BIOL 220 - General Microbiology Course Outline

Approval Date: 05/10/2018
Effective Date: 08/13/2018

SECTION A

Unique ID Number	CCC000309043
Discipline(s)	Biological Sciences
Division	Science and Engineering
Subject Area	Biology
Subject Code	BIOL
Course Number	220
Course Title	General Microbiology
TOP Code/SAM Code	0403.00 - Microbiology / E - Non-Occupational
Rationale for adding this course to the curriculum	Update required text edition and add new required materials (goggles) and recommended materials (lab coats)
Units	5
Cross List	*N/A*
Typical Course Weeks	18

Total Instructional Hours

	Contact Hours
Lecture	54.00
Lab	108.00
Activity	0.00
Work Experience	0.00
Outside of Class Hours	108.00

Total Contact Hours	162
Total Student Hours	270
Open Entry/Open Exit	No
Maximum Enrollment	
Grading Option	Letter Grade or P/NP
Distance Education Mode of Instruction	

SECTION B

General Education Information:

SECTION C

Course Description

Repeatability	May be repeated 0 times
Catalog Description	Morphology, metabolism, molecular genetics and ecology of bacteria, fungi, viruses, helminths and protozoa. Extensive laboratory work includes aseptic

techniques, methods of cultivation, identification and enumeration of bacteria, examination of biochemical characteristics and molecular biology techniques using common bacteria. Primarily intended for students pursuing degrees in a health sciences field or majoring in biological sciences.

Schedule Description Lecture and extensive laboratory study of bacteria and other microbes. Intended primarily for pre-health sciences students.

SECTION D

Condition on Enrollment

1a. Prerequisite(s)

- BIOL 120 or
- BIOL 219

1b. Corequisite(s): *None*

1c. Recommended: *None*

1d. Limitation on Enrollment: *None*

SECTION E

Course Outline Information

1. Student Learning Outcomes:

A. Identify the differences between the major groups of microorganisms and the non-living infectious agents.
B. Compare and contrast methods of microbial growth control in the body and in the environment.
C. Analyze in detail the human host defenses and immune mechanisms.

2. Course Objectives: Upon completion of this course, the student will be able to:

A. Describe and analyze the differences between the major groups of microorganisms.
B. Distinguish and compare the function of structures found in bacteria, fungi, viruses, helminths and protozoa.
C. Differentiate between the types of light microscopy and electron microscopy and their utilization.
D. Differentiate between aerobic and anaerobic metabolism in bacteria, evaluating the energy flow between glycolysis, the citric acid cycle and the electron transport systems.
E. Compare the growth cycles or mechanisms of proliferation of bacteria, viruses, viroids and prions.
F. Discuss microbial genetic and biochemical techniques used in bacterial identification and evolutionary analysis.
G. Compare and contrast methods of microbial growth control in the body and in the environment.
H. Analyze in detail the human host defenses and immune mechanisms.
I. Distinguish the differences in morphology, staining reactions and biochemical reactions of common bacterial species encountered in both clinical laboratories and the environment.
J. Analyze the results of data collected from laboratory experiments and relate the results to clinical and environmental situations.
K.

3. Course Content

A. LECTURE
    a. Scope and diversity of the microbial world.
    b. History and evolution of microbiology.
    c. Theory of and practice of microscopic visualization of microorganisms.

d. Bacterial structure and function.
e. Cultivation and growth of bacteria.
f. Microbial metabolism.
g. Microbial genetics.
h. Fungal structure and function.
i. Virus structure, growth methods and reproduction techniques.
j. Protozoa structure and function.
k. Multicellular parasites.
l. Control of microbial growth and antimicrobial agents.
m. Host-parasite relationships.
n. Host defenses and immunity.

B. LABORATORY
a. Microorganisms in the environment.
b. Staining methodology.
c. Motility assessment.
d. Morphologic unknown.
e. Media and pure culture techniques.
f. Cultural characteristics of bacteria.
g. Water quality testing.
h. Control of microbial populations by physical agents.
i. Control of microbial populations by chemical agents.
j. Biochemical activities of bacteria.
k. Cultural and biochemical unknown.
l. Molecular techniques in microbiology.
m.

4. Methods of Instruction:

Lab:
Lecture:
Observation and Demonstration:

5. Methods of Evaluation: Describe the general types of evaluations for this course and provide at least two, specific examples.

Typical classroom assessment techniques

Exams/Tests -- Four lecture exams. Two comprehensive lab practical exams.
Quizzes -- Online and in-class quizzes.
Oral Presentation -- Group presentations.
Lab Activities -- Formal written lab reports including identification of two "unknowns".
Final Exam -- Comprehensive final exam.

Letter Grade or P/NP

6. Assignments: State the general types of assignments for this course under the following categories and provide at least two specific examples for each section.

A. Reading Assignments
Weekly reading of text chapters assigned in lecture.
Weekly reading of laboratory exercises posted on line.
In addition to assigned reading, students are encouraged to investigate journals and other media sources including the internet to stimulate the questioning and analysis of relevant issues. Examples of journals include, Clinical Microbiology Reviews and Diagnostic Microbiology and Infectious Disease. The internet site for the Centers for Disease Control and Prevention along with the site for the National Institute of Health

are among those with updates and articles where students can research and report on recent events.

B. Writing Assignments
Weekly analysis and evaluation of lab exercises.
Mathematical analysis of lab data.
Written reports on identification of microbial organisms including assessment of procedures used and determination of experimental errors.
Written essays on lecture exams require students to compare and contrast major topics such as eukaryotic and prokaryotic cell architecture and cell wall structure.

C. Other Assignments
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7. Required Materials

A. EXAMPLES of typical college-level textbooks (for degree-applicable courses) or other print materials.

Book #1:

Author:	Tortora G., B. Funke, C. Case
Title:	Microbiology, An Introduction
Publisher:	Pearson
Date of Publication:	2019
Edition:	13th

Manual #1:

Author:	Johnson T., C. Case
Title:	Laboratory Experiments in Microbiology, 12th ed.
Publisher:	Pearson
Date of Publication:	01-01-2018

B. Other required materials/supplies.

- Indirectly-ventilated goggles
- Lab coat
- Microscope slides