Introduction to Microbiology (BIOL 2320)

For Non-Science Majors

Credit: 3 semester credit hours (3 hours of lecture)

Prerequisite/Co-requisite: Must be enrolled in BIOL 2120 at the same time

Course Description

Study of cell types and structure also microbial growth, control, metabolism, and genetics. This course provides information about microbes and human interactions, microbial pathogens and human diseases/ health.

Recommended Textbook and Materials:

Microbiology, An Introduction, Pearson publishing, 12th edition, by Tortora, Funke, and Case, Publishing. **ISBN: 978-0-321-92915-0**

Course Objectives

Upon completion of the course, the student will be able to:

1. Identify and describe groups of microbes including prokaryote microbes, eukaryote microbes, and viruses.
2. Explain differences between prokaryotic and eukaryotic cells.
3. Understand importance of microorganisms on agriculture, environment, and human health.
4. Demonstrate microbial metabolism and genetics.
5. Describe interaction between microbes and human, and understand the mechanisms of pathogenesis, diseases transmission, spread, and control.
6. Describe host defense and immunity.
7. Understand microbial growth, manipulation of microorganisms, and control.

Core Objectives

1. Critical thinking skills and problem solving skills to make decision in the laboratory.
2. Communication skills to effectively develop, interpret, and express the ideas and results of scientific investigations.
3. Quantitative skills to investigate and analysis data and use scientific tools in the laboratory to collect data.
4. Teamwork working on research and group presentations as well as classroom activities.

Course Outline

A. Fundamental of Microbiology

1. Naming and Classifying Microorganisms
2. History of Microorganisms
3. Microbes and Human Benefits
4. Microbes and Human Disease

B. Microorganisms Culturing and Microscopy
C. Prokaryotic Cells (Bacteria – Archaea)
    1. Bacteria
    2. Archaea
D. Eukaryotic Cells and Microorganisms
    1. Eukaryotic Microorganisms
    2. Structure of the Eukaryotic Cells
    3. Fungi
    4. The Protists
    5. Helminths
E. Viruses
    1. Introduction of Viruses
    2. Structure of Viruses
    3. Viral Multiplication
    4. Viruses and Host Cell
    5. Viruses and Cancer
    6. Bacteriophage
    7. Techniques in Cultivating and Identifying
    8. Non-cellular Infectious Agents
    9. Viruses and Human Health
F. Microbial Metabolism
    1. Metabolism of Microbes
    2. Energy
    3. Catabolism
    4. Biosynthesis
G. Microbial Growth and Control
    1. Microbial Nutrition
    2. Microbes and Environmental Factors
    3. Microbial Growth
    4. Controlling Microbial Growth
H. Microbial Genetics
    1. Genetics and Genes
    2. Replication
    3. Transcription
    4. Translation
    5. Genetic Regulation

6. DNA Recombination
7. Mutations
8. Genetic Engineering

I. Host Defenses
   1. Defenses Mechanisms of The Host
      a. First Line of Defenses, Barriers
      b. Second Line of Defenses, Immune Defense
      c. Third Line of Defenses, Specific Immunity
   2. Adaptive Immunity

J. Disorder in Immunity
   1. Hypersensitivity (Primary and Secondary)
   2. Hyposensitivity (type I, II, III, and IV)

K. Antimicrobial Treatment
   1. Antimicrobial activity
   2. Microbe and Host Interactions

Grade Scale

A	900 – 1000 points
B	800 – 899 points
C	700 – 799 points
D	600 – 699 points
F	599 or below

Course Evaluation

Final Grades will be calculated according to the following criteria:

1. 4 Units Exams (drop 1 lowest) 60%
   * Final Exam is mandatory to take
2. 3 Quizzes (drop 1 lowest) 10%
3. Current Event (A scientific paper with Individual presentation) 10%
4. Common Assignment - Group Presentation 20%

Course Requirements

1. Be prepared to complete:
2. Reading and writing assignments
3. Class activities
4. Quizzes
5. Research current event with presentation (Power Point)
6. Major Exams

Course Policies

1. No food or drinks, or use of tobacco products in class.
2. Electronic devices are to be used for school related activities only as directed by the instructor.

3. Do not bring children to class.
4. No late assignment will be accepted. All assignments are due when stated. Be ready (have things printed out and stapled and ready to turn in)
5. Students that miss a test or quiz are not allowed to make up the test or quiz. There are no make-ups for either a missed test or a missed quiz. The lowest quiz test grade and the lowest quiz grade will be automatically dropped. If you are absent, that is automatically your dropped grade for the semester. You may not be absent for more than one test or one quiz in a given semester.
6. Attendance policy. Be present! Perfect attendance = +10 extra points.3 tardies = 1 absence. 2 'leaving class early' situations (i.e., for a dental appointment) = 1 absence.
7. If you wish to drop a course, the student is responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an 'F' in the course.
8. In the event that LIT is forced to cancel classes due to inclement weather, DMS classes and clinical rotations will also be canceled. Notification of closures will be made through local radio and TV stations. Students out of the immediate broadcast area should contact either their instructor or the program director.
9. Students are responsible for material in instructor Power Points, handouts and on videos found on the course website. Exam questions may come from this material.

Academic Dishonesty

Cheating and Plagiarism are two types of academic dishonesty.
Cheating is taking an examination or test in a dishonest way, as by improper access to answers. Plagiarism is taking someone else's work and misrepresenting it as your own.
Student's work should always be his/her own unless participating in a group project.
Cheating and/or plagiarism will result in disciplinary action; i.e., zero on assignment/exam or an **F** in the course, expulsion, etc.

Students with Disabilities:

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator, (409) 880-1737 or visit the office located in the Cecil Beeson Building.

Course Calendar - Course Schedule (Tentative)

Week of	Topic	Reference
1	Course Overview and Introduction Ch 1(Fundamentals of Microbiology)	Textbook
		Textbook
2	Ch 3 (Microscopy and Identification of Microbes) Ch 4 (Prokaryote Microorganisms) **Quiz1 Ch 1**	Textbook
3	Ch 4 (Prokaryote Microorganisms) Ch 12 (Eukaryotic Microorganisms)	Textbook
4	Ch 12 (Eukaryotic Microorganisms) **EXAM I** (Over Ch 1, 3, 4, and 12)	Textbook
5	Ch 13 (Virus) **Papers Due with Individual presentations**	Textbook
6	**Quiz 2** (Over Ch 13) / Begin Ch 5 (Microbial Metabolisms) Ch 5 (Microbial Metabolisms)	Textbook
7	Ch 5 (Microbial Metabolisms) **EXAM II** (Over13 and 5)	Textbook
8	Ch 6 (Microbes Growth) Ch 7 (Microbes Control)	Textbook
9	**Quiz 3** (Over Ch 6 and 7)/ Begin Ch 8 (Microbial Genetics) Ch 8 (Microbial Genetics)	Textbook
10	Ch 8 (Microbial Genetics) Ch 8 (Microbial Genetics)	Textbook
11	**EXAM III** (Over Ch 6, 7, and 8) Ch 16, 17 (Host Defense)	Textbook
12	Ch 16, 17 (Host Defense)	Textbook
13	Special Topics in Microbiology (TBA)Group Presentations	Textbook
14	Group Presentations **/Review**	Review
15	**FINAL EXAM**	

Contact Information:

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Office Hours: MW 3:00 PM-5:30 PM
TR 2:30 PM-5:30 PM
FRI by appointment only