with emphasis on ethnic, religious material.
  - 234/434: **Opera Workshop.** 1-0-1 (3). A function study in opera performance including vocal, dramatic, and technical aspects of opera production.
  - 251/451: **Chamber Orchestra.** 4-0-1 (6). Preq., audition. Instruction and performance in string ensemble.
  - 260/460: **Musical Stage Orchestra.** 3-1-2 (8). Orchestral experience with literature and techniques of music theatre.
  - 261/461: **Musical Stage Production.** 3-1-2 (8). Practical study of theories, practices and techniques of musical stage production.
  - 271/471: **University Marching Band.** 4-0-1 (4). Preq., audition required. Major Ensemble. Instruction and performance in the college marching band. Includes performance in designated football games, bowl games, pep rallies and other presentations as directed.
  - 272/472: **Fall Wind Ensemble.** 1-0-1 (2). Preq., audition. Open to any major. Instruction and performance in concert band. Includes reading and study of selected works from the major standard band repertoire for participating music majors.
  - 273/473: **Symphonic Wind Ensemble.** 4-0-1 (4). Preq., audition. Major ensemble. Instruction and performance in advanced band ensemble.
  - 274/474: **University Concert Band.** 4-0-1 (4). Preq., audition. Major ensemble. Instruction and performance in band ensemble.
  - 275/475: **University Jazz Ensemble.** 3-0-1 (6). Preq., audition. Performance and instruction in stage band ensemble covering a variety of jazz styles and genres.
  - 281/481: **Percussion Ensemble.** 2-0-1 (6). Preq., audition. Performance and instruction in the various combinations of percussion ensemble.

#### MUSIC GENERAL (MUGN)

- 112: **Beginning Piano.** 2-0-2 (6). Preq., consent of instructor. Instruction in beginning piano techniques for the non-music major.
- 152: **Beginning Guitar.** 2-0-2 (6). Preq., consent of instructor. Instruction in beginning guitar techniques for the non-music major.
- 290: **Music Appreciation.** 0-3-3. Satisfies General Education Requirement for Fine Arts Appreciation. For non-music majors. Attempts to answer the question "What is Music?" by acquainting students with knowledge and appreciation of music from several cultures and eras.

#### MUSIC HISTORY AND LITERATURE (MUHS)

- 101: **Music Literature I.** 0-2-1. A broad survey of music literature from the Middle Ages to the Early Baroque. Includes selected music of Native American peoples.
- 102: **Music Literature II.** 0-2-1. A broad survey of music literature from the Baroque through the Classical era.
- 103: **Music Literature III.** 0-2-1. A broad survey of music literature from the Romantic era to the modern era. Includes selected world music.
- 304: **Music History I.** 0-3-3. Preq., MUTH 102 or permission of instructor. Survey of music history and literature from ancient times through mid-eighteenth century. Concentrates on music of Western European traditions from Renaissance through Baroque era.
- 305: **Music History II.** 0-3-3. Preq., MUTH 102 or permission of instructor. Survey of music history and literature from mid-eighteenth century through 1970's. Latter part of course will introduce some musical concepts and traditions of non-western cultures.

- 306: Introduction to Non-Western Music.** 0-2-2. Preq., MUHS 305 or permission of instructor. An introduction to the music and musical life of the world's peoples by sampling and by synthesis.
- 307: Introduction to Jazz History.** 0-2-2. Preq., MUHS 305 or permission of instructor. Cultivate in the music major an understanding of jazz music through a comprehensive study of major artists and styles from 1900 to the present.
- 410: Piano Literature.** 0-3-3. A survey of piano literature from the Classic Period to the present including literature composed for earlier keyboard instruments.
- 430: Vocal Literature.** 0-3-3. A survey of vocal literature covering a wide diversity of composers, styles, and historical periods through discussion and analysis of representative works including assignments in listening, performance, and reading.
- 431: Choral Literature.** 0-2-2. A survey of choral literature covering a diversity of composers, styles, and historical periods through discussion and analysis of representative works.
- 432: Survey of Opera.** 0-3-3. Preq., permission of instructor. Designed to cultivate in students an understanding and enjoyment of opera by surveying selected, significant operatic works through viewing and analysis.
- 433: Survey of American Music Theatre.** 0-3-3. Preq., MUGN 290 or SPTH 290. Designed to increase the understanding and appreciation of the American Music Theatre genre through the study of musical theatre works, composers, lyricists, directors, and performers.

#### MUSIC PEDAGOGY (MUPD)

- 300: Beginning Conducting.** 1-1-1. Elementary methods, principles and practice of conducting.
- 301: Choral Conducting.** 1-2-2. Preq., MUTH 201 and MUPD 300. Principles of interpretation and score reading with emphasis on choral conducting. Includes laboratory experience with the choral ensembles.
- 302: Instrumental Conducting.** 1-2-2. Preq., MUTH 201 and MUPD 300. Principles of interpretation and score reading with emphasis on instrumental conducting. Includes laboratory experience with the instrumental ensembles.
- 303: Instruments.** 1-1-1. Preq., MUTH 102. Group instruction in the functional knowledge of wind, string, fretted, and percussion instruments for vocal majors.
- 311: Piano for Vocal Education.** 2-0-2. Preq., students must have passed all parts of the piano proficiency exam and have the consent of the instructor. Experiences in improvising, transposing and performing vocal accompaniments at the piano. These skills are required for vocal music education majors.
- 331: Vocal Methods.** 1-1-1. Group instruction in the singing voice including methods and materials of instruction for the music educator. Includes laboratory experiences and observation at the elementary and secondary levels.
- 334: Elementary Teachers Appreciation/Methods.** 0-3-3. Provides an understanding and appreciation of the elements of music.
- 351: String Methods.** 2-0-1. Group instruction in strings including methods and materials of instruction for the music educator. Includes laboratory experiences and observation at the elementary and secondary levels.
- 352: Guitar Methods.** 2-0-1. Group instruction in fretted instruments including methods and materials of instruction for the music educator. Includes laboratory experiences and observation at the elementary and secondary levels.
- 361: Flute Methods.** 2-0-1. Group instruction in flute including methods and materials of instruction for the music educator. Includes laboratory experiences and observation at the elementary and secondary levels.
- 362: Single Reed Methods.** 2-0-1. Group instruction in single reed instruments including methods and materials of instruction for the music educator. Includes laboratory experiences and observations at the elementary and secondary levels.
- 363: Double Reed Methods.** 2-0-1. Group instruction in double reed instruments including methods and materials of instruction for the music educator. Includes laboratory experiences and observation at the elementary and secondary levels.
- 371: High Brass Methods.** 2-0-1. Group instruction in high brass instruments including methods and materials of instruction for the music educator. Includes laboratory experiences and observation at the elementary and secondary levels.
- 372: Low Brass Methods.** 2-0-1. Group instruction in low brass instruments including methods and materials of instruction for the music educator.

Includes laboratory experiences and observation at the elementary and secondary levels.

- 381: Percussion Methods I.** 2-0-1. Group instruction in percussion instruments including methods and materials of instruction for the music educator. Includes laboratory experiences and observation at the elementary and secondary levels.
- 382: Percussion Methods II.** 2-0-1. Preq., MUPD 381. Continuation of MUPD 381.
- 410: Piano Pedagogy I.** 1-1-2. Methods and materials used in teaching piano to beginners. Required by the State Department of Education for teachers wishing to be certified in piano.
- 411: Piano Pedagogy II.** 1-1-2. Preq., MUPD 410. Continuation of MUPD 410. Practice teaching of beginning students in integral to this course.
- 430: Vocal Pedagogy.** 1-1-2 (4). Methods and materials of teaching voice in private studio and/or in the school.
- 464: Elementary Music Methods.** 0-3-3. An overview of the methodologies of Orff, Kodaly, and Dalcroze. Learning to plan, execute and evaluate music programs in the elementary school. Includes observation at the elementary level.
- 465: Secondary Vocal Methods.** 0-3-3. Examines the materials and methods for the teacher and supervisor of vocal music, e.g., program building, contests, festivals, requisitions, grading, materials, scheduling, and rehearsing. Includes observation at the secondary level.
- 466: Secondary Instrumental Methods.** 0-3-3. Examines the materials and methods for the teacher and supervisor of instrumental music, e.g., program building, contests, festivals, requisitions, grading, materials, scheduling, and rehearsing. Includes observation at the secondary level.

#### MUSIC TECHNOLOGY (MUTC)

- 141: Music Technology.** 1-2 semester hours. Individualized instruction in the techniques of working with various sound sources and resources in the field of music technology.
- 301: Computer Science in Music.** 2-2-3. Study of general computer applications and music related applications including notation, graphics, sound generation, sequencing, audio manipulation, and other related uses.

#### MUSIC THEORY (MUTH)

- 100: Rudiments of Music Theory.** 0-2-2. Instruction in the fundamentals of music theory including reading, notation, and aural skills.
- 101: Music Theory I.** 2-2-2. Preq., diagnostic exam. Beginning study of fundamentals of music covering the areas of notation, ear-training, sight singing, and functional keyboard.
- 102: Music Theory II.** 2-2-2. Preq., MUTH 101. Continuation of MUTH 101, increasing emphasis on common-practice harmonic vocabulary.
- 103: Music Theory III.** 2-2-2. Preq., MUTH 102. Continuation of MUTH 102.
- 201: Music Theory IV.** 2-2-2. Preq., MUTH 103. Continuation of MUTH 103 with emphasis on the organization and interaction of melodic, harmonic and rhythmic concepts and music forms. Aural training and functional keyboard is intensified in proportion to the depth of course content.
- 202: Music Theory V.** 2-2-2. Preq., MUTH 201. Continuation of MUTH 201.
- 203: Music Theory VI.** 2-2-2. Preq., MUTH 202. Continuation of MUTH 202.
- 301: Music Composition.** 0-3-3. Preq., MUTH 203. A survey of the techniques of 20th century composition with projects consisting of the writing of short compositions illustrating these techniques.
- 302: Form and Analysis.** 0-3-3. Preq., MUTH 203. A study of specific examples of the major forms of composition to show the relative importance of detail to the overall comprehension of a composition.
- 330: Choral Arranging.** 0-2-2. Preq., MUTH 203. A study of writing for the individual voices and the combinations of voices in choral ensembles.
- 370: Instrumental Arranging.** 0-2-2. Preq., MUTH 203. A study of writing for the individual instruments of the band and orchestra, the combinations of instruments in the various sections, and the combination of all the sections.
- 401: Counterpoint.** 0-3-3. Preq., MUTH 203. A study of contrapuntal practice of the 18th and 19th centuries with emphasis on the understanding of counterpoint within a harmonic context.

#### NURSING (NURS)

- 109: Introduction to Nursing.** 0-2-2. An introduction to the health care system and professional nursing. Basic human needs, the elderly client, and concepts related to death and dying are introduced.

- 110: Introduction to Application of the Nursing Process.** 8-0-3. Coreq., NURS 109, and credit or registration in BISC225 and 226. Acquaints student with basic nursing principles and techniques of safe nursing care to meet basic human needs. Emphasis on interpersonal skills, communication, interviewing and observation.
- 112: Adult Health Maintenance I.** 8-3-5. Preq., NURS 109 and 110 and BISC 225 and 226 and credit or registration in BISC227. Study, identification and application of nursing knowledge and skills related to adult health needs. Emphasis on patient-centered care utilizing the nursing process.
- 113: Introduction to Associate Degree Nursing.** 0-0-10. Emphasizes the nursing process and basic human needs with introduction to associate degree nursing roles. Principles are applied with validation in the clinical setting.
- 114: Adult Health Maintenance II.** 8-3-5. Preq., NURS 112 and BISC 225, 226, and 227. Continuation of the study, identification and application of nursing knowledge and skills related to adult health needs. Emphasis on patient-centered care utilizing the nursing process.
- 116: Adult Neuro/Psycho-Social Health Maintenance.** 8-3-5. Preq., NURS 114 and PSYC 102. Utilizes nursing knowledge/skills in provision of health care. Emphasis on nursing care of clients experiencing threats to needs as a result of neuro-psycho-social dysfunction.
- 210: Maternal/Newborn Health Maintenance.** 8-3-5. Preq., NURS 116. Study/application of principles and concepts of family-centered maternal/newborn care. Emphasis on meeting specific needs of clients during the childbearing cycle and newborn period.
- 212: Child Health Maintenance.** 8-3-5. Preq., NURS 116 and PSYC 408. Study/application of nursing knowledge/skills related to children's and adolescent's health needs. Includes growth and development, family, and prevention of and intervention in illness.
- 214: Nursing Seminar.** 0-1-1. Preq., Credit in all previous nursing courses. Study of current nursing trends in light of evolving patterns and practices. Emphasis on professional opportunities and obligations and legal aspects of nursing practice.
- 216: Nursing Practicum.** 24-4-7. Coreq., NURS 214. Preq., Credit in all other nursing courses. Integration of knowledge and skills acquired in previous nursing courses in caring for clients with complex and/or multiple threats to basic needs.
- 280: Selected Topics.** 1-3 hour(s) credit (6). Preq., Approval by Nursing Division Director. Independent study course designed for students to become involved with creative learning opportunities related to nursing research, theory and practice.

