Agricultural Sciences

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Location: 903-886-5358
Agricultural Sciences Web Site (https://new.tamuc.edu/agriculture/)

Program of Graduate Work

Master of Science in Agricultural Sciences

The College of Agricultural Sciences and Natural Resources offers a Master of Science degree program in which students may choose to emphasize course work in Agribusiness, Agricultural and Family Education, Animal Science, Plant and Soil Science, Natural Resource Management, Wildlife, Equine Science, and Horticulture. Graduate-level research is encouraged through the use of on campus laboratories and facilities, the University Instructional and Research Farm, and the Plant Science Research Farm.

The College of Agricultural Sciences and Natural Resources also coordinates the Transition to Teaching program for degreed professionals who wish to become certified to teach Agricultural Science and Technology or Family and Consumer Sciences in secondary schools. This program consists of graduate-level courses in agricultural and family education that focus on professional development competencies required for a successful career in teaching, as well as preparation for the Texas Examination of Educator Standards (TExES). Courses may be applied to a Master of Science degree in Agricultural Sciences, provided the student is admitted to a degree program. Individuals interested in Transition to Teaching should contact the department for specific information regarding admission.

The department additionally has signed agreements with other cooperating institutions to conduct research projects at off-campus locations.

Admission

Admission to a graduate program is granted by the Dean of the Graduate School upon the recommendation of the department. Applicants must meet the following requirements for admission in addition to meeting the general university requirements in Agricultural Science.

- Admission Requirements (https://www.tamuc.edu/programs/agricultural-sciences-ms/#admission)

Degree Requirements

Students may choose either the Option I (thesis) or Option II (non-thesis) program. Though not guaranteed assistantships are awarded preferentially to students who are conducting thesis.

Successful completion of the Comprehensive Exam is required of all students.

Note: Individual departments may reserve the right to dismiss from their programs students who, in their judgment, would not meet the professional expectations of the field for which they are training.

Agricultural Sciences (https://coursecatalog.tamuc.edu/grad/colleges-and-departments/college-of-agricultural-sciences-and-natural-resources/agricultural-sciences/agricultural-sciences-ms/)

Agricultural Leadership, Education, and Communications (https://coursecatalog.tamuc.edu/grad/colleges-and-departments/college-of-agricultural-sciences-and-natural-resources/agricultural-sciences/agricultural-leadership-education-and-communications-ms/)

Agribusiness Graduate Certificate (https://coursecatalog.tamuc.edu/grad/colleges-and-departments/college-of-agricultural-sciences-and-natural-resources/agricultural-sciences/agribusiness-graduate-business/)
Plant and Soil Science Graduate Certificate (https://coursecatalog.tamuc.edu/grad/colleges-and-departments/college-of-agricultural-sciences-and-natural-resources/agricultural-sciences/plant-and-soil-science-graduate-certificate/)
Sustainable Food Systems Graduate Certificate (https://coursecatalog.tamuc.edu/grad/colleges-and-departments/college-of-agricultural-sciences-and-natural-resources/agricultural-sciences/agricultural-sciences-ms/sustainable-food-systems-graduate-certificate/)

AEC 500 - Food Industry Trends and Issues
Hours: 3
Analysis of current trends and issues in the food industry, including norms, specifications, and standards; trade issues; and policies with national and international scope that affect the U.S. food industry. The focus is on developing an understanding of the causes and consequences, the various issues involved, and how they affect stakeholders and society.

AEC 520 - AgriBusiness Analysis and Forecasting
Hours: 3
Fundamentals of linear programming, forecasting, and simulation based on economic theories using statistical software packages. Construction, solution, and interpretation of different types of linear programming models. Quantitative techniques for forecasting economic data. Risk analysis and decision-making using simulation.

AEC 530 - Agricultural Production Economics
Hours: 3
Agricultural production theory for optimization of resources under certainty and uncertainty. Economic theory, analytical methodology, and agribusiness firm behavior.

AEC 540 - Advanced Theory of Demand and Price Analysis
Hours: 3
The development and use of economic models for price analysis and forecasting with emphasis on the interpretation of economic relationship in agriculture. Analysis of the effects of consumer behavior upon marketing firms and upon the demand for agricultural products.

