

University of Arkansas – Fort Smith
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General Syllabus

BIOL 2501 General Microbiology Laboratory

Credit Hours: 1

Lecture Hours: 0

Laboratory Hours: 2

Prerequisite or corequisite: BIOL 2503 General Microbiology

Effective Catalog: 2019-2020

I. Course Information

A. Catalog Description

A study of the basic techniques used in microbiology including culturing and isolation strategies along with aseptic technique. Biochemical tests using differential media will be used to identify bacteria and enumeration techniques such as serial dilutions. Immunological testing using agglutination for blood typing and ELISA for identification and diagnosis will be employed.

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

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

1. Prepare culture media, isolate and culture bacteria, describe the colonial morphology, prepare them for microscopic observation, describe the microscopic appearance and staining reactions, and interpret tests of biochemical activity.
2. Handle cultures and media with proper aseptic technique and isolate bacteria into pure cultures.
3. Identify an unknown bacterial specimen.
4. Perform enumeration techniques such as serial dilutions and the most probable number (MPN) method.
5. Test antibiotics and disinfectants for their efficacy.
6. Determine blood types with agglutination reactions and diagnose disease with an ELISA kit.

B. University Learning Outcomes

This course enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills. Students will apply factual knowledge of microorganisms to identify unknown bacterial cultures.

Quantitative Reasoning. Students will use mathematical skills to perform serial dilutions and learn how statistical methods are used in a most probable number (MPN) determination. Skills such as working with fractions, exponents and scientific notation will be employed.

Communication Skills (written and oral)

Students will communicate orally with their lab partners as they work together to identify and unknown bacterial culture. They then will communicate in a written identification form submitted to the instructor.

Global and Cultural Perspectives

Students will explore the global distribution of microorganisms and examine scientists from different cultures that have contributed to the science of microbiology.

III. Major Course Topics

- A. Culturing of microorganisms
- B. Preparation of smears and simple staining
- C. Gram staining and differential stains
- D. Transfer of bacteria: Aseptic technique
- E. Selective and differential media and biochemical fingerprints
- F. Enumeration: serial dilutions and most probable numbers (MPN)
- G. Pipetting
- H. Antibiotic and disinfectant testing
- I. Taxonomy
- J. Agglutination: Blood typing
- K. Immunological tests: ELISA