

ACCOUNTING (ACC)

- 203-3 Introduction to Financial Accounting. (3-0)** (TCCNS = ACCT 2301 or ACCT 2401) An introduction to financial accounting concepts and their application in the accounting process for business organizations. Includes financial statement preparation and analysis and communication of financial information. No previous knowledge of accounting required. Lab fee \$2. Course fee \$15.
- 204-3 Introduction to Managerial Accounting. (3-0)** (TCCNS = ACCT 2302 or ACCT 2402) An introduction to the use of accounting information as an aid to management decision making. Includes budgeting, the control process, the classification of costs, and financial modeling. Prerequisite: ACC 203. Lab fee \$2. Course fee \$15.
- 300-3 Accounting Concepts. (3-0)** A survey of basic accounting principles, concepts, and methods to include a review of general purpose financial statements and the accounting process. Financial accounting procedures are presented to support the overall managerial function. This course is provided for students without a previous accounting background. (Meets requirements for Accounting I.)
- 301-3 Microcomputer Applications in Accounting and Finance. (3-1)** Theory and application of microcomputer technology in the practice of accounting and finance. Emphasis on the utilization of basic spreadsheet and general ledger software. Intended to stimulate creative initiative in performing accounting tasks and to develop the basic skills necessary to efficiently and effectively utilize the microcomputer. Credit for both CIS 301 and ACC 301 will not be awarded. Prerequisite: ACC 203. Lab fee \$15.
- 302-3 Cost Accounting. (3-0)** An introductory cost course, emphasizing the accounting for material, labor, and manufacturing expenses in both job order and process cost systems. Special attention to distribution of service department cost and costing of byproducts and joint products. Prerequisite: ACC 203.
- 303-3 Intermediate Accounting I. (3-0)** The environment of accounting, development of standards, basic theory, financial statements, worksheets, and the application of generally accepted accounting principles for the business enterprise with emphasis on corporations. Prerequisite: ACC 203 or approval of department head. Lab fee \$5.
- 304-3 Intermediate Accounting II. (3-0)** A continuation of Intermediate I with continued emphasis on generally accepted accounting principles as applied to the business enterprise. Prerequisite: ACC 303 or approval of department head. Lab fee \$5.
- 305-3 Governmental and Institutional Accounting. (3-0)** Budgeting, accounting, and financial reporting principles and practices for governmental and other not-for-profit entities. Prerequisites: ACC 303 or approval of department head.
- 308-3 Managerial Accounting. (3-0)** A study of the uses of accounting information by management. Accounting procedures and reports essential to management are emphasized, as are cost analysis, cost control, budgeting, and controllership. Prerequisite: ACC 203 or approval of the department head. Course cannot be counted as part of a degree program for an accounting major.
- 310-3 Accounting Information Systems. (3-0)** Specific study of design and implementation of complex accounting information systems. An understanding of the traditional accounting model and its relationship to each type of accounting information system will be emphasized, including

accounts receivable, inventory control, cost accounting, operational budgeting, and capital budgeting. Key elements of a well-designed management control system are included. Prerequisite: ACC 203. Lab fee \$15.

- 399-v Cooperative Education. (Credit variable; 1-3 for each hour)** This course is designed to offer students the opportunity to integrate academic study with work experience that is germane to their major or minor. Enrollment requires a two-semester minimum commitment that may be accomplished by 1) alternating semesters of full-time study with semesters of curriculum-related employment, or 2) enrolling in courses at least half-time (6 semester hours) and working part-time in parallel positions of curriculum-related employment. The department Cooperative Education advisor will supervise the student's experience and assign the final grade based on the student's final report which is required to complete the course. Students may participate in the Cooperative Education program for an unlimited number of semesters but a maximum of 6 hours credit may be counted toward a degree. Prerequisites: Completion of 30 semester hours which includes 12 hours in the major or minor discipline in which the Cooperative Education course is desired, minimum overall GPA of 2.5 and a minimum GPA of 3.0 in the appropriate major or minor field, and department head approval. Field experience fee \$75.
- 401-3 Financial Accounting. (3-0)** A study of financial statement analysis and accounting topics related to financial statement presentation and disclosure. Prerequisite: ACC 304 or approval of department head. Lab fee \$5.
- 403-3 Advanced Accounting Principles. (3-0)** Special phases of partnership accounting, joint ventures, consignments, installment sales, statement of affairs and accounting for insolvent concerns, and business combinations. Prerequisite: ACC 401 or concurrent registration. Lab fee \$5.
- 405-3 Federal Tax Accounting. (3-0)** The present income tax law and regulations; income tax legislation, treasury and court decisions, departmental rulings; income tax problems and returns, social security, and self-employment taxes. Prerequisites: ACC 203 and junior classification. Credit for both ACC 405 and FIN 405 will not be awarded.
- 406-3 Federal Tax Accounting--Advanced. (3-0)** Current income tax law and tax accounting procedures. Preparation of income tax returns of partnerships and corporations. Prerequisite: ACC 405 or approval of department head. Credit for both ACC 406 and FIN 406 will not be awarded.
- 423-3 Ethics for Accountants. (3-0)** Introduction to auditing and ethical responsibilities for auditors and other accountants in both public and private practice. Topics include generally accepted auditing standards, the standard audit report, legal responsibilities of accountants, the Code of Professional Conduct for accountants, independence, and objectivity. Includes case studies involving ethical reasoning and decision making. Prerequisite: ACC 304 or concurrent enrollment.
- 424-3 Auditing Evidence and Reporting. (3-0)** Procedures used by auditors and accounting practitioners to gather and evaluate information and report on their findings. Includes evaluation of internal control, planning an audit or other engagement, compliance testing, substantive testing, statistical sampling, evaluation of findings, and preparation of reports. Prerequisite: ACC 423.
- 435-3 Financial Statement Analysis. (3-0)** Use of financial statements to analyze the position of a firm. Topics include analysis techniques and limitations

imposed by generally accepted accounting principles. Prerequisite: ACC 303 (Intermediate Accounting I).

- 457-3 Accounting Theory. (3-0)** A systematic study of the generally accepted accounting rules and principles that govern the practical application of accounting methods. Prerequisites: ACC 303 and 304 (Intermediate Accounting I and II).
- 485-3 Seminar. (3-0)** A study of current issues and developments in accounting. Prerequisite: approval of instructor.
- 486-v Problems. (Credit variable)** A directed study of selected problems in accounting. May be repeated with approval of department head. Prerequisites: Senior classification and approval of department head.
- 503-3 Accounting for Management. (3-0)** A study of accounting as related to problems of making business and economic decisions. Includes both financial and managerial accounting. Readings, problems, and cases requiring use of accounting data. Prerequisite: FIN 500 or approval of instructor.
- 585-3 Accounting Seminar. (3-0)** Selected accounting topics of current importance to business management. May be repeated once for credit when topics vary.
- 586-v Problems. (Credit variable)** This course offers students the opportunity to become acquainted with current research being conducted within the student's area of interest; directed reading of a number of sources selected in concert by the student's professor. Prerequisite: Approval of department head.

ADMINISTRATIVE SYSTEMS (ADMS)

- 105-3 Intermediate Keyboarding. (3-2)** Students will master the alpha-numeric computer keyboard by touch, with attention to accuracy and the correct formatting of business documents such as letters, memorandums, formal reports, forms, and other business correspondence. Prerequisite: ADMS 102 or beginning typewriting in high school or college. Lab fee \$10.
- 315-3 Word Processing. (3-2)** Orientation to word processing concepts terminology, procedures, and hardware. Students are given experience with basic and advanced functions of dedicated word processors and microcomputer word processing software. Prerequisite: ADMS 106 or approval of department head. Lab fee \$15.
- 314-3 Advanced Document Production. (3-2)** Students will prepare high-quality documents using the computer. Prerequisite: ADMS 105. Lab fee \$10
- 316-3 Advanced Word Processing. (3-2)** A comprehensive study of microcomputer word processing software. Students will develop proficiency in the use of word processing software through extensive hands-on experience with advanced formatting functions including macros, graphics, drawing, merging, and sorting to create documents with columns, tables, and charts. Prerequisites: ADMS 106 and 315 or approval of department head. Lab fee \$15.
- 318-3 Current Issues in Business Technology. (3-0)** A survey of current topics to acquaint the business student with a variety of technological changes encountered in the business environment. Prerequisite: Junior classification.
- 319-3 Current Issues in Business Operations. (3-0)** Examination of a variety of contemporary issues affecting business operations in the areas of accounting, finance, business communication, business law, management, marketing, and economics. Prerequisite: Junior classification.