AEC 550 - Market Analysis and Structure
Hours: 3
Managerial strategies, marketing decision-making process, analyses of marketing opportunities and challenges, agricultural firms, food distribution industry, marketing system, agricultural firms under imperfect market conditions, sources of imperfections, and welfare considerations under imperfect market conditions.

AEC 560 - International Agricultural Trade
Hours: 3
Trade theory dealing with the production, marketing, and distribution of goods and services. Comparative advantage, gains from specialization, trade models, trade policy analysis, partial equilibrium analysis of free trade, welfare aspects of trade, preferential agreements, and policy issues.

AEC 589 - Independent Study
Hours: 1-4
Independent Study. One to four semester hours. Individualized instruction/research at an advanced level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies. Prerequisite: Consent of department head.

AEC 597 - Special Topics
Hours: 1-4
Special Topics. One to four semester hours. Organized class. May be repeated when topics vary.

AFE 518 - Thesis
Hours: 3-6
Development and reporting of a research project under the supervision of a graduate faculty member. Note: Granting of credit for this course is dependent upon completion and approval of a thesis.

AFE 530 - History and Philosophy of Agricultural Education
Hours: 3
(Same As ALEC 530) This course is designed to provide a historical perspective of the development and execution of school based agricultural education, educational philosophy/philosophers, and educational theory with a purpose to better understand and communicate modern agricultural education and hone one’s personal educational philosophy.

AFE 531 - Experiential Learning Theory and Application in Agricultural Education
Hours: 3
(Same As ALEC 531) This course will examine experiential learning in light of Kolb’s experiential learning model and the three-circle model of agricultural education. The overarching goal is to make you more familiar with the concepts such that you will incorporate the concepts in your program in a practical manner.

AFE 570 - Instructional Management
Hours: 3
(Same as ALEC 570) Provides students with a review of the ethical and pedagogical principles and practices needed to organize and deliver instructional programs in Agricultural Sciences and Family and Consumer Sciences.

AFE 571 - Program Development
Hours: 3
(Same As ALEC 571) This course addresses the theoretical and practical principles of planning, funding, and conducting effective educational programs in Agricultural Sciences and Family and Consumer Sciences.

AFE 572 - Special Populations
Hours: 3
Special Populations. Three semester hours. Principles, procedures, and policies associated with teaching students who are representative of special populations as defined by federal career-technical education guidelines.

AFE 573 - Practicum in Teaching
Hours: 3
(Same as ALEC 573) Supervised teaching practicum in Agricultural Science or Family and Consumer Sciences at the secondary level. Course includes field-based teaching component and monthly seminars on strategies and issues related to the teaching profession.

AFE 574 - Assessment & Evaluation
Hours: 3
(Same as ALEC 574) Theories and techniques used in assessing student learning and skill development and evaluating educational programs in Agricultural Science and Family and Consumer Sciences.

AFE 575 - Community Leadership & Development
Hours: 3
Theories and practices associated with organizing and implementing social and economic change within the community context. Prerequisites: None.

AFE 576 - Models Experiential Learning
Hours: 3
Application of experiential learning theories and techniques to instructional programs in secondary, postsecondary, and community-based settings. Prerequisites: Admission to graduate school.

AFE 577 - Coordinating Extension Program
Hours: 3
Techniques and practical field experience in organizing, delivering, and evaluating community-based programs through the cooperative extension model. Prerequisites: Admission to graduate school.

AFE 579 - Field Experience in Teaching
Hours: 3
(Same as ALEC 579) Fifteen week supervised teaching internship in agriculture or family and consumer sciences at the secondary or postsecondary level.

AFE 589 - Independent Study
Hours: 1-4
Individualized instruction/research at an advanced level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies. Prerequisite: Consent of department head.

AFE 595 - Research Literature and Techniques
Hours: 3
This course provides a review of significant research studies produced by investigators in the student's major field with emphasis on the investigative and verification techniques that were used.

AFE 597 - Special Topics
Hours: 0-4
Special Topics. One to four semester hours. Organized class addressing topics relevant to teaching Agricultural Science. May be repeated when topics vary.

AG 501 - Instrumentation for Agricultural Sciences
Hours: 3
Principles, equipment, and techniques for measuring variables in animal, plant, soil, and environmental sciences. Advanced exercises measuring physical and chemical properties will be explored.

