

Master of Science Degree in Agricultural Regulations

Non-Thesis Option

For further information, please contact:

[Dr. Shahidul Islam](mailto:islams@uapb.edu)
Graduate Coordinator and
Director, Regulatory Science Program
University of Arkansas at Pine Bluff
islams@uapb.edu
870-575-7239

PROGRAM TITLE: Master of Science (M.S.) Degree in Agricultural Regulations (Non-Thesis Option)

Program Overview

The Master of Science Degree Program in Agricultural Regulations (Non-Thesis Option; NTO) is offered by the USDA Regulatory Science Center of Excellence in conjunction with the Department of Agriculture. Students will be expected to develop in-depth, comprehensive knowledge in a specific core content area. However, students will also be expected to develop basic familiarity with the principles of areas related to their core content area.

Program Structure

The proposed non-thesis M.S. degree in Agricultural Regulations consists of 36 - 42 credit hours, depending on the track chosen. The core coursework consists of twenty-five (25) credit hours, including one credit hour of special projects presentation under the Agricultural and Environmental Regulatory Practices Seminar and two credit hours of Scientific Writing and Editing in Agriculture that included the particular project. Special Projects will cover practical skills, knowledge, and professional development training. Students choosing the NTO will be required to complete a final written report on a selected topic and present their project in an oral presentation. Each student must prepare and deliver the project to members of their committee who will attend the presentation and to the project advisor at least two weeks before the presentation.

Students will complete a core of regulatory science courses and select, with the approval of /her graduate committee, other graduate courses that meet the student's career goals. The proposed core courses are presented in Table 1. Additional courses will be selected depending on the graduate student's area of interest. See Table 2 for the full sample curriculum. All requirements for the completion of the degree, including coursework, special topics/project report, and presentation, must be completed within six (6) years of beginning the program.

Course schedules and sample programs of study have been designed to offer students a choice of three interest areas: Plant and Animal Systems, Food Safety, and Agricultural Policy and Economic Risk (Tables 3-5). The University also offers other graduate-level courses outside the Agriculture Department that may be utilized in the student’s program of study. Selected courses are presented in Table 6.

Academic courses will continue to be modified on an individual basis by program faculty members. Course offerings are closely monitored to ensure that students’ competency needs are met. The core course requirements are aligned with the needs and standards of industry organizations such as USDA agencies, and various regulatory science and agriculture industries.

These core courses (Table 1) provide a foundation for the Agricultural Regulations program’s main objective. The core course requirements are aligned with the needs of agricultural regulatory agency professionals. Additional elective courses for the program include Molecular Biology, Food Safety, Environmental Soil Chemistry, Ecological Economics, Post-Harvest Physiology, Food Microbiology, Environmental Policy Analysis, GIS and Watershed Management, Animal Health Issues, and Epidemiology, and Principles of Pest Management.

Graduate Student Load

A full-time graduate student course load in the Agricultural Regulations graduate program is six (7) credit hours during the fall and spring semesters and two (2) credit hours during the summer term. A full-time graduate student’s course load may not exceed twelve (12) credit hours during the spring and fall semesters. Students must be enrolled full-time to be eligible for assistantships. Students who are not on assistantships and are finishing their special projects may maintain their graduate status by registering for at least one (1) credit hour.

Table 1. Core Courses in the Non-Thesis Graduate Agricultural Regulations Program.

Course Number	Course	Credits
GAGRI 6101	Agricultural and Environmental Regulatory Practices Seminar	1
GAGRI 6102	Ethical Concepts	1
GAGRI 6313	Principles of Pest Management	3
GAGRI 6320	Food Safety	3
GAGRI 6323	Statistics in Agriculture	3
GAGRI 6342	Risk Analysis	3
GAGRI 6350	Agricultural Law and Regulatory Practices	3
GAGRI 6369	Environmental Policy Analysis	3
GAGRI 6398	Animal Health Issues and Epidemiology	3
GARGI 6280	Scientific Writing and Editing in Agriculture	2