- 413-3 Administrative Information Systems. (3-2)** Business information and decision support systems are examined as critical elements in business data and information systems. Emphasis is placed on data and records management systems, electronic filing and retrieval systems, reprographics systems, telecommunication systems, and machine transcription systems. The course includes discussion of current and future technological trends. Prerequisite: Junior classification. Lab fee \$12.
- 414-3 Administration of the Electronic Office. (3-0)** Principles of office management, including planning, organizing, staffing, directing, and controlling are examined. Emphasis is placed on improved managerial performance, including procedures, personnel requirements, and equipment needs. Prerequisite: Junior classification.
- 484-3 Internship. (1-6)** Pre-approved and supervised work experience in an administrative systems-related position with a public or private business organization. May be repeated for a total of 6 hours credit. Prerequisites: Junior classification and approval of department head. Field experience fee \$75.
- 486-v Problems. (Credit variable)** A directed study of selected problems in administrative systems. May be repeated with department head approval. Prerequisites: Senior classification and approval of department head.

AGRICULTURAL COMMUNICATIONS (ACOM)

- 486-v Problems in Agricultural Communications. (Credit variable)** Individualized study of current topics in student's major concentration of study or supporting discipline. Specific content and credit dependent upon students' interest, needs, and depth of study. Maximum undergraduate credit, four semester hours. Prerequisites: Senior classification and advanced approval by academic advisor.
- 490-3 Special Topics (3-0)** Selected topics in Agricultural Communications. May be repeated for credit when topics vary. Prerequisite: Senior classification or approval of department head.

AGRICULTURAL ECONOMICS (A EC)

- 105-3 Introductory Agricultural Economics. (3-0)** (TCCNS = AGRI 2317) An introduction to economics principles and concepts in agriculture today as they relate to the American economic system. Emphasis will be on management problem-solving techniques under various situations, especially those agricultural in nature, including producing, processing, distributing, and consuming farm and ranch products. Course fee \$10.
- 212-3 Microcomputer Applications in Agriculture. (2-2)** (TCCNS = AGRI 1309) Microcomputer technology applied to management, record keeping, and agribusiness. Emphasis on the application of database, spreadsheet, and other business software in various agricultural environments. Lab fee \$15.
- 230-3 Agricultural Credit. (3-0)** Emphasis will be on building Balance Sheets, Income/Expenses Statements, Collateral Analysis, Credit Action Forms and Financial Analysis. Prerequisite: A EC 105 and MATH 107 or equivalent.
- 312-3 Production Economics. (3-0)** Application of economic production principles in solving resource allocation problems in agriculture and agribusiness. Prerequisites: A EC 105; ECO 201, 202, 302.
- 314-3 The Agricultural Marketing System. (3-0)** An introductory course covering the principles, practices, institutions, functions, and problems involved in the marketing of agricultural commodities. Prerequisite: A EC 105 or ECO 202.

- 317-3 Agricultural Statistics. (2-2)** Statistical principles and methods in analyzing agricultural and economic data to solve problems relating to production, consumption, and cost/profit optimization. Provides a basic background in statistical analysis and related computer applications. Prerequisites: MATH 107 or equivalent, or approval of instructor. Lab fee \$15.
- 333-3 Agricultural Prices. (3-0)** Factors affecting commodity prices, price trends and seasonal variations, parity prices, methods of forecasting demand and prices, and economic tools and techniques for making decisions. Prerequisites: A EC 105, 212, and 314. Lab fee \$15.
- 399-v Cooperative Education. (Credit variable; 1-3 for each hour)** This course is designed to offer students the opportunity to integrate academic study with work experience that is germane to their major or minor. Enrollment requires a two-semester minimum commitment that may be accomplished by 1) alternating semesters of full-time study with semesters of curriculum-related employment, or 2) enrolling in courses at least half-time (6 semester hours) and working part-time in parallel positions of curriculum-related employment. The department Cooperative Education advisor will supervise the student's experience and assign the final grade based on the student's final report which is required to complete the course. Students may participate in the Cooperative Education program for an unlimited number of semesters but a maximum of 6 hours credit may be counted toward a degree. Prerequisites: Completion of 30 semester hours which includes 12 hours in the major or minor discipline in which the Cooperative Education course is desired, minimum overall GPA of 2.5 and a minimum GPA of 3.0 in the appropriate major or minor field, and department head approval. Field experiences fee \$75.
- 401-3 Public Agricultural and Food Programs and Policies. (3-0)** Identification and analysis of alternative governmental programs and policies affecting prices and quantities of agricultural commodities, farmer-rancher incomes, food supplies and consumer prices, and domestic and foreign food distribution and trade. Consideration of relevant political and economic factors, administrative aspects, and the policy participants. Prerequisites: A EC 105 or two semesters of economics and junior classification.
- 402-3 International Economics. (3-0)** An introduction to international theory and policy and its extensions, welfare effects of tariffs and non-tariff barriers, commercial policies of the United States, trade policies of developing countries, multinationals, balance of payments, and foreign exchange markets. Credit for both A EC 402 and ECO 401 will not be awarded. Prerequisite: ECO 201.
- 406-3 Commodity Futures Markets. (3-0)** Introduction to the organization and functioning of futures markets. Analysis of the economic function performed by markets, and study of fundamental and technical approaches to market forecasting. Examination of various trading strategies applied primarily to agricultural commodities. Prerequisites: A EC 105 or ECO 202; A EC 212 and 314.
- 421-3 Economic Development of Rural Areas. (3-0)** Analysis of economic problems of rural areas of the United States. Review of fundamental causes of economic decline in rural areas. Application of economic principles and theory to problems of rural areas. Evaluation of current methods and public programs for economic development. Application of analytical methods to development problems. Credit for both A EC 421 and ECO 421 will not be awarded. Prerequisite: A EC 105 or ECO 202.

- 425-3 Recreation and Tourism Economics. (3-0)** Benefit-cost frameworks in public planning for outdoor recreation development, pricing problems, market demand assessment, and impacts of recreational development on regional economies. Prerequisites: A EC 105, ECO 201, 202.
- 430-3 Agricultural Finance. (3-0)** Analysis of the capital requirements for farming and ranching; principles involved in the use of each type of farm credit. Prerequisites: Senior classification, A EC 312, and one semester of accounting, or approval of department head.
- 433-3 Economics of Agribusiness Management. (3-0)** Economic aspects of the agribusiness system. Management techniques related to problem recognition and decision making in organizations involved in the agricultural sector. Prerequisites: A EC 105 or ECO 202 and A EC 314.
- 484-v Internship. (Credit Variable)** An approved, supervised, comprehensive work experience consisting of a minimum of 240 hours (6 weeks) for career preparation in an agribusiness enterprise. Prerequisites: Junior or senior classification and approval of academic advisor and department head. Field experience fee \$75.
- 486-v Agricultural Economics Problems. (Credit variable)** Individualized study of current topics in student's major concentration of study or supporting discipline. Specific content and credit dependent upon student's interest, needs, and depth of study. Maximum undergraduate credit, four semester hours. Prerequisites: Senior classification and advance approval by instructor of record.
- 488-v Undergraduate Research. (Credit variable)** Fundamental research methods will be addressed through a faculty-directed project. Participation in an abbreviated lecture series may be required. Project components may include a literature review, data collection and analysis, testing, planning, project design, and/or computer modeling. The student is required to prepare a final report and produce a presentation. No credit is awarded until the report and presentation are submitted. Only one undergraduate research experience will be counted toward degree requirements. Prerequisites: Junior standing, completion of 12 hours in A EC, and approval of department head.
- 501-3 Environmental Issues and Agricultural Policy. (3-0)** Current and emerging problems in economics of environmental issues relating to agriculture and agribusiness firms. Examination of policy issues, institutions, and legal and political constraints in relation to environmental quality and agricultural resources. Prerequisites: ECO 201 and 302, or approval of instructor of record.
- 510-3 Advanced Farm and Ranch Management. (2-2)** Economic theory and business principles applied to the organization and operation of farm and ranch businesses. Emphasis will be on farm budgeting and decision making, selecting and combining enterprises, analyzing farm investment alternatives, farm growth strategies, risk, and uncertainty. Prerequisites: A EC 314, 410. Lab fee, \$6.
- 512-3 Production and Operations Analysis. (3-0)** Analysis of the production and operations function from a problem-solving and quantitative models approach. Prerequisite: Approval of instructor of record.
- 514-3 Advanced Agricultural Marketing. (3-0)** Market development concepts, practices, and strategies for food and fiber products. Causes, effects, and relationships to business and consumer economics. Strategies for price risk management in buying and selling agricultural products. Prerequisites: ECO 302 and A EC 314, or approval of instructor of record.

