

**SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES**

Sciences

Revision date: 07-01-25

I. CATALOG DESCRIPTION

Course Number: BIOS2460
Course Title: Microbiology
Prerequisite(s): General Biology (BIOS1010) or with 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
Class Hours: 45.0
Lab Hours: 30.0
Total Contact Hours: 75.0

II. COURSE OBJECTIVES: *Course will:*

- A. The course will identify various microorganisms and analyze their relationships to each other and to other organisms.
- B. The course will describe the physiological processes used by microorganisms and evaluate their relationships with other organisms.
- C. The course will explain the reproductive processes of microorganisms in detail.
- D. The course will apply modern microbial control methods in practical scenarios.
- E. The course will evaluate both naturally-occurring and artificial methods of protecting the body against disease.
- F. The course will assess the effects of microorganisms on the human body.
- G. The course will describe techniques and applications of genetics and genetic engineering in microbiology.
- H. The course will explore real-world applications of microbiology in various fields.
- I. The course will differentiate microorganisms using various techniques and methodologies.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

- A. Student Learning Outcomes: *Student 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 Explain 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.
- B. General Education Learning Outcomes**
1. GELO #3: Critical Thinking & Problem Solving
Outcome: Collect, identify, interpret and analyze data.
 2. GELO #5: Analytical, Quantitative, and Scientific Reasoning
Outcome: Apply mathematical and scientific methods to solve problems from an array of contexts and everyday situations.

IV. CONTENT/TOPICAL OUTLINE (*course outline may provide more detailed information*)

- A.** Microbial structure and classification.
- B.** Growth and development, ecological relationships, and metabolic processes of microorganisms.
- C.** Reproduction including genetic coding, viruses, and biotechnology.
- D.** Microbial control and immunity.
- E.** Principles of disease and its effects on body systems.

V. INSTRUCTIONAL MATERIALS

- A.** Required Text(s):
 1. *Talaro's Foundations in Microbiology*, 12th Edition, Chess, 2024.
 2. *Benson's Microbiological Applications Laboratory Manual*, 15th edition, Smith and Brown, 2022.

VI. METHODS OF PRESENTATION/INSTRUCTION

- A.** Methods of presentation typically include a combination of the following:
 - A.** Lecture
 - B.** Lab
 - C.** Demonstration
 - D.** Group activities
 - E.** On-Line
 - F.** Online simulations
 - G.** Distance Education

VII. METHODS OF EVALUATION

- A.** Methods of evaluation typically include a combination of the following:
 1. Participation
 2. Assignments
 3. Exams
 4. Presentations
 5. Papers and/or a portfolio
 6. Instructors will distribute and discuss evaluation and grading policies with students at the beginning of each term.
- B. SCC GRADING SCALE**

A+	95-100	C+	75-79	F	59 or less
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A	90-94	C	70-74
B+	85-89	D+	65-69
B	80-84	D	60-64