Total = 25

Table 2. Non-Thesis Option Graduate Program (M.S.) in Agricultural Regulations*

Course Number & Name (R = Required/E = Elective)	Credits
<u>Fall Semester- Year I</u>	
GAGRI 6323 Statistics in Agriculture (R)	3
GAGRI 5400 Molecular Biology (E)	4
GAGRI 6320 Food Safety (R)	3
<u>Spring Semester-Year I</u>	
GAGRI 6102 Ethical Concepts (R)	1
GAGRI 6342 Risk Analysis (R)	3
GAGRI 6301 Environmental Soil Chemistry (E)	3
GAGRI 6345 Ecological Economics (E)	
<u>Fall Semester- Year I</u>	
GAGRI 6350 Agricultural Law and Regulatory Practices (R)	3
GAGRI 6369 Environmental Policy Analysis (R)	3
GAGRI 6408 Post-harvest Physiology (E)	4
GARGI 6280 Scientific Writing and Editing in Agriculture (R)	2
<u>Spring Semester-Year II</u>	
GAGRI 5306 Geographic Information Systems and Watershed Management (E)	3
GAGRI 6398 Animal Health Issues and Epidemiology (R)	3
GAGRI 6313 Principles of Pest Management (R)	3
GAGRI 6101 Agricultural & Environmental Regulatory Practices Sem (R)	1

Table 3. Non-thesis option Graduate Agricultural Regulations Program: **Sample Program of study for concentration in Plant and Animal Systems***

Course Number & Name (R – Required; E – Elective)	Credits
<u>Fall Semester- Year I</u>	
GAGRI 6323 Statistics in Agriculture (R)	3
GAGRI 5400 Molecular Biology (E)	3
GAGRI 6320 Food Safety (R)	3
<u>Spring Semester-Year I</u>	
GAGRI 6102 Ethical Concepts (R)	1
GAGRI 6342 Risk Analysis (R)	3
GAGRI 6345 Ecological Economics (E)	3
GAGRI 6301 Environmental Soil Chemistry (E)	3
<u>Fall Semester- Year II</u>	
GAGRI 6350 Agricultural Law and Regulatory Practices (R)	3
GAGRI 6369 Environmental Policy Analysis (R)	3
GAGRI 5306 Geographical Information System (GIS) (E)	3
GARGI 6280 Scientific Writing and Editing in Agriculture (R)	2
<u>Spring Semester-Year II</u>	
GAGRI 6313 Principles of Pest Management (R)	3
GAGRI 6398 Animal Health Issues and Epidemiology (R)	3
GAGRI 6101 Agricultural and Environmental Regulatory Practices Sem (R)	1

*Students must complete 25 credit hours as required for this option. Depending on the track and can choose at least 11 credit hours of electives from the list of courses identified below.

Table 4. Non-thesis option Graduate Agricultural Regulations Program: Sample Program of study for concentration in Food Safety*

Course Number & Name (R – Required; E – Electives)	Credits
<u>Fall Semester- Year I</u>	
GAGRI 6323 Statistics in Agriculture (R)	3
GAGRI 6320 Food Safety (R)	3
GAGRI 5400 Molecular Biology (E)	3
<u>Spring Semester-Year I</u>	
GAGRI 6102 Ethical Concepts (R)	1
GAGRI 6342 Risk Analysis (R)	3
GAGRI 6420 Food Microbiology (E)	4
<u>Fall Semester – Year II</u>	
GAGRI 6350 Agricultural Law and Regulatory Practices (R)	3
GAGRI 6369 Environmental Policy Analysis (R)	3
GAGRI 6408 Post-harvest Physiology (E)	4
GARGI 6280 Scientific Writing and Editing in Agriculture (R)	2
<u>Spring Semester – Year II</u>	
GAGRI 6313 Principles of Pest Management (R)	3
GAGRI 6398 Animal Health Issues and Epidemiology (R)	3
GAGRI 6101 Agricultural and Environmentl Regulatory Practices Sem (R)	1

Table 5. Non-thesis option Graduate Agricultural Regulations Program: Sample Program of study for concentration in Agricultural Policy and Economic Risk *

