

Program Overview

Based on a multidisciplinary approach, the Master of Science (M.S.) degree with a major in Integrated Agricultural Sciences will expose students to the breadth of agriculture, and provide opportunities for them to integrate what they learn across different courses. Students will be able to enhance their depth of knowledge in the focus area of their choice: agricultural business, economics and policy; agricultural education; animal science; or crop and soil science. Graduates will develop a 21st century expertise with theoretical and practical skills necessary to analyze, optimize, and apply their knowledge to complex agro-systems. The rigorous interdisciplinary agriculture curriculum will provide exposure to real-world applications, for students to develop technical and leadership skills necessary for an effective career in addressing and solving food and agricultural issues.

- completed online application
- \$55 nonrefundable application fee
- or
- \$90 nonrefundable application fee for applications with international credentials
- baccalaureate degree in agriculture, biology, chemistry, economics, education, or a closely related field from a regionally accredited university. The degree earned should indicate the ability to conduct and complete the thesis research proposed or the non-thesis program with excellent results. (Non-U.S. degrees must be equivalent to a four-year U.S. Bachelor's degree. In most cases, three-year degrees are not considered. Visit our International FAQs (<https://www.gradcollege.txst.edu/international/faqs.html>) for more information.)
- official transcripts from **each institution** where course credit was granted
- a 3.0 overall GPA or a 3.0 GPA in the last 60 hours of undergraduate course work (plus any completed graduate courses)
- resume/CV detailing prior work experience, research experience, awards, scholarships, and other related qualifications
- statement of interest (two-page maximum) including research interests, plans for graduate study, and professional aspirations and describing how the student's scholarly interests and relevant skills can be utilized in the program to pursue those goals
- three letters of recommendation from non-related individuals familiar with the student's scholarly work and/or relevant work experience

Approved English Proficiency Exam Scores

Applicants are required to submit an approved English proficiency exam score that meets the minimum program requirements below unless they have earned a bachelor's degree or higher from a regionally accredited U.S. institution or the equivalent from a country on our exempt countries list (<http://www.gradcollege.txstate.edu/international/language.html#waver>).

- official TOEFL iBT scores required with a 78 overall and minimum individual module scores of
 - 19 listening
 - 19 reading
 - 19 speaking
 - 18 writing

- official PTE scores required with a 52 overall
- official IELTS (academic) scores required with a 6.5 overall and minimum individual module scores of 6.0
- official Duolingo scores required with a 110 overall
- official TOEFL Essentials scores required with an 8.5 overall

This program does **not** offer admission if the scores above are not met.

Additional Information: You will be required to take leveling courses if you lack sufficient background course work. Any required leveling course work must be completed with grades of B or better. Contact the graduate advisor for information regarding the background course work that may be required.

Degree Requirements

The Master of Science (M.S.) degree with a major in Integrated Agricultural Sciences (Professional Option) requires 36 semester credit hours. The major and supportive courses are to be taken with the advice and consent of the student's advisory committee, which consists of three or more faculty selected in consultation with the graduate advisor.

Non-credit (leveling) course work may be required prior to admission into the program if the student lacks sufficient background course work. Any required leveling course work must be completed with grades of B or better prior to admission.

Course Requirements

Code	Title	Hours
Required Courses		
AG 5300	Applied Statistics and Econometrics for Agriculture	3
	or MATH 5376E Analysis of Variance	
AG 5310	Research Methods in Integrated Agricultural Sciences	3
Required Elective		
Choose 3 hours from the following:		3
AG 5301	Agricultural Development and Policy	
AG 5324	Agroecology and Integrated Agriculture	
AG 5350	Foundations of Ethics and Leadership in Agriculture	
AG 5365	The Role of Animal Science in Society: An Integrated Approach	
Electives		
Choose 27 hours from the following:		27
Any 5000 – 7000 level courses offered by Agricultural Sciences (AG 5XXX – AG 7XXX)		
ANLY 5335	Forecasting and Simulation	
BIO 5412	Plant Anatomy	
GEO 5415	Geographic Applications of Remote Sensing	
TECH 5382	Industrial Ecology and Sustainability Engineering	
ADED 5382	Foundations of Adult Education	
SOCI 5309	Seminar in Qualitative Research Methods	
BIO 5413	Parasitology	
GEO 5313	Environmental Studies	
GEO 5334	Applied Water Resources	
MCS 5342	Sustainable Consumer Economy	

