

MICRO 60 Course Outline as of Fall 2024**CATALOG INFORMATION**

Dept and Nbr: MICRO 60 Title: FUNDMTL MICROBIOLOGY

Full Title: Fundamentals of Microbiology

Last Reviewed: 5/8/2023

| Units | | Course Hours per Week | | Nbr of Weeks | Course Hours Total | |
|---------|------|-----------------------|------|--------------|--------------------|--------|
| Maximum | 4.00 | Lecture Scheduled | 3.00 | 17.5 | Lecture Scheduled | 52.50 |
| Minimum | 4.00 | Lab Scheduled | 3.00 | 6 | Lab Scheduled | 52.50 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 6.00 | | Contact Total | 105.00 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 105.00

Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

Catalog Description:

Students will study the major concepts of microbiology with emphasis on those related to infectious disease. Students will learn basic techniques for cultivation and identification of microorganisms.

Prerequisites/Corequisites:

Course completion of BIO 10 or higher (V7); AND

Completion of CHEM 60, CHEM 3A (OR CHEM 1A), or higher (V6)

Recommended Preparation:

Course Completion of ENGL 1A

Limits on Enrollment:**Schedule of Classes Information:**

Description: Students will study the major concepts of microbiology with emphasis on those related to infectious disease. Students will learn basic techniques for cultivation and identification of microorganisms. (Grade or P/NP)

Prerequisites/Corequisites: Course completion of BIO 10 or higher (V7); AND

Completion of CHEM 60, CHEM 3A (OR CHEM 1A), or higher (V6)

Recommended: Course Completion of ENGL 1A
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

| | | | | |
|----------------------|----------------------|---------------------|------------|-----------|
| AS Degree: | Area | | Effective: | Inactive: |
| | C | Natural Sciences | Fall 1981 | |
| CSU GE: | Transfer Area | | Effective: | Inactive: |
| | B2 | Life Science | Fall 1981 | |
| | B3 | Laboratory Activity | | |
| IGETC: | Transfer Area | | Effective: | Inactive: |
| CSU Transfer: | Transferable | Effective: | Fall 1981 | Inactive: |
| UC Transfer: | | Effective: | | Inactive: |

CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Integrate basic principles of microbial cell structure and processes as they apply to medical microbiology.
2. Explain the impact of microbiology on medical, public health, and environmental concerns.
3. Perform, and explain the theory behind, basic laboratory techniques used for routine culture and identification of bacteria.

Objectives:

At the conclusion of this course, the student should be able to:

1. Define microorganism and categorize microbes by domain and kingdom.
2. Describe the history of the discovery of the microbial world.
3. Relate microbial causality of disease to Koch's postulates.
4. Describe the basic chemical activities essential to life.
5. Describe the structure of prokaryotic and eukaryotic cells.
6. Contrast genetic mutation, recombination, conjugation, transformation, and transduction.
7. Describe viruses and their relationships to cells and vaccines.
8. Compare various mechanisms of pathogenicity.
9. Describe the function of the immune system and its relation to disease.
10. Relate environmental influences on host resistance to public health measures.
11. Perform basic microbiological laboratory techniques.

Topics and Scope:

Lecture-Related Topics & Scope:

- I. History of Microbiology

- A. Discovery, microscopy, and staining
- B. Koch's postulates and causality
- C. Scientific method as it applies to microbiology
- II. Unity of Life
 - A. Cells and chemistry
 - B. Structure and function of nucleic acids
 - C. Structure and function of proteins
 - D. Energy metabolism
 - E. Prokaryotes and eukaryotes
 - F. Antibiotics and selective toxicity
- III. Taxonomy and Identification
 - A. DNA based methodologies
 - B. Epidemiology
 - C. Select normal flora and pathogens
- IV. Microbial Genetics
 - A. Mutation and recombination
 - 1. Plasmids, conjugation, transduction, and transformation
 - 2. Biotechnology
 - B. Antibiotic paradox
- V. Viruses
 - A. Discovery and definitions
 - B. Interactions with host cell
 - C. Anti-viral vaccination and chemotherapy
 - D. Retroviruses, HIV disease, and cancer
- VI. Host's Role in Disease
 - A. Symbiosis
 - B. Non-specific resistance
 - C. The immune system and immunization
 - D. Environmental influences on host resistance

Lab-Related Topics & Scope:

- VII. Laboratory Exercises
 - A. Laboratory safety and sanitation
 - B. Laboratory techniques
 - 1. Aseptic techniques
 - 2. Bacterial culture (liquid and solid medium)
 - 3. Microscopy and staining techniques
 - 4. Preparation and sterilization of media
 - 5. Analyses of bacteria in water samples and on the human skin
 - 6. Antibiotic sensitivity
 - 7. Metabolic tests and bacterial identification
 - 8. ELISA (enzyme-linked immunosorbent assay)
 - 9. Identification of unknown bacteria

Assignment:

Lecture-Related Assignments:

- 1. Reading assignments from text, averaging one chapter per week; additional reading assignments at 5-10 pages per week
- 2. Research paper
- 3. Examinations (3-4), such as:
 - A. Lecture exams

- B. Final exam
- 4. Quiz(zes) (0-15)
- 5. Concept map assignment may be included

Lab-Related Assignments:

- 1. Lab practical exams (2-3)
- 2. Laboratory experiments, such as:
 - A. Data collection
 - B. Demonstration of sterile and culture technique
 - C. Lab skills may also be assessed by performance in the identification of an unknown bacteria (research paper or lab report)
- 3. Laboratory report: involves description of process student undertakes to identify unknown bacteria

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

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| Research paper; laboratory report | Writing 10 - 20% |
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Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

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| Concept map | Problem solving 0 - 5% |
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Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

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| Laboratory experiments | Skill Demonstrations 0 - 10% |
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Exams: All forms of formal testing, other than skill performance exams.

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| Examinations; quiz(zes); lab practical exams | Exams 80 - 90% |
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Other: Includes any assessment tools that do not logically fit into the above categories.

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| None | Other Category 0 - 0% |
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Representative Textbooks and Materials:

Microbiology: An Introduction. 14th ed. Tortora, Gerard, Funke, Berdell and Case, Christine. Pearson. 2024.

Microbiology: A Systems Approach. 6th ed. Cowan, Marjorie. McGraw-Hill. 2020.

Instructor prepared lab manual