- 533-3 Management Practices of Agribusiness. (3-0)** An examination of the choices, decisions, strategies and organizational behavior of agribusiness firms and their management. Primary emphasis will be given to the managerial practices of food and agricultural supply firms in the agri-food industry. Prerequisites: A EC 430 or equivalent FIN course, A EC 314 or MKTG 314, and MGMT 301, or approval of instructor of record.
- 586-v Agricultural Economics Problems. (Credit variable)** Advanced independent study and research in agricultural economics topics. A written report will be submitted to the supervising professor. Prerequisite: Approval of instructor of record.
- 590-3 Advanced Topics. (3-0)** Studies in mathematical economics, input-output analysis, linear programming, social benefit-cost analysis, risk management, or other advanced topics as offered. Prior academic training requirements vary with topic. May be repeated once as topic varies. Prerequisite: Consent of instructor.

AGRICULTURAL EDUCATION (A ED)

- 502-3 Leadership for Agri-Services and Development. (3-0)** Study of styles and theories that are applicable to functioning in a leadership role in educational and agri-industry/business settings.
- 511-3 Information Systems to Agricultural Services & Development. (3-0)** Analysis of information systems used in agricultural services and development. A study of the flow of information in and among various components of the agri-education/industry/business sectors.
- 513-3 Administration and Supervision of Career and Vocational-Technical Education. (3-0)** Theories and procedures applicable to the organization, administration, financing, and supervision of career and vocational-technical education in public and post-secondary schools. Prerequisite: Professional experience or approval of the instructor.
- 516-3 Program Building in Agricultural Education. (3-0)** Organization of educational programs in agriculture on local, state, national and international levels. Prerequisite: Professional experience or approval of the instructor.
- 518-3 Ethical/Environmental Issues in Agriculture. (3-0)** Ethical and environmental issues affecting public policy as related to agri-education/industry/business. Credit for both ANSC 518 and A ED 518 will not be awarded. Prerequisites: Approval of instructor.
- 519-3 Workshop in Agricultural Education/Service/Development. (3-0)** Selected programs in agricultural education, extension, service, development, or international programs. Also will serve as state certifying course for cooperative part-time training teachers as topic justifies. Prerequisite: Professional experience or approval of instructor. May be repeated for credit.
- 520-3 Programs and Personnel of the Cooperative Extension Service. (3-0)** Enabling legislation, program areas, teaching methods used, staffing patterns, funding, and program administration of the Cooperative Extension Service. Special emphasis on entry-level positions and responsibilities of each.
- 521-3 International Programs in Agricultural and Extension Education. (3-0)** The function of international agencies, organizations, foundations, religious groups, and education concerning the improvement of the quality of life for peoples in developing nations through improved, sustained agricultural production.

- 5403. Methods of Technological Change. (3-0)** Methods of planning and implementing change in agricultural techniques and practices. Special emphasis on the role of the agricultural change agent and the effects of change on society and the economy. Prerequisite: Approval of the instructor.
- 585-v Seminar. (Credit variable)** Group study and discussion of current developments in agricultural education. Special emphasis given to research and legislation as they affect programs in teacher education, vocational agriculture, and related areas of education. Prerequisite: Graduate classification.
- 586-v Problems (Credit variable)** Studies related to agricultural education, extension, service and development, international programs, and policies affecting agriculture. Prerequisite: Approval of the instructor.
- 588-3 Thesis. (3-0)** Scheduled when student is ready to begin the thesis. No credit until thesis is accepted. Prerequisite: AGRI 598 or other approved research methodology course and consent of major professor.
- 590-3 Advanced Topics. (3-0)** Selected topics in agricultural education offered as needed and dependent upon departmental, faculty, and student interest. May be repeated as topics vary.
- 598-3 Philosophy, Interpretation and Application of Research. (3-0)** Studies designed to acquaint students in agricultural research techniques and demonstration related to the classroom, laboratories, work experience, and extension and adult education activities in agricultural programs. Basic concepts concerning interpretation and analysis of research data.
- 599-3 Practicum, Field Problems, or Internship. (3-0)** Supervised professional activities in agricultural education/industry/business settings. Emphasis is placed on the student's involvement in successful practices in the area of professional interest. Experience may be on the local, state, national, or international level. May be repeated once for credit. Field experiences fee \$75.

AGRICULTURAL ENGINEERING (A EN)

- 586-3 Agricultural Engineering Problems. (3-0)** Advanced problems in agricultural engineering topics. Prerequisite: Approval of instructor of record.

AGRICULTURAL SERVICES & DEVELOPMENT (AGSD)

- 101-1 Freshman Seminar in Agricultural Services and Development. (1-0)** A survey of the agricultural services industry and the career preparations needed. Exploration of degree programs, degree planning, and academic preparation will be reviewed. The seminar will also include academic skills development aimed to improve first-year success.
- 201-3 Agricultural Power Units. (2-2)** Fundamentals of internal combustion engine operation to include gasoline, diesel, and liquefied petroleum. Preventative maintenance and general servicing of tractor engine systems: intake & exhaust; fuel; lubrication; cooling; electrical; power trains; and hydraulic. Also covered are tractor tune-up; small engine operation maintenance & reconditioning; and plumbing & irrigation power systems. Lab fee \$15.
- 211-3 Applied Analysis. (3-0)** Collection and computer analysis of data and records related to production agricultural enterprises. Problem-solving techniques related to the areas of animal science, agronomy, agricultural business, and agricultural mechanization are stressed.
- 221-3 Fundamentals of Agricultural Building Construction. (2-3)** A course designed to acquaint students with principles and application of carpentry,

tool maintenance, tool and hardware nomenclature, preparation of drawings and bills of materials, blueprint reading, and the preparation and use of concrete. Also included are maintenance needs for the home and agricultural buildings. Lab fee \$8.

- 230-3 Introductory Metals and Welding. (2-4)** Cold metal work, soldering, pipe fitting, tool conditioning, hardware nomenclature, arc and oxyacetylene welding. Lab fee \$25.
- 301-1 Analysis of Agricultural Occupations. (1-0)** A course to advance student understanding of professional occupations in agriculture and the professional and technical competencies required.
- 302-3 Agricultural Sales and Services. (3-0)** Application of successful selling. Principles and practices in providing farm and ranch operations with agricultural materials, supplies, equipment, and services. Seller aspects involved in the marketing of farm and ranch products by farm-related agribusinesses. Career opportunities and preparation in agricultural sales and services will be explored. Prerequisite: A EC 105 or approval of department head.
- 306-3 Laboratory Techniques in Agricultural Mechanics. (1-4)** The development of mechanical laboratory skills used in the teaching of agriculture with emphasis on electrical, construction, and environmental topics. Laboratory management and maintenance for effective teaching will also be emphasized. Lab Fee \$12
- 318-3 Conservation and Water Utilization. (2-3)** Surveying principles including leveling, total station, laser levels, and mapping as applied to agriculture. The utilization of GPS in the agricultural industry. Planning and development of structures for surface water and waste water management. Lab fee \$10.
- 325-3 Agricultural Electrical Systems. (2-2)** Elements of: electric current generation and transmission, agricultural applications of electric heating, lighting and power, wiring, motors, and power rates. Also includes National Electrical Code and maintenance of air conditioning and cooling systems. Lab fee \$16.
- 329-3 Farm Utilities. (2-3)** Farm water supply, sewage disposal, heating and ventilating system, farm refrigeration and farmstead layouts. Lab fee \$6.
- 340-3 Agricultural Field Machinery. (2-4)** Principles of construction, operation, adjustment, calibration, and repair of agricultural tillage, planting, cultivating, spraying, fertilizing, and harvesting machinery. Laboratory activities include set-up of new equipment, wear analysis and repair of used equipment, calibration of equipment, and field operations. Lab fee \$12
- 401-6 Student Teaching. (1-16)** Ten weeks or equivalent of off-campus supervised student teaching in an Agricultural Science and Technology Program in selected public schools in Texas. Prerequisite: Senior classification. Field experience fee \$75.
- 402-3 Processing and Storage of Agricultural Products. (2-2)** The mechanical processes used in the processing and storage of grains, forages, nuts, and other agricultural products along with factors important to maintaining product quality during storage and processing. Lab fee \$6.
- 405-3 Agricultural Mechanical Services. (2-2)** Applications of advanced phases in agricultural mechanics. The course will emphasize the organization, management, service, and use of equipment in all areas of agricultural mechanics. Prerequisites: Senior classification and 6 hours of A EN. Lab fee \$30.