SOCI 5368 Seminar in Environmental Sociology

Total Hours**36**

Comprehensive Examination Requirement

All Professional Option students must pass an oral comprehensive examination to demonstrate they have mastered the main concepts covered in their courses. The comprehensive exam is comprised of questions based on research methods, statistics, theory, and topics related to the student's coursework and area(s) of specialization. Students should consult their graduate advisor and the Graduate Handbook for the M.S program in Integrated Agricultural Sciences for a detailed description of the comprehensive examination procedures. If a student fails the comprehensive examination, they will be allowed to retake it: If a student fails a second time, they may petition the Integrated Agricultural Sciences steering committee for permission to take the examination a third time. Students will not be allowed to take an examination more than three times.

Students who do not successfully complete the requirements for the degree within the timelines specified will be dismissed from the program.

Agriculture (AG)

AG 5100. Professional Development.

This course introduces key concepts and practices for teaching college courses. It provides regular in-service training and planned periodic evaluations of instructional responsibilities. It is required for first-year teaching and instructional assistants in the Master's of Science in Integrated Agricultural Sciences. Graded on a credit (CR), no-credit (F) basis.

1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing|Graduate Assistantship|Exclude from Graduate GPA

Grade Mode: Leveling/Assistantships

AG 5101. Research Experience.

This course provides students with an opportunity to explore a focused research topic. Ideally the topic would be an emergent topic within their research area that was unplanned and resulted from their initial investigation. May be repeated twice for credit.

1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing

Grade Mode: Standard Letter

AG 5113. Summer Programs in Agricultural Education.

This course provides students field experience in summer agricultural education programming in secondary school settings. Students will receive individualized instruction during supervised visits while they are engaged in their field experience. The course includes program planning and educating diverse student learning populations. Prerequisite: AG 5212 with a grade of C or better.

1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5120. Aquaponic Internship.

This course provides students with hands-on production experience in aquaculture. Students will complete 64 hours of internship with an aquaponic facility.

1 Credit Hour. 0 Lecture Contact Hours. 1 Lab Contact Hour.

Grade Mode: Standard Letter

AG 5199B. Thesis.

This course represents a student's continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing

Grade Mode: Credit/No Credit

AG 5212. Program Building.

This course focuses on program and curriculum development in agricultural education settings. Topics include determining program and curriculum goals and objectives, implementing the program, and curriculum evaluation. The course also addresses Supervised Agricultural Experience (SAE) program development and supervision, FFA advisement, and program and class management.

2 Credit Hours. 2 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5299B. Thesis.

This course represents a student's continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

2 Credit Hours. 2 Lecture Contact Hours. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing

Grade Mode: Credit/No Credit

AG 5300. Applied Statistics and Econometrics for Agriculture.

This course focuses on data analysis, modeling techniques and their applications with statistical inference for agriculture. This course will cover statistical tools applied in agriculture, including probability, sampling, principles of estimation, hypothesis testing, general linear models, multiple regression analysis, qualitative response modeling, and other related tools widely used in agriculture.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5301. Agricultural Development and Policy.

This course focuses on current issues that integrate agricultural policy, resource development, application of welfare criteria and economic analysis, and food and rural development problems of the U.S. and the world. Course topics include integrated agricultural and rural development, food and nutrition security, commodity issues, and trade policy.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5302. Economics of Agricultural Production.

This course focuses on analysis of agricultural production economic concepts and models. Topics will include traditional neo-classical theory of the firm, duality theory, resource allocation, production selection, scale of operation of agricultural firms, and risk and uncertainty associated with agricultural production.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5303. Agricultural Marketing and Price Analysis.

This course emphasizes marketing theory and structure, characteristics of demand and supply of farm products, agricultural price research techniques for evaluating marketing behavior, market legislation, and market development. The course will provide an opportunity for students to develop marketable skills in quantitative price and market analysis.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5304. Economics of Sustainable Natural Resource Management.

This course provides economic tools to analyze sustainable natural resources and environmental issues. It enables students to develop integrative expertise in economic analysis utilizing natural and behavioral sciences. The integrative expertise provides students with the ability to more effectively, efficiently, and sustainably manage natural resources for multiple objectives.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5310. Research Methods in Integrated Agricultural Sciences.

This course covers research techniques, literature analysis, the development and implementation of experimental designs, conceptual models and survey instruments.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5311. Instructional Methods for Career and Technology Educators.

