

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. Each student's degree will culminate in either thesis-based research or in a non-thesis professional paper.

Application Requirements

The items listed below are required for admission consideration for applicable semesters of entry during the current academic year. Submission instructions, additional details, and changes to admission requirements for semesters other than the current academic year can be found on The Graduate College's website (<http://www.gradcollege.txstate.edu>). International students should review the International Admission Documents page (<http://mycatalog.txstate.edu/graduate/admission-documents/international/>) for additional requirements.

- 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.
- official transcripts from **each institution** where course credit was granted
- minimum 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

TOEFL, PTE, or IELTS Scores

Non-native English speakers who do not qualify for an English proficiency waiver:

- 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

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 requires 36 semester credit hours, including a thesis. 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
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	
Prescribed Electives		
Choose 21 hours from the following:		21
AG 5101	Research Experience	
Agricultural Business, Economic and Policy Research Area:		
AG 5302	Economics of Agricultural Production	
AG 5303	Agricultural Marketing and Price Analysis	
AG 5304	Economics of Sustainable Natural Resource Management	
QMST 5335	Forecasting and Simulation	
Crops and Soils Research Area:		
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	
Agriculture Education and Leadership Research Area:		
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	
Animal Science Research Area:		
AG 5361	Food Technology and Meat Science	
AG 5362	Advanced Animal Science: Minerals and Vitamins in Animal Nutrition	
AG 5364	Biology of Reproduction in Farm Animals	
AG 5463	Animal Molecular Genetics	
BIO 5413	Parasitology	
Agricultural Sustainability Research Area:		
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	
Thesis		
AG 5399A	Thesis	3
Choose a minimum of 3 hours from the following:		3
AG 5199B	Thesis	
AG 5299B	Thesis	
AG 5399B	Thesis	
AG 5599B	Thesis	
AG 5999B	Thesis	
Total Hours		36

Comprehensive Examination Requirement

All thesis students must pass an oral comprehensive examination to demonstrate they have mastered the main concepts covered in their courses and research activities. The comprehensive exam is comprised of questions based on research methods, statistics, and theory, and that also incorporate empirical research and coursework from a student's area(s) of specialization. Immediately following their thesis oral defense, each student will undertake the oral comprehensive exam as administered by the student's thesis committee. 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.

If a student elects to follow the thesis option for the degree, a committee to direct the written thesis will be established. The thesis must demonstrate the student's capability for research and independent thought. Preparation of the thesis must be in conformity with the *Graduate College Guide to Preparing and Submitting a Thesis or Dissertation*.

Thesis Proposal (http://www.gradcollege.txstate.edu/docs/Thesis_Diss_Guide.pdf)

The student must submit an official Thesis Proposal Form (<http://www.gradcollege.txstate.edu/forms.html>) and proposal to his or her thesis committee. Thesis proposals vary by department and discipline. Please see your department for proposal guidelines and requirements. After signing the form and obtaining committee members' signatures, the graduate advisor's signature if required by the program and the department chair's signature, the student must submit the Thesis Proposal Form with one copy of the proposal attached to the dean of The Graduate College for approval before proceeding with research on the thesis. If the thesis research involves human subjects, the student must obtain exemption or approval from the Texas State Institutional Review Board prior to submitting the proposal form to The Graduate College. The IRB approval letter should be included with the proposal form. If the thesis research involves vertebrate animals, the proposal form must include the Texas State IACUC approval code. It is recommended that the thesis proposal form be submitted to the dean of The Graduate College by the end of the student's enrollment in 5399A. Failure to submit the thesis proposal in a timely fashion may result in delayed graduation.

Thesis Committee

The thesis committee must be composed of a minimum of three approved graduate faculty members.

Thesis Enrollment and Credit

The completion of a minimum of six hours of thesis enrollment is required. For a student's initial thesis course enrollment, the student will need to register for thesis course number 5399A. After that, the student will enroll in thesis B courses, in each subsequent semester until the thesis is defended with the department and approved by The Graduate College. Preliminary discussions regarding the selection of a topic and assignment to a research supervisor will not require enrollment for the thesis course.

Students must be enrolled in thesis credits if they are receiving supervision and/or are using university resources related to their thesis work. The number of thesis credit hours students enroll in must reflect the amount of work being done on the thesis that semester. It is the responsibility of the committee chair to ensure that students are making adequate progress toward their degree throughout the thesis process. Failure to register for the thesis course during a term in which supervision is received may result in postponement of graduation. After initial enrollment in 5399A, the student will continue to enroll in a thesis B course as long as it takes to complete the thesis. Thesis projects are by

definition original and individualized projects. As such, depending on the topic, methodology, and other factors, some projects may take longer than others to complete. If the thesis requires work beyond the minimum number of thesis credits needed for the degree, the student may enroll in additional thesis credits at the committee chair's discretion. In the rare case when a student has not previously enrolled in thesis and plans to work on and complete the thesis in one term, the student will enroll in both 5399A and 5399B.

The only grades assigned for thesis courses are PR (progress), CR (credit), W (withdrew), and F (failing). If acceptable progress is not being made in a thesis course, the instructor may issue a grade of F. If the student is making acceptable progress, a grade of PR is assigned until the thesis is completed. The minimum number of hours of thesis credit ("CR") will be awarded only after the thesis has been both approved by The Graduate College and released to Alkek Library.

A student who has selected the thesis option must be registered for the thesis course during the term or Summer I (during the summer, the thesis course runs ten weeks for both sessions) in which the degree will be conferred.

Thesis Deadlines and Approval Process

Thesis deadlines are posted on The Graduate College (<http://www.gradcollege.txstate.edu/>) website under "Current Students." The completed thesis must be submitted to the chair of the thesis committee on or before the deadlines listed on The Graduate College website.

The following must be submitted to The Graduate College by the thesis deadline listed on The Graduate College website:

1. The Thesis Submission Approval Form bearing original (wet) and/or electronic signatures of the student and all committee members.
2. One (1) PDF of the thesis in final form, approved by all committee members, uploaded in the online Vireo submission system.

After the dean of The Graduate College approves the thesis, Alkek Library will harvest the document from the Vireo submission system for publishing in the Digital Collections database (according to the student's embargo selection). **NOTE: MFA Creative Writing theses will have a permanent embargo and will never be published to Digital Collections.**

While original (wet) signatures are preferred, there may be situations as determined by the chair of the committee in which obtaining original signatures is inefficient or has the potential to delay the student's progress. In those situations, the following methods of signing are acceptable:

- signing and faxing the form
- signing, scanning, and emailing the form
- notifying the department in an email from their university's or institution's email account that the committee chair can sign the form on their behalf
- electronically signing the form using the university's licensed signature platform.

If this process results in more than one document with signatures, all documents need to be submitted to The Graduate College together.

No copies are required to be submitted to Alkek Library. However, the library will bind copies submitted that the student wants bound for personal use. Personal copies are not required to be printed on archival

quality paper. The student will take the personal copies to Alkek Library and pay the binding fee for personal copies.

Master's level courses in Agriculture: AG

Courses Offered 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