Course Number & Name (R – Required; E – Electives)	Credits
<u>Fall Semester- Year I</u>	
GAGRI 6323 Statistics in Agriculture (R)	3
GAGRI 6320 Food Safety (R)	3
Elective	3
<u>Spring Semester-Year I</u>	
GAGRI 6102 Ethical Concepts (R)	1
GAGRI 6342 Risk Analysis (R)	3
GAGRI 6345 Ecological Economics (E)	3
Elective	3
<u>Fall Semester – Year II</u>	
GAGRI 6350 Agricultural Law and Regulatory Practices (R)	3
GAGRI 6369 Environmental Policy Analysis (R)	3
GAGRI 5306 Geographical Information System (GIS) (E)	3
GARGI 6280 Scientific Writing and Editing in Agriculture (R)	2
<u>Spring Semester – Year II</u>	
GAGRI 6398 Animal Health Issues and Epidemiology (R)	3
GAGRI 6313 Principles of Pest Management (R)	3
GAGRI 6101 Agricultural and Environmentl Regulatory Practices Sem (R)	1

*Students must complete 25 credit hours as required for this option and can choose at least 11 credit hours of electives from the list of courses identified.

Table 6. List of selected graduate course offerings from other UAPB Academic Departments available to students in the Graduate Agricultural Regulations Program**

Department	Course Name
Aquaculture/Fisheries	Water Quality Management (GAQF 5341)
Aquaculture/Fisheries	Statistics in Research (GAQF 5405)
Aquaculture/Fisheries	Stream Ecology (GAQF 5445)
Aquaculture/Fisheries	Ecology of Fishes (GAQF 5414)
Aquaculture/Fisheries	Special Topics (GAQF 5390)
Biology	Integrated Principals of Biology (GBIO 5310)
Biology	Laboratory Experiences/High School Teachers (GBIO 5320)
Biology	Advanced Cell Biology (GBIO 5330)
Chemistry	Advanced Environmental Science (GPHY 5365)
Chemistry	Advanced Laboratory (GCHM 5311)
Chemistry	Advanced Biochemistry (GCHM 5312)
Chemistry	Advanced Chemistry (GCHM 5345)
Chemistry	Higher-Order Thinking in Science (GCHM 5331)
Chemistry	Nuclear Chemistry (GCHM 5335)
Chemistry	Advanced Organic Chemistry (GCHM 5340)
Chemistry	Chemical Separations (GCHM 5350)
Math	Probability and Statistics (GMTH 5345)
Math	Mathematical Modeling (GMTH 5360)
Math	Modern Algebra and Discrete Structures (GMTH 5380)
Social and Behavioral Sciences	Human Geography (GSSC 5308)
Social and Behavioral Sciences	Topics in Global Studies (GSSC 5309)

**Other UAPB Graduate Courses. Additional UAPB graduate courses are available in other graduate programs on campus. The addition of graduate courses outside the department to the student's plan of study will be determined by the student's assigned advisor/mentor.

Graduate Course Offerings:

GAGRI 5306 Geographic Information Systems and Water Management (3 credit hours):

This course introduces students to the application of geographic information systems (GIS) including cartography, data structure, map overlays, and spatial analysis. This course approaches GIS in the context of environmental issues relating to hydrology and watershed management, soil science, land-use planning, and conservation. Both field activities and GIS and GPS software/hardware are incorporated into course experiences. After completing this class, students will be able to describe what GIS is and several ways that it may be used as a tool in agriculture and resource management; enter data into ArcView and describe the primary GIS data types and sources; describe how GIS is used in the context of watershed management; analyze and query data in ArcView; present results of the analysis using the ArcView software; and create a GIS database.

GAGRI 5400 Molecular Biology (4 credit hours):

Molecular biology provides an overview of the basic molecular process and recombinant DNA technologies that play an important role in forensics, therapeutics, drug discovery, and agriculture. This includes the structure and function of DNA, RNA, and proteins; DNA replication and repair processes; RNA synthesis and processing; protein synthesis and regulation; and basic recombinant DNA technology.

GAGRI 6101 Agricultural and Environmental Regulatory Practices Seminar (1 credit hour):

This course is designed to provide students with a forum for the presentation of their special project and to provide an opportunity for faculty and agricultural professionals to present seminars relative to issues in agricultural and environmental regulatory affairs. All non-thesis option graduate students are required to take this course during their final semester of enrollment in the graduate program.

GAGRI 6102 Ethical Concepts (1 credit hour):

This course will provide students with an understanding of best practices for responding to ethical issues that an agricultural professional is likely to encounter in real-world situations, and a forum in which students will identify and develop positions on key ethical agricultural issues. The course will also provide students with a framework for making ethical judgments in difficult situations and determining how to act on those judgments. Finally, the course will analyze how one can influence and lead others to act ethically in challenging situations.