This course focuses on instructional techniques, strategies, and methods appropriate to the effective teaching of career and technology subjects including application in the areas of instructional planning, culturally responsive teaching, organizing and evaluating learning activities, lesson preparation, diagnosis of learner differences, and the ethical and legal aspects of teaching. Teaching special populations and teaching in multicultural environments will be addressed.

3 Credit Hours. 2 Lecture Contact Hours. 2 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5320. Integrated Agricultural Production in Aquaponic Systems.

This course focuses on crop and fish production, pest management, water quality, nutrient management, and economics and marketing in aquaponic systems. Topics covered include contrasts and comparisons to soil based, hydroponic cropping and aquaculture (confined fish production without crop interactions).

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5323. Composting and Integrated Resource Management.

The course provides experience and theoretical foundation for the basic design, production, management, utilization and marketing of composts, vermicomposts and related products, and non-renewable natural resource issues related to agriculture.

3 Credit Hours. 2 Lecture Contact Hours. 2 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5324. Agroecology and Integrated Agriculture.

This course will focus on integrative and ecological principles of agricultural production. Emphasis will be on sustainable agriculture, complex systems, production diversity, integrated animal-crop systems, resilience and small producers.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5326. Advanced Animal Science of Ruminants.

This course applies the scientific and technological advances to ruminant production and management. It includes the study of scientific and technological advances with an emphasis on overall management, health care, nutrition, genetics, physiology, and marketing of ruminant animals.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5343. Organization & Management for Laboratory Programs.

This course focuses on instructional programs involving laboratory equipment and facilities. Curriculum, teaching methods, equipment, and facility management practices including various aspects of safety, tool management, inventory, and security are emphasized along with facilities layout planning. Additionally, theories in leadership development will be analyzed and the organization of youth groups in secondary schools and cooperative extension will be examined.

3 Credit Hours. 2 Lecture Contact Hours. 2 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5350. Foundations of Ethics and Leadership in Agriculture.

This course prepares students for professional leadership and service in agriculture, with emphasis on applications of ethics and leadership principles. The course will focus on industry ethics and leadership theory in various professional settings in agriculture.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5351. Grant Development and Management.

This course explores competencies of locating external agency funding for agricultural research, teaching and extension. The principles of producing a competitive proposal that includes multi-, cross and interdisciplinary collaborations are also discussed. The development of the grant proposal, implementation, budget, and evaluation plan will be emphasized.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5352. Program Development and Evaluation.

This course examines philosophies of program development, implementation and evaluation to meet stakeholders' expectations. Emphasis is placed on methodologies that effectively evaluate agricultural programs.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5354. Instructional Design in Agricultural Education.

This course examines instructional design models appropriate from a pedagogical and andragogical viewpoint. Emphasis is placed on theories and models to support the design of print-based, web-based, or multimedia-based instruction. Students will prepare evaluation strategies to assess comprehensive instruction in a high-tech environment.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5355. Methods of Technological Change.

This course explores the dynamics and culture of technological change in agriculture. Topics covered will include ways to implement change, skills for being an innovator and a change agent, how to predict the effects of change, and the integration of other sciences into agricultural sciences.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5360. Advancements in Animal Science.

Survey of the current knowledge and concepts in animal production including economic considerations and current production problems in breeding and feeding livestock.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5361. Food Technology and Meat Science.

This course explores the science and instrumentation of meat science; including food safety, processing and evaluation of wholesale and retail cuts of beef, pork, lamb, and poultry; including fresh, cooked/smoked, grilled, and pickled products. The evaluation of consumer preference and economic returns based on product presentation will be included.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5362. Advanced Animal Science: Minerals and Vitamins in Animal Nutrition.

This course is an advanced study of the utilization and requirements of minerals and vitamins in farm and ranch animals. It emphasizes ruminant and non-ruminant mineral and vitamin metabolism and utilization. The utilization of specific minerals and vitamins by different species will be used to explain and predict subsequent performance.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5363. Animal Molecular Genetics.

This course examines the theory and practice of molecular genetics of livestock. Topics covered include genetic concepts and theory, as well as applications of these concepts in animal agriculture, including Mendelian genetics, genomic revolution, cloning, epigenetics, and transgenics. There is an emphasis on the techniques and underlying biological principles in genetics, as they apply to animal agriculture.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5364. Biology of Reproduction in Farm Animals.

This course will focus on animal agriculture reproduction and examine the molecular principles of reproduction. Topics will include molecular reproductive endocrinology, advanced physiology and current research in animal reproduction science.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5365. The Role of Animal Science in Society: An Integrated Approach.