- 406-3 Agricultural Mechanical Services and Instruction. (2-2)** Field-based applications of agricultural mechanics instruction. This course will emphasize the organization, management, service, and use of equipment in all areas of agricultural mechanics instruction. Prerequisites: A EN 201, 221, 230, and EDU 303. Lab fee \$30.
- 407-3 Program Methods. (3-0)** A study of curriculum and programmatic management for all aspects of the secondary/middle school agricultural science and technology program. Topics include pre-employment laboratories, work-based learning, advisory committees, supervised agricultural experience programs, new program development/implementation, foundations of agricultural education, program activism, and incorporating Agricultural Science and Technology into the total school curriculum. Prerequisite: EDU 320.
- 410-3 Leadership Development. (2-2)** Field-based experiences designed to develop leadership ability for teaching, entrepreneurship, and conducting adult and youth organizations. Includes systems of record keeping. Co-requisite: AS&D 420 or 430. Lab fee \$10.
- 420-3 Agriscience Course Building. (2-2)** Field-based experiences are provided in a school setting where students will prepare and deliver units of instruction for middle school and secondary programs; develop unit and daily lesson plans, reports; manage curricular issues; examine various models of instruction; implement brain-based teaching and learning techniques, analyze classroom management strategies, and demonstrate competencies in effective teaching practices. Prerequisites: EDU 330 and RDG 351. Lab fee \$10.
- 430-3 Agricultural Extension and Industry Methods (3-0)** Agricultural extension in agriculture and the agriculture industry. Objectives include organization, methods, and program building. Prerequisite: Approval of department head.
- 450-3 Animal Related Systems. (2-2)** Specialized feeding, training, and fitting livestock for sales and advertising. Specialized topics in identifying, selecting, and evaluating poultry and poultry products, horses, and dairy and dairy products. Prerequisites: Senior classification and ANSC 107, 403. Lab fee \$18.
- 455-3 Mexican Agricultural Relations. (3-0)** A study of international agricultural technology, educational methodology, and diverse cultural activities related to Mexico. A required one-week trip at student's expense to Mexico will be one of the requirements necessary to meet the course objectives. Prerequisites: Junior or senior classification and approval of the instructor. Field assignment fee \$75.
- 483-3 Internship in Classroom Teaching in AS&D. (1-9)** This internship includes supervised, field-based activities in public school classrooms. Major emphasis is placed on the development of instructional strategies and professional practices designed to improve teaching performance. Students are required to conduct a reflective analysis of their teaching performance. May be repeated for credit. Prerequisite: admission to the Teacher Education Program and approval of department head. Field experience fee \$75.
- 484-v Internship. (Credit variable)** The student will complete an approved supervised work experience with an agricultural services organization or industry. Prerequisites: Senior Classification and advisor approval. Lab fee \$2. Field experience fee \$75.

- 485-v Seminar. (Credit variable)** A review of current problems and developments in agricultural services; professional opportunities and responsibilities; individual investigations and reports. Prerequisite: Senior classification.
- 486-v Problems in Agricultural Services. (Credit variable)** Independent study in an area of specialization. May be repeated for a maximum of 6 hours credit when topics differ. Prerequisite: Approval of department head.
- 490-3 Special Topics. (3-0)** Deals with selected topics in Agricultural Services and Development. May be repeated for credit when topics vary. Prerequisite: approval of department head.

AGRICULTURE (AGRI)

- 101-1 Freshman Seminar in Agriculture. (1-0)** (TCCNS = AGRI 1131) Exploration of the nature and purpose of degree programs in agriculture, degree planning, course sequencing, and the role of academic advisement related to career development and career selection. Academic procedures, requirements, calendars, and support services will be reviewed. The seminar will also include academic skills development aimed to improve first-year success.
- 490-v Special Topics. (Credit variable)** Deals with selected topics in agriculture or agribusiness. May be repeated for credit when topics vary, with a maximum of six hours. Prerequisite: Approval of department head.
- 560-3 Agricultural Research Methods. (3-1)** The application of sampling and experimental designs to laboratory and field research for agricultural sciences. Data collection protocols, statistical analyses, instrumentation, computer applications, data presentation, and technical writing associated with plant and animal research. Students are required to design and complete an independent research project or complete components of a thesis.
- 580-3 Research and Writing for Agriculture. (3-0)** Preparation of writing samples, technical reviews, and/or professional manuscripts related to various topics in agriculture. Prerequisites: Approved research methodology course and approval of instructor of record. Credit for both ANSC 580 and AGRI 580 will not be awarded.
- 585-v Graduate Seminar. (Credit variable)** A graduate seminar with content varying according to the needs and experiences of students and the instructor of record. May be repeated for up to three hours credit as content varies. Credit for more than a combined total of 3 hours of AGRI 585 and ANSC 585 will not be granted. Prerequisites: Open to all students with graduate classification majoring in agriculture.
- 588-3 Thesis. (3-0)** Scheduled when the student is ready to begin the thesis. No credit until the thesis is completed. Prerequisite: Approved research methodology course and approval of instructor of record.
- 590-3 Special Topics. (3-2)** Selected topics in agriculture offered as needed and dependent upon departmental, faculty, and student interests. May be repeated as topics vary. Instructor approval required prior to registration.

AGRONOMY (AGRN)

- 105-3 Fundamentals of Crop Production. (2-2)** (TCCNS = AGRI 1307) Classification and distribution of farm crops; importance of food cultivars and good seed; crop improvement; preparation of seedbed, commercial fertilizers, manures, and lime; seeding practices; crop tillage; harvesting; meadow and pasture management; weeds; crop rotation; diseases and insect enemies. Lab fee \$5. Course fee \$5.

- 301-4 Soils. (3-2)** Designed to acquaint the student with the field of soil science. Basic principles of the physical, chemical, and biological properties of the soil and their general applications. Prerequisites: CHEM 105 and junior classification. Lab fee \$4. Course fee \$25.
- 305-3 GIS for Natural Resource Managers. (2-2)** An introductory course on the use of geographic information systems (GIS) in natural resource management. Laboratory exercises will apply knowledge learned in lectures to solve real world problems in natural resource management using GIS software. Cross-listed with R&RM 305 and WLDM 305: credit will not be given for multiple enrollments in these cross-listed courses. Lab fee \$15.
- 309-4 Introduction to Genetics. (3-2)** Fundamental principles of genetics: variation, heredity, and interaction of genes, linkage, sex linkage, and mutation. Special emphasis given to breeding of farm crops and domestic animals. Laboratory includes demonstration of Mendelian ratios with field crops and *Drosophila* and an introduction to statistical methods as applied to agricultural research. Credit for both AGRN 309 and GEN 309 will not be awarded. Prerequisites: BIOL 120 or 121 and junior classification. Lab fee \$7.
- 315-4 Weed Management. (3-2)** General principles in the development of weed prevention and management programs. Common weed ecology and life cycles, land management factors, herbicide selection and performance, and cultural control strategies. Laboratory includes weed identification and herbicide application methods. Pre-requisites: AGRN 105. Lab fee \$10
- 312-4 Soil Morphology and Classification. (3-3)** Soil development, classification, and mapping. Laboratory work will consist of field study of the morphological features of the soil profile and the mapping of designated areas using standardized methods. Prerequisite: AGRN 301. Lab fee \$10.
- 320-3 Improved Pastures and Grazing Crops. (2-2)** To provide the student a thorough understanding of the establishment, development, and maintenance of improved native and introduced species of forage plants, including seed bed preparation, seeding and sodding techniques, fertilization, weed control, and grazing systems involved in maximizing the utilization of such pastures. Procedures used in the production and harvesting of the seed or sod of each plant species also will be discussed. Prerequisite: Junior classification or approval of department head.
- 411-3 Genetics (3-0)** Molecular basis of gene structure, function, regulation and expression, mutation theory, chromosomal aberrations, polyploidy effects and inheritance, genetic engineering, biotechnology, and genetic ethics. Credit for both AGRN 411 and GEN 411 will not be awarded. Prerequisite: AGRN 309 or GEN 309 or equivalent course.
- 420-3 Soil Physics. (3-0)** Soil physical characteristics and their relationship to soil management; emphasis placed on methods of measuring soil and soil conservation. Credit for both AGRN 420 and AGRN 530 will not be awarded. Prerequisite: AGRN 301.
- 420-4 Soil Fertility. (3-4)** To provide students with a thorough understanding of plant nutrition, soil fertility, and nutrient management so that they can (1) describe the influence of soil biological, physical, and chemical properties and interactions on nutrient availability to crops; (2) identify plant nutrition/soil fertility problems and recommend corrective action; and (3) identify soil and nutrient management practices that maximize productivity

and profitability while maintaining or enhancing the productive capacity of the soil and quality of the environment. Prerequisite: AGRN 301. Lab fee \$4.