#### PHILOSOPHY (PHIL)

- 201: Introduction to Philosophy.** 0-3-3. Preq., junior standing or permission of the instructor. Philosophical vocabulary; types and problems of philosophy; major philosophical positions.
- 305: Ethics.** 0-3-3. Preq., PHIL 201 or permission of the instructor. A study of the writings of the major moral philosophers, beginning with the Greeks and continuing to the present.

#### PHYSICS (PHYS)

- 102: Introductory Physics.** 2-1-1. An introductory survey of physics, use of library resources, and basic computation.
- 103: Introductory Physics.** 2-1-1. A continuation of PHYS 102.
- 104: Introductory Physics.** 2-1-1. A continuation of PHYS 103.
- 201: General Physics.** 0-3-3. Preq., MATH 241. Thorough treatment of fundamental principles and detailed analysis of important physical situations.
- 202: General Physics.** 0-3-3. Preq., PHYS 201 and MATH 242. A continuation of PHYS 201.
- 205: Descriptive Physics.** 0-3-3. For non-science majors interested only in the cultural aspects of the subject.
- 206: Descriptive Physics.** 0-3-3. A continuation of PHYS 205.
- 209: Elementary Physics.** 0-3-3. Preq., MATH 112. For pre-medical, pre-dental, pre-pharmacy, and science education students. A study of the fundamental principles of physics and their applications.
- 210: Elementary Physics.** 0-3-3. Preq., PHYS 209. A continuation of PHYS 209.
- 220: Astronomy - The Solar System.** 0-3-3. An introduction to Astronomy, covering the history of Astronomy and the Solar System.
- 221: Introduction to Astrophysics.** 0-3-3. Introduction to astronomy, with emphasis on physical principles. Application of mechanics to orbits of

- planets and multiple stars. Atomic theory applied to stellar spectra. Nuclear reactions in stars.
- 230: Astronomy - The Stars and Galaxies.** 0-3-3. An introduction to Astronomy, covering the stars, galaxies, and the universe.
- 261: General Physics Laboratory.** 4 1/2-0-1. Preq., MATH 112 or 241. Laboratory investigations of basic physical principles.
- 262: General Physics Laboratory.** 4 1/2-0-1. Preq., PHYS 261. A continuation of PHYS 261.
- 303: Geometrical Optics.** 0-3-3. Preq., PHYS 202. The study of thick lenses, lens system layouts, aberrations, photometric theory applied to optical systems, optical instruments and matrix optics.
- 304: Physical Optics.** 0-3-3. Preq., PHYS 202. A thorough position of the wave theory of light and an introduction to the quantum theory.
- 307: Thermodynamics.** 0-3-3. Preq., PHYS 202. Classical thermodynamics and introductory classical and quantum statistical mechanics.
- 320: Optics Laboratory I.** 4 1/2-0-1. Experiments in optics to demonstrate optical phenomena.
- 350: Introduction to Lasers.** 0-3-3. Preq., six hours of physics. Introduction to modern laser technology. A semi-quantitative approach presents all known types of lasers. Applications such as measurements, instrumentation, communications, biological, medical, and health hazards are concluding topics.
- 406: Electricity and Magnetism.** 0-3-3. Preq., MATH 245, PHYS 202. A study of the fundamental theories of electricity and magnetism. An application of basic principles is stressed.
- 407: Electricity and Magnetism.** 0-3-3. Preq., PHYS 406. A continuation of PHYS 406.
- 408: Electricity and Magnetism Laboratory.** 4 1/2-0-1. Experiments in circuitry and in classical electricity and magnetism.
- 409: Electricity and Magnetism Laboratory.** 4 1/2-0-1. Preq., PHYS 408. A continuation of PHYS 408.
- 415: Introduction to Lasers.** 0-3-3. Preq., PHYS 304, 417. Introduction to modern laser technology. Topics included are spectra of simple systems, lifetimes and energy levels, atomic, molecular and solid state lasers, and laser applications.
- 416: Modern Physics.** 0-3-3. Preq., PHYS 202. An advanced course in general physics stressing the modern developments of the subject.
- 417: Modern Physics.** 0-3-3. Preq., PHYS 416. A continuation of PHYS 416.
- 418: Modern Physics Laboratory.** 4 1/2-0-1. Laboratory exercises involving the electron and the nucleus.
- 419: Modern Physics Laboratory.** 4 1/2-0-1. Preq., PHYS 418. A continuation of PHYS 418.
- 420: Optics Laboratory II.** 4 1/2-0-1. Experiments in optics to demonstrate advanced optical phenomena.
- 422: Physical Mechanics.** 0-3-3. Preq., PHYS 202, MATH 245. Statics, particle dynamics, dynamics of a rigid body, kinetic theory, elasticity, wave motion, and behavior of fluids. Fundamental importance of mechanical principles in all fields of physics emphasized. (G)
- 423: Physical Mechanics.** 0-3-3. Preq., PHYS 422. A continuation of PHYS 422. (G)
- 424: Quantum Mechanics.** 0-3-3. Preq., PHYS 423 or equivalent, PHYS 416, and MATH 245. An extension of mechanics into the microscopic world. The statistical nature of physical law is developed to augment the classical Newtonian picture of the macroscopic world.
- 430: Introduction to Medical Physics.** 0-3-3. Preq., PHYS 209-210 or 201-202. A basic course in Physics of radiology, designed for students interested in therapeutic and diagnostic uses of ionizing radiation. (G)
- 435: Undergraduate Physics Research.** 1-3 hours credit (6). Preq., consent of instructor. Introduction to methods of research.
- 440: Fourier Optics.** 0-3-3. Preq., PHYS 406, 407, or ELEN 411. An introduction to the theory of Fourier Optics including optical data processing and holography. (G)
- 450: Modern Optics.** 0-3-3. Preq., PHYS 350. Selected topics in modern optics.
- 462: Modern Physics for Teachers.** 0-3-3. Preq., 8 hours of Physics or permission of instructor. A survey of modern physics as used by the high school teacher of physics. Emphasis is placed on experimental techniques.
- 463: Modern Physics for Teachers.** 0-3-3. Preq., 8 hours of Physics or permission of instructor. Hands-on experience for teachers developing a physics science program that emphasizes the observational side of Physics.

- 465: Physics of Sound.** 0-3-3. Preq., PHYS 205. The physical and psychophysical processes associated with sound are studied so that the basic mechanisms of hearing, speech and music can be better understood.
- 470: Seminar.** 1-6 hours credit. Preq., Permission of instructor. An opportunity is given for students to present current topics and actively participate in discussions concerning new developments in physics.
- 480: Modern Astrophysics.** 0-3-3. Preq., PHYS 417. Astrophysics is discussed in light of the tremendous amount of data accumulated from areas such as high energy experimental physics and elementary particle theory.
- 503: Topics in Physics.** 1-3 hours credit (6). Independent study. Topics arranged to meet the needs of the student.
- 511: Electromagnetic Theory.** 0-3-3. An advanced treatment of the theory of electricity and magnetism.
- 512: Solid State Physics.** 4 1/2-3-4. An advanced treatment of the structure and the thermal, electrical and magnetic properties of solid materials.
- 521: Theoretical Mechanics.** 0-3-3. A presentation of advanced classical mechanics oriented towards modern theories of physics.
- 522: Quantum Mechanics.** 0-3-3. Preq., MATH 502. An outline of the principles of wave mechanics and quantum mechanics, followed by their application to problems in atomic and nuclear theory.
- 523: Classical Theory of Fields.** 0-3-3. Preq., PHYS 511, 522. A concentrated study of the dynamics of relativistic particles and electromagnetic fields utilizing the Lagrangian and Hamiltonian formulations for fields.
- 524: Quantum Theory of Fields.** 0-3-3. Preq., PHYS 523. An advanced course on the quantum structure of field theories. Functional techniques are used to discuss the quantum theory of electroweak and strong interactions.
- 531: Theories of Physics.** 0-3-3. Selected topics. Contemporary theories dealing with recent trends in physics.
- 532: Theories of Physics.** 0-3-3. A continuation of PHYS 531.
- 533: Statistical Mechanics.** 0-3-3. Preq., PHYS 521. A study of the statistical aspects of modern physical theory. Considers the classical and quantum aspects of many-particle systems.
- 540: Computational Methods in Physics Modeling and Simulation I.** 0-3-3. Computational methods for implementing modeling and simulation of physical systems.
- 541: Computational Methods in Physics Modeling and Simulation II.** 0-3-3. Preq., PHYS 540. Computational methods for implementing modeling and simulation of physical systems.
- 549: Physics Research & Reporting.** 0-3-3 (6). Preq., 12 semester hours of graduate work. Experimental or computational study of a problem in physics. A survey of the relevant literature and a formal written report are required. This course fulfills the research and reporting requirement for a master's degree non-thesis option.
- 551: Research and Thesis in Physics.** Registration in any quarter may be for three semester hours credit or multiples thereof. Maximum credit allowed is six semester hours.

#### PLANT SCIENCE (PLSC)

- 101: Introduction to Plant Science.** 0-3-3. Basic concepts of production and management of agronomic and horticultural crops.
- 211: Forage Crops and Pasture Management.** 3-2-3. A study of the growth adaptation and culture of forage crops including types of plants, methods of establishment and improvement, and use of forages.
- 284: Woody Plants.** 3-2-3. Identification of woody landscape plants, including culture, propagation, and use.
- 300: Horticulture Field Trip.** 9-0-1. Field trips to experiment stations, large wholesale and retail nurseries, botanical gardens, and arboreta.
- 301: Landscape Design.** 3-2-3. Elements and principles of design as applied to the home and other small properties.
- 302: Environmental Design.** 3-2-3. Environmental factors affecting the landscape, including discussion of natural systems, remote sensing and large-scale design.
- 309: Field Crops.** 3-2-3. Fundamentals of production, harvesting, storage, marketing, and utilization of grain, fiber, oil, and sugar crops.
- 310: Soil Science.** 0-3-3. Preq., CHEM 100, 101, 102. A general study of soil science, emphasizing the relation of soil properties and processes to plant growth. Also listed as ENSC 310.
- 311: Soil Science Laboratory.** 3-0-1. Coreq. or Preq., PLSC 310. Laboratory exercises to elaborate fundamental principles of soil properties, soil testing, and soil survey reports. Also listed as ENSC 311.

- 312: Turf Management.** 3-2-3. Establishment, maintenance, and management of turf grasses for homes, athletic fields, golf courses, playgrounds, parks, highways, airfields, and other uses.
- 319: Agricultural Chemical Applications and Techniques.** 3-1-2. Equipment and procedures used for applying agricultural chemicals (e.g., herbicides, insecticides, and fungicides). Calibration. Safety. Exam for certification of applicators.
- 320: Plant Propagation.** 3-2-3. Principles and practices of sexual and asexual methods or propagating horticultural plants.
- 384: Herbaceous Plants.** 3-2-3. Identification of annual, perennial, and tropical plants, including culture, propagation, and use.
- 400: Special Problems.** 3-0-1 (4). Assignments in floral or landscape design, greenhouse or field production projects or other horticulture practicums.
- 403: Edible Horticultural Crops.** 3-2-3. Methods and practices of home and commercial production of vegetable and fruit crops, with emphasis on those adapted to the South.
- 409: Plant Breeding.** 3-2-3. A study of the application of the fundamental principles of genetics to the development and maintenance of improved plant varieties. (G)
- 420: Greenhouse Management.** 3-2-3. Principles and practices involved in greenhouse operation, including production of flowering and foliage crops.
- 421: Weed Science.** 3-2-3. Weed control in Agricultural crops, including weed ecology, classification, dormancy, dissemination; seed anatomy and germination; herbicidal action and practical application techniques. (G)
- 422: Pest Management I.** 0-3-3. Basic concepts of integrated pest management; pesticides, biological control agents, varietal resistance, pheromones and trap crops, laws and regulations, labeling requirements, pesticide classification and safety. (G)
- 423: Pest Management II.** 3-2-3. Identification of insects, nematodes and disease-causing organisms affecting row crops of the south; monitoring procedures, economic threshold levels; steps in solving pest problems. (G)
- 430: Soil Fertility.** 3-2-3. Preq., PLSC 310, 311. Fundamentals of soil fertility and plant nutrients; source, manufacture, use, and properties of chemical fertilizers.
- 440: Nursery Management.** 0-3-3. Production, handling and sales practices in the nursery, greenhouse and garden center. (G)
- 441: Landscape Contracting.** 3-2-3. Landscape contracting operations; estimating and bidding, plant installation, care and maintenance, design considerations, use of structural elements and irrigation systems. (G)

#### POLITICAL SCIENCE (POLS)

- 201: National Government in the United States.** 0-3-3. A study of the development of the national government with emphasis on problems connected with the federal system and separation of powers.
- 302: Comparative Foreign Governments.** 0-3-3. Preq., POLS 201 or consent of instructor. A study of the political systems and governments of the major European nation-states of the twentieth century.
- 303: State Government and Administration in the United States.** 0-3-3. Preq., POLS 201. A study of the role of the state in the American Union including nation-state and interstate relations.
- 310: Government and the Economy.** 0-3-3. Preq., POLS 201. Political/economic issues (employment, inflation, poverty, energy, environment, health care, etc.) are studied according to competing theories of political economy.
- 320: Legislation in the United States: Federal and State.** 0-3-3. Preq., POLS 201. A study of the legislative process and of the influences that determine the nature of the legislative product.
- 322: Political Parties in the United States.** 0-3-3. Preq., POLS 201. A study of American political parties, including historical origins, their broad role in the political system, and their current place in American politics.
- 325: History of European Political Theory.** 0-3-3. Preq., POLS 201, and junior class standing, or consent of instructor. A study of Western political philosophy from its beginnings to the nineteenth century.
- 327: Modern Political Theory and Ideologies.** 0-3-3. Preq., POLS 201. A study of nineteenth and twentieth century political theory with emphasis on the principal modern ideologies (Anarchism, Communism, Socialism, Fascism, Democracy).
- 330: The American Presidency.** 0-3-3. Preq., POLS 201. A study of the American Presidency including its origins, roles, functions, and problems.
- 345: Scope and Methods in Social Sciences.** 0-3-3. Preq., POLS 201. An introduction to basic statistics, research design, and the application of the qualitative and quantitative methods to the social sciences.

- 350: International Relations.** 0-3-3. Preq., POLS 201. An introductory study of political contacts between modern nation-states, the origin of nationalism and imperialism, and the causes and effects of power politics.
- 355: American Foreign Policy.** 0-3-3. Preq., POLS 201. America's foreign policy doctrines and the factors involved in their formulation, including constitutional framework, presidential and congressional leadership, pressure groups, public opinion, and international environment.
- 420: Contemporary Problems in Government.** 0-3-3. Preq., One of the following courses: POLS 201, or 303, and junior standing.
- 426: American Constitutional Law I.** 0-3-3. Preq., POLS 201. Introduction to judicial institutions and processes as well as a case method study of the constitutional issues of judicial review, federalism, government economic regulation, and others.
- 427: American Constitutional Law II.** 0-3-3. Preq., POLS 201. A continuation of the case method study of constitutional law, with emphasis on political and civil rights (speech, press, assembly, religion, race, criminal procedure, etc.).
- 460: Politics of Developing Nations.** 0-3-3. Preq., POLS 201. An analysis of the relationship of politics to rapid economic and social change in developing nations and evaluation of policies intended to promote development.
- 465: Asian Politics.** 0-3-3. Preq., POLS 201. A survey of interrelationships among Asian nations, their relationships with occidental powers, their international roles, and politics of the region as a whole.

#### PROFESSIONAL AVIATION (PRAV)

- 101: Private Pilot Ground I.** 0-3-3. An introduction to basic aerodynamics, aircraft systems, instrumentation, performance, and aviation weather. Initial preparation for FAA Private Pilot Certificate.
- 102: Private Pilot Ground II.** 0-3-3. Preq., PRAV 101. An introduction to FAA regulations and procedures, communications, navigation, aviation physiology, aviation safety and emergency procedures. Final preparation for the FAA Private Pilot Written Certificate.
- 110: Private Pilot Flight I.** 4-0-1. Preq., PRAV 101, 102 or concurrent enrollment. Provides student with approximately 11 hours of simulator/dual/solo flight instruction. Designed to meet FAA flight requirements for the Private Pilot Certificate. Special Fee.
- 111: Private Pilot Flight II.** 4-0-1. Preq., PRAV 102 or concurrent enrollment. Provides student with approximately 24 hours of dual/solo flight instruction. Designed to meet FAA flight requirements for the Private Pilot Certificate. Special fee.
- 200: Aircraft Powerplant Systems.** 0-3-3. Preq., PRAV 101/102. Theory of piston engines. A study of the internal combustion process in the radial, opposed and V-typed engines including engine driven accessories.
- 205: Aircraft Electrical Systems.** 0-3-3. Preq., PRAV 101 and 102. Fundamentals of aircraft electrical systems.
- 208: Introduction to Computers.** 1-2-2. Introduction to computers to acquire computer literacy. Study of hardware, software, systems, and application in aviation.
- 223: Fixed Base Operations.** 0-3-3. Preq., PRAV 101 and 102. Detailed study of the functions and responsibilities of the typical Fixed Base Operator.
- 239: Aviation Weather.** 0-3-3. Preq., PRAV 102. Weather systems, weather reporting, airborne weather radar, weather safety, and severe weather avoidance. Designed to meet weather knowledge requirements for instrument, commercial, and CFI ratings.
- 240: Instrument Pilot Ground I.** 0-3-3. Preq., PRAV 102 and 111 or concurrent enrollment. Attitude instrument flying, instrumentation, navigation systems for general aviation and air carriers. Designed to meet the FAA ground training requirements for the Instrument rating.
- 241: Instrument Pilot Ground II.** 0-2-2. Preq., PRAV 240 and Private Pilot Certificate. Navigation/approach charts, regulations pertinent to instrument flight, instrument flight planning, communications. Departure, en-route, and approach procedures. Final preparation for FAA Instrument rating.
- 242: Instrument Flight I.** 3-0-1. Preq., Private Pilot Certificate. Provides the student with approximately 15 hours of instrument flight instruction necessary to meet the FAA requirements for the Instrument rating. Special Fee.
- 243: Instrument Pilot Flight II.** 3-0-1. Preq., PRAV 242. Provides the student with approximately 60 hours of dual instrument flight instruction necessary to meet the FAA requirements for the Instrument rating. Special Fee.
- 303: Aerodynamics.** 0-3-3. A study of advanced aircraft design, aerodynamics, and performance.
- 305: Jet Propulsion Systems.** 0-3-3. Preq., PRAV 102. Theory of jet propulsion to include turbojet, turbofan, and turboprop engines.
- 315: Airport Planning & Management.** 0-3-3. Provides the student with introductory exposure to the field and scope of airport planning and management.
- 316: Human Factors in Aviation.** 0-3-3. For recognition of the comprehensive role of human factors in enhancing aviation safety.
- 320: Corporate Aviation.** 0-3-3. Value/Benefit analysis of the corporate aviation decision. Topics include aircraft selection, flight department administration and operations, aircraft maintenance, FAA regulatory requirements, and future considerations.
- 322: Aviation Law.** 0-2-2. Study of aviation law development and application. Case studies. Required for Airway Science curriculum.
- 331: Air Carrier Systems:** 0-3-3. Study of air carrier operations to include flight planning, large airplane systems, and performance systems. A capstone course designed to prepare students for a career with a commercial carrier.
- 332: Air Carrier Operations.** 0-3-3. Study of required pilot operations, dispatcher procedures, and FAA certification requirements.
- 340: Commercial Pilot Ground I.** 0-3-3. Preq., PRAV 240. Aerodynamics, performance, instrumentation, stability and control, aircraft limitations, aircraft systems, aviation safety. Designed to meet FAA ground instruction requirements for Commercial Pilot Certificate.
- 341: Commercial Pilot Ground II.** 0-2-2. Preq., PRAV 340. Advanced navigation, aircrew decision making, crew resource management, physiology of flight. FAA Part 121, 125, and 135 operations. Final preparation for FAA Commercial Pilot Certificate.
- 342: Commercial Pilot Flight I.** 6-0-1. Preq., PRAV 341 or Private Instrument Certificate. Provides students with approximately 21 hours of flight instruction. Designed to meet the flight requirements for the FAA Commercial Pilot Certificate.
- 343: Commercial Pilot Flight II.** 6-0-1. Preq., PRAV 342. Provides students with approximately 23 hours of flight instruction. Designed to meet the FAA flight requirements for the Commercial Pilot Certificate. Special Fee.
- 344: Commercial Pilot Flight III.** 6-0-1. Preq., PRAV 343. Provides students with approximately 22 hours of flight instruction. Designed to meet the FAA flight requirements for the Commercial Pilot Certificate. Special Fee.
- 400: Multi-Engine Ground.** 0-2-2. Preq., PRAV 341 and 343. Ground instruction for FAA Multi-Engine rating. Emphasizes systems, crew concept procedures, emergency procedures, performance, weight/balance and air carrier flight planning procedures.
- 405: Instrument Flight Instructor.** 3-2-3. Preq., PRAV 414 and Certified Flight Instructor Rating and approval of Department Head. Provides students with fundamentals necessary to analyze and instruct instrument referenced flight maneuvers and procedures. Prepares student for FAA Instrument Flight Instructor rating (CFII).
- 407: The National Airspace System.** 0-3-3. A survey course designed to instruct the student on the National Airspace Systems to include Air Traffic Control issues and procedures.
- 410: Multi-Engine Pilot Flight.** 3-0-1. Preq., PRAV 400 or concurrent enrollment. Provides students with flight instruction necessary for FAA Multi-Engine rating. Special fee.
- 411: Instructor Pilot Flight.** 3-0-1 (3). Preq., PRAV 414 or concurrent enrollment and a Commercial Instrument Pilot Certificate. Provides students with flight instruction necessary to meet the requirements for an FAA Flight Instructor Certificate (CFI). Special fee
- 414: Flight Instructor Ground.** 0-3-3. Preq., PRAV 241 and 243 and a Commercial Instrument Pilot Certificate. Fundamentals of flight instruction and analysis of visual reference flight maneuvers. Preparation for FAA Instructor Pilot Certification (CFI).
- 415: Air Transport Pilot Flight.** 3-0-1 (3). Preq., approval of Department Head. Provides the student with flight instruction necessary to meet the requirements for FAA Airline Transport certificates and ratings. Special fee.
- 419: Supervised Practice Flight/Ground Instruction.** 3-0-1 (4). Preq., completion of PRAV 411 and 414. Directed observation and instructional critique of the student's performance in developing lesson plans and presenting actual flight and ground instruction.

- 440: Airline Economics and Management.** 0-3-3. An advanced study of airline operation, fleet acquisition, management techniques, economic considerations, public benefits applications.
- 490: The Government Role in Aviation.** 0-3-3. Preq., Senior standing. Historic, current and future governmental control. A study of congressional action, the NAS, the FAA, ICAO, and state and local aviation laws.
- 491: Aviation Safety.** 0-3-3. Historical development of aviation safety, accident/incident analysis and reporting, introduction to accident investigation, human factors, accident prevention and development of aviation safety programs.
- 495: Aviation Professionalism.** 0-3-3. Preq., senior standing. Study of aerospace industry and career opportunities. Emphasis on business climate and job acquisition. Overview of business, management, labor practices, and professional responsibility.
- 496: Internship in Aviation.** 3-12 hours credit. Internship in area(s) of specialization. Supervised work in government or industry to gain experience in aviation fields. Minimum 90 clock hours; maximum 360 clock hours.
- 498: Independent Study.** 0-3-3. Preq., Department Head's approval. Directed study of air transportation as part of a foreign and domestic, multi-model transportation system.

