

# Department of Agricultural and Biological Engineering

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## Agricultural Engineering Technology and Business (AETB)

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The Agricultural Engineering Technology and Business (AETB) curriculum is designed to provide students the academic and technical background necessary to understand the operation and management of current and emerging agricultural production systems, technologies, and businesses. Students gain real-world experience by participating in immersive learning projects and field studies. AETB graduates can find rewarding careers in a variety of agricultural, environmental, and industrial businesses. Technologists focus on managing, operating, and troubleshooting technology systems by applying their knowledge of technology and business applications. This hands-on curriculum teaches students to manage equipment and machinery, biological processes, computers, computer simulations, and other technologies to create and maintain current and new production systems. The AETB Bachelor of Science degree is offered by the Department of Agricultural and Biological Engineering, which is housed in the College of Agriculture and Life Sciences.

Students may pursue one of four concentrations within AETB:

1. Precision Agriculture (PRAG)
2. Natural Resources and Environmental Management (NREM)
3. Enterprise Management (EMGT)
4. Surveying and Geomatics (SGEO)

Concentration descriptions and employment opportunities are discussed below. These concentrations are achieved by completing 36 to 38 hours of restricted and free electives relevant to the focus area. The PRAG, NREM, and SGEO concentrations provide students a pathway to complete the requirements of the Geospatial and Remote Sensing Minor.

Students are required to earn a grade of C or better in all AETB major core courses. Students interested in AETB who are attending a community college before transferring to Mississippi State University are strongly encouraged to contact the AETB Undergraduate Coordinator regarding their community college course schedule and transfer requirements. A maximum of 12 transfer hours of technical credit from a community college can be applied toward degree requirements.

Internship and co-op experiences are highly encouraged and help students translate their classroom and laboratory experiences into the reality of the business setting.

The **Precision Agriculture** (PRAG) concentration provides students the background and technical skills in current and emerging technologies necessary for decision-making in agricultural production based on geospatial data. Technologies of interest include the global positioning system (GPS), geographic information systems (GIS), unmanned aircraft systems (UAS), artificial intelligence (AI), broadband wireless communication networks, sensors, robotics, the Internet of Things (IoT), and advanced machinery systems.

The **Natural Resource & Environmental Management** (NREM) concentration provides students the background and technical skills in current and emerging technologies necessary for conserving resources and minimizing the environmental risks associated with agricultural production. Technologies of interest consider the environmental impacts of human activities on rural/agricultural and urban landscapes and include BMPs (best management practices) for water-resource management, remote sensing, alternative energy, geographic information systems (GIS), artificial intelligence (AI), and sensors for environmental monitoring.

The **Enterprise Management** (EMGT) concentration provides students the background and technical/business skills for current and emerging markets that are necessary to apply engineering technology in agricultural enterprises like agricultural supplies, agricultural machinery, and commodity logistics. Technologies and business skills of interest include data science, geographic information systems (GIS), artificial intelligence (AI), the Internet of Things (IoT), life-cycle analysis, and agricultural business management.

The **Surveying & Geomatics** (SGEO) concentration provides students the background and technical skills in current and emerging technologies necessary to conduct property/boundary surveys, topographic and construction surveys, and control surveys. Technologies of interest include various types of surveying equipment, the global positioning system (GPS), and geographic information systems (GIS). This concentration is designed to provide the first stage of the three-step process (academic training, supervised surveying experience, and the Principles and Practice of Surveying Exam) to become a registered land surveyor.

General Education Requirements

**English Composition**

EN 1103 or EN 1104	English Composition I Expanded English Composition I	3
EN 1113 or EN 1173	English Composition II Accelerated Composition II	3

**Creative Discovery**

Select from General Education courses		3
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**Humanities**

Select from General Education courses		6
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**Social/Behavioral Sciences**

AEC 2713	Introduction to Food and Resource Economics	3
Select from General Education courses		3

**Quantitative Reasoning**

MA 1323	Trigonometry	3
MA 1613 or MA 1713	Calculus for Business and Life Sciences I Calculus I	3

**Natural Sciences**

PH 1113 & PH 1123 or PH 2213 & PH 2223	General Physics I and General Physics II Physics I and Physics II	6
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## Degree Requirements

**AETB Major Core**

ABE 1073	Technology Design I. <sup>1</sup>	3
ABE 1863	Engineering Technology in Agriculture	3
ABE 2873	Land Surveying <sup>1</sup>	3
ABE 3513	The Global Positional System and Geographic Information Systems in Agriculture and Engineering <sup>1</sup>	3
ABE 4263	Soil and Water Management	3
ABE 4383	Building Construction	3
ABE 4473	Electrical Applications for Agriculture	3
ABE 4961	Seminar	1