- 425-3 Crop Production and Management. (3-0)** Current concepts and practices in field crop production with emphasis on the applications of technology. Recognition and discussion of cultural practices, fertilization, irrigation, weed and pest control from economic and environmental perspectives. Review of crop improvement strategies and bio-engineering. Prerequisites: AGRN 105, 301, and 309.
- 427-3 Soils and the Environment. (3-0)** This course applies fundamental concepts of soil science to environmentally significant reactions in soil. It will cover background information useful to students new to the discipline, including the chemistry of inorganic and organic soil components, acidity, salinity, ion exchange, and redox phenomena. Discussion will also extend to sorption/desorption, oxidation/reduction of metals and organic chemicals, rates of pollutant reactions, and technologies for remediating contaminated soils. Prerequisite: AGRN 301.
- 484-6 Internship. (1-16)** An approved, supervised, comprehensive work experience consisting of a minimum of 240 hours (6 weeks) for career preparation in a public, commercial, or private agronomic enterprise. Prerequisites: Senior or junior classification and approval of academic advisor and department head. Field experience fee \$75.
- 486-v Agronomy Problems. (Credit variable)** Individualized study of current topics in student's major concentration of study or supporting discipline. Specific content and credit dependent upon student's interest, needs, and depth of study. Maximum undergraduate credit, four semester hours. Prerequisites: Senior classification and advance approval by instructor of record.
- 488-v Undergraduate Research. (Credit variable)** Fundamental research methods will be addressed through a faculty-directed project. Participation in an abbreviated lecture series may be required. Project components may include a literature review, data collection and analysis, testing, planning, project design, and/or computer modeling. The student is required to prepare a final report and produce a presentation. No credit is awarded until the report and presentation are submitted. Only one undergraduate research experience will be counted toward degree requirements. Prerequisites: Junior Standing, completion of 12 hours in AGRN, and approval of department head.
- 501-4 Plant Breeding. (3-3)** Specialized study of genetics as related to plant breeding. Methods of improving crop plants through hybridization, inbreeding and selection, heterosis, ploidy, quantitative characters, and induced mutation. Prerequisites: AGRN 309 and graduate classification. Lab fee \$5.
- 510-4 Vegetative Influences. (3-3)** Effects of plants on their environment, microclimate, soil properties, water yield, watershed management, forage production, and range management practices. Prerequisites: Graduate classification and approval of instructor of record. Lab fee \$5.
- 511-3 Advanced Genetics. (3-0)** Impact of molecular genetics and biotechnology in agriculture and industry; evaluation of changes, discoveries, and potential of genetic engineering; assessment of related ethical impact on society. Credit for both AGRN 511 and GEN 511 will not be awarded. Prerequisite: AGRN 309 or GEN 309 or equivalent.
- 527-3 Environmental Soil Science. (3-0)** This course applies fundamental concepts of soil science to environmentally significant reactions in soil. It will

cover background information useful to students new to the discipline, including the chemistry of inorganic and organic soil components, soil acidity and salinity, and ion exchange and redox phenomena. Discussion will also extend to sorption/desorption, oxidation/reduction of metals and organic chemicals, rates of pollutant reactions, and technologies for remediating contaminated soils. Credit for AGRN 427 and AGRN 527 will not be awarded. Prerequisites: AGRN 301 and graduate classification.

530-3 Soil Physical Properties and Management. (3-0) Soil physical characteristics and their relationship to soil management; emphasis placed on the methods of measuring soil and soil conservation. Prerequisites: AGRN 301 and graduate classification.

540-3 Soil Mapping. (3-0) A field-based course in soil mapping incorporating landscape and vegetative interpretation, source sediment identification and introductory cartographic techniques. GIS techniques, aerial photo interpretation and county soil survey interpretations will also be incorporated in some settings. The course will be designed as a mini-session and will require travel to various areas across Texas to view a variety of different soils. Travel locations may include but are not limited to far west Texas, coastal areas, central Texas, etc. Students will be responsible for travel costs incurred. Taught every other summer. Prerequisites: AGRN 301, 3103 and graduate classification.

586-v Agronomy Problems. (Credit variable) Advanced problems in agronomy topics. Prerequisite: Approval of instructor of record.

ANIMAL SCIENCE (ANSC)

101-1 The Animal Science Industry. ((1-0) A survey of the Animal Science industry, its challenges and recent trends as they affect entering students and their career plans and preparations.

107-3 General Animal Science. (2-2) (TCCNS = AGRI 1319) The scientific study of animal agriculture involving beef cattle, swine, sheep, goats, and horses. Subjects covered will include management practices involving reproduction, nutrition, health, handling, genetic selection, and shelter. Marketing strategies and procedures. Lab fee \$13. Course fee \$10.

109-3 Introduction to Horse Production. (2-2) An introduction to some of the fundamental aspects of horse production, including the scope and status of the equine industry. Functional anatomy and dental hygiene of the horse are treated in detail, and the disciplines of nutrition and reproduction are introduced. Prerequisite: ANSC 107 or approval of department head. Course fee \$10.

120-3 Rodeo Production and Skills. (2-2) A study of rodeo activities including organization, promotion, and management of rodeos. Skill development in all standard events will be emphasized with special attention to student needs. Lab fee \$10, course fee \$25.

150-3 Rodeo Techniques. (1-2) Skill development in all standard events will be emphasized, with special attention to student needs. Students must be members of the Tarleton varsity rodeo team. Credits may substitute for required P ED only and may be repeated. Prerequisite: approval of rodeo coach.

200-3 Horse Science. (3-0) Continuation and amplification of ANSC 109. Designed to further increase the student's vocabulary and understanding of the areas of soundness, endocrinology, parasitology, pharmacology, and genetics. Prerequisite: ANSC 109.

- 201-3 Avian Science. (2-2)** An introduction to the study of birds, their structure, physiology, reproduction, ecology and behavior. Relates gamebird production and biology to basic ornithological principles. Laboratory covers production of gamebirds from conception and incubation to marketing and sales. Gamebirds studied are various quail, pheasant, partridge, and wild turkey species. Credit for both WLDM 201 and ANSC 201 will not be awarded. Prerequisites: Sophomore classification or approval of the department head. Course fee \$10.
- 202-3 Dairying. (2-2)** (TCCNS = AGRI 1311) A survey of the dairy industry, dairy breeds, standards for selection and culling, herd replacements, feeding, management, and health maintenance. The food value, composition and quality, utilization, and processing of market milk and dairy products will be discussed. Credit for both D S 202 and ANSC 202 will not be awarded.
- 203-3 Basic Horsemanship. (1-4)** Instruction and practice of basic horsemanship skills. Focus will be on the proper use of feet, seat, hands and legs to provide the horse with the correct stimulus to perform basic maneuvers. Criteria from the North American Riding for the Handicapped Association Instructor Certification Exam will be presented. Prerequisite: ANSC 109. Lab fee \$5. Course fee \$15.
- 205-2 Equine Fitting and Showmanship. (0-4)** Basic instruction in fitting and showing horses. The general format for conducting horse shows and contests will be presented. Students are required to train, groom, and show animals in the Little International Livestock Show and the judging contests. Lab fee \$10.
- 207-3 Market Animal Evaluation. (2-2)** (TCCNS = AGRI 1325) Phenotypic evaluation of market animals including cattle, swine, and sheep. Emphasis on selection of market animals designated for slaughter. Evaluation of the economically important carcass characteristics for each species will be studied. Prerequisite: ANSC 107. Lab fee \$12.
- 210-3 Introduction of Veterinary Science. (3-0)** An introduction to veterinary science including structure and function of major body systems, nutrition, diseases, and surgical principles. Both farm animals and companion animals will be discussed. Prerequisite: ANSC 107. Course fee \$10.
- 213-3 Horse Psychology and Training. (2-2)** Principles of breaking and training young horses, training techniques, basic anatomy, recognition of unsoundness and defects, and corrective techniques. Prerequisites: ANSC 109 and 200. Lab fee \$4.
- 215-3 Principles of Farrier Science. (1-6)** Principles of horseshoeing. Trimming and horseshoeing techniques; recognition and correction of lameness and conformation defects. Anatomy and physiology of locomotion. Prerequisite: permission of instructor. Course fee \$15. Additional fee may be charged for supplies and materials. Student must furnish basic tools.
- 225-3 Equine Behavior Modification. (2-4)** Application of the principles of equine psychology to train young horses. Students will be assigned a two- or three-year-old horse to train in the fundamental maneuvers of equitation. Students will prepare these horses to be marketed in an annual horse sale. The fundamentals of sale management will also be covered. Prerequisite: ANSC 213. Course fee \$15.
- 302-3 Animal Management and Product Utilization. (2-2)** Development of knowledge and skills pertaining to the management, nutrition, reproduction, and health of livestock, poultry, and wildlife. Processing, preparation, and distribution of animal products. Importance of wildlife species management