#### PSYCHOLOGY (PSYC)

- 102: General Psychology.** 0-3-3. A survey of fundamental processes and concepts of human behavior.
- 202: Advanced General Psychology.** 0-3-3. Preq., PSYC 102. An intensive survey of literature and procedures in general psychology.
- 204: Educational Psychology.** 0-3-3. Education Majors only. A survey course designed to meet the needs of prospective teachers by bringing an application of psychological principles to the instructional setting.
- 205: Child Psychology.** 0-3-3. Education Majors only. A study of the physical and mental growth of the child, the social, emotional, motor development, interests, and imaginative activities.
- 206: Adolescent Psychology.** 0-3-3. Education Majors only. A study of the physical and mental growth of youth during the period of adolescence and the transition from childhood to adulthood.
- 207: Learning and Development.** 1-3-3. An in-depth study of human development with emphasis on contemporary research relating to human learning and the application of psychological principles.
- 300: Elementary Statistical Methods in the Social Sciences.** 0-3-3. A course designed to provide an orientation to statistical concepts used in the behavioral science field.
- 301: Fields of Psychology.** 0-3-3. A study of the history of major fields and trends in psychology.
- 302: Physiological Psychology.** 0-3-3. Preq., BISC 225 (or concurrent enrollment), PSYC 202. An intensive study of the physiology of the nervous system, and its relation to behavior.
- 303: Parapsychology.** 0-3-3. Preq., PSYC 102 and 202 Critical examination of theoretical and methodological issues in the study of non-conventional sensory, perceptual, and cognitive processes.
- 304: Social Psychology.** 0-3-3. Preq., PSYC 202. A study of the nature of social behavior, social stimulation and response; a psychological analysis of society and social institutions.
- 305: Practical Psychology.** 0-3-3. Preq., PSYC 102. A survey of the practical application of psychological concepts to daily life. Emphasis on human social relationships, self-concept and personal growth.
- 307: Elementary Experimental Psychology.** 3-2-3. Preq., PSYC 300. A beginning course in applying the scientific method to the problems of psychology.
- 310: Psychology of Personality.** 0-3-3. Preq., PSYC 202. A study of major theories of personality.
- 312: Psychology of Learning.** 0-3-3. Preq., PSYC 202. A survey of current theories of learning.
- 321: Psychological Testing.** 0-3-3. Preq., PSYC 300. An introduction to the principles and practices of psychological testing and evaluation.
- 400: Behavior Modification.** 0-3-3. Applied analysis to individual behaviors using concepts, and principles from experimental analysis of behavior. (G)
- 404: Seminar In Psychology.** 0-3-3-(9). An intensive survey in selected current topics in the field of psychology. (G) (Graduate students should contact instructor for more specific criteria.)

- 407: Advanced Experimental Psychology.** 3-2-3. Preq., PSYC 307. Emphasis on investigating specific learning, motivation, and perception topics from methodological and historical viewpoints.
- 408: Human Growth and Development.** 0-3-3. A seminar for the study of human growth. (G)
- 411: Crisis Intervention.** 0-3-3. Preq., 6 hours in PSYC and COUN 400 or approval of department head. Overview of theories, strategies, and service delivery systems in crisis intervention. (G)
- 414: Dynamics of Adjustment.** 0-3-3. A comprehensive study of the problems of self-adjustment and self-management and the development of a well integrated personality. (G)
- 418: Abnormal Psychology.** 0-3-3. Preq., PSYC 310 and 312. A study of the nature and development of abnormal behavior from a psychological viewpoint. (G)
- 450: Introduction to Clinical Psychology.** 0-3-3. Preq., consent of instructor. Introduction to clinical psychology as a science and profession. Lectures, discussions, demonstrations, and field observations are provided for an overview of clinical psychology.
- 455: Environmental Psychology.** 0-3-3. Preq., PSYC 102. A survey of concepts about individual's interaction with the physical environment. Emphasis is placed upon designing physical surroundings to serve social and personal needs.
- 459: Research Methods in Psychology.** 0-3-3. Preq., PSYC 300. An examination of the practical problems of designing, conducting, and interpreting research and of the structure and organization of research writing.
- 460: Field Research in Psychology.** 1 - 3 hours credit (9). Preq., PSYC 459. Consent of the instructor. Supervised practice in methods of field research as a basic tool of psychology. Each student develops and executes a field research project. May be repeated for a maximum of 9 hours credit.
- 461: Data Analysis and Interpretation.** 1-3 hours credit (3). Preq., PSYC 300 or equivalent. A course designed to provide the skills necessary to use currently existing computer software to analyze data encountered in the social sciences.
- 465: Industrial Psychology.** 0-3-3. The application of psychological findings and concepts to the industrial environment. (G)
- 469: Psychology of Sexual Behavior.** 0-3-3. Preq., PSYC 102 and junior standing. Survey of both normal and abnormal sexual behavior and selected techniques employed in sex therapy and counseling. (G)
- 474: Psychology of Adult Learning and Development.** 0-3-3. Provides understanding of cognitive and psychosocial development in young, middle, and later adulthood. Emphasis is on aging process and factors, which affect adult learning.
- 475: Death, Dying and Grievance Process.** 0-3-3. Exploration of one's personal values toward death and the grieving process, funeral customs and practices, counseling the terminally ill, and various customs of death. Graduate students should contact instructor for more specific criteria. (G)
- 480: Psychology of Sex Roles.** 0-3-3. Overview of psychology of sex roles including history, theory, methodology, sex differences, and implications for development, socialization, abnormal behavior, counseling and gender. (G)
- 484: Introduction to Human Relations.** 0-3-3. An introduction to human relations factors in various work settings.
- 485: Industrial Behavioral Analysis.** 0-3-3. Application to behavior change techniques in work settings. A study of how to effectively manage others' as well as one's own work habits.
- 486: Introduction to Decision Making.** 0-3-3. An introduction to decision making models and methods.
- 487: Human Relations Communication.** 0-3-3. A study of how communications influences human relation in different contexts.
- 490: Social and Psychological Aspects of Blindness.** 0-3-3. Preq., enrollment in Educational Psychology Visual Impairments program or permission of instructor. Psychological and environmental aspects of blindness. Current and historical overview of practices & trends in the rehabilitation and education of individuals with visual impairments. (G)
- 499: Health Psychology.** 0-3-3. Preq., PSYC 102. A survey of the systematic application of psychology to the relevant areas of health, disease and the health care system.
- 502: Cognitive Psychology.** 0-3-3. Preq. enrollment in graduate program in psychology, counseling, or permission of instructor. Contemporary approaches to cognitive psychology; a broad survey of social cognition including attention, cognitive organization, mental reasoning, information processing, decision making, and human memory.

- 505: Theories in Marriage and Family Therapy.** 0-3-3. An overview of marital development and change; principles of family dynamics and functioning.
- 506: Strategies for Marriage and Family Therapy.** 0-3-3. Techniques for aiding married couples and families in distress; parenting strategies.
- 507: Learning and Development.** 0-3-3. Provides an understanding of forces, which propel learning and development and enables teachers to help students successfully meet the unique demands of school.
- 508: Psychological Aspects of Disability.** 0-3-3. An examination of attitudes, adjustment problems, sexuality, family and program implications for disabled populations.
- 509: Psychology of Aging.** 0-3-3. An analysis of changes that occur in middle and late adulthood from psychological, cognitive, and social viewpoints.
- 510: Principles of Human Development.** 0-3-3. Biological, psychological, and cultural interrelationships in human development.
- 512: Advanced Abnormal Psychology.** 0-3-3. Preq., Enrollment in Counseling MA Program or permission of instructor. Comprehensive review of the major characteristics, etiology, and implications for treatment of the major psychological disorders. Clinical and research findings are emphasized.
- 513: Organizational Psychology.** 0-3-3. A survey of current research and theories comprising organizational psychology. Critical-thinking skills are used to evaluate empirical research and current theories in the field.
- 516: Personnel Psychology.** 0-3-3 Topics covered include the professional and legal requirements for personnel selection instruments; design and evaluation of personnel selection systems, designing and conducting job analyses and selection interviews.
- 517: Training and Development.** 0-3-3. Provides the skills necessary to analyze, design, and evaluate training in organizations. Topics include determining training needs, task analysis, learning objectives, training methodologies, and evaluation.
- 518: Behavioral Analysis in Industry.** 0-3-3. Application of behavioral analysis in industry. A study of concepts, principles, and skills essential for designing and implementing a behavior change plan in organizational settings.
- 519: Advanced Theories in Counseling.** 0-3-3. Preq., COUN 508. Further analysis of theories of counseling as is evidenced by a review of current counseling literature.
- 522: Communication in Human Relations.** 0-3-3. A review of the concepts, principles, and skills essential for effective communication in working with people.
- 523: Leadership and Decision-Making.** 0-3-3. Examination of the various skills, behaviors, and attitudes required for effective leadership. Includes practices, decision-making, communication and ethical issues related to leadership.
- 524: Internship in Industrial/Organizational Psychology.** 20-1-3 (6). Supervised experiences in an applied setting involving application of skills and field work in Industrial/Organizational Psychology.
- 533: Community Psychology/Rural Mental Health.** 0-3-3. A study of community systems, intervention techniques, consultation methods, history and current status of the community mental health movement with particular emphasis on rural mental health research. Addresses psychological practice issues in the rural environment.
- 534: Psychology of Creativity.** 0-3-3. Preq., enrollment in Educational Psychology or Counseling Psychology graduate programs or permission of instructor. Reviews theories, defining characteristics, and empirical research literature on the creative process. Identifies relationships of creativity to ability/personality variables, and measurement/research issues.
- 541: Research Methods in Behavioral Sciences.** 0-3-3. Preq., PSYC 542. A study of the research methods and designs commonly used in the Behavioral Sciences. Emphasis on quantitative methodology and APA writing style.
- 542: Statistical Methods in Behavioral Sciences.** 0-3-3. A study of the statistical methods used to study problems in Behavioral Sciences.
- 543: Psychometrics.** 0-4-3. Preq., Graduate enrollment in I/O Psychology, Educational Psychology, or Counseling Psychology, or permission of instructor. Test and measurement theory, including classical, true score, and item response theory models. Covers reliability, validity, scaling, norms, and score transforming issues.
- 544: Qualitative Research Methods.** 0-3-3. Concepts and applications of qualitative research methods including techniques for data collection and analysis are explored.
- 580: Developmental Psychology of Blindness.** 0-3-3. This course emphasizes knowledge of physical, social, and emotional development of the blind including acquisition of motor, language, and cognitive skills, birth through adulthood.
- 589: Special Topics in Psychology.** 1-4 hours credit, may be repeated. Preq., enrollment in relevant graduate program in Psychology or permission of instructor. Current or specialized topics in psychology.
- 599: Master's Thesis.** 0-3-3 (6 hours minimum). Original research conducted under the supervision of a departmental faculty member in the student's program area. Student must be enrolled whenever university facilities or faculty are used. (Pass/Fail).
- 600: Seminar: Issues in Academic Psychology & Teaching.** 0-1-1 (9). May be repeated. Required of resident Counseling Psychology PhD students each quarter. Study of professional issues and research applications in counseling psychology. **Non-degree credit.**
- 601: Historical Foundations of Modern Psychology.** 0-3-3. Historical development of psychology from its philosophical beginnings to the present.
- 602: Physiological Psychology.** 0-3-3. A study of the neuroanatomical and neurochemical bases of behavior; contributions of physiological processes to fundamental behavioral processes.
- 603: Sensation and Perception.** 0-3-3. Sensory and perceptual phenomena that influence motivation, cognition, and learning.
- 604: Theories of Social Psychology.** 0-3-3. Theory and research concerning interpersonal perceptions, attitude formation and change, social motivation, and interactive processes.
- 605: Child Psychopathology.** 0-3-3. Examines diagnosis and treatment of child and adolescent disorders from empirical, theoretical, and practical viewpoints.
- 606: Comparative Psychology.** 0-3-3. A study of the phylogenetic bases of behavior. Interspecies behavioral similarities and differences are examined as they relate to human behavior.
- 607: Fundamentals of Psychopharmacology.** 0-4-3. Preq., enrollment in Ph.D. program in Counseling Psychology or permission of the instructor. Biochemical substrates of emotion, affect, and behavior are reviewed. Psychopharmaceutical mechanisms and intervention strategies are emphasized along with a review of the treatment research literature
- 608: Developmental Psychology.** 0-3-3. An advanced theory and research based study of the biological, psychological, social, and cultural processes in human growth and development. Counseling Psychology PhD students only.
- 609: Personality Theory.** 0-3-3. Comparative approach to personality theory from the framework of philosophical issues, definitional problems, and current research issues.
- 610: Professional Issues and Ethics.** 0-3-3. An investigation of legal and ethical issues relevant to the practice of counseling psychology.
- 611: Advanced Group Counseling and Psychotherapy.** 2-3-3. Group counseling theories with emphasis on advanced techniques and application, ethical responsibilities, and current trends with group research methodology. Practicum experience required.
- 612: Advanced Learning Theory.** 0-3-3. Psychological aspects of learning, including theoretical and practical applications.
- 613: Career Assessment and Counseling.** 4-3-4. Preq., enrollment in Counseling Psychology Ph.D. program, PSYC 531, 616, and 617. Assessment and counseling of career clients using interest, ability, and personality tests.
- 614: Professional Seminar in Counseling Psychology.** 0-3-3. Preq., Counseling Psychology PhD students only. A survey of trends and issues pertinent to the professional activities of counseling psychologists.
- 616: Intellectual Assessment.** 0-3-3. Preq., Enrollment in Counseling Psychology PhD program and approval of instructor. This course focuses on psychological assessment and interpretation of tests of ability, achievement, and higher cognitive functions. Differential psychodiagnosis and formal report writing are emphasized.
- 617: Personality Assessment: Objective and Projective.** 0-3-3. Preq., approval of instructor. This course focuses on psychological assessment using tests of personality, DSM-IV psychodiagnosis, and DSM-IV Axis II disorders. Psychological report writing and interpretation are emphasized.
- 618: Motivation.** 0-3-3. The study of levels of motivation from ethological to cognitive-social motives; relevant motivational theories are used to explain human behaviors.
- 619: Psychopathology.** 0-3-3. Comprehensive review of the etiology of psychological disorders and their diagnosis; clinical research findings are emphasized.