**AETB Science Courses**

CH 1043 & CH 1053 & CH 1051 or CH 1213 & CH 1211 & CH 1223 & CH 1221	Survey of Chemistry I and Survey of Chemistry II and Experimental Chemistry Chemistry I and Investigations in Chemistry I and Chemistry II and Investigations in Chemistry II	7-8
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**AETB Statistics Requirement <sup>2</sup>**

BQA 2113 or MA 2113 or ST 2113	Business Statistical Methods I Introduction to Statistics Introduction to Statistics	3
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**AETB Business Courses**

ACC 2013	Principles of Financial Accounting <sup>1</sup>	3
ACC 2023	Principles of Managerial Accounting <sup>1</sup>	3
AEC 3133	Introductory Agribusiness Management	3
BL 2413	The Legal Environment of Business <sup>1</sup>	3
MGT 3513	Introduction to Human Resource Management	3

**AETB Oral Communication Requirement**

CO 1003	Fundamentals of Public Speaking	3
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or CO 1013	Introduction to Communication	
<b>AETB Writing Requirement</b>		
AELC 3203	Professional Writing in Agriculture, Natural Resources, and Human Sciences	3
Concentration Courses -- see specific lists for courses		30-32
<b>Total hours</b>		<b>122-124</b>

## Natural Resource & Environmental Management (NREM) Concentration

### Required Concentration Courses

ADS 1113 & ADS 1121 or BIO 1134	Animal Science and Animal Science Laboratory Biology I	4
PSS 1313 or BIO 1023	Plant Science Plants and Humans	3
GR 4303	Principles of GIS	3
PSS 3303	Soils	3
PSS 3301	Soils Laboratory	1

### NREM Restricted Electives - choose 9 hours from the following:

<b>ABE 1083</b>	<b>Technology Design II (NREM Restricted Electives - choose 9 hours from the following:)</b>	<b>3</b>
ABE 4313	Biological Treatment of Nonpoint Source Pollutants	3
ABE 4803	Simulation in Biological Systems	3
GG 3613	Water Resources	3
GR 3113	Conservation of Natural Resources	3
PSS 4333	Soil Conservation and Land Use	3
PSS 4373	Geospatial Agronomic Management	3

### NREM Electives - choose 15 hours from the following:

ABE 4483	Introduction to Remote Sensing Technologies	3
ABE 4800	Undergraduate Research in Ag & Bio Engineering	13
AEC 3233	Introduction to Environmental Economics and Policy	3
AEC 4223	Applied Quantitative Analysis in Agricultural Economics	3
AEC 4233	Environmental Economics	3
AEC 4243	Natural Resource Economics	3
BIO 2503	Environmental Quality	3
BL 4263	Environmental Law	3
FO 4483	Forest Soils	3
GG 3133	Introduction to Environmental Geology	3
GG 4613	Physical Hydrogeology	3
GR 2313	Maps and Remote Sensing	3
GR 4313	Advanced GIS	3
GR 4333	Remote Sensing of the Physical Environment	3
NREC 3213	Environmental Measurements	3
NREC 4313	Spatial Technologies in Natural Resources Management	3
NREC 4353	Natural Resource Law	3
NREC 4463	Forest Hydrology and Watershed Management	3
PSS 4383	Agriculture Remote Sensing I	3
PSS 4393	Agriculture Remote Sensing II	3
PSS 4483	Introduction to Remote Sensing Technologies	3
PSS 4733	Ag. Flight Technologies I	3
PSS 4743	Ag. Flight Technologies II	3

## Precision Agriculture (PRAG) Concentration

### Required Concentration Courses

ADS 1113 & ADS 1121 or BIO 1134	Animal Science and Animal Science Laboratory Biology I	4
PSS 1313 or BIO 1023	Plant Science Plants and Humans	3
GR 4303	Principles of GIS	3
PSS 3303	Soils	3
PSS 3301	Soils Laboratory	1

### PRAG Restricted Electives - choose 9 hours from the following:

<b>ABE 1083</b>	<b>Technology Design II (PRAG Restricted Electives - choose 9 hours from the following:)</b>	<b>3</b>
ABE 2173	Principles of Agricultural and Off-Road Machines	3
ABE 2543 or PSS 2543	Precision Agriculture I Precision Agriculture I	3
ABE 4163 or PSS 4373	Agricultural and Off-Road Machinery Management Geospatial Agronomic Management	3