as a part of production agriculture. Prerequisite: ANSC 107 or equivalent. Lab fee \$8. Course fee \$15.

- 305-3 Equine Evaluation. (2-2)** Comparative evaluation of horses for show and competition. Conformation analysis, judging, basic exercise physiology, conditioning, and sales preparation will be presented.
- 307-3 Livestock and Meat Evaluation. (2-2)** Comparative evaluation of breeding and market animals with emphasis on live animal selection, official carcass grading, carcass contest, wholesale cut selection and pricing, and performance testing. Oral reasons and written justifications on placing classes will be emphasized. Prerequisite: ANSC 207 or approval of department head and instructor. Lab fee \$13.
- 308-4 Physiology of Reproduction. (3-2)** Breeding efficiency of cattle, sheep, swine, and horses. Study includes the anatomy and physiology of the male and female reproductive tracts, hormones directly controlling reproduction, estrus and estrous cycles, ovulation, mating, gestation, pregnancy tests, parturition, sperm physiology, semen evaluation, collection and storage of semen, and the primary causes of sterility in males and females. Prerequisites: ANSC 107 and junior classification. Lab fee \$15. Course fee \$15.
- 309-4 Feeds and Feeding. (3-2)** Study of principal feeds and feed-stuffs from a practical point of view. Feeding standards and calculation of rations for maintenance, growth, fattening, and for milk, wool, and egg production. Prerequisite: Junior classification. Lab fee \$10.
- 310-4 Principles of Equine Reproduction. (3-2)** Application of fundamental concepts and principles of equine genetics, breeding and reproduction. Prerequisites: ANSC 200, 308 and either 213 or permission of instructor based on documentation of prior experience with stallions. Lab fee \$15.
- 313-3 Sheep and Goat Production. (2-2)** Practical applications of breeding, feeding, management, disease and parasite control with regard to range and farm conditions; fitting and showing. Wool and mohair production; grading; sorting; and marketing. Prerequisite: ANSC 107. Lab fee \$10.
- 315-3 Animal Diseases and Parasites. (2-2)** Diseases of farm animals, both infectious and non-infectious, parasites, parasitic diseases. Disease and parasite prevention through sanitation, treatment of animal diseases. Prerequisite: Junior classification or approval of Department head. Lab fee \$2.
- 318-2 Physiology of Reproduction Laboratory. (0-4)** Application of the fundamental concepts and principles of reproduction to cattle, sheep, and swine. Includes estrus detection, mating, pregnancy tests, semen collection and evaluation, and artificial insemination. Prerequisite: ANSC 308. Lab fee \$25. Additional fees for personal supplies and materials.
- 319-3 Animal Breeding. (3-0)** Specialized study of the application of genetic principles to livestock breeding. Improvement of the economic traits of farm animals by utilizing the principles of heritability and selection. Breeding and selection systems in cattle, swine, sheep, and horse production. Prerequisite: AGRN 309 or equivalent.
- 321-4 Meat Science. (2-4)** Study of the science and physical processes involved in converting selected farm animals into marketable products. Particular attention will be given to the anatomy and nomenclature of meats, sanitation practices, and evaluation. Various techniques used by commercial establishments will be accentuated in the study of meat processing. Prerequisites: ANSC 107 and junior classification, or approval of department head. Course fee \$10.

- 324-3 Horse Nutrition. (2-2)** Includes health of stallion, mare, and foal. Nutrition and selection of optimum feeding programs. Prerequisites: ANSC 200 and 309. Lab fee \$2.
- 325-3 Equine Exercise Physiology and Conditioning. (2-2)** Studies of the influence of training and conditioning on muscle physiology, cardiovascular physiology, the biomechanics of locomotion, and energy utilization. This course is designed for students primarily interested in training and recreational riding. Students will receive training and experience in evaluating and monitoring the levels of conditioning in horses. Fundamental rehabilitation and treatment of sports injuries will be included. Prerequisites: ANSC 213, 321, 324, or approval of department head.
- 330-3 Equine Assisted Therapy. (1-4)** Study and application of the methods of using the horse in a therapy program. Guidelines from the North American Riding for the Handicapped Association. Students will gain practical experience in the development and conduct of an equine-assisted therapy program. Prerequisite: approval of department head. Course fee \$10.
- 331-3 Advanced Equine Assisted Therapy. (1-4)** Advanced studies in the use of the horse in a therapeutic riding program. Students will gain the hands-on experience and the information about riding, instruction and safety necessary to become a Certified Therapeutic Riding Instructor with the North American Riding for the Handicapped Association. Prerequisites: ANSC 109, 330, and approval of the instructor. Course fee \$10.
- 399-v Cooperative Education. (Credit variable; 1-3 for each hour)** This course is designed to offer students the opportunity to integrate academic study with work experience that is germane to their major or minor. Enrollment requires a two-semester minimum commitment that may be accomplished by 1) alternating semesters of full-time study with semesters of curriculum-related employment, or 2) enrolling in courses at least half-time (6 semester hours) and working part-time in parallel positions of curriculum-related employment. The department Cooperative Education advisor will supervise the student's experience and assign the final grade based on the student's final report which is required to complete the course. Students may participate in the Cooperative Education program for an unlimited number of semesters but a maximum of 6 hours credit may be counted toward a degree. Prerequisites: Completion of 30 semester hours which includes 12 hours in the major or minor discipline in which the Cooperative Education course is desired, minimum overall GPA of 2.5 and a minimum GPA of 3.0 in the appropriate major or minor field, and department head approval. Field experience fee \$75.
- 400-3 Research and Writing in Animal Sciences. (3-0)** Detailed discussions and literature review of current knowledge in areas such as reproductive and alimentary physiology, nutrition, parasitology, pharmacology, and genetics. Topics will include experimental design and statistical evaluation of agricultural research. Students will prepare various types of writings based on scientific literature. Prerequisite: senior classification in agriculture.
- 403-3 Beef Cattle Production. (2-2)** Beef cattle industry, principles involved in breeding, feeding, management, disease and parasite control, and marketing analysis of ranch and feed lot systems. Prerequisite: ANSC 309 or 406. Lab fee \$9.
- 405-3 Anatomy and Physiology of Farm Animals. (3-0)** Introduction to comparative anatomy and physiology of farm animals. The roles of the various systems of the animal body will be studied with practical applications

made to animal production. Prerequisite: ANSC 107 or equivalent and junior classification.