AG 503 - Adult Education
Hours: 3
The purpose of this course is to advance the understanding of the basic principles behind motivating adults to learn. Procedures in implementing these principles to bring about change in adult behavior will be explored.

AG 504 - Qualitative Research
Hours: 3
Qualitative Research - Three semester hours This course investigates the different strategies/methods of conducting qualitative research such as conducting effective interviews, participant observation, and document analysis (data mining). Students will learn about the different research designs associated with qualitative research and explore data analysis and establishing validity/reliability for qualitative research.

AG 505 - Statistical Methods in Agriculture
Hours: 3
Introductory statistics course for graduate students in agricultural sciences. Topics include descriptive statistics, measures of dispersion, hypothesis testing, confidence intervals, analysis of variance, pairwise comparisons, and linear regression. Prerequisites: Admission to graduate school.

AG 506 - Advanced Statistical Methods in Agriculture
Hours: 3
Students will learn to work with various probability distributions (including F-distribution, Chi-square, t-distribution, standard normal distribution, normal), as well as hypothesis tests, including tests for normality, correlation, advanced regression analysis, CRD, ANOVA, general factorial models, nesting versus crossing, and non-parametric statistics. The course covers commonly used features and advanced statistical analysis using Statistical Analysis System (SAS) programming, including summarizing, combining, visualizing, and analyzing data.

AG 507 - Water Issues and Ethics
Hours: 3
This course will explore critical issues and ethical considerations related to existing and proposed water management policies and conservation promotion. Perspectives from rural and urban consumers, agricultural producers, and industry will be examined in context to these issues at the local, state, national, and global levels. Prerequisites: Admission to graduate school.

AG 508 - Gardening Across the Curriculum
Hours: 3
This course provides a review of research and resources related to school and university-based gardening programs for academic enrichment, nature awareness, nutrition improvement, and other aspects of garden-based learning. Prerequisites: Admission to graduate school.

AG 509 - Contemporary Issues in Sustainable Agriculture
Hours: 3
This course will examine the philosophical, theoretical, and practical aspects of sustainable agriculture. Course activities will provide the current or aspiring agricultural professional with sufficient background to engage and assist clientele with planning and decision-making related to the adoption of sustainable agriculture practices.

AG 512 - Methods of Technol Change
Hours: 3
Methods of Technological Change - Three semester hours This course will focus on the processes by which professional change agents (for example, extension agents) influence the introduction, adoption, and diffusion of technological change. The interlocking relationships of technology, culture, and society and the role of the change agent in affecting those relationships will be covered. Students will learn how to predict and minimize the undesirable consequences of change and how to enhance the development of communication skills required when working with people.

AG 518 - Thesis
Hours: 3-6
Thesis. Three to six semester hours. Development of a research project under the supervision of a staff member. Granting of credit for this project is dependent upon the completion and approval of the thesis.

AG 532 - Sci Meth Ag Research
Hours: 3
The course is for graduate students in an option 1 (thesis) graduate program and introduces students to the processes of scientific investigation, research methodologies and techniques, data interpretation, experimental design options, and scientific methodologies involved with planning, executing, interpreting and the scientific writing of research projects.

AG 533 - Grant Writing
Hours: 3
This course provides the student with practical skills in identifying grant sources and developing proposals. The course will focus primarily on agriculture, food, family, community, and youth initiatives appropriate for master’s students, as well educational projects applicable to professionals at the secondary, postsecondary, or extension/outreach level.

AG 574 - Records Rep Voc Tc
Hours: 3

AG 589 - Independent Study
Hours: 1-4
Individualized instruction/research at an advanced level in a specialized content area under the direction of a faculty member. Prerequisites: Consent of department head. Note May be repeated when the topic varies.

AG 595 - Research Lit Techniques
Hours: 3
Research Literature and Techniques. Three semester hours. A careful study of the latest research literature and techniques available in different fields of agriculture. A research paper will be required according to the interests of the individual student.

AG 597 - Special Topics
Hours: 1-5
Special Topics. One to four semester hours. Organized class. May be repeated when topics vary.

AGED 597 - Special Topics
Hours: 0-4
Special Topics. One to four semester hours. Organized class. May be repeated when topics vary.

