

**University of Arkansas - Fort Smith 5210
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General Syllabus

BIOL 20181 General Biology Laboratory

Credit Hours: 1

Lecture Hours: 0

Laboratory Hours: 3

Prerequisite or corequisite: BIOL 20083 Introduction to Cell Biology and BIOL 20283 Introduction to Organismal Biology

Effective Catalog: 2018- 2019

I. Course Information

A. Catalog Description

Introduction to basic biological laboratory techniques, scientific method, and experimentation. Course designed to complement concepts presented in BIOL 20083 Introduction to Cell Biology and BIOL 20283 Introduction to Organismal Biology.

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

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

1. Use scientific method to answer biological questions.
2. Demonstrate how to use a light microscope.
3. Demonstrate basic laboratory techniques used in cell biology, genetics, and physiology.
4. Demonstrate an understanding of how allele frequencies may change over time.
5. Collect biological specimens, keep a field notebook, and use dichotomous keys and field guides to identify species.
6. Perform basic analysis of ecology data and draw biologically significant conclusions.

B. University Learning Outcomes

This course enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills: Students will identify a problem, break it down into its component parts and use scientific method to answer biological questions.

Quantitative Reasoning: Students will collect data which will be analyzed quantitatively. Students will apply mathematical and statistical models to the study of biology (e.g., molecular biology, genetics, ecology and evolution, biodiversity) and demonstrate how quantitative reasoning may be used to test hypotheses in the application of scientific method.

Communication Skills (written and oral)

Students will demonstrate proficiency in communication by composing coherent arguments presented both orally and in writing. Students will use responses using proper English grammar and usage in answering questions both orally and in writing.

Ethical Decision Making

Students will identify ethical dilemmas (e.g., stem-cell research, genetic engineering, preservation of environmental quality and biodiversity, current global health concerns) and apply ethical frameworks in discussions about these issues.

Global and Cultural Perspectives

Students will demonstrate (1) the application of the science of biology in a global environment, and (2) how interacting with nature may impact societies and cultures, biological communities, and ecosystems around the world.

III. Major Course Topics

- A. Scientific method
 - 1. Hypothesis testing
 - 2. Structure of experiments
- B. Microscopy
 - 1. Types of microscopes and their parts
 - 2. Use of microscopes
- C. Cell structure and function
 - 1. Prokaryotic cells
 - 2. Eukaryotic cells
- D. Cell division
 - 1. Mitosis
 - 2. Meiosis
- E. Genetics
 - 1. Gene replication
 - 2. Principles of heredity
- F. Developmental biology
 - 1. Principles of development
- G. Evolutionary processes
 - 1. Natural selection
 - 2. Population genetics
- H. Biodiversity

1. Classification
2. Overview of diversity
- I. Plant physiology
 1. Photosynthesis
- J. Animal physiology/behavior
 1. Cellular respiration
 2. Behavioral principles
- K. Ecology
 1. Population interactions
 2. Community interactions