

# Minnesota State University Moorhead

## BIOL 350: Microbiology

### A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 3

Lab Hours/Week: 3

OJT Hours/Week: \*.\*

Prerequisites:

This course requires all four of these prerequisites

BIOL 111 - Cell Biology

BIOL 115 - Organismal Biology

CHEM 150 - General Chemistry I

CHEM 210 - General Chemistry II

Corequisites: BIOL 350L

MnTC Goals: None

Covers concepts of basic and applied microbiology, emphasizing bacteriology and introducing virology and immunology. Laboratory covers basic microbiological techniques, identification of unknowns as well as a group research project. With lab.

**B. COURSE EFFECTIVE DATES:** 06/01/1995 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. This course is designed for science majors and builds on the students understanding of the key concepts of biology and chemistry addressed in the prerequisite courses.
2. This course provides coverage of the basic principles of microbiology, molecular biology and genetics that support microbiology today.
3. Emphasis is placed on the diversity of metabolisms and organisms and the medical and immunological facets of microbiology with the themes of ecology and evolution permeating the delivery.
4. Focus is placed on studying the biology of the prokaryotic microorganisms and bacteriophages and representative animal and plant viruses.
5. Key concepts addressed in the course include those recommended by the American Society for Microbiology Curriculum guidelines which are evolution; structure and function; metabolic pathways; information flow and genetics; microbial systems; impact of microorganisms.
6. The coverage of the basic skills used in the study of microbiology and their application in the laboratory portion of the course.
7. Critical thinking will be emphasized and assessed throughout the course.

#### **D. LEARNING OUTCOMES (General)**

1. Have demonstrated scientific thinking skills in both lecture and laboratory activities.
2. Properly prepared and viewed specimens for examination using microscopy (bright field).
3. Employed pure culture and selective techniques to enrich for, and isolate, microorganisms.
4. Used appropriate methods to identify microorganisms (media-based, molecular and serological).
5. Estimated the number of microorganisms in a sample (using, for example, direct count, viable plate count and spectrophotometric methods).
6. Used appropriate microbiological and molecular lab equipment and methods.
7. Developed and practiced safe microbiology, using appropriate protective and emergency procedures.
8. Documented and reported on experimental protocols, results and conclusions.
9. Have acquired and demonstrated investigative microbiological skills in the laboratory.
10. Have been demonstrated competency with, and an understanding of, the key concepts in microbiology including those listed above.
11. Demonstrated an ability to formulate hypotheses and designed experiments, based on the scientific method.
12. Analyzed and interpreted results from a variety of microbiological methods, and applied these methods to analogous situations.
13. Employed quantitative reasoning and used mathematical reasoning and graphing skills to solve problems in microbiology.
14. Communicated and collaborated in with their fellow students in gathering and analyzing data.
15. Effectively communicated fundamental concepts of microbiology in written and oral formats.
16. Demonstrated an understanding of the relationship between science and society having identified and discussed ethical issues in microbiology.

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

None

#### **F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

#### **G. SPECIAL INFORMATION**

None noted