- 406-3 Animal Nutrition. (3-0)** The animal body, its composition and food, some physiochemical bases of life processes; digestion, composition, metabolism, and functions of feeds and nutrients; vitamins, inorganic elements, and metabolism; growth, reproduction, lactation. Prerequisites: ANSC 107 and senior classification or approval of instructor.
- 408-3 Environmental Physiology of Farm Animals. (3-0)** Studies of farm animals and interactions with their physical environment. Detailed attention is given to the effects of changes and extremes in natural and artificial animal environments, including temperatures, shelter, altitude, humidity, crowding, and other stress factors associated with modern livestock production and handling practices. Prerequisites: ANSC 405 and senior classification or approval of department head.
- 410-3 Swine Production. (2-2)** Applications of breeding, feeding, housing, sanitation, and disease control. Analysis of herd records. Prerequisite: ANSC 309 or 406. Lab fee \$8.
- 412-3 Meat Processing and Merchandising. (2-2)** The chemical and physical characteristics of meats and their relations to the processing and manufacturing of meat food items. Carcass value as influenced by merchandising techniques and practices. Sanitation control and commercial and retail operations will be stressed. Laboratory work will include meat processing and the development of competencies in processing all classes of livestock. Prerequisite: ANSC 321 or approval of department head. Lab fee \$10.
- 426-3 Big Game Ecology and Management. (2-2)** Survey of distributions and life histories of North American big game species. Productivity, food habits, economic significance and management will be examined. Will include a study of current management strategies employed on deer farms in North America with a focus on the Texas deer industry and impacts on traditional wildlife management. Credit for both ANSC 426 and WLDM 426 will not be awarded. Prerequisites: WLDM 221 and 8 hours of advanced ANSC/WLDM or approval of the department head. Modest cost of field trips will be borne by the student. Course fee \$5.
- 430-3 Horse Enterprise Management. (2-2)** Individualized instruction in management techniques for horse enterprises. Record systems, marketing, and business operation procedures. Prerequisites: Senior classification in ANSC and approval of instructor. Lab fee \$10. Course fee \$10.
- 450-3 Feed Analysis. (1-4)** Analytical techniques for determining the nutrient content of animal feeds. Students will learn to measure moisture, protein, fiber, carbohydrates, fats, and minerals. Different methods for estimating the useable energy content of feeds will be presented. Prerequisite: CHEM 108 or approval of department head.
- 458-3 Laboratory Topics in Animal and Food Sciences. (1-4)** Individualized instruction in laboratory analytical procedures, techniques, and instrumentation commonly used in animal and food sciences. Topics involve various aspects of analysis techniques associated with nutrition, reproduction, breeding, physiology, and meats and dairy-products processing. May be repeated once when topics vary. Lab fee \$20. Students may also need to purchase appropriate personal articles such as protective apparel.
- 484-v Internship. (1; 8-16 Credit variable, 3-6)** Formally arranged and approved on-the-job training with cooperating sponsor in a commercial or private

sector of the livestock or meats industries. A minimum of 40 hours of training is required for each hour of academic credit. A maximum of six hours credit may be earned by internship completion. Oral and written reports of internship experience required. Prerequisite: Advanced standing and approval of department head. Field experience fee \$75.

- 485-v Seminar. (Credit variable)** A review of current problems and developments in agriculture; professional opportunities and responsibilities; individual investigations and reports. Prerequisite: Senior classification.
- 486-v Animal Science Problems. (Credit variable)** Individualized study of current topics in student's major concentration of study or supporting discipline. Specific content and credit dependent upon student's interest, needs, and depth of study. May be repeated for a maximum of 6 semester hours credit. Prerequisite: Senior classification and advance approval by academic advisor.
- 490-3 Special Topics. (3-0)** Selected topics in the animal sciences. May be repeated for credit when topics vary, with a maximum of six hours. Prerequisite: approval of department head.
- 504-3 Ruminant Nutrition. (3-0)** Survey of current knowledge and concepts in ruminant physiology and biochemistry, their literature and experimental basis and relation to current and future practice and investigation. Prerequisites: ANSC 406 and graduate classification.
- 505-3 Advanced Livestock Production. (3-0)** Survey of current knowledge and concepts in breeding and reproduction, nutrition, and modern management of livestock. Review of past and present research and application to future practice. Prerequisites: ANSC 308 and graduate classification.
- 506-3 Assisted Breeding Technology. (2-2)** Theory and practice of assisted breeding technology in modern breeding programs for farm livestock and other animal species. Prerequisites: ANSC 3083 and AGRN 3094 or equivalents.
- 507-3 Advanced Beef Cattle Production. (3-0)** A study of current technologies and management practices for beef cattle operations. Specific topics will be selected for in-depth study of current knowledge, available technologies, implementation methods, and expected benefits for the beef cattle industry. Prerequisites: ANSC 403 or equivalent.
- 520-3 Beef Cattle Feedlot Management. (3-0)** A study of the operation of industrial feedlots. Design of feedlots, economics, technical nutrition, cattle management, marketing, and consumer relations. Prerequisites: ANSC 309 and graduate classification.
- 513-3 Advanced Meat Goat Production and Management. (3-0)** In-depth study and applications of management situations for breeding, feeding, housing, and herd health of goats. Prerequisites: ANSC 107 or equivalent and approval of instructor.
- 515-3 Animal Growth and Development. (3-0)** A study of the processes related to animal growth. Emphasis on cellular changes allowing for muscle, bone and adipose tissue growth as well as the role and functions of hormones related to development and age-related adaptation. Composition of muscle, bone, and adipose tissue in market animals will be discussed. Prerequisites: ANSC 107 and approval of instructor.
- 518-3 Ethical/Environmental Issues in Agriculture. (3-0)** Ethical and environmental issues affecting public policy as related to agriculture/industry/business. Credit for both ANSC 518 and A ED 518 will not be awarded. Prerequisites: Approval of instructor.

- 540-3 Advanced Dairy Ration Balancing and Records Management. (1-4)** Students will learn to evaluate real-life dairy rations and feeding management strategies and make suggestions for improvements. Students also will learn to evaluate dairy herd management records and make management recommendations based on those records. The course is for students who desire advanced practical training in applied nutrition and dairy herd management. Credit for both ANSC 540 and either D S 440 or ANSC 440 will not be awarded. Prerequisite: D S 302 or equivalent.
- 580-3 Research and Writing for Agriculture. (3-0)** Preparation of writing samples, technical reviews, and/or professional manuscripts related to various topics in agriculture. Prerequisites: Approved research methodology course and approval of instructor of record.
- 585-v Agriculture Seminar. (variable)** A graduate seminar with content varying according to the needs and experiences of students and the instructor of record. May be repeated for up to three credit hours as content varies. Credit for more than a combined total of 3 hours of AGRI 585 and ANSC 585 will not be awarded. Prerequisites: Open to all students with graduate classification majoring in agriculture.
- 586-v Animal Science Problems. (Credit variable)** Advanced studies in animal science problems and procedures. Problems assigned according to experience, interest, and needs of individual student.
- 588-v Thesis. (variable)** Scheduled when the student is ready to complete the thesis. No credit until the thesis is completed. Prerequisite: Approved research methodology course and approval of the instructor of record.
- 590-3 Special Topics in Animal Sciences. (3-2)** Selected topics in Animal Sciences offered as needed and dependant upon departmental, faculty, and student interests. May be repeated as topics vary. Instructor approval required prior to registration.
- 599-3 Internship. (1-8)** Prepared and supervised work experience in an Animal Science-related position with a public or private business organization. May be repeated for a total of 6 hours credit. Prerequisite: Approval of the student's graduate committee. Field experience fee \$75.

ARCHEOLOGY (ARCH)

- 201-3 Archeology. (3-0)** A survey of human prehistory and the origins of civilization. Topics covered include archeological theory and methodology, the evolution of humans, the origins of culture, development of agriculture, and the early history of world civilizations. Theory reinforced by field experience.

ART (ART)

- 111-3 Design I. (2-4)** Emphasis on two-dimensional design; includes the fundamentals of line, color, form, texture, shape, space, and arrangement.
- 121-3 Drawing I. (2-4)** (TCCNS = ARTS 1316) A beginning course investigating a variety of media, techniques, and subjects, exploring perceptual and descriptive possibilities and consideration of drawing as a development process as well as an end in itself.
- 131-3 Art Appreciation. (3-0)** (TCCNS = ARTS 1301) A theory course designed to introduce the trends, techniques, styles, and major personalities of the visual arts.
- 211-3 Design II. (2-4)** (TCCNS = ARTS 1311) Continuation of Design I with emphasis on three-dimension concept. Lab fee \$5.