ALEC 530 - History and Philosophy of Agricultural and Career Education
Hours: 3
(Same As AFE 530) This course is designed to provide a historical perspective of the development and execution of school based agricultural education, educational philosophy/philosophers, and educational theory with a purpose to better understand and communicate modern agricultural education and hone one's personal educational philosophy. Crosslisted with: AFE 530.

ALEC 531 - Experiential Learning Theory and Application in Agricultural Career and Family Education
Hours: 3
(Same As AFE 531) This course will examine experiential learning in light of Kolb's experiential learning model and the three-circle model of agricultural education. The overarching goal is to make you more familiar with the concepts such that you will incorporate the concepts in your program in a practical manner. Crosslisted with: AFE 531.

ALEC 535 - Leading and Communicating Contemporary Issues in Agriculture
Hours: 3
This course is an evaluation of current issues pertaining to leadership in agriculture including a historical look at leadership and its impact on producers and consumers. Content and teaching will promote understanding of the agricultural industry with a focus on advocacy, written, online, and oral communications.

ALEC 560 - Laboratory Management in Agricultural, Family, and Career Technical Education
Hours: 3
This course is designed to give students certifying to teach secondary agricultural education through the online alternative certification program an overview of managing and safety related to various laboratories involved in teaching at a school-based agricultural education program or in FCS and CTE

ALEC 570 - Instructional Management
Hours: 3
(Same as AFE 570) Provides students with a review of the ethical and pedagogical principles and practices needed to organize and deliver instructional programs in Agricultural Sciences and Family and Consumer Sciences. Crosslisted with: AFE 570.

ALEC 571 - Program Development
Hours: 3
(Same As AFE 571) This course addresses the theoretical and practical principles of planning, funding, and conducting effective educational programs in Agricultural Sciences and Family and Consumer Sciences. Crosslisted with: AFE 571.

ALEC 573 - Practicum in Teaching
Hours: 3
(Same As AFE 573) Supervised teaching practicum in Agricultural Science or Family and Consumer Sciences at the secondary level. Course includes field-based teaching component and monthly seminars on strategies and issues related to the teaching profession. Crosslisted with: AFE 573.

ALEC 574 - Assessment & Evaluation
Hours: 3
(Same As AFE 574) Theories and techniques used in assessing student learning and skill development and evaluating educational programs in Agricultural Science and Family and Consumer Sciences. Crosslisted with: AFE 574.

ALEC 579 - Field Experience in Teaching
Hours: 3
(Same as AFE 579) Fifteen week supervised teaching internship in agriculture or family and consumer sciences at the secondary or postsecondary level. Crosslisted with: AFE 579.

AMC 589 - Independent Study
Hours: 1-4
Independent Study. One to four semester hours. Individualized instruction/research at an advanced level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies. Prerequisite: Consent of department head.

AMC 597 - Special Topics
Hours: 1-4
Special Topics. One to four semester hours. Organized class. May be repeated when topics vary.

ANS 510 - Advanced Ultrasound Techniques for Body Composition in Livestock
Hours: 3
This course is designed to provide students with basic knowledge and techniques of real-time ultrasound to measure body composition in Livestock. Students will compose and present a research paper to class members and Professor.

ANS 511 - Adv Reproductive Physiology
Hours: 3
Recent advances in mammalian reproductive physiology. Special emphasis on endocrine chemistry and cellular action. Prerequisites: ANS 311.

ANS 512 - Endocrinology of Domestic Animals
Hours: 3
Study of the anatomy and physiology of the endocrine system, hormone-producing cells, synthesis of hormones, mechanisms of hormone action, and effects of hormones on physiological processes in domestic animals. Study of hormone-related diseases and disorders.

ANS 513 - Environmental Physiology of Domestic Animals
Hours: 3
Principles of environmental physiology and animal adaptation with emphasis on mechanisms of temperature regulation and related nutritional and metabolic-hormonal functions.

ANS 515 - Advanced Animal Nutrition
Hours: 3
Principles of animal nutrition; anatomy and physiology of the digestive system; biochemistry of digestion, absorption, and metabolism; and animal nutrition research methodology with emphasis on domestic animal species.

ANS 517 - Advanced Domestic Animal Behavior and Welfare
Hours: 3
Etiology of common and uncommon behaviors in domestic meat animal species will be explored from the physiological and neurological perspective. Ethical determinations from a global perspective of food animal species will be outlined and explored. Crosslisted with: ANS 417

ANS 522 - Animal Breeding
Hours: 3
Animal Breeding. Three semester hours. An advanced course dealing with problems in population genetics as applied to domestic animals. Heredity and environmental interaction, methods of selection, mating systems, and biometrics of animal improvements. Prerequisite: ANS 310.

