Introdyction to Microbiology, Laboratory (BIOL 2120)

Credit: 1 semester credit hours (2 hours of lab)

Prerequisite/Co-requisite: Must be enrolled in BIOL 2321 at the same time

Course Description

Applying microbiological experiments to study of principle of microbiology, including structure, metabolism, and function of microbes. Development of microbiological methods including, aseptic techniques, safely handling microbes, cultivating and isolating bacteria, characterizing microbes by microscopy and biochemical tests, and determining antibiotic resistance.

Recommended Text(s) and Materials:

1. Required: Microbiology Fundamental, A Clinical Approach, Laboratory Manual: Second edition, Steven Obenauf and Susan Finazzo, 2016.

ISBN: 978-1-259-29386-3

Course Objectives

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

1. Apply aseptic technique to handle and culture microbes safely.
2. Identify bacteria and fungi by macroscopic and microscopic appearance.
3. Isolate pure cultures by using selective and differential media and the streak-plate method.
4. Perform biochemical test to identify differences among bacteria.
5. Understand the effect of physical and chemical agents on microbial growth.
6. Perform and interpret antibiotics sensitivity and resistant tests.
7. Describe microbiological diagnostic techniques, as well as factors that may interfere with interpretation of results.
8. Isolate dental caries causing bacteria and understand the microbial role in tooth decay.
9. Understand respiratory transmission of bacteria.
10. Enumerate coliform bacteria in water by the most probable numbers approach.

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.

Course Outline

1. Laboratory safety, equipment, and material
2. Use of microscope
3. Aseptic technique
4. Environmental sampling
5. Streak-Plate method
6. Mycology
7. Simple staining
8. Gram Stain
9. Biochemical microbial tests
    a. Mannitol Salt Agar
    b. Blood agar Plate
    c. MacConkey agar
10. Microbial growth and count
11. Antibiotic sensitivity and resistance
12. Effect of physical and chemical agents on microbial growth (Effective hand washing)

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. 2 Units Practical Exams	20%
2. 5 Pop Quizzes	40%
3. Lab Reports	20%
4. Lab Performance	20%

Course Requirements

1. Be prepared to complete:
2. Reading and writing assignments and reports
3. Class activity and performance
4. Quizzes
5. Major Exams

Policies associated with Assignments/Exams:

Lab Quizzes: 400 pts points

1. Five unannounced lab quizzes will be given during the semester.
2. Lab quizzes will be given at the beginning of lab.
3. Lab quizzes will cover material from the current lab exercise as well as material since the previous quiz.

4. Lab quizzes may contain questions regarding theory, procedures, results, and any information given to you by your instructor during the laboratory period.
5. You will take 5 quizzes this semester but only the 4 best quizzes will be recorded. The lowest grade is automatically dropped. If you miss a quiz, there is no make-up. This will be your dropped quiz grade for the semester. You may not miss more than one quiz per semester.

Lab Performance, Attendance, and behavior: 200 pts

1. Students will be graded based on performance of various techniques covered throughout the