GAGRI 6301 Environmental Soil Chemistry (3 credit hours):

This course will provide a better understanding of reactions and processes controlling the toxicity of contaminants in the soil. There are growing concerns about organic and inorganic contamination of important resources and potential ecological and human health risks. Knowledge of environmental soil chemistry is important in understanding the fate, mobility, and potential toxicity of contaminants in the environment. Upon completion of this course, students will be able to predict the fate and toxicity of contaminants and develop sound and cost-effective remediation strategies.

GAGRI 6313 Principles of Pest Management (3 credit hours):

Students will be exposed to concepts and principles underlying the development of pest management systems. Pest population dynamics, economic and action thresholds, control methods and their environmental impacts, governmental restrictions and their development, and ethical and moral considerations will be discussed. A historical and practical justification of pest management will be developed and related to the presentation of current pest management systems.

GAGRI 6320 Food Safety (3 credit hours):

This course provides a comprehensive application of up-to-date topics in food science technology and safety. This course covers the interdisciplinary nature of food science, including biology, engineering, chemistry, microbiology, nutrition, and physics, in all major food commodities. This course helps students apply their knowledge of contributory sciences to thinking critically about core topics in food science, technology, and safety.

GAGRI 6323 Statistics in Agriculture (3 credit hours):

To introduce a basic and practical overview of descriptive and inferential statistics as applied to the fields of plant and soil sciences, animal science, and regulatory science. To enable graduate students to collect, summarize, and analyze data, state meaningful hypotheses statements, and draw accurate conclusions from research results. Students will gain experience in experimental design, data analysis, computer statistical software, and interpretation of results. The laboratories will include an example of applications from research in agriculture science.

GAGRI 6342 Risk Analysis (3 credit hours):

This is an introductory course in risk analysis, with applications to biosecurity, agricultural, environmental health, and technological problems. Mathematical and statistical topics covered include flow models, lognormal and other distributions, Monte Carlo methods, Bayesian estimates, basic toxicological models, and basic epidemiological models. Applications will apply to carcinogens and other toxic substances. Other topics such as event trees, fault trees, risk perception, and risk communication will be addressed.

GAGRI 6345 Ecological Economics (3 credit hours):

This course focuses on the application of economic analysis to problems of resource depletion and environmental pollution. Fundamental questions that will be addressed include a) Does economic growth imply environmental destruction? b) What are optimal levels of pollution control and energy conservation? c) What policy options exist for achieving these goals? d) Should the government sell permits to pollute, tax polluters, or impose direct legal restrictions on the quantities of pollutants? e) What are the effects of market structure and uncertainty on the rate of resource depletion?

GAGRI 6369 Environmental Policy Analysis (3 credit hours):

This course provides students with economic tools and techniques for use in analyzing natural resources and environmental policy issues. This course involves an intensive exploration of the environmental policy process and its conceptual framework. Recognizing and defining natural resource or environmental problems in issues; aggregating interests; agenda-setting; formulating and selecting alternative solutions; implementation and evaluation stages; and the roles of lobbyists, legislature, an executive branch, and other actors will be explored. Case studies, presentations by, and discussions with local and regional legislators appearing as guest lecturers are primary components of the course.

GAGRI 6350 Agricultural Law and Regulatory Practices (3 credit hours):

This course includes a survey of current and emerging policies and policy issues that regulate agricultural producers, agri-business firms, and other related sectors. The course will address a variety of issues including the history and objectives of agricultural policy, land use planning for agricultural activities, resource use and allocation, industrialization in the agricultural sector, intergenerational transfers of farm businesses, international trade, biosecurity, and ethical issues that confront the agricultural sector.

GAGRI 6398 Animal Health Issues and Epidemiology (3 credit hours):

This course helps students to develop an understanding of general principles of health and the prevention of disease in farm animals. The application of epidemiologic procedures to the understanding of the occurrence and control of infections and chronic diseases, in general, is also covered. Students will become familiar with examples of causative agents of infections and zoonotic diseases, including viruses, bacteria, and parasites; recognize and describe a variety of non-infectious diseases and develop a basic understanding of surveillance for analysis of emerging animal health issues; learn about specific methods and techniques for surveillance and analysis of emerging animal health issues; explore the design and implement a system for identification and assessment of emerging animal health issues; practice interpretation and assessment of emerging animal health issues; foster their ability to recognize and create rational arguments regarding animal health issues through discussion and written assignments; and learn to discuss practical social, economic and legal issues that relate to animal health issues.