ANS 532 - Advanced Beef Cattle Management
Hours: 3
Three semester hours (3 lect) covering the current status of the beef industry and the latest advances in genetics, breeding, nutrition, welfare, and health management of beef cattle. A emphasis in the the translation and adoption of current research into beef cattle management practices. Crosslisted with: ANS 412.

ANS 589 - Independent Study
Hours: 1-4
Independent Study. One to four semester hours. Individualized instruction/research at an advanced level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies. Prerequisite: Consent of department head.

ANS 597 - Special Topics
Hours: 1-4
Special Topics. One to four semester hours. Organized class. May be repeated when topics vary.

EQSC 589 - Independent Study
Hours: 0-4
Individualized instruction/research at an advanced level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies

EQSC 597 - Special Topics
Hours: 1-4
Organized class. May be repeated when topics vary.

FDSC 511 - Food in Social Context
Hours: 3
This course will examine cultural, sociological, economic, geographic, and political factors affecting food production, processing, distribution, and consumption. Prerequisites: Graduate standing.

FDSC 521 - Community Food Systems
Hours: 3
This course will introduce students to the concepts and issues associated with food security/insecurity at the community or local level. We will examine the social, economic, and technical issues faced by local food producers and consumers as well as strategies used to overcome these challenges. Prerequisites: Admission to Graduate School.

FDSC 589 - Independent Study
Hours: 1-4
Individualized instruction/research at an advanced level in a specialized content area under the direction of a faculty member. May be repeated when the topic varies

FDSC 597 - Special Topics
Hours: 0-4
Special Topics. One to four semester hours. Organized class. May be repeated when topics vary.

PLS 501 - Plant Science Instrumentation
Hours: 3
Principles, equipment, and techniques for measuring variables in plant, soil and environmental sciences. Advanced laboratory exercises measuring soil and plant physical and chemical properties will be explored. (Every fall).

PLS 502 - Ecological Plant Physiology
Hours: 3
This class covers plant physiological responses to the environment, including water, temperature and light, and how these affect plant production, growth and distribution.

PLS 503 - Plant Nutrition
Hours: 3
A study of essential elements for plant growth, including uptake and function. Nutrients will be studied in relation to sources of nutrient elements, application methods, effects on plant growth, and production of horticultural and agronomic plants.

PLS 504 - Advanced Hydroponic Crop Production
Hours: 3
Advanced knowledge on principles and practices of hydroponic crop production in controlled environment agriculture (CEA), including types of hydroponic systems, nutrient solution preparation and management, aerial environmental production factors and their manipulation, emerging indoor vertical farming. Specific cases of hydroponic production practices of major vegetables (leafy greens, culinary herbs, and fruit crops such as tomatoes, peppers, cucumbers, and strawberries) will be discussed. Prerequisites: PLS 1315 or PLS 1307.

PLS 506 - Weed Science
Hours: 3
Three semester hours (2 lec / 2 lab) An introduction to the principles of weeds, weed control, and herbicides. Crosslisted with: PLS 434.

PLS 515 - Pasture Management
Hours: 3
A careful study of the literature concerning the soil and vegetative problems in regard to establishing, restoring, and maintaining pastures. Consideration will be given to pasture plans for this section of Texas, fertilizers to use, and good pasture practices to be observed.

PLS 518 - Plant Science Thesis
Hours: 3-6
Three to six semester hours. Development of a plant science research project under the supervision of a Plant Science faculty member. Granting of credit for this project is dependent upon the completion and approval of the thesis.

PLS 521 - Microclimates in Agriculture
Hours: 3
This course is designed to help students understand, describe and analyze microclimates, including local and anatomical microclimates and the role they play in plant stress and productivity.

PLS 589 - Independent Study
Hours: 1-4
Individualized instruction/research at an advanced level in a specialized content area under the direction of a faculty member. Prerequisites Consent of department head. Note May be repeated when the topic varies.

PLS 597 - Special Topics
Hours: 0-4
Special Topics. One to four semester hours. Organized class. May be repeated when topics vary.