

## 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 21<sup>st</sup> 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#wave>).

- 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
<b>Required Courses</b>		
AG 5300	Applied Statistics and Econometrics for Agriculture	3
	or MATH 5376E Analysis of Variance	
AG 5310	Research Methods in Integrated Agricultural Sciences	3
<b>Elective</b>		
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	
<b>Prescribed Electives</b>		
Choose 27 hours from the following:		27
AG 5101	Research Experience	
AG 5398	Professional Paper	
<b>Agricultural Business, Economic and Policy Research Area:</b>		
AG 5302	Economics of Agricultural Production	
AG 5303	Agricultural Marketing and Price Analysis	
AG 5304	Economics of Sustainable Natural Resource Management	
ANLY 5335	Forecasting and Simulation	
<b>Crops and Solis Research Area:</b>		
AG 5120	Aquaponic Internship	
AG 5320	Integrated Agricultural Production in Aquaponic Systems	

AG 5323	Composting and Integrated Resource Management
AG 5426	Soil Health and Development
BIO 5412	Plant Anatomy
GEO 5415	Geographic Applications of Remote Sensing
TECH 5382	Industrial Ecology and Sustainability Engineering
<b>Agriculture Education and Leadership Research Area:</b>	
AG 5351	Grant Development and Management
AG 5352	Program Development and Evaluation
AG 5354	Instructional Design in Agricultural Education
AG 5355	Methods of Technological Change
ADED 5382	Foundations of Adult Education
SOCI 5309	Seminar in Qualitative Research Methods
<b>Animal Science Research Area:</b>	
AG 5361	Food Technology and Meat Science
AG 5362	Advanced Animal Science: Minerals and Vitamins in Animal Nutrition
AG 5463	Animal Molecular Genetics
AG 5364	Biology of Reproduction in Farm Animals
BIO 5413	Parasitology
<b>Agricultural Sustainability Research Area:</b>	
AG 5304	Economics of Sustainable Natural Resource Management
AG 5323	Composting and Integrated Resource Management
AG 5370	Special Problems in Technical Agriculture
AG 5426	Soil Health and Development
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 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 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 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 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 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 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 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 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