

Anoka-Ramsey Community College

BIOL 2201: Microbiology

A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 3

Lab Hours/Week: 3

OJT Hours/Week: *.*

Prerequisites:

This course requires both of these prerequisite categories

1. One of these two

BIOL 1106 - Principles of Biology I (Minimum grade: 2.0 GPA Equivalent)

A score of 3 on test Advanced Placement Biology

And

2. Any one of these three

CHEM 1020 - Interpretive Chemistry (Minimum grade: 2.0 GPA Equivalent)

CHEM 1050 - Fundamentals of General, Organic, and Biological Chemistry (Minimum grade: 2.0 GPA Equivalent)

CHEM 1061 - Principles of Chemistry I (Minimum grade: 2.0 GPA Equivalent)

Corequisites: None

MnTC Goals: Goal 03 - Natural Science

(MnTC Goal 3)

Prerequisites: BIOL 1106 plus CHEM 1020 OR 1050 OR 1061 with a grade of C or better

Study of general microbiology including bacteriology, virology, parasitology, and mycology. The course covers aspects of microbial ecology and epidemiology, including host-pathogen interactions and environmental influences on growth and reproduction. The course emphasis is on bacteria: principles of control and culture, genetics and metabolic processes, and microbiological techniques. Three lecture hours and two 90-minute laboratories per week.

B. COURSE EFFECTIVE DATES: 06/01/1998 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Use an application of light and electron microscopy as applied to microbiology
2. Prokaryotic and eukaryotic cell structure
3. Cell walls of gram-positive and gram-negative bacteria
4. Bacterial growth curves
5. Classification and application of bacterial growth mediums
6. Bacterial response to environmental variables such as temperature, pH, salinity, osmolarity, and nutrient deprivation
7. Life cycle of significant viruses in molecular detail
8. Organization of bacterial operons and genomes
9. Application of bioinformatics databases and methods to bacterial DNA analysis
10. Regulation of gene expression in the lac and trp operons of E. Coli
11. Bacterial metabolism including aerobic and anaerobic respiration, fermentation, and phototrophy
12. Mechanisms of pathogenicity in bacteria and viruses
13. Mechanisms of immunity
14. Vaccination
15. Utilize the American Society for Microbiology Curricular Guidelines found at www.asm.org/index.php/guidelines/curriculum-guidelines

D. LEARNING OUTCOMES (General)

1. Explain and apply fundamental concepts related to the taxonomy, structure, function and ecology of microbes including bacteria, viruses, fungi and Protista
2. Use critical thinking skills to understand, evaluate, and analyze processes related to microbes:
 - a. Microbial pathogenesis
 - b. The response of the mammalian immune system to microbial infection
 - c. Microbial metabolic diversity
 - d. Microbial biotechnology
3. Demonstrate ability to use the microscope, identify microbes, and perform several staining techniques
4. Utilize and understand the application of the isolation of microbes from the environment, food and water
5. Understand the action of antibiotics and disinfectants
6. Formulate a hypothesis and conduct and analyze an experiment with a model organism
7. Organize, draft, edit, and revise formal scientific writing
8. Read, interpret, incorporate, and cite information and ideas from primary literature into writing

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted