Syllabus
BIOS 2460
Microbiology
2025

Committee Members:

Tanner Jenkins, Central Community College
Lois Bartsch, Metropolitan Community College
Dr. Leah Christensen, Mid-Plains Community College
Stacie Hoile, Northeast Community College
Steven McConnell, Southeast Community College
Kate Schneider, Western Nebraska Community College
Sudha Shanmugam, Ph.D, Little Priest Tribal College
Dr. Meaghan Murie-Mazariegos, Nebraska Indian Community College

Facilitator: Tanner Jenkins

The Institution agrees to the contents in this syllabus including course prefix, number, course description and other contents of this syllabus.

Chief Academic Officer, Central Community College	02/17/2025	Adopt
Chief Academic Officer, Little Priest Tribal College	02/19/2025	Adopt
Chief Academic Officer, Metropolitan Community College	02/20/2025	Decline
Chief Academic Officer, Mid-Plains Community College	02/12/2025	Adopt
Chief Academic Officer, Nebraska Indian Community College	02/19/2025	Adopt
Chief Academic Officer, Northeast Community College	02/12/2025	Adopt
Chief Academic Officer, Southeast Community College	02/19/2025	Adopt
Chief Academic Officer, Western Nebraska Community College	02/12/2025	Adopt

I. CATALOG DESCRIPTION

Course Number: BIOS 2460
Course Title: Microbiology
Prerequisite(s): General Biology (BIOS1010) or department approval.

Catalog Description: Study of microbiology with emphasis on structure of microbial cells, their nutrition and growth, control of growth including the immune system, genetics and genetic engineering, metabolic and biosynthetic activity, and host-parasite interactions. Accompanying laboratory study emphasizes microbiological techniques including microbial control and manipulation.

Credit Hours: 4.0 semester
6.0 quarter
Lecture / Classroom Hours: 3 hours / week (semester)
5 hours / week (quarter)
Laboratory Hours: 2 hours / week (semester)
3 hours / week (quarter)

II. COURSE OBJECTIVES / COMPETENCIES

Course will:

1. The course will identify various microorganisms and analyze their relationships to each other and to other organisms.
2. The course will describe the physiological processes used by microorganisms and evaluate their relationships with other organisms.
3. The course will explain the reproductive processes of microorganisms in detail.
4. The course will apply modern microbial control methods in practical scenarios.
5. The course will evaluate both naturally occurring and artificial methods of protecting the body against disease.
6. The course will assess the effects of microorganisms on the human body.
7. The course will describe techniques and applications of genetics and genetic engineering in microbiology.
8. The course will explore real-world applications of microbiology in various fields.
9. The course will differentiate microorganisms using various techniques and methodologies.

III. STUDENT LEARNING OUTCOMES:

Students will be able to:

1. The student will identify key milestones and notable scientists in the history of microbiology.
2. The student will demonstrate proficiency in basic laboratory techniques to include aseptic technique, lab safety, microscopy, staining techniques, microbial transfer, and interpretation of bacterial growth.
3. The student will compare and contrast the structure and function of prokaryotic cells, eukaryotic cells, prions, and viruses.

4. The student will analyze microbial growth requirements and their implications for growth in different environments.
5. The student will explain microbial genetics including processes such as expression, mutation, recombination, and transformation.
6. The student will apply various techniques used in genetic engineering and evaluate their applications.
7. The student will articulate modern methods of microbial control and explain mechanisms of microbial resistance.
8. The student will compare and contrast methods to minimize pathogen transmission.
9. The student will describe the processes of the immune system and components of the immune system and their role in disease prevention.
10. The student will utilize modern taxonomy systems to classify and understand microorganisms.

IV. COURSE CONTENT / TOPICAL OUTLINE

1. Microbial structure and classification.
2. Growth and development, ecological relationships, and metabolic processes of microorganisms.
3. Reproduction including genetic coding, viruses, and biotechnology.
4. Microbial control and immunity.
5. Principles of disease and its effects on body systems.

V. INSTRUCTIONAL MATERIALS

A. Required Text(s) Suggested

1. *Microbiology: An Introduction*, 2016, 13th edition or newer, Tortora.
2. *Microbiology: Laboratory Theory and Application*, brief 3rd edition, 2016,or newer, Leboffe.
3. *Foundations in Microbiology*, 11th edition or newer, Chess, 2020.
4. *Benson's Microbiological Applications,* 13th edition or newer, short version, 2015.
5. *Laboratory Applications in Microbiology*, 3rd edition or newer, Barry Chess, 2015, McGraw-Hill Publishing.
6. *Nester's Microbiology: A Human Perspective*, 10th edition 2022, or newer, Denise Anderson, Sarah Salm, Deborah Allen, published by McGraw Hill.
7. *Microbiology,* 2017(online updates) or newer, Open Stax, publisher by Rice University.
8. *Microbiology Fundamentals: A Clinical Approach*. 4th Edition. 2022, By Marjorie Kelly Cowan and Heidi Smith.
9. *Fundamentals of Microbiology*, 12th edition or newer , Jeffrey C. Pommerville, Jones and Bartlett Learning.
10. *Laboratory Fundamentals of Microbiology*, 12th edition or newer, Jeffrey C. Pommerville, Jones and Bartlett Learning.
11. Labster Virtual Lab, Microbiology.

B. Suggested

1. *Bergey's Manual of Determinative Bacteriology*, 9th edition or newer. LW&W Publishing.

VI. METHOD OF PRESENTATION/INSTRUCTION

Methods of presentation typically include a combination of the following:

1. Lecture
2. Lab
3. Demonstration
4. Group activities
5. On-Line
6. Online simulations
7. Distance Education

VII. METHODS OF EVALUATION

At the determination of the instructor, course grades will be based on participation, assignments, exams, presentations, papers and/or a portfolio. Instructors will distribute and discuss evaluation and grading policies with students at the beginning of each term.

VIII. INSTITUTIONAL DEFINED SECTION

(*To be used at the discretion of each community college as deemed necessary)*