- 620: Sex Roles and Behavior.** 0-3-3. An investigation of the effect of gender upon cognition, affect, and behavior.
- 621: Career Development Theories.** 0-3-3. Preq., Counseling Psychology PhD students only. Intensive review of theories and research literature on career development across the life span. Application of theories to current career- and work-related problems.
- 622: Theories of Counseling and Psychotherapy.** 0-3-3. Preq., Counseling Psychology PhD students only. A comparative approach to theories of counseling and psychotherapy at an advanced level.
- 623: Integrative Assessment.** 0-3-3. Preq., PSYC 616 & 617, Counseling Psychology PhD students only. Emphasis on selection, administration, and combination of results from various assessment instruments into an integrated whole. Integrative report writing is emphasized.
- 624: Counseling Psychology Internship.** 1-3 hours credit. Minimum credit allowed is 12 hours. Preq., completion of departmental requirements and approval of Counseling/Psychology Program Director and Department Head. One calendar year (or two half-years) of supervised full-time, counseling psychology experience in a Department-approved (typically, APA-approved) internship facility.
- 625: Research Seminar.** 0-3-3. Preq., Counseling Psychology PhD students only, or signature of instructor. Integration of research design, methodology, and statistics in psychological research.
- 627: Advanced Assessment Topics.** 0-3-3 (9). Preq., Counseling Psychology PhD students only. A rotating topics course providing advanced training in selected assessment instruments and processes. May be repeated twice.
- 628: Special Topics in Psychology.** 1-3 hours credit (9). May be repeated. Counseling Psychology PhD students only or permission of instructor. Intensive study of a selected topic in psychology.
- 629: Advanced Seminar in Counseling Theories & Techniques.** 0-3-3 (9). May be repeated. Preq., Counseling Psychology PhD students only. A rotating topics course providing advanced study of selected counseling theories and therapeutic techniques.
- 630: Supervision in Counseling & Psychotherapy.** 0-3-3. Preq., Counseling Psychology PhD students only. Overview of supervision/consultation models, including application of principles to clinical practice.
- 632: Psychotherapy Research.** 0-3-3. Preq., Counseling Psychology PhD students only. Investigation of research on change elements and outcome research in psychotherapy, including factors impacting change processes and cost-benefit issues raised by managed mental health care.
- 641: Advanced Experimental Design and Analysis.** 0-3-3. Theory and technique for maximizing the validity of psychological experiments and analyzing results via ANOVA, factorial ANOVA, ANCOVA, repeated measures ANOVA, and higher-order analyses.
- 642: Advanced Statistical Methods.** 0-3-3. Techniques such as multiple regression, canonical correlation, discriminant analysis, MANOVA, and factor analyses in behavioral research are present.
- 643: Multivariate Statistics.** 0-4-3. Advanced multivariate topics including multiple regressions, factor analyses, MANOVA, multi-dimensional scaling, structural equation modeling, path analysis, discriminant analysis, and meta-analyses.
- 650: Practicum in Counseling Psychology.** 3 hours credit (9). May be repeated. Supervised counseling experience within a practicum setting.
- 651: Advanced Practicum in Counseling Psychology.** 1-3 hours credit (9). Preq., PSYC 650 (9 hours total). May be repeated. Progressive development of advanced clinical skills within an approved practicum setting. Counseling Psychology PhD students only.
- 652: Field Placement in Practicum Setting.** 1-3 hours (18). May be repeated. PSYC 650 & 651 (three quarters each), Counseling Psychology PhD students only. Advanced practicum in a field setting.
- 660: Dissertation Research.** 1-3 hours credit. Proposal, research, and defense of original doctoral-level research study. May be repeated each quarter for 3 credit hours per quarter. Minimum credit allowed is 6 hours. Enrollment is minimally required during the term in which the dissertation proposal is defended and the term in which the dissertation research is defended.

#### QUANTITATIVE ANALYSIS (QA)

- 233: Basic Business Statistics.** 0-3-3. Preq., MATH 111 or 125. Descriptive statistics, probability, sampling distributions, confidence intervals, inference, and regression and correlation. Emphasis is given to business applications.
- 390: Quantitative Methods for Business and Economics.** 0-3-3. Preq., junior standing. Presentation and review of pertinent quantitative topics to

furnish the necessary background for the graduate quantitative methods field of study.

- 430: Management Science Methods.** 0-3-3. Preq., MGMT 333. Linear programming including sensitivity analysis, the transportation problem, inventory analysis, and PERT.
- 432: Intermediate Business Statistics.** 0-3-3. Preq., QA 233. Applied statistical methods utilizing the computerized Statistical Analysis System; multiple regression and correlation, Chi-Square, analysis of variance, and non-parametric methods. (G)
- 522: Advanced Business Statistics.** 0-3-3. Preq., QA 432. Applied statistical methods utilizing the computerized Statistical Analysis System (SAS); multiple regression and correlation, biased regression, analysis of variance, multiple comparisons, and non-parametric methods.
- 525: Quantitative Approaches for Decision-Making.** 0-3-3. Preq., QA 233 and QA 390 or consent of instructor. Survey of the quantitative and statistical methods for managerial decision making.
- 540: Advanced Management Science Methods.** 0-3-3. Preq., QA 430 or consent of instructor. Quantitative decision-making including linear, integer and parametric programming; project planning and scheduling with CPM/PERT and MAP as applied to business management.
- 550: Directed Study in Quantitative Analysis.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of quantitative analysis.
- 605: Methods of Business Research.** 0-3-3. Preq., QA 522 or consent of instructor. Formulation of statistical hypotheses germane to business research. Determination of the experimental conditions and extraneous conditions. Methods of measurement and the statistical analysis required.
- 610: Multivariate Statistics: Business Applications.** 0-3-3. Preq., QA 522. Regression extensions, canonical correlation, multivariate ANOVA, discriminant, business applications, principal components using SAS, SPSS, and BMD, factor and cluster analysis.
- 620: Seminar in Management Science.** 0-3-3. Study of current topics in the discipline of Management Science. In-depth analysis of a specialized field along with an investigation of the literature.
- 622: Advanced Business Statistics.** 0-3-3. Preq., QA 432. Requires Doctoral standing. May require additional class meetings. Applied statistical methods utilizing the computerized Statistical Analysis System (SAS); multiple regression and correlation, biased regression, analysis of variance, multiple comparisons, and non-parametric methods. Credit will not be given for QA 622 if credit is given for QA 522.
- 640: Advanced Management Science Methods.** 0-3-3. Preq., QA 430 or consent of instructor. Requires Doctoral standing. May require additional class meetings. Quantitative decision-making including linear, integer and parametric programming; project planning and scheduling with CPM/PERT and MAP as applied to business management. Credit will not be given for QA 640 if credit is given for QA 540.
- 650: Directed Study in Quantitative Analysis.** 1-3 hours credit. Hours and credits to be arranged. Consent of instructor and approval of department head required. Special problem or specific area of quantitative analysis.
- 685: Comprehensive Exam in Quantitative Analysis.** No credit. Doctoral standing required. Required for all business administration doctoral students seeking to take the comprehensive exam in quantitative analysis. Successful completion is a prerequisite to the oral comprehensive exam for those seeking a primary field or examined minor in quantitative analysis. Requires consent of graduate director.

#### READING (READ)

- 099: Developmental Reading.** 0-3-3. Builds reading fundamentals that are essential for comprehension of college-level textbooks. Develops skills in word recognition, comprehension, functional reading, vocational, library and reference skills. (Pass/Fail)
- 200: Reading Skills Improvement.** 0-3-3. This course is designed to assist any student who would like to improve basic reading skills. Emphasis on comprehension, concentration and speed.

#### RUSSIAN (RUSS)

- 101: Elementary Russian I.** 0-3-3. Introduction to contemporary spoken and written forms of Russian; emphasis on communicative competence.
- 102: Elementary Russian II.** 0-3-3. Preq., RUSS 101. Continuation of introduction to contemporary spoken and written forms of Russian; emphasis on communicative competence.

- 201: Intermediate Russian I.** 0-3-3. Preq., RUSS 102. Study of the more complex grammatical structures of Russian; emphasis on developing communicative competence and basic skills in reading and writing.
- 202: Intermediate Russian II.** 0-3-3. Preq., RUSS 201. Study of the more complex grammatical structures of Russian; emphasis on developing communicative competence and basic skills in reading and writing.
- 203: Intermediate Russian III.** 0-3-3. Preq., RUSS 202. Study of the more complex grammatical structures of Russian; emphasis on developing communicative competence and basic skills in reading and writing.
- 301: Russian Conversation.** 0-3-3. Preq., RUSS 203. Emphasis on developing conversational fluency in Russian in a variety of academic and social contexts.
- 302: Russian Composition.** 0-3-3. Preq., RUSS 203. Development of skills in writing Russian in a variety of academic and social contexts.
- 303: Russian Phonetics.** 0-3-3. Preq., RUSS 203. Intensive study of the Russian phonological system; exercises for refining skills in pronunciation, intonation, and stress patterns.
- 310: Russian Short Prose Fiction.** 0-3-3. Preq., RUSS 301 or permission of department head. In Russian. Russian short story, skazka, rasskaz, povest' and the novella. Includes works by Pushkin, Gogol, Lermontov, Chekhov, Babel, Rasputin, Tolstaya, Makanin, and others.
- 425: Russian Literature in English Translation.** 0-3-3 (6). Representative works of Russian literature from the 19<sup>th</sup> and 20<sup>th</sup> centuries; repeatable for credit with different course content. May not be counted towards a minor in Russian. Also listed as ENGL 425. (G)

#### SOCIAL SCIENCE (SOSC)

- 470: Senior Reading Program.** 3 hours credit (9). A reading/research course optional for all majors in geography, political science, and sociology.

