

# Agricultural and Biological Engineering

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Graduate study is offered in the Department of Agricultural and Biological Engineering leading to the degree of Master of Science in Agriculture with a concentration in Engineering Technology or a Doctor of Philosophy in Agricultural Sciences with a concentration in Engineering Technology. A Precision Agriculture Certificate is also offered.

## Precision Agriculture Certificate

There is a need to train students in the broad array of precision agriculture technologies. This certificate program complements majors taught across College of Agriculture and Life Sciences (CALs) departments. This certificate features emerging technologies in decision-based agricultural planning and implementation. The certificate requires a minimum of 16 hours with at least 10 credit hours specific to Precision Agriculture coursework and 6 additional hours of electives or optional courses. Graduate requirements: PSS/ABE 2543 may be required as a leveling course and graduates may need a combination of Option 1 and Option 3 (below) to meet graduate credit requirements.

To obtain a Precision Agriculture Certificate, students are required to complete the following 16 hours.

PSS 2543	Precision Agriculture I	3
or ABE 2543	Precision Agriculture I	
PSS 4543	Precision Agriculture II (or PSS 6543 or ABE 4543/6543)	3
ECE 4411	Remote Sensing Seminar (or ECE 6411 or FO 4411/6411 or GR 4411/6411 or PSS 4411/6411)	1
ABE 4000	Directed Individual Study in Agricultural and Biological Engineering (or ABE 7000 or PSS 4000/7000)	3
Option 1: Choose from the following.		6-8
ABE 6483/4483	Introduction to Remote Sensing Technologies	
or PSS 6483/4483	Introduction to Remote Sensing Technologies	
or ECE 6423/4423	Introduction to Remote Sensing Technologies	
ABE 3513	The Global Positional System and Geographic Information Systems in Agriculture and Engineering	
FO 4471/6471	(and GIS for Natural Resource Management)	
FO 4472/6472		
PSS 4373/6373	Geospatial Agronomic Management	
GR 4303/6303	Principles of GIS	
GR 3303	Survey of Geospatial Technologies	
Option 2 (Community/Junior College AGT courses) : Any TWO transfer courses from the following in a Precision Agriculture Technology Concentration with the Postsecondary Agriculture Business and Management Technology program		6-8
AGT 1163 Introduction to Spatial Information Systems		
AGT 2154 Geographic Information Systems I		
AGT 1254 GPS Data Collection		
AGT 2164 Variable Rate Technology		
AGT 1354 Remote Sensing		
AGT 2474 Site Specific Pest Management		
OR Completion of the UAV Training Program coursework at Hinds Community College		
Option 3: Discipline Specific Electives		6-8
ABE 3413	Bioinstrumentation I	
ABE 4163	Agricultural and Off-Road Machinery Management	
or ABE 6163	Machinery Management for Agro-Ecosystems	
ABE 4263/6263	Soil and Water Management	
ABE 4844/6844		

ABE 6423	Bioinstrumentation II
AEC 3413	Introduction to Food Marketing
AEC 3513	Economics of Food and Fiber Production
AEC 4113/6113	Agribusiness Firm Management
AEC 4133/6133	Analysis of Food Markets and Prices
AEC 4343/6343	Advanced Farm Management
BIO 4214	General Plant Physiology
EPP 3124	Forest Pest Management
EPP 4163/6163	Plant Disease Management
EPP 4214/6214	Diseases of Crops
EPP 4234/6234	Field Crop Insects
EPP 4263/6263	Principles of Insect Pest Management
FIN 3123	Financial Management
PSS 3301	Soils Laboratory
PSS 3303	Soils
PSS 3133	Introduction to Weed Science
PSS 4113/6113	Agricultural Crop Physiology
PSS 4313/6313	Soil Fertilizers
PSS 4333/6333	Soil Conservation and Land Use
PSS 4343/6343	Controlled Environment Agriculture
PSS 4813/6813	Herbicide Technology
PSS 4823/6823	Turfgrass Weed Management

## Admission Criteria

Prerequisites for admission into the graduate program include all the general requirements of the Graduate School and identification of a departmental professor who is willing to serve as research director for the master's or Ph.D. project. International students must obtain a TOEFL score of 550 PBT (79 iBT) or an IELTS (International English Language Testing Systems) score of 6.5 or higher. Exceptions to these requirements are considered on a case-by-case basis and require approval of the Department Chair.

