Northwest Arkansas Community College
Division of Science & Mathematics

MBIO 2014 General Microbiology

Catalog Description: Survey of microorganisms, their role in the ecosystem, their impact on and use by man. The basic structure, growth and metabolism of bacteria and viruses will be examined. Immunological principles and their application to microbiology will also be presented. Emphasis in laboratory on sterile technique and culturing microorganisms on various diagnostic media. Three hours lecture and three hours lab weekly.

Prerequisite: Anatomy & Physiology I (BIOL 2214) with a grade of "C" or better or both Principles of Biology I (BIOL 1544) and Fundamentals of Chemistry (CHEM 1075) with grade(s) of C or better. (Other chemistry or biology courses may also meet prerequisite requirements, for further information please contact the Science Department.)

Credit hours/ Contact hours/ Load hours: 4/6/5

Target Audience/ Transferability: MBIO 2014 is an introductory microbiology laboratory science course appropriate for science majors and nonmajors alike. . The course applies toward the general education requirements for baccalaureate degrees granted by state-funded colleges and universities. This course transfers to the University of Arkansas as 2013 and 2011L. Students should consult the degree plans of transfer institutions to determine how the course transfers in a particular program. This course is also required for students in respiratory therapy and nursing AAS degrees.

Student Learning Outcomes: Students completing this course will:

- Provide examples of how scientific processes have been used to increase understanding of microorganisms.
- Identify the impact of microbes on life at the individual, societal, and ecological levels.
- Define terms and explain microbiological principles sufficient for professional application and further study.
- Demonstrate basic microbial lab techniques.
- Develop writing and research skills.

Required Text(s):

- Tortora, Microbiology An Introduction, 10th ed. Benjamin Cummings, 2010
- Lammert, Techniques in Microbiology A Student Handbook, Pearson, 2007

Topics: MBIO 2014 is conducted in accordance with the Undergraduate Microbiology Curriculum Guidelines recommended by the American Society for Microbiology Core Themes and Concepts:

- Microbial Cell Biology
- Microbial Genetics
- Microbial Interactions and Impact of Microbes on Humans
- Microbial Interactions and Impact of Microorganisms in the Environment
- Integrating Themes of Microbiology

Historical events key in the development of microbiology included as appropriate to each topic

Required Methods of Instruction: Participation in interactive discussions of pertinent topics and working with others in groups is strongly encouraged. Laboratory activities (between 2 and 3 hours per week) emphasize a hands-on approach to learning of the tools and basic skills used in the microbiology laboratory. Lab activities will include at a minimum:

- Lab safety and sterile transfer techniques
- Sampling bacteria out of the environment, growth on plated and liquid media, isolation from mixed cultures
- Use of the microscope, including cleaning and microscopic measurements
- Preparation of smears and staining, including simple (positive and negative), Gram, spore, and capsule
- Observation and identification of microscopic eukaryotes including representative fungi, protozoa, algae, oomycetes and helminthes
- Measuring growth of bacterial cultures and preparation of grow curves
- Measuring effectiveness of antimicrobial agents
- Metabolic tests
- Identification of unknown bacteria

Students should prepare laboratory notebook/ portfolio as part of the lab experience.

Forms of Assessment: Overall assessment methods will emphasize higher-order thinking skills. Assessment of the student's mastery of the course content and its application to everyday life situations and/or career activities will include required written exams, required laboratory reports, and abstracts of at least five pertinent scientific or career journal articles. A set of common final exam questions will be included in the final exam. Faculty will report student performance on the exam questions at the end of the semester.