#### SOCIOLOGY (SOC)

- 201: Principles and Elements of Sociology.** 0-3-3. An introduction to the structures and processes of group behavior.
- 202: Social Problems.** 0-3-3. Selected social problems in contemporary American society.
- 205: Introduction to Anthropology.** 0-3-3. Introduction to the origin and development of man; the nature and development of culture.
- 210: Introduction to Criminal Justice.** 0-3-3. A survey of the criminal justice system, its history and organization at the local, state and federal levels.
- 230: The Social Welfare System in the United States.** 0-3-3. A study of the social welfare system and the effort to prevent or resolve social problems encountered by individuals, groups, families, and communities.
- 304: Social Psychology.** 0-3-3. Preq., PSYC 102 or SOC 201. A study of the nature of social behavior; a psychological analysis of society and social institutions.
- 306: Juvenile Delinquency.** 0-3-3. Preq., PSYC 102 or SOC 201 or 202. The nature, causes, extent, and methods of treatment of juvenile delinquency.
- 308: The Family.** 0-3-3. A study of the family as a social institution with comparisons of family life in various societies.
- 312: Race and Ethnic Relations.** 0-3-3. Preq., SOC 201. Factors & conditions which underlie disagreement about fundamental values; their relation to social maladjustment; evaluation of theories; group approaches to reintegration.
- 313: The Sociology of Deviance.** 0-3-3. Factors and conditions which underlie disagreement about fundamental values; their relation to social maladjustment; evaluation of theories; group approaches to reintegration.
- 314: Criminology.** 0-3-3. Theories of the origins of crime; analysis of specific types of offenders, prevention, control, and treatment.
- 320: Research Methods.** 0-3-3. Preq., Statistics course or consent of instructor. Scientific methods and their application in social analysis; procedures in testing sociological theory; computer and data analysis.
- 330: An Introduction to Social Work.** 0-3-3. An examination of Social Work within the social welfare system. A review of the multiple roles of the social worker in service delivery and practice.
- 340: Urban Sociology.** 0-3-3. Preq., SOC 201. The influence of socio-cultural factors and their consequences for urban America.
- 345: Social Stratification.** 0-3-3. Types and results of social inequality; social class, status and power as determinants of behavior, values and life chances.
- 401: Social Theory.** 0-3-3. Preq., SOC 201, Junior standing or consent of instructor. The development of sociological theory and its relation to research.

- 410: Family Violence.** 0-3-3. A sociological examination of the types, extent, causes, and consequences of violence between family members and intimate partners; policy implication are explored.
- 416: Sociology of Education.** 0-3-3. The education system and the larger society; education as a social structure and process; implications for students, parents, teachers, and administrators.
- 418: Social Control.** 0-3-3. Preq., SOC 201. Informal and formal regulative processes in social behavior, with reference to techniques and processes of social control.
- 420: Treatment of Offenders.** 0-3-3. Preq., SOC 314. A study of principles of treatment of offenders; application of social science principles to treatment of offenders; interviewing, guidance, and counseling of offenders.
- 424: The Sociology of Corrections.** 0-3-3. Trends, issues and problems in the field of corrections.
- 425: Family Therapy.** 0-3-3. Preq., SOC 201 or FCS 210 or SOC 308. A survey of family therapy; the family as a system; theoretical models of modern practice, state laws and policies; code of ethics governing family therapy.
- 435: Sociology of Aging.** 0-3-3. Preq., SOC 201 or consent of instructor. Social and biological problems as a consequence of aging. Current issues, deficiencies and resources available to deal with specific problems.
- 436: Grieving and Loss.** 0-3-3. An analysis of loss, grief and bereavement. An assessment of services, programs, treatments, stress reduction techniques and communication skills.
- 437: Retirement and Community.** 0-3-3. Preq., SOC 201 or consent of instructor. Seminar for advanced students. An examination of retirement and the various environments in which people age.
- 438: Illness & Healing.** 0-3-3. A sociological examination of the illness experience, and social and ethical aspects of treatment.
- 444: Substance Abuse.** 0-3-3. Social, cultural and individual problems associated with alcohol and drug use. Family and other group responses. The nature and treatment of alcoholism and drug addiction.
- 450: Sociology of Religion.** 0-3-3. Seminar for advanced students in social sciences. An examination of religion as a multilevel sociological phenomenon.
- 455: Social Movements and Collective Behavior.** 0-3-3. Preq., SOC 201. Seminar for advanced students in social sciences. Social movements and collective behavior as studied in sociology, such as fads, migrations, mass hysteria, disaster reactions, and riots.

#### SPANISH (SPAN)

- 101: Elementary Spanish.** 0-3-3. Conversation reading and grammar. Non-native speakers only.
- 102: Elementary Spanish.** 0-3-3. Preq., SPAN 101. Conversation reading and grammar. Non-native speakers only.
- 201: Intermediate Spanish.** 0-3-3. Preq., SPAN 102. Structure, cultural reading, conversation. Non-native speakers only.
- 202: Intermediate Spanish.** 0-3-3. Preq., SPAN 201. Structure, cultural reading, conversation. Non-native speakers only.
- 301: Spanish Conversation and Composition.** 0-3-3. Preq., SPAN 202. Non-native speakers only. Conversation on everyday topics and review of elements of Spanish through structured compositions.
- 302: Spanish Conversation and Composition.** 0-3-3. Preq., SPAN 202. Non-native speakers only. Conversation on everyday topics and review of elements of Spanish through structured compositions.
- 380: Readings in Spanish Literature.** 0-3-3. Preq., SPAN 301 and/or 302 or permission of department head. Required for major in Spanish. A survey of the masterpieces of Spanish literature.
- 381: Readings in Spanish American Literature.** 0-3-3. Preq., SPAN 301, 302 or permission of department head. Required for major in Spanish. Survey of the masterpieces of Spanish American literature.
- 403: The Novel in Spain.** 0-3-3. Preq., SPAN 380, 381 or permission of department head. Study of the novel in Spain from the sixteenth century to the present.
- 405: The Modern Drama of Spain.** 0-3-3. Preq., SPAN 380, 381 or permission of department head. Study of the drama in Spain in the 19th and 20th centuries.
- 407: The Novel of Latin America.** 0-3-3. Preq., SPAN 380, 381 or permission of department head. Study of representative novels of Latin America. Mexico excepted.
- 408: Spanish Civilization.** 0-3-3. Preq., SPAN 380, 381 or permission of department head. Lectures and readings in Spanish history, geography, government, language, music art, etc.

- 425: The Novel in Mexico.** 0-3-3. Preq., SPAN 380, 381 or permission of department head. A study of outstanding novels from 1800 to the present.
- 426: Spanish Literature in English Translation.** 0-3-3 (6). Representative works of Spanish literature from the Middle Ages to the 20th century. Offered in English translation; repeatable for credit with different course content. May not be counted towards a major or minor in Spanish. Also listed as ENGL 426. (G)
- 427: Latin American Literature in English Translation.** 0-3-3 (6). Representative works of 20th century Latin American literature; repeatable for credit with different course content. May not be counted towards a major or minor in Spanish. Also listed as ENGL 427.(G)
- 450: The Spanish Language.** 0-3-3. Preq., 21 hours of Spanish or permission of department head. Advanced grammar. General characteristics of the language, including sources, etymology, dialects.
- 460: Applied Linguistics for Spanish.** 0-3-3. Preq., SPAN 450 or permission of department head. Pertinent theories of psycholinguistics and sociolinguistics. Contrastive study of Spanish and English patterns and structures.
- 480: Commercial Spanish.** 0-3-3. Preq., SPAN 450 or permission of department head. Study of common commercial forms for use in Spanish correspondence and business.

### SPECIAL EDUCATION (SPED)

- 300: Introduction to Exceptional Students.** 0-3-3. A survey of the physical, emotional, social, and learning characteristics of exceptional students; educational programs; incidence and prevalence.
- 301: Specific Learning Problems in Students.** 0-3-3. Preq., SPED 300. Learning principles, issues, specific deficits in learning; assessment and remediation of problems in visual and auditory perception, cognitive processes, language; gross and fine motor coordination.
- 302: Characteristics of Exceptional Students.** 0-3-3. Preq., SPED 300. Specific problems in cognitive, language and social skills related to academic and vocational training, special educator's role in management, planning, and resource or community interaction.
- 303: Characteristics of Severely and Profoundly Handicapped Students.** 0-3-3. Preq., SPED 300. An overview of education of student classified as severely and profoundly handicapped, including educationally relevant physical, cognitive and behavioral characteristics.
- 325: Introduction to Mental Retardation.** 0-3-3. Preq., SPED 301. Medical, psychological, social, and educational aspects of mental retardation.
- 335: Information on Childhood Diseases and Crippling Conditions.** 0-3-3. Emphasis on orthopedic conditions and chronic medical health problems with implications for education, psychology, social work, and occupational, physical, and speech therapy.
- 340: Management of Behavior Disorders.** 4-2-3. Preq., SPED 300. Foundations of behavioral science, operant analysis of human behavior, learning principles, behavior modification principles and techniques; educational programs, supervised application of skills and techniques covered.
- 341: Psycho-social Management of Exceptional Students.** 4-2-3. Preq., SPED 300. Non-behavioral teaching interventions emphasizing biophysical, psychodynamic, sociological, and ecological strategies; supervised application of skills and techniques using an instructional model that synthesizes strategies covered.
- 360: Education of the Partially Seeing Child.** 0-2-2. Preq. SPED 301. Learning behavior, curriculum adaptation, educational programs, environmental movement and control, and behavioral characteristics of children with visual impairment.
- 375: Education Procedures and Materials in Special Education.** 4-2-3. Preq., SPED 300 and 302 or permission of instructor. Educational procedures in developing and implementing curricula in the areas of self-help, language, social skills, motor skills, vocational skills, cognitive skills, and functional academics.
- 376: Materials and Methods for Severely and Profoundly Handicapped Students.** 4-2-3. Preq., SPED 303 or permission of instructor. Educational procedures in developing and implementing curricula in the areas of self-help, language, social skills, motor skills, vocational skills, cognitive skills, and functional academics.
- 460: Introduction to the Education of Exceptional Preschool Children.** 2-3-3. An introduction to the nature and needs of preschool handicapped children. Students will review literature, publications, trends, and model programs. (G)
- 461: Teaching Strategies for Exceptional Preschool Children.** 4-2-3. Preq., SPED 300, 460, and FCS 301. Emphasis on specific programs, materials

- and strategies for teaching young preschool children who have serious handicapping conditions. Areas covered include perceptual, motor, and intellectual development. (G)
- 462: Language and Cognitive Development in Exceptional Preschool Children.** 4-2-3. Preq., SPED 461. An emphasis on the identification, assessment and remediation of problems in language and cognitive development of preschool handicapped children.
- 463: Early Identification and Evaluation of Exceptional Children.** 4-2-3. Preq., SPED 460. Early identification and evaluation principles and procedures, parent interviews, norm-and criterion-referenced measure; diagnostic evaluation assessment incorporated into individualized educational planning. (G)
- 464: Parent Involvement and Community Resources for Education for the Exceptional Student.** 0-3-3. Preq., SPED 300 and 460. Parent-teacher duality roles and the dyadic process between student and teacher; material planning and implementation by parents through teacher modeling; community services. (G)
- 465: Intergency Services in Special Education.** 4-2-3. Preq., SPED 300 and 460. Study of related services to the handicapped, team control and contributions, strategies used in integrating overall life-experience planning and implementation. (G)
- 471: Prevocational Skills and Procedures for Exceptional Students.** 4-2-3. Preq., SPED 375 and 475. Competency-based prevocational education incorporated with curriculum design and informal assessment; long-term planning for vocational needs, occupational guidance.
- 477: Advanced Procedures in Educating Severely and Profoundly Handicapped Students.** 4-2-3. Preq., SPED 303 and 376 or permission of instructor. Diagnostic-prescriptive teaching procedures for educating severely and profoundly handicapped students, including criterion-referenced assessment procedures and individualized educational programming. (G)
- 490: Psycho-social and Educational Appraisal of Exceptional Students.** 3-2-3. Preq., EDUC 402 and SPED 300 or consent of instructor. Concepts of measurement applied to exceptional students; normative assumptions; measures of receptive and expressive language; social maturity; and perceptual-motor functions, observations of procedures. (G)
- 495: Psycho-social and Educational Appraisal of Exceptional Students II.** 7-2-3. Preq., SPED 490. Supervised administration of individual diagnostic tests, developmental scales, measure for the handicapped, interpretation and application to individualized educational planning and report writing. (G)
- 500: Curriculum Design for Exceptional Students.** 4-2-3. A examination of issues and strategies required in selecting and developing curriculum for exceptional students. Emphasis on the scope and sequence of curriculum for all areas of exceptional students.
- 501: Contemporary Issues in Special Education.** 0-3-3 (6). Historical and comparative approaches to theoretical issues and research, critical examination of assumptions, sampling, and tactics of research.
- 503: Educationally Disadvantaged.** 0-3-3. Biological, learning, interpersonal, and motivational determinants of behavior, cultural deprivation as a factor in school learning; educational implications.
- 510: The Exceptional Adolescent Student.** 0-3-3. Advanced course designed to acquaint the student with the complex challenges of the exceptional adolescent. Emphasis on remedial efforts, pre-vocational and vocational skills needed by the exceptional adolescent.
- 517: Curriculum for the Gifted/Talented.** 0-3-3. Preq., consent of area coordinator. Curriculum models in gifted/talented education, emphasizing essential principles and skills necessary for designing, implementing, and evaluating educational plans for gifted/talented students.
- 520: Advanced Study: Mental Retardation.** 0-3-3. Preq., EDUC 541 and SPED 501. Advanced study of the biological, social, and psychological factors in retarded behavior.
- 530: Advanced Study: Nonsensory Physically Impaired.** 0-3-3. Preq., EDUC 541 and SPED 501. Advanced study of the biological, social and psychological factors in crippling conditions and special health problems.
- 540: Advanced Study: Behavior Disorders.** 0-3-3. Preq., EDUC 541 and SPED 501. Advanced study of the biological, social, and psychological factors in behavior disorders.
- 560: Administration in Special Education.** 0-3-3. The major administrative and supervision functions necessary for the effective operation of special education programs and the major areas of knowledge necessary to carry out these basic functions.
- 562: Advanced Study: School-Related Language Problems in Special Education.** 0-3-3. Analysis of language deviations and disorders in

classroom situations, understanding of assessment, approaches and models for remediation/enrichment. Intervention and flexibility in curriculum development.