## Provisional Admission

An applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is eligible for a change to regular status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). The first 9 hours of graduate courses must be within the student's program of study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student **shall** be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. **While in the provisional status, a student is not eligible to hold a graduate assistantship.**

## Academic Performance

Unsatisfactory performance in the graduate program in Agricultural and Biological Engineering is defined as any of the following:

- Failure to maintain a 3.00 average GPA in attempted graduate courses after admission to the program
- A grade of U, D, I, or F in any one course
- More than two courses not exceeding 8 credit hours with a grade of C
- Failure of the research defense
- Unsatisfactory evaluation of a thesis
- Or failure of a required component of the program of study

Any one of these, or a combination of these, will constitute the basis for review for possible dismissal. The graduate coordinator will review the record, along with the student's graduate committee, and take a final course of action which will be immediate dismissal or the establishment of a probationary period in which corrective action must take place. Appeal of dismissal can be made by submitting a written appeal statement to the department head. If the dismissal is upheld by the department upon the student's appeal, the student can then submit a written appeal to the dean of the College of Agriculture and Life Sciences.

The Department of Agricultural and Biological Engineering also offers the Master of Science degree in Biological Engineering and Doctor of Philosophy degree in Engineering; both programs are housed in the College of Engineering. See program information in the James Worth Bagley College of Engineering section of this publication.

## Accelerated Program

The goal of the accelerated B.S./M.S. Program in the Department of Agricultural & Biological Engineering (ABE) is to enable highly qualified students to earn up to 12 hours of graduate course credit during their final year of undergraduate studies. Students will complete graduate level courses (6000-level) and receive dual credit for the equivalent undergraduate course (4000-level). Students must apply and be admitted to an accelerated program prior to enrolling in the graduate level classes. Interested students must consult with the Graduate Coordinator to ensure graduate credit could be applied to a program of study for the graduate degree.

For admission, the student must:

- 1.) Be enrolled at Mississippi State University in Biological or Biomedical Engineering.
- 2.) Have completed a minimum of 90 credit hours of undergraduate coursework
- 3.) Have an overall GPA of 3.5 or higher for all undergraduate work

Students interested in applying to the Accelerated Program should contact their academic advisors or undergraduate coordinator.

## Master of Science in Agriculture with Engineering Technology Concentration - Thesis

ST 8114	Statistical Methods	4
Select one of the following:		1
ABE 8911	Agricultural and Biological Engineering Seminar I	
ABE 8921	Agricultural and Biological Engineering Seminar II	
ABE 8XXX	Minimum of 12 hours in 8000-level or higher courses	12
Graduate-level coursework		7
ABE 8000	Thesis Research/ Thesis in Agricultural and Biological Engineering	6
<b>Total Hours</b>		<b>30</b>

The Master of Science degree in Agriculture with a concentration in Engineering Technology requires a minimum of 24 credit hours of coursework beyond the baccalaureate degree. A thesis and an oral comprehensive examination in defense of the thesis are required. Once the student's research plan has been established, the student is required to present his/her research plan to the faculty in the form of a departmental seminar.

## Master of Science in Agriculture with Engineering Technology Concentration - Non-Thesis

ST 8114	Statistical Methods	4
Select one of the following:		1
ABE 8911	Agricultural and Biological Engineering Seminar I	
ABE 8921	Agricultural and Biological Engineering Seminar II	
Graduate-level coursework		25
<b>Total Hours</b>		<b>30</b>

The non-thesis option for the Master of Science in Agriculture with a concentration in Engineering Technology requires a minimum of 30 credit hours of coursework with at least 15 hours at the 8000-level. The major professor and graduate committee will determine specific course requirements for the student's program. The student must submit a research paper.

## Doctor of Philosophy in Agricultural Sciences with Engineering Technology Concentration

Beyond the Baccalaureate Degree

MA XXXX Graduate Mathematics Course		3
One of the following Seminars taken twice for 2 hours credit:		2
ABE 8911	Agricultural and Biological Engineering Seminar I	
ABE 8921	Agricultural and Biological Engineering Seminar II	
Graduate Level Coursework as approved by committee		33
ABE 9000	Dissertation Research/ Dissertation in Agricultural and Biological Engineering	20
8000 Level Coursework as approved by the committee		10

Minimum Hours	68 Beyond B.S.
Beyond the Master's Degree (any discipline of Engineering)	
MA XXXX Graduate Mathematics Class	3
Select two of the following	
ABE 8911 Agricultural and Biological Engineering I	1
ABE 8921 Agricultural and Biological Engineering Seminar II	1
Graduate Level Coursework as approved by the committee	19
Research/Dissertation	20
Minimum Hours	44 Beyond M.S.

A preliminary examination, a dissertation, and an oral defense of the dissertation are required. Doctoral students are required to take or have credit in a graduate level Math course, complete a minimum of 48 hours credit hours of coursework beyond the baccalaureate degree or a minimum of 24 credit hours of coursework beyond the master's degree, and complete 20-32 hours of dissertation research.