### PRAG Electives - choose 15 hours from the following:

ABE 4483	Introduction to Remote Sensing Technologies	3
ABE 4543 or PSS 4543	Precision Agriculture II Precision Agriculture II	3
ABE 4800	Undergraduate Research in Ag & Bio Engineering	13
AEC 4413	Public Problems of Agriculture	3
FO 4453	Remote Sensing Applications	3
GR 2313	Maps and Remote Sensing	3
GR 3303	Survey of Geospatial Technologies	3
GR 4313	Advanced GIS	3
GR 4323	Cartographic Sciences	3
GR 4333	Remote Sensing of the Physical Environment	3
GR 4343	Advanced Remote Sensing in Geosciences	3
NREC 4313	Spatial Technologies in Natural Resources Management	3
PSS 3133	Introduction to Weed Science	3
PSS 4103	Forage and Pasture Crops	3
PSS 4123	Grain Crops	3
PSS 4133	Fiber and Oilseed Crops	3
PSS 4383	Agriculture Remote Sensing I	3
PSS 4393	Agriculture Remote Sensing II	3
PSS 4483	Introduction to Remote Sensing Technologies	3
PSS 4733	Ag. Flight Technologies I	3
PSS 4743	Ag. Flight Technologies II	3
PSS 4813	Herbicide Technology	3

## Enterprise Management (EMGT) Concentration

### Required Concentration Courses

ADS 1113 & ADS 1121 or BIO 1134	Animal Science and Animal Science Laboratory Biology I	4
PSS 1313 or BIO 1023	Plant Science Plants and Humans	3
GR 4303	Principles of GIS	3
PSS 3303	Soils	3

PSS 3301	Soils Laboratory	1
<b>EMGT Restricted Courses - choose 9 hours from the following: <sup>2</sup></b>		
<b>ABE 1083</b>	<b>Technology Design II (EMGT Restricted Courses - choose 9 hours from the following:)</b>	<b>3</b>
ABE 2173	Principles of Agricultural and Off-Road Machines	3
ABE 4163	Agricultural and Off-Road Machinery Management	3
AEC 3113	Introduction to Quantitative Economics	3
EC 2113	Principles of Macroeconomics	3
MGT 3323	Entrepreneurship	3
<b>EMGT Electives - Choose 15 hours from the following;</b>		
ABE 4483	Introduction to Remote Sensing Technologies	3
ABE 4800	Undergraduate Research in Ag & Bio Engineering	13
ADS 4323	Beef Cattle Science	3
AEC 2223	Introduction to Sustainability Economics	3
AEC 3233	Introduction to Environmental Economics and Policy	3
AEC 4113	Agribusiness Firm Management	3
AEC 4213	Ag Finance I	3
AEC 4343	Advanced Farm Management	3
AEC 4413	Public Problems of Agriculture	3
AEC 4623	Global Marketing of Agricultural Product	3
BL 4243	Legal Aspects of Entrepreneurship	3
MGT 3113	Principles of Management	3
MGT 3823	Socially Responsible Leadership	3
PO 4334	Broiler Production	4
PSS 4103	Forage and Pasture Crops	3
PSS 4123	Grain Crops	3
PSS 4133	Fiber and Oilseed Crops	3

## Surveying & Geomatics (SGEO) Concentration

### Required Concentration Courses

MA 1313	College Algebra	3
CE 2213	Surveying <sup>1</sup>	3
CE 4233	Control Surveys	3
CE 4243	Land Surveys <sup>1</sup>	3
GR 4303	Principles of GIS	3

### SGEO Restricted Elective

ABE 1083	Technology Design II	3
or EG 1143	Graphic Communication	

### SGEO Electives - choose 18 hours from the following: <sup>2</sup>

<b>ABE 4483</b>	<b>Introduction to Remote Sensing Technologies (SGEO Electives - choose 18 hours from the following:)</b>	<b>3</b>
ABE 4800	Undergraduate Research in Ag & Bio Engineering	13
BL 4243	Legal Aspects of Entrepreneurship	3
BL 4333	Real Estate Law <sup>1</sup>	3
FO 4453	Remote Sensing Applications	3
GR 2313	Maps and Remote Sensing	3
GR 3303	Survey of Geospatial Technologies	3
GR 4313	Advanced GIS	3
GR 4323	Cartographic Sciences	3
GR 4333	Remote Sensing of the Physical Environment	3
GR 4363	Geographic Information Systems Programming	3
MGT 3323	Entrepreneurship	3

NREC 4463	Forest Hydrology and Watershed Management	3
PSS 4383	Agriculture Remote Sensing I	3
PSS 4393	Agriculture Remote Sensing II	3
PSS 4483	Introduction to Remote Sensing Technologies	3
PSS 4733	Ag. Flight Technologies I	3
PSS 4743	Ag. Flight Technologies II	3
REF 3333	Principles of Real Estate	3