**570: Advanced Study: Learning Disabilities.** 0-3-3. Advanced study of the biological, social, and psychological factors in learning disabilities.

**575: Behavior Technology in Special Education.** 3-2-3. Preq., SPED 475. Remediation of severe learning and behavior problems in students through programming and behavior modification; use of automated equipment for direct control of stimuli and contingencies.

#### SPEECH THEATRE (SPTH)

**101: Stagecraft.** 4-2-3. Practical experience in scenery construction, painting, stage lighting, and organizational techniques.

**201: Introduction to Theatre.** 0-3-3. A comprehensive overview of the elements that comprise the theatre; intended as a basic preparation for an understanding of theatre art.

**240: Acting.** 4-2-3 (9). Basic training in the art of acting with emphasis upon physical and vocal skills as well as fundamentals of relaxation and public performance.

**290: Theatre Appreciation.** 0-3-3. A study of Theatre and its different forms and how they affect our life and society.

**307: Play Production.** 3-3-3 (9). Preq., SPTH 201, 240, or 409. The director's introduction to play production: script analysis, research, staging, actor coaching, scenery, lighting, and costuming.

**400: Stage Makeup.** 3-0-1. Practical experience in the design and application of stage makeup. (G)

**402: Advanced Acting.** 8-1-3 (9). Preq., SPTH 240 or consent of instructor. A study in the practice of the major period styles of acting from ancient Greece to the present. (G)

**403: Stage Lighting.** 4-2-3. Preq., SPTH 201 or consent of instructor. Practical and theoretical experience in stage lighting, design, and equipment. (G)

**404: Theatre Practicum.** 4-0-1 (12). Practical experience in interpretation, acting, directing, or technical theatre.

**405: Scene Painting.** 3-0-1. Preq., SPTH 101. Practical experience in the art of scene painting, using both historical and modern techniques and solutions. (G)

**407: Play Direction.** 3-3-3 (9). Preq., SPTH 307. Advanced course in directing methodologies, including the practical experience of directing a publicly performed short play. (G)

**408: Technical Direction and Stage Technology.** 4-2-3. Preq., SPTH 101. Practical experience in advanced theories of stage technology, shop management, budgeting, cost effective solutions and construction practices. (G)

**409: Stage Management.** 0-3-3. Preq., SPTH 201. A study of the responsibilities, organization, and methods used in the operations of the stage manager in theatre. (G)

**410: Studies in Scene and Costume Design.** 0-3-3. Preq., SPTH 201 or consent of instructor. A study of the theories of color, design, rendering, graphic techniques, and perspective as they pertain to scene and costume design for the stage. (G)

**414: Sound for the Theatre.** 4-2-3. Preq., SPTH 201 or consent of the instructor. Practical and theoretical experience in sound reinforcement, design, and equipment, and their uses in both commercial and non-commercial stage. (G)

**415: Shakespeare.** 0-3-3. The major plays and the poems. (Same as English 415.) (G)

**423: Dance for the Theatre.** 3--1-1 (3). A course in the advanced movements of Ballet, Jazz, and Modern Dance that are used in musical Theatre. (G)

**427: Movement for the Stage.** 3-1-1 (6). A performance class that introduces traditional techniques of movement styles for the stage and offers a survey of contemporary movement theory. (G)

**428: Contemporary Developments in Theatre.** 0-3-3. A study of theatre development since 1900. This course will cover trends, movements, and genres in all areas of theatre. (G)

**434: History of the Theatre I.** 0-3-3. Study of the theatre from ancient origins through the Restoration. Focus on literature, production, style, performance, and historical context. (G)

**435: History of the Theatre II.** 0-3-3. Study of the theatre from the 18th Century to 1960. Focus on literature, production, style, performance, and historical context. (G)

**471: The Craft of Dramatic Writing.** 0-3-3. An introduction to writing for the actor with emphasis on projects aimed at focusing on the structures of character, action, and dialogue. (G)

**472: Advanced Dramatic Writing.** 0-3-3 (6). Preq., SPTH 471 or signature of instructor. Studies in the craft of dramatic writing with varying areas of concentration including research, adaptation, writing for the screen, stage, radio, video, etc. (G)

**480: Voice for the Stage.** 0-3-3. A study of the use and training of the human voice for performance utilizing the Lessac system of voice training. (G)

**490: Arts Management.** 0-3-3. An overview of arts management in the fields of performing and visual arts. Included are basic management principles, personal management, and organizational structures and procedures. (G)

**491: Promotion.** 2-3-3. Study of promotional theory that enables students to design, produce and evaluate promotional campaigns for fine arts institutions and events. (G)

**502: Studies in Scene Design.** 0-3-3. Preq., SPTH 401. A seminar course in the theory, practice, and history of scene design for the theatre.

**503: Studies in Lighting Design.** 0-3-3. Preq., SPTH 403. A seminar course in the history, theory, and practice of lighting design for theatre, opera, dance, and other media.

**511: Studies in Stage Costuming.** 0-3-3. Preq., SPTH 406. A seminar course in the history, theory, and practice of design and construction of stage costumes.

**515: Theatre Management.** 0-3-3. Preq., SPTH 491. Study of theatre management concentrating on organization of business and administrative areas of theatre.

**516: Arts Administration.** 0-3-3. Study of arts administration concentrating on the theories and practices involved in the business aspects of theatre.

**518: Interpretation of Contemporary Drama.** 0-3-3. Preq., SPTH 315 and 319. A study of American and European drama from 1940 to the present.

**531: History of Drama.** 0-3-3. Preq., SPTH 424. A survey of dramatic literature from ancient times to the present.

**533: Theories of Performance.** 0-3-3. A seminar course examining the theories of major innovators in acting and directing from the ancient Greeks to the present.

**536: Analysis and Criticism of Drama.** 0-3-3. A seminar course in the theory of critical analysis of drama from Aristotle to the present.

#### SPEECH (SPCH)

**110: Principles of Speech.** 0-3-3. Designed to develop the principles of effective oral communication in typical speaker-audience situations, through practice in informative and persuasive speaking. (Cannot be taken for credit if student has credit for SPCH 377.)

**202: Supervised Observation.** 3-0-1. This course is designed to provide students with supervised observation of diagnostic and therapy sessions with clients who present speech, language and/or hearing disorders.

**210: Introduction to Communicative Disorders.** 0-3-3. A study of the various disorders of communication, their nature, etiology, and treatment.

**211: Public Speaking.** 0-3-3. Preq., SPCH 110 or permission of instructor. This course is concerned with developing advanced skill in special occasion speeches, the book review, the entertaining speech, and effective reading from an original speech.

**222: Phonetics.** 0-3-3. Principles of phonetics; articulatory phonetics; description and classification of sounds; transcription at different levels of detail; production and perception included.

**260: The Mass Media.** (0-3-3). Consideration of these media from the viewpoint of their audience; emphasizes the development of objectivity standards for evaluating mass communication. Open to all students.

**300: Discussion and Debate.** (0-3-3). A study of the principles of group discussion and debate with practical experience in each.

**301: Anatomy and Physiology of the Speech and Hearing Mechanism.** 0-3-3. Functional anatomy and physiology of those structures associated with speech production and reception.

**302: Introduction to Speech and Hearing Science.** 0-3-3. Comprehensive survey of the communicative process from the speaker to the listener, speech production, acoustics, and speech perception.

**308: Dactylogy.** 0-2-2. An introductory course in manual communication of the deaf; emphasis on drills and exercises to help students acquire a sign vocabulary and conversational fluency.

**312: Clinical Procedures.** 7 1/2-2-4. Students are taught principles and procedures used with clients with speech disorders through lecture, observation and supervised clinical experience.

**315: Oral Interpretation of Literature.** 0-3-3. Preq., SPCH 110. Advised, SPCH 211. The development of responsiveness to prose, poetry, and drama, and the ability to communicate the logical emotional and aesthetic elements to others.