GAGRI 6408 Post-Harvest Physiology (4 credit hours):

This course will provide a fundamental understanding of post-harvest physiology, handling, and technology. The course aims to provide a basic understanding of the structure, physiology, and biochemistry of horticultural produce concerning post-harvest handling and storage. The importance of preharvest factors and genetic material, as well as environmental conditions and handling during distribution and storage periods, is considered.

GAGRI 6420 Food Microbiology (4 credit hours):

This course provides an overview of the role of microorganisms in food spoilage, food safety, food processing, food preservation, foodborne illness, and food intoxication. This course is meant as a basic laboratory course in food microbiology and safety.

GAGRI 6280 Scientific Writing and Editing in Agriculture (2 credit hours):

This writing course is designed for graduate students in agricultural regulations, the sciences, and natural resources disciplines who are ready to begin, or who are currently working on a master's thesis. The course

assumes that writing is inseparable from thinking and that writing is a process that benefits from collaboration with peers and mentors. Students will learn to use writing to help develop their thinking as a scientist, understand how to organize and compose the major scientific writing genres, identify the various scientific article genres and their function in the academic community, and identify a well-conceived rationale, purpose, organization, focus, and conclusion, understand what makes an effective oral presentation and be able to present their work accordingly as well as to relate their presentations to specific audience needs.

Degree requirements

The non-thesis M.S. Degree in Agricultural Regulations consists of 36 - 42 credit hours, depending on the track chosen. The core coursework consists of twenty-five (25) credit hours, which include the agricultural and environmental regulatory practices seminar (1 credit hour) and scientific writing (2 credit hours) classes. The above two courses will consist of special topics/projects that must be presented before graduation as outlined in the program requirements. Students must complete a core of regulatory science courses, including the above special project report and presentation, and select, with the approval of their advisor/graduate coordinator and graduate committee, other elective graduate courses that meet the student's career goals. Students are expected to have an average GPA of 3.0 to graduate from the program. All requirements for the degree must be completed within 6 years.

Graduation Requirements

Each student must complete 36 semester hours of the graduate course for graduation, including the agricultural and environmental regulatory practices seminar (1 credit hour) and scientific writing (2 credit hours) classes. The above two courses are linked to the particular topics/projects that need to be presented before graduation as outlined in the program requirements with a cumulative grade-point average of 3.0 or better. Students are required to make a "B" or better in all courses. A maximum of one "C" is allowed.

The minimum requirements for graduation include:

1. A minimum of 36 -42 credit hours, depending on the track chosen. The core coursework consists of twenty-five (25) credit hours, which include the agricultural and environmental regulatory practices seminar (1 credit hour) and scientific writing (2 credit hours) classes. The above two courses will consist of special topics/projects that must be presented before graduation as outlined in the program requirements. Students must complete a core of regulatory science courses including the above project report and presentation.
2. Graduate students must finalize a program of study by the end of the first semester of graduate course work. The program of study includes courses to be taken by semester over the 2 years of enrollment. Coursework must include required core courses and elective courses as listed in this document in Table 1. The student, advisory committee, graduate coordinator, and the Director, Regulatory Science Center of Excellence must sign the student's program of study.
3. **Non-Thesis Option Project:** Students choosing this option will have to complete a final presentation in the project-related area. The agricultural and environmental regulatory practices seminar and scientific writing courses will relate to the project report and presentation. The review committee is to be selected by the student in consultation with the graduate coordinator and instructor(s) based on the project work chosen. Each student must prepare and deliver the project to members of their committee who will attend the presentation and to the project advisor at least two weeks before the presentation is scheduled.
4. Students cannot graduate with an incomplete (I) grade.
5. All requirements for the degree must be completed within 6 years of enrolling in the M.S. Program. Courses older than 6 years will not be counted toward the completion of a degree.
6. Students must be in good academic and financial standing with the University for Graduation.