This course provides students with a broad understanding of the role animals have in society, the influences of animal production on economic development, changes in policy and social viewpoints of animal production, and the development of domesticated animals.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5370. Special Problems in Technical Agriculture.

Special problems will be selected to meet the needs of the individual student. May be repeated (once) for additional credit when the problem differs.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing

Grade Mode: Standard Letter

AG 5372. Agricultural Electricity and Mechanical Systems.

This course focuses on developing an understanding of electrical terms, safety procedures, and cost considerations related to electricity. The course also includes applying electrical wiring, controls, and motors through testing, selection, and wiring of electrical devices.

3 Credit Hours. 2 Lecture Contact Hours. 2 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5390. Foundation Studies in Agriculture.

This course is a leveling course to provide prerequisite knowledge necessary for graduate-level coursework in Agriculture. Course content varies depending on academic preparation. This course does not earn graduate degree credit. Repeatable up to 9 hours with different emphasis. Prerequisite: Instructor approval.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing|Exclude from Graduate GPA

Grade Mode: Leveling/Assistantships

AG 5391. Agro-Climatology.

This course focuses on the study of climate, and climate change impacts on agricultural systems. This will include fundamental elements of the water cycle, changes in surface hydrology, policy related to agricultural water resources and production. Atmospheric CO₂, and water vapor influences on climate will be explored, as well as geographic agricultural refugia and crop migration.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5398. Professional Paper.

This course is required for non-thesis students to prepare a professional paper of publishable quality. Graded on a credit (CR), no-credit (F) basis.

Prerequisite: Instructor approval.

3 Credit Hours. 0 Lecture Contact Hours. 3 Lab Contact Hours.

Grade Mode: Credit/No Credit

AG 5399A. Thesis.

This course represents a student's initial thesis enrollment. No thesis credit is awarded until the student has completed the thesis in Integrated Agricultural Sciences. Graded on a credit (CR), progress (PR), no-credit (F) basis.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Credit/No Credit

AG 5399B. Thesis.

This course represents a student's continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing

Grade Mode: Credit/No Credit

AG 5402. Soil and Crop Mycology.

This course addresses the agro-ecological importance of the mycorrhizal community's influence on crop health and nutrition as related to regenerative agriculture and utilizing ecosystem processes to promote crop production. Students will review the current literature and research on the the roles of endo- and ectomycorrhiza. They will develop a project that investigates plant pathology, soil aggregation, and mineral dissolution from parent material, affects on soil organisms and fungi.

4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5403. Crop Physiology.

This course focuses on the study of changes in crop physiology and morphology induced by normal growth conditions, and those caused by adverse growing conditions. Students will review literature regarding production impacts of climate change (flood, drought, changing growing degree days, heat and cold), poor nutrition, poor soils, and disease.

4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5404. Rhizosphere Ecology.

This course investigates the emerging science on rhizosphere ecology. Specifically, the course discusses rhizophagy, microbial root colonization, root exudates, carbon cycling, allelochemistry and plant-plant signaling) and nutrient transfer to crops in the rhizosphere. Other topics include root growth and elongation responses to the presence and absence of the microbial community.

4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5408. Range Synecology.

This course investigates the relationships of range plants to each other. Topics include woody plant encroachment, resilience theory, allelochemistry, kairomone and phytotoxin releases for competitive exclusion. Importantly, the topic of range recovery, ecosystem services, recovery from disturbance, successional stages, climax conditions and how livestock production is impacted will be covered.

3 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5426. Soil Health and Development.

This course focuses on the fundamental topics of soil health and development. These fundamentals include pedogenesis, mineral composition, tillage practices, soil ecosystem and sustainability, soil biology and soil physics.

4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5463. Animal Molecular Genetics.

This course examines the theory and practice of molecular genetics of livestock. Topics covered include genetic concepts and theory, as well as applications of these concepts in animal agriculture; e.g., Mendelian genetics, genomic revolution, cloning, epigenetics and transgenics. The course emphasizes techniques and underlying biological principles in genetics.

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.

Grade Mode: Standard Letter

AG 5599B. Thesis.

This course represents a student's continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

5 Credit Hours. 5 Lecture Contact Hours. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing

Grade Mode: Credit/No Credit

AG 5999B. Thesis.

This course represents a student's continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

9 Credit Hours. 9 Lecture Contact Hours. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing

Grade Mode: Credit/No Credit