- 325: Introduction to Communication Research Methods.** (0-3-3). A study of the goals and methods of research with emphasis on understanding the nature and structure of communication.
- 377: Professional Speaking.** 0-3-3. Designed to establish a foundation for effective speaking in informative speaking, in the interview, and in communication from the manuscript. (Cannot be taken for credit if student has credit for SPCH 110.)
- 411: Diagnostic Procedures.** 0-3-3. Principles and procedures for differential diagnosis of speech and language disorders. Administration and interpretation of various tests, parent interviewing, and clinical observation of behavior.
- 413: Articulation.** 0-3-3. A study of the nature, etiology, and retraining procedures related to defective articulation with emphasis on current research.
- 417: Seminar in Speech Communication.** (0-3-3). Selected current issues/topics in an identified area of theory or application within the field of Speech Communication.
- 418: Language Disorders in Children.** 0-3-3. Preq., SPCH 470. A beginning course in the study of language disorders in children with emphasis on evaluation and treatment procedures.
- 430: Nonverbal Communication.** 0-3-3. Study of the effects of space, physical properties of persons, movement, eye and vocal behavior on interpersonal communication.
- 431: Organizational Communications.** 0-3-3. Focuses on the factors related to communication processes within government, private, and volunteer organizations.
- 433: Applied Organizational Communication.** (0-3-3). Application of communication practices in organizational settings including the practical considerations that arise in conducting communication surveys.
- 440: Interpersonal Communication.** 0-3-3. Study of the verbal and nonverbal dimensions of interpersonal relationships including dialogues, interviews and dyadic systems.
- 443: Introduction to Audiology.** 0-3-3. Study of the auditory mechanism, physics of sound, the process of hearing, disorders of hearing and their treatment. (G)
- 451: Communication Training and Development.** (0-3-3). Critical analysis and practical application of the relationship between the study of communication and training and development.
- 455: Communication Theory.** (0-3-3). An examination and synthesis of theoretical approaches to contemporary communication theory with special emphasis on interpersonal contexts.
- 460: Applied Forensics.** 3-0-1 (9). Practical experience in debate and other forms of forensic speaking. May be repeated for a maximum of 9 hours credit.
- 465: Applied Practicum.** 6-0-2. Practical experience in clinical activities related to service programs. May be repeated for a maximum of 6 hours credit. Registration by permission of instructor.
- 466: Group Processes.** 0-3-3. Theory and practice of conducting group meetings, group discussions, to include parliamentary procedure.
- 470: Language and Speech Development.** 0-3-3. Study of the normal acquisition and maintenance of speech and language; theoretical formulations about speech and language behavior, and approaches to its study. (G)
- 500: Introduction to Research.** 0-3-3. A course designed to introduce students to research applicable to speech and theories of measurement including statistical and behavioral designs, reliability and judgments.
- 501: Seminar.** 0-3-3. Individual problems and research in any of the following general areas of concentration: speech communication; speech-language pathology; audiology; theatre arts. Registration by permission of instructor.
- 504: Language Disorders in Children: Remediation.** 0-3-3. Preq., SPCH 520 and permission of instructor. Etiologies, remediation techniques, principles, and programs for the language disorders found among children and adolescents.
- 507: Dysphagia.** 0-3-3. A study of etiology symptomatology, and anatomic/behavioral characteristics of dysphagia with an emphasis on principles and methods of diagnosis and treatment.
- 508: Practicum in Communicative Disorders.** 1-3 hour(s) credit (18). Supervised clinical experience with individuals who have disorders of communication.
- 509: Instrumentation and Calibration.** 0-3-3. A study of the procedures, instruments, and standards used for calibration of audiometric equipment. Measurement of noise levels and OSHA guidelines will be reviewed.
- 510: Speech Science.** 0-3-3. Study of normal speech and voice production with emphasis on the respiratory, articulatory, and phonatory mechanisms, and speech perception.
- 512: Audiological Correlates of Language Disorders in Adults.** 0-3-3. Preq., Permission of Department Head. Language changes/disorders associated with normal aging and a neurogenic origin with management implications for the audiologist.
- 513: Articulation Disorders.** 0-3-3. Preq., permission of instructor. Study of current research in testing, prediction, and management procedures for articulation disorders.
- 516: Hearing Disorders.** 0-3-3. The effects of pathologies of the auditory system on basic and advanced audiometric tests are studied.
- 517: Hearing Science.** 0-3-3. A study of basic acoustics, psychoacoustics and physiological acoustics.
- 519: Professional Issues in Speech-Language Pathology and Audiology.** 0-1-1 (6). Preq., Permission of Department Head. Issues and professional responsibilities related to the professional practice of speech-language pathology and audiology. Three semester hours required of all graduate students in SLP/A in the first year of study; may be taken for three additional semester hours with permission of Department Head.
- 520: Language Disorders in Children: Assessment.** 0-3-3. Preq., permission of instructor. A study of standardized and non-standardized techniques used to assess language disordered children and adolescents.
- 521: Anatomy and Physiology of the Hearing Mechanism.** 0-3-3. Structure and function of bodily organs related to the processes of hearing.
- 523: Adult Language Disorders.** 0-3-3. Preq., permission of instructor. A study of acquired language disorders associated with brain damage in adults with an emphasis on symptomatology, assessment, and diagnosis.
- 524: Voice Disorders.** 0-3-3. Preq., permission of instructor. A study of the etiology, symptomatology and treatment procedures for voice disorders, including those that result from laryngeal pathologies.
- 525: Cleft Palate.** 0-3-3. A study of the articulatory, resonance, and phonatory problems associated with cleft palate and facial maxillary disturbances including medical and speech therapy, habilitative and rehabilitative procedures.
- 526: Disorders of Fluency.** 0-3-3. Preq., permission of instructor. A critical review of the literature to synthesize information regarding the definitions of fluency disorders, theories of etiologies, symptomatology, and treatment.
- 527: Advanced Diagnostic Procedures.** 0-3-3. A study of formal and informal assessment procedures applicable to speech/language disorders. Emphasis on the role of differential diagnosis, specialized test procedures, and referral procedures.
- 528: Motor Speech Disorders.** 0-3-3. Preq., permission of instructor. A study of motor speech disorders that result from damage to the central and peripheral nervous systems, their etiologies, symptomatology, diagnoses, and management.
- 529: Management of Adult Language Disorders.** 0-3-3. Preq., SPCH 523 and permission of instructor. Clinical management of acquired adult language disorders.
- 530: Special Problems in Communicative Disorders.** 0-3-3. Registration by permission of instructor. Individual research assignments in speech pathology and audiology.
- 533: Differential Audiology.** 0-3-3. Discussion, demonstration and interpretation of behavioral tests used to differentiate hearing disorders.
- 534: Qualitative Research Methods.** 0-3-3. The use of observational and interviewing research techniques for studying human communication.
- 535: Hearing Aids.** 0-3-3. Involves discussion of hearing aids, selection procedure, and the amplification needs of the individual.
- 537: Seminar in Interpersonal Communication.** 0-3-3. Interpersonal communication theory and research including topics concerning acquaintance, attitudes, language, nonverbal codes, and dyadic and small group communication patterns.
- 539: Seminar in Organizational Communication.** 0-3-3. Topics include theories of organizational communication, consultation, research and field experience in organizations, communication in organizational settings and communication styles in decision making.
- 540: Industrial Audiology.** 0-3-3. Directed toward the study of management and control of hearing problems in industry, and conservation of hearing in occupations and activities involving excessive noise exposure.
- 541: Physiological Tests of Auditory Function.** 0-3-3. Auditory evoked potentials and electro-nystagmography examined in relation to purpose, scientific basis, procedures, and interpretation.

- 542: Seminar in Central Auditory Processing Disorders.** 0-3-3. A study of central auditory processing disorders including examination of various auditory tests for central processing, including strengths and weaknesses of the tests.
- 543: Seminar in Pediatric Audiology.** 0-3-3. A study of the investigation, identification, and assessment of children with audiological problems.
- 544: Communication in Small Groups.** 0-3-3. Study of theory and research in the dynamics of small group communication processes with emphasis on the interaction of message variables with other variables.
- 545: Clinical Audiological Experience.** 1 - 3 hour(s) credit (18). Supervised practicum in audiology including testing, aural habilitation/rehabilitation, report writing, and counseling clients with auditory problems.
- 546: Conference Course in Speech Communication.** 0-3-3. Readings in the literature of speech communication designed to expand opportunities for individual consultation in research and in informational aspects of the students' work.
- 547: Internship.** Advanced practicum in organizational communication in public, private and volunteer organizations.
- 548: Psychoacoustics.** 0-3-3. A study of the experimental areas of audiology that are directed toward developing a theory of auditory functioning. May be repeated one time for credit.
- 555: Externship in Communicative Disorders.** 8 semester hours. 40 contact hours per week. Preq., permission of the instructor. Supervised clinical practicum in an affiliated off campus clinical facility.
- 556: Seminar in Aural Rehabilitation.** 0-3-3. Review of topical areas in aural rehabilitation for the infant through geriatric population.
- 558: Seminar in Amplification.** 0-3-3. A study of recent advances in technology, rehabilitation strategies, and measurement as applied to amplification for the hearing impaired.
- 559: Special Topics.** 1-4 hours credit. Selected topics in an identified area of study in speech and hearing science, audiology, or speech-language pathology.

#### STATISTICS (STAT)

- 200: Basic Statistics.** 0-3-3. Preq., Mathematics ACT score is greater than or equal to 26, or Mathematics ACT score is greater than or equal to 590, or Placement by Exam, or MATH 101. Sample statistics, frequencies, normal and binomial distributions, point and interval estimation, significance testing, linear regression.
- 400: Introduction to Probability and Statistics.** 0-3-3. Preq., MATH 242. Probability, random variables, discrete and continuous distributions, mathematical expectations, estimation, hypothesis testing, regression, analysis of variance. (G)
- 402: Introduction to Statistical Analysis.** 0-3-3. Preq., MATH 101, junior standing and consent of the instructor; non-COES majors only. Understanding and applying: descriptive statistics, p-values, estimation, significance, regression, correlation. Use of packaged computer programs. (G)
- 405: Statistical Methods.** 0-3-3. Preq., MATH 242, or consent of instructor. Data description, discrete and continuous random variables, inferences about means and variances of populations, categorical data, regression, correlation, analysis of variance, computers in data analysis. (G)
- 506: Regression Analysis.** 0-3-3. Preq., STAT 405 or equivalent. Simple and multiple regression, inferences in regression, model formulation and diagnostics, analysis of covariance, nonlinear models, estimation and inference. Use of computers in data analysis.
- 507: Analysis of Variance.** 0-3-3. Preq., STAT 405 or equivalent. Analysis of variance for standard and unbalanced experimental designs, multiple comparisons, fixed, random, and mixed effects models. Use of computers for data analysis.
- 508: Biometrics.** 0-3-3. Preq., a course in statistics, or consent of instructor. Binomial, and normal distributions, hypothesis testing, regression, correlation, analysis of variance.
- 510: Advanced Statistics For Quality Improvements.** 0-3-3. Preq., STAT 506, 507, or consent of instructor. Least squares, fractional factorials, Taguchi's parameter design, performance criteria, second-order designs, fitting second-order models, exploration of response surfaces, optimization.
- 511: Design of Experiments.** 0-3-3. Preq., STAT 506 or 507 or 508, or equivalent. Factorial and fractional factorial experiments, incomplete block designs, repeated measures, split-plot, response surface, cross-over designs, use of computers for data analysis.
- 520: Applied Probability and Mathematical Statistics.** 0-3-3. Preq., MATH 245, and a 400-level or above STAT course, or consent of instructor.

Probability, random variables, discrete and continuous distributions, joint and conditional distributions, distribution of functions of random variables, expectations, moment generating functions.

- 525: Multivariate Statistics.** 0-3-3. Preq., STAT 506 and 507, and MATH 308, or consent of instructor. Tests of hypotheses on means, multivariate analysis of variance, canonical correlation, principle components, factor analysis, computer applications.
- 530: Nonlinear Models.** 0-3-3. Preq., STAT 506, 507, and MATH 244, or consent of instructor. Parameter estimation, tests of hypotheses, confidence intervals and regions, measures of curvature, use of computer algorithms.
- 548: Theory of Probability.** 0-3-3. Preq., any 500-level STAT course, and MATH 244, or consent of instructor. Combinatorial analysis, conditional probability, distribution theory, random variables, random vectors, limit theorems, random walks.
- 550: Practicum in Statistical Consulting.** 0-1-1 (3). Preq., STAT 506, 507, 511, or equivalent. Working with clients on statistical problems arising in research, such as modeling, design, data analysis and interpretation.
- 556: Time Series Analysis.** 0-3-3. Preq., MATH 245, and STAT 520, or consent of instructor. Spectral analysis, least square filtering, parameter estimation, stationary random processes, ARIMA models, trend and seasonality.
- 606: Linear Statistical Models.** 0-3-3. Preq., MATH 244 and 308, and STAT 506, 507, or consent of instructor. Generalized inverses, quadratic forms, Gauss-Markov theory, estimability, full rank models, non-full rank models, covariance analysis.
- 620: Theory of Probability.** 0-3-3. Preq., any 500-level STAT Course, and MATH 244, or consent of instructor. Combinatorial analysis, conditional probability, distribution theory, random variables, random vectors, limit theorems, random walks.
- 621: Theory of Statistics.** 0-3-3. Preq., STAT 520 or 620 or consent of instructor. Point estimation, interval estimation, statistical hypotheses, statistical tests, nonparametric inference, normal distribution theory.
- 625: Multivariate Statistics.** 0-3-3. Preq., STAT 506 or 507, MATH 308, or consent of instructor. Tests of hypotheses on means, multivariate analysis of variance, canonical correlation, principle components, factor analysis, computer applications.
- 630: Nonlinear Models.** 0-3-3. Preq., STAT 506 or 507, and MATH 244; or consent of instructor. Parameter estimation, tests of hypotheses, confidence intervals and regions, measures of curvature, use of computer algorithms.
- 650: Time Series Analysis.** 0-3-3. Preq., MATH 244, and STAT 506, or consent of instructor. Spectral analysis, least square filtering, parameter estimation, stationary random processes, ARIMA models, trend and seasonability.
- 651: Discrete Markov Processes.** 0-3-3. Preq., MATH 244 and 308, and STAT 520, or consent of instructor. Probability generating functions, Markov chains, renewal processes, Poisson processes, branching processes.
- 652: Stochastic Processes.** 0-3-3. Preq., STAT 520, and MATH 245, or consent of instructor. Birth-death processes, random walks, diffusion processes.
- 680: Topics in Statistics.** 0-3-3 (9). May be repeated for 3 hours credit each time.

#### STUDY SKILLS (STSK)

- 099: Developmental Orientation and Study Skills.** 0-2-2. Identification and application of practical study techniques and attitudes associated with college success; identification of goals, time management and scheduling. (Pass/Fail)

#### UNIVERSITY SEMINAR (UNIV)

- 100: Orientation and Study Skills.** 1-2 hour(s) credit. Orients new students to the University and facilitates the identification and application of practical study techniques and attitudes associated with college success; identification of goals, time management and scheduling.
- 101: Academic Skills Enhancement.** 1-3-3. Required if Reading ACT score is less than or equal to 17. Orients new students to the University environment and builds reading and study skills fundamentals, which are essential for success in higher education.