

**Course discipline/number/title: BIOL 2021: Microbiology****A. CATALOG DESCRIPTION**

1. **Credits:** 4
2. **Hours/Week:** 3 Lecture, 2 Lab
3. **Prerequisites (Course discipline/number):** BIOL 1217 or BIOL 1220 and CHEM 1117 or CHEM 1127
4. **Other requirements:** None
5. **MnTC Goals (if any):** Goal 3/Natural Sciences

**B. COURSE DESCRIPTION:** This is an introductory microbiology course covering the following topics: prokaryotic cell structure, metabolism, growth, genetics, pathogenesis; viruses; the eukaryotic microbes, fungi and protozoa; epidemiology, control of microbial growth, specific and nonspecific immunity and immune disorders. Students must show completion of prerequisite courses with a C or better.**C. DATE LAST REVISED (Month, year):** February, 2025**D. OUTLINE OF MAJOR CONTENT AREAS:**

1. Characteristics of microbial life forms
2. Bacterial morphology and staining characteristics
3. Growth requirements of bacteria
4. Bacterial genetics
5. Control of microbial growth (physical, chemical, chemotherapeutic)
6. Bacterial groups of medical importance
7. Eukaryotic microbes: fungi and protozoa
8. Viruses
9. Principles of disease - infection and transmission
10. Host defense mechanisms: specific and nonspecific

The laboratory exercises are designed to introduce basic microbiological culture and identification techniques to the students. In addition, the students are required to analyze experimental data and report the results. The following list illustrates the types of exercises included in the laboratory experience:

1. Microscope use
2. Staining techniques
3. Aseptic technique
4. Maintain cultures
5. Perform basic tests
6. Estimate bacterial numbers
7. Identify unknown microbes

**E. LEARNING OUTCOMES (GENERAL):** The student will be able to:

1. Exhibit proper use of the microscope.
2. Demonstrate basic aseptic procedures necessary for working in laboratories and hospitals.
3. Demonstrate proper staining techniques.
4. Perform and interpret basic tests used in identifying microbes.
5. Understand the role of microbes in the environment.
6. Demonstrate knowledge of selected fungal, viral, protozoal and bacterial diseases and the host response to these diseases.
7. Determine microbial sensitivity to various physical, chemical, and chemotherapeutic agents.

**F. LEARNING OUTCOMES (MNTC):**

Goal 3/Natural Sciences: The student will be able to:

1. Demonstrate understanding of scientific theories and the ways in which scientists develop, express, and question theories in the field of microbiology.
2. Formulate and test hypothesis by performing laboratory experiments requiring collection of data, its statistical and/or graphical analysis, and an appreciation of uncertainty and sources of error.

**F. LEARNING OUTCOMES (MNTC): Continued. . .**

3. Communicate their findings, analyses, and interpretations with other students and/or instructor orally and/or in writing.

**G. METHODS FOR EVALUATION OF STUDENT LEARNING:** Methods may include but are not limited to:

1. Theory exams over lecture material
  2. Homework assignments and quizzes
  3. Laboratory exams
  4. Laboratory reports
- Case studies

**H. RCTC CORE OUTCOME(S).** This course contributes to meeting the following RCTC Core Outcome(s):  
**Critical Thinking.** Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

**I. SPECIAL INFORMATION (if any):**

The initial lab session explains and familiarizes the student with general safety hazards and safety equipment in the lab. During the pre-lab discussion, the hazardous characteristics of any materials used during the lab are discussed. In addition, the students are instructed on the proper handling and disposal of all potentially infectious material. The instructor will direct all students to wear necessary protective equipment while working with any hazardous chemicals. Safety Data Sheets for chemicals used are available online.