University of Arkansas – Fort Smith
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General Syllabus

BIOL 2503 General Microbiology

Credit Hours: 3 Lecture Hours: 3 Laboratory Hours: 0

Prerequisite: BIOL 1153/1151 Biological Science/Lab, BIOL 2003 Introduction to Cell Biology, CHEM 1303/1301 Chemistry Principles/Lab, or CHEM 1403/1401 College Chemistry I/Lab

Effective Catalog: 2019-2020

I. Course Information

A. Catalog Description

A general overview of the topic of microbiology including culturing and enumeration techniques, metabolism, microbial genetics, taxonomy, sterilization and disinfection, disease processes and immunology. The course will conclude with a survey of infectious diseases, immunological disorders, immunizations, and chemotherapy.

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

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

1. Describe, in general terms, the scope of the science of microbiology, and explain how microorganisms fit the overall scheme for classifying living organisms.
2. Discuss the major developments in the history of microbiology, name the scientists responsible for them, and discuss their impact on the science and upon society in general.
3. Describe the distinguishing characteristics of viruses, bacteria, fungi, algae, and parasitic animals.
4. Discuss principles of microbial growth, including physical and chemical factors that affect growth.
5. Discuss the host-microbe interactions that result in microbial infection.
6. Utilize principles of epidemiology as they apply to microbial interactions with plants and animals, including humans.
7. Discuss disease processes and describe examples of microbial infections.

8. Describe the metabolic processes and products of bacteria, and discuss their importance to humans.
9. Discuss the fundamental principles of immunology as they relate to microbial infections.
10. Describe the different types of immunizations and how immunological testing has improved medical technology.
11. Apply the principles of sterilization, disinfection, and sanitation as they relate to medicine, pharmaceuticals, the food industry, and the environment.
12. Discuss the methods of controlling microorganisms for the purpose of preventing or reducing human disease transmission.

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 case studies of infectious diseases. They will identify problems such as antibiotic resistance or vaccine preparation and analyze why certain chemotherapies or vaccines are chosen over other options.

Quantitative Reasoning. Students will interpret diagrams, charts and graphs from the textbook. They will also employ mathematical skills when learning enumeration techniques such as serial dilutions.

Communication Skills

Students will create a coherent disease paper that summarizes characteristics of a particular disease or disorder similar to how the Center for Disease Control (CDC) would present the information.

Ethical Decision Making

Students will discuss ethical issues often seen in current events such as stem cell research, vaccine preparation and possible links with autism.

Global and Cultural Perspectives

Students will evaluate how infectious diseases affect global geographical areas and see how various cultural groups deal with disease and health issues.

III. Major Course Topics

A. Scope of microbiology
B. History of microbiology
C. Review of chemistry
D. Prokaryotic and eukaryotic cell structure
E. Microscopy
F. Cellular respiration and fermentation
G. Microbial genetics
H. Taxonomy of microorganisms

I. Viruses and viral infections
J. Parasitology
K. Culturing bacteria
L. Sterilization and disinfection
M. Disease processes and epidemiology
N. Chemotherapy
O. Immunology and Immune system disorders
P. Systematic approach to infectious diseases