MICRO 60 Course Outline as of Fall 2020

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:
Survey of the major concepts of microbiology with emphasis on those related to infectious disease. 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: Survey of the major concepts of microbiology with emphasis on those related to infectious disease. 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:
In order to achieve these learning outcomes, during the course the students will:
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:

I. History of Microbiology
   A. Discovery, microscopy, 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, 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, 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

VII. Lab 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 averaging 5-10 pages per week
2. Research paper
3. Examinations: 3 lecture exams and a final exam (including multiple choice, completion, objective and essay questions)
4. Quizzes (0-15)
5. Concept map assignment

Lab Related Assignments:
1. Lab practical exams (2)

2. Laboratory experiments, data collection, demonstration of sterile and culture technique; lab skills may also be assessed by performance in the identification of an unknown bacteria
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.

Laboratory report, research paper	Writing 10 - 20%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Concept map	Problem solving 0 - 5%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Laboratory experiments, data collection, demonstration of sterile and culture technique	Skill Demonstrations 0 - 10%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes, lecture exams, lab practical exams, final exam	Exams 80 - 90%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Microbiology: An Introduction. 12th ed. Tortora, Gerard and Funke, Berdell and Case, Christine. Pearson. 2015
Microbiology: A Systems Approach. 4th ed. Cowan, Marjorie. McGraw-Hill. 2014
Instructor prepared lab manual