- 221-3 Drawing II. (2-4)** (TCCNS = ARTS 1312) Expansion of Drawing I stressing expressive and conceptual drawing aspects, including the human figure within a spatial environment. Prerequisite: Drawing I.
- 231-3 Art History I. (3-0)** (TCCNS = ARTS 1303) A chronological examination of Western painting, sculpture, architecture and related visual arts from prehistoric times to the end of the Gothic Period.
- 232-3 Art History II. (3-0)** (TCCNS = ARTS 1304) A chronological examination of painting, sculpture, architecture and related visual arts from the early Renaissance to the present.
- 234-3 Introduction to Digital Graphics. (2-4)** This course emphasizes the relationships between traditional and electronic art forms and the metaphors used in computer software applications as they apply primarily to producing graphic designs, although the tools and skills involved relate to producing digitally stored images in general. Prerequisite: ART 111 or instructor approval. Course fee \$10. Lab fee \$10.
- 241-3 Introduction to Painting Media. (2-4)** An introduction to painting media with an emphasis on color, composition, and self expression. Prerequisites: ART 111, 121, 221, or approval of department head. Lab fee \$5.
- 311-3 Experimental Media Studio. (2-4)** A studio course in experimentation in two- and three-dimensional media and techniques. May be taken for credit twice. Prerequisites: ART 211, 221 or department head approval. Lab fee \$5.
- 321-3 Life Drawing. (2-4)** An advanced drawing course based on the observation of the human figure and interpretation through a variety of drawing techniques. May be taken for credit twice. Prerequisites: ART 111 and 221 or approval of department head. Lab fee \$10.
- 331-3 Art History of America. (3-0)** A study of the art of America from pre-Columbian periods to the present.
- 341-3 Painting Studio. (2-4)** A continued investigation of the technical qualities and expressive possibilities of painting media with emphasis on personal and stylistic development. May be taken for credit twice. Prerequisite: ART 241 or approval of department head. Lab fee \$5.
- 342-3 Watercolor. (2-4)** A studio in painting with an emphasis on traditional watercolor within the study of color, composition, and self expression. May be taken for credit twice. Prerequisite: ART 241 or approval of department head. Lab fee \$5.
- 351-3 Sculpture Studio. (2-4)** An investigation of the cultural techniques, methods and media. May be taken for credit twice. Prerequisites: ART 111, 121, 211, 221 or approval of department head. Lab fee \$5.
- 371-3 Printmaking. (2-4)** The basic printmaking processes including planographic, intaglio, stencil, and relief. May be taken for credit twice. Prerequisite: ART 111, 121, or approval of department head. Lab fee \$10.
- 441-3 Advanced Studio in Two-Dimensional Media. (2-4)** A guided project in a variety of two-dimensional media with a group or individual show as an objective. May be taken for credit twice. Prerequisite: Completion of 6 hours of junior-level studio courses with a grade of C or better or approval of department head. Lab fee \$5.
- 485-3 Art Seminar. (3-0)** Content varies according to the needs of students and opportunities available. When topic varies, course may be repeated for credit. Prerequisite: Junior classification or approval of department head.
- 486-v Individual Problems in Art. (Credit variable)** Art problems assigned in the area of the student's individual interest with emphasis on individual development. Prerequisite: ART 221.

AVIATION SCIENCE (ASCI)

- 301-3 Air Carrier Operations. (3-0)** Designed to expand upon the Federal Aviation Regulations relating to various specialized facets of the aviation industry, including airline operations, aircraft certification, air-worthiness standards and airport operations. Prerequisite: Commercial Pilot Certificate or instructor approval.
- 302-3 Techniques of Instruction. (3-0)** Acquaints the student with the fundamentals of teaching and learning in an aviation oriented environment. It also introduces techniques of instruction and analysis of flight maneuvers. The theory of flight and Federal Aviation Regulations relating to the flight instructor rating are taught in this course. Prerequisite: Commercial Pilot Certificate or instructor approval.
- 303-3 Air Traffic Control. (3-0)** Instruction pursues Terminal Enroute Air Traffic Controllers Procedures, controllers standpoint of ARTC, Departure, Arrival, Rapcon, Airport Control Tower procedures, air traffic separation, enroute and approach clearance criteria. Practical application of Air Traffic Control procedures by field trips and Airport Control Tower Operation are specifically accentuated.
- 304-3 Airport Management. (3-0)** The requirements for developing a public airport to include local and state governmental agencies are studied. Federal aid and regulations are examined. Also, the management required for the overall airport operations to include tenant operators, leases, property development for non-aviation use, user taxation for airport operations, planning and policies, organization and administration, maintenance, safety and airport fuels and regulations are covered in the areas studied.
- 307-3 Aviation History. (3-0)** A study of people and events that have influenced modern aviation internationally. Historical evidence such as artifacts and recorded documents will be examined to document the role aviation has played in world events. Prerequisite: junior classification.
- 308-3 Aviation History II. (3-0)** A study of people and events from 1939 to the present that have influenced modern aviation internationally. Historical evidence such as artifacts and recorded documents will be examined to document the role aviation has played in world events. Prerequisite: junior classification.
- 401-3 Aviation Law. (3-0)** The field of aviation has developed its own distinctive body of statutes, treaties, regulation and case law. Each of these areas will be studied as well as specialized rules and laws that have been developed because of the distinctive nature of the airplane as a mode of transportation. Both the "text method" and "case method" will be used in the course of instruction.
- 402-3 Advanced Aircraft Systems. (3-0)** This course is designed to prepare the commercial pilot for the application and operation of advanced aircraft systems that are used by aircraft utilized in air carrier operations. A thorough study of aerodynamics, federal aviation regulations, weight and balance and the turbine systems will be covered. Prerequisite: Commercial Pilot Certificate or instructor approval.
- 408-3 Aviation Safety. (3-0)** A study of detailed analysis of effective procedures and techniques in the development and supervision of an Aviation Safety program. A comprehensive program in aircraft accident prevention is studied for implementation. The use of statics and related materials are

covered throughout the course. Safety measures and education media materials are extensively used.

- 444-3 Historical Applications in Aircraft Design. (3-0)** This course presents the study of the evolution, concepts, and design aspects used in aircraft development with emphasis on aerodynamic efficiency and aircraft manufacture. Scale models from various historical periods will be constructed and studied.
- 411-3 Internship. (0-20)** Provides a closely supervised experience in Aviation Management in a fixed base operations, commuter airline operations or airport management operations setting. Management problems are stressed and resolution techniques are implemented. Customer service is an important phase of the management process. This course is open only to Aviation Science majors. Prerequisites: 12 hours of upper-level aviation courses, ASCI 304 and permission of instructor to enroll required. Field assignment fee \$75.
- 485-3 Seminar in Aviation. (3-0)** A survey of current issues in aviation. Readings are required from current aviation publications and other related periodicals. May be repeated for credit when topics vary. Prerequisite: Approval of department head.
- 486-v Aviation Problems. (Credit variable)** A directed study of selected problems in aviation. May be repeated with approval of the department head. Prerequisite: approval of department head.

BIOLOGY (BIOL)

- 120-4 General Biology. (3-2)** (TCCNS = BIOL 1411) Detailed study of a typical cell, cell phenomena, mitosis, meiosis, nucleic acids, protein synthesis, basic principles of genetics, photosynthesis, and respiration. A survey of the Plant Kingdom is covered. Much of laboratory is devoted to the anatomy and physiology of flowering plants, while representatives of the lower plant phyla are studied with emphasis on life histories. Substantial microscopic observation required. Lab fee \$10. Course fee \$10.
- 121-4 General Biology. (3-2)** (TCCNS = BIOL 1413) The major animal phyla and vertebrate systems are surveyed, with representative examples and dissection of the frog stressed in the laboratory. Substantial microscopic observation required. Lab fee \$10. Course fee \$10.
- 210-3 Essential Elements of Biology. (2-3)** The study of morphology, anatomy, growth, life cycles, ecology, behavior, classification, and uses of organisms. Human systems and tissues and mechanisms of heredity and metabolism will be introduced. The laboratory will give experience in the use of the microscope, dissecting procedures, and problem solving. Prerequisite: 8 hours laboratory science. Lab fee \$10.
- 219-4 Human Anatomy and Physiology. (3-2)** (TCCNS = BIOL 2401) Basic physiological principles and their applications in the study of the skeletal, muscular, and nervous systems are emphasized. Substantial microscopic observation required. Lab fee \$10.
- 220-4 Human Anatomy and Physiology. (3-2)** (TCCNS = BIOL 2402) A continuation of the integrated study of human anatomy and physiology. Emphasis is on the various organ systems not studied in BIOL 219. Substantial microscopic observation required. Prerequisite: BIOL 219 or approval by the department head. Lab fee \$10.
- 302-4 Histology. (3-3)** Introduction to cellular ultrastructure. Study of vertebrate tissues and their arrangement in various organs. Prerequisites: BIOL 121 or approval by the department head. Lab fee \$10.