

AGRICULTURAL SCIENCES

(PLANT AND SOIL SCIENCES)

Overview

The Department of Agriculture is offering a minor in Plant, Soil, and Horticultural Sciences. This minor will acquaint undergraduate agriculture and non-agriculture majors with the necessary knowledge, skills, and experience to pursue prospective careers in agriculture within industries, universities, and governmental agencies.

Program Learning Outcomes for BS in Agricultural Sciences (Plant, Soil, and Horticultural Sciences Emphasis):

At the end of the program, students should be able to:

1. Apply relevant statistical concepts for on- and off-field agriculture experiments
2. Demonstrate an understanding of crop production, breeding principles, and scientific writing
3. Integrate environmentally friendly, human, and soil health strategies for sustainable crop production

Admission Requirements:

Academic Standing: Students must have completed a minimum of 24 hours in their major with a minimum GPA of 2.5 prior to starting the animal science minor

Statement of Purpose: Include a statement of purpose outlining the reasons for choosing this minor and how it fits into the student's academic and career goals.

Transcripts: Official transcripts from previous or current institutions attended must be submitted. These transcripts should reflect all coursework completed and demonstrate fulfillment of the prerequisites.

Graduation requirements:

- A grade of 'C' or higher will be required to fulfill the requirements of the minor in Plant, Soil, and Horticultural Sciences.
- Students will take a total of 15 credit hours of coursework (three required courses + three elective courses) to obtain a minor in plant, soil, and horticultural sciences. The list of courses is provided below.
- Equivalent transfer courses with a grade of 'C' or above can be substituted.

List of Courses (Minor in Plant, Soil, and Horticultural Sciences)

| Courses | Credit Hours |
|---|-----------------|
| Required Courses | |
| PS 122: Crop Production | 3 |
| PS 315: Soils | 3 |
| PS 316: General Horticulture | 3 |
| Total | 9 hours |
| Select two courses from the following: | |
| PS 305: Plant Development and Physiology | 3 |
| PS 346: General Entomology | 3 |
| PS 437: Soil Conservation and Land Use | 3 |
| PS 448: Soil Management | 3 |
| PS 449: Vegetable Production | 3 |
| PS 459: Soil Fertility | 3 |
| PS 441: General Plant Pathology | 3 |
| Total | 6 hours |
| Grand Total | 15 hours |

Note: Students admitted into the minor in Animal Science will be able to receive instruction online.

Career Opportunities for Plant, Soil, and Horticultural Sciences:

Our students have internship opportunities with several private and government agencies, including the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS).

There are diverse career options upon completing the BS in Agricultural Sciences (plant, soil, and horticultural sciences major):

- Agronomist
- Plant breeder
- Plant geneticist
- Plant pathologist
- Plant physiologist
- Horticulturist
- Entomologist
- Soil scientist
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- Soil conservationist
- Farmer/Grower
- Crop consultant/advisor
- Extension specialist
- Agripreneur
- Research Scientist
- Academia

Agriculture Job Outlook

The Bureau of Labor Statistics (May 2023) estimates that there are 15,800 plant and soil scientists in the U.S. There has been continuous high demand for plant and soil scientists, and recruiting websites project an annual increase of about 4-8% in the plant and soil job market over the next few years.

Annual Salary Range for Plant & Soil Science Jobs

The Bureau of Labor Statistics (May 2023) estimates that the mean annual wage of plant and soil scientists is \$77,080. The estimated median annual wage at the 50th percentile is \$68,240. The estimated range of annual salary earned by plant and soil scientists is between \$43,790 and \$119,410.

Course Description

PS 122 3-0-3 Crop Production: This course deals with the study of agronomic and horticultural crop production. This course provides students with an understanding of the basic principles of field crop production – tillage, soil testing, fertilization, variety selection, planting, and in-season crop management. The lecture classes cover studies on soil management, fertilizer application, cultivation, agronomic practices, and harvesting. Additionally, “model” crops will be discussed to assist students in preparing for a career in agriculture or the agricultural sciences.

PS 122L 1-0-3 Crop Production Lab: This laboratory covers practical training in the lab, greenhouse, and field. The crop fields include vegetable plots, vineyards, orchards, and nut plantations. Lab activities include organic and non-organic production of major vegetable crops. Students will learn basic production techniques and cultural practices for horticultural crop production, including principles for propagating horticultural plants, establishing and managing fruit crops, and meeting cultural requirements for successful vegetable cropping.

PS 305 3-0-3 Plant Development and Physiology: With the growing human population, it is a huge challenge to meet the food requirements of future generations. Achieving food security depends on the successful cultivation and the achievement of the best crop yields. To achieve greater yields, an in-depth understanding of crop physiology and growth regulation is vital. This course will introduce the fundamentals of crop physiology and plant growth regulation. Specifically, the course deals with the architecture of the plant cell, photosynthesis, metabolism of macromolecules, secondary metabolites, and plant hormones.

PS 315 2-2-3 Soils: This foundational course introduces students to a broad range of disciplines in soil science. Study soil formation, composition, and a range of soil characteristics that seek to understand their relationship to soil function, land use, plant growth, and environmental quality. Identify the physical, chemical, and biological properties and processes of soils and relate these to soil function. Students acquire a working knowledge of the technical terminology of soil science and begin developing skills applicable in environmental and natural resource management careers. Students also evaluate the impact of land use and management decisions on agricultural productivity, sustainability, and environmental health.

PS 315L 2-2-3 Soils Lab: This laboratory course is designed for students who plan to

work directly with soils, make land use and management decisions, or be involved in projects requiring practical application of soil science. By conducting weekly laboratory and field exercises and writing reports on their work, students will deepen their understanding and learn to apply the fundamental soil properties and processes. This laboratory course, in conjunction with the SOILS 315 lecture course, will provide foundational learning in soil science and prepare students for upper-level soil science courses. This laboratory course is also designed to provide students with hands-on experience in analytical procedures for soil assessment, testing, and interpretation.

PS 316 3-2-4 General Horticulture: An introduction to the principles and practices in the development, principles and practices applied to production and preservation of fruits and vegetables. Includes the classification, structure, growth, and development, and environmental influences on horticultural plants. Additionally, we will identify emerging issues in horticulture and encourage robust discussion.

PS 316L 1-0-1 General Horticulture Lab: This is the lab course that will study the concepts outlined in the PS316 General Horticulture course.

PS 346 3-0-3 General Entomology: Fundamentals of structure, function, biology, and identification of different insect groups. Study of principles, concepts, and components of insect pest management. Pest management program in specific crops. Develop an extension pest fact sheet that includes information on pests, types of damage incurred, and their biology and behavior.

PS 346L 1-0-1 General Entomology Lab: Laboratory exercises parallel topics presented in PS 346. The lab focuses on identifying common insects across all orders and developing skills in insect collecting, preservation, curation, and imaging.

PS 441 3-0-3 Introduction to Plant Pathology: This course will cover the basic concepts and principles of Plant Pathology. Students will study microorganisms that induce plant diseases, the mechanisms and environmental conditions that stimulate these diseases, the interactions between disease-causing agents, and methods for preventing, managing, or alleviating the damage caused by plant diseases. Students will acquire an understanding of the perspectives and problem-solving processes used by Plant Pathologists.

PS 437 3-0-3 Soil Conservation and Land Use: Study the principles of soil conservation and land use with best management practices to improve soil functioning and protect the environment. The course will assess the importance of soil and water as natural resources for ecosystems and focus on developing methods for conservation and sustainable use of resources. Know the principles of soil erosion processes and management practices to decrease erosion in cropland, rangeland, and urban systems. Understand the principles of the soil water cycle to improve water use efficiency in agricultural systems. Understand how to utilize soil resource assessment tools to make land management decisions. Examine the role of soil management in mitigation and adaptation to climate change. Emphasis will also be given to proper land use based on land capability classes with reference to the State of Mississippi. Students will be required to develop a detailed soil conservation plan for the class, which will contribute to their grade.

PS 448 3-0-3 Soil Management: Study principles of soil management under managed agricultural systems. Relationships between soil and climate resources and the processes of soil erosion, movement, and storage of soil water, soil organic matter, and irrigation practice. Special problem topics such as acidity, alkali, drainage, and soil testing. The course is designed to acquaint the student with good soil management practices and soil analysis. The application of fundamental soil science principles is crucial in the sustainable management of agricultural, forested, and urban ecosystems.

PS 449 2-2-3 Vegetable Production: This course is an introduction to vegetable crops and the theoretical knowledge and hands-on experience required for successfully producing them. This course is designed to demonstrate the practices and problems involved in producing important fresh, marketed, and processed vegetable crops. It provides students with applicable knowledge of successful vegetable production, including the what, where, when, and how of growing specific crops. Topics will include crop classification; planting methods; crop climatic conditions; physiological growth and development; pest management; organic production; cover cropping; crop rotation; postharvest handling/management and marketing. Field trips to areas devoted to commercial production constitute a part of the course.

PS 459 2-2-3 Soil Fertility: This course provides a comprehensive overview of the principles of soil fertility, plant nutrition, and nutrient management. Study soil conditions affecting the availability of plant nutrients; function and movement of nutrients in plants, methods of determining nutrient levels in plants, soils, and other growing media. The course focuses on understanding nutrient cycling and behavior in soils, essential plant nutrients, and the role and function of nutrients in plants. Also, understand relationships between fertilizers, soils, and plant productivity and how these components dynamically interact to influence environmental quality.