

University of Arkansas – Fort Smith
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General Syllabus

BIOL 3824 Plant Physiology

Credit Hours: 4

Lecture Hours: 3

Laboratory Hours: 3

Prerequisite: BIOL 2303/2301 General Botany/Laboratory, BIOL 3803/3801 Genetics/Lab, CHEM 2703/2701 Organic Chemistry I/Lab.

Effective Catalog: 2018- 2019

I. Course Information

A. Catalog Description

Physical and biochemical processes of plant functions, including water relations, photosynthesis, and growth and development.

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Describe how plants manufacture biological molecules (metabolism).
2. Explain how plants acquire and transport raw materials for growth.
3. Predict how plants grow and develop throughout their lives in various environmental conditions.
4. Discuss “cutting edge” discoveries and ideas in plant physiology.
5. Explain how plant physiology relates and is connected to other fields of biology.
6. Predict how advances in plant physiology and plant biotechnology will be used to shape the future of society.

B. University Learning Outcomes

This course enhances student abilities in the following areas:

Analytical Skills

Quantitative Reasoning: Students collect and analyze data on various aspects of plant physiology and the effects of environmental stimuli on plants. Students will apply mathematical and statistical models to the study of plant physiology and demonstrate how quantitative reasoning may be used to test hypotheses in the application of scientific method.

Ethical Decision Making

The students will conduct themselves in an ethical manner and evaluate ethical considerations during discussions of ecosystem modifications induced by human activities.

III. Major Course Topics

- A. Plant and cell architecture
- B. Genome structure and gene expression
- C. Transport and translocation of water and solutes
 - 1. Water and plant cells
 - 2. Water balance of plants
 - 3. Photosynthesis: The light reactions
- D. Biochemistry and metabolism
 - 1. Photosynthesis: The carbon reactions
 - 2. Translocation in the phloem
- E. Growth and development
 - 1. Signals and signal transduction
 - 2. Embryogenesis
 - 3. Seed dormancy, germination and seedling establishment
 - 4. Biotic interactions
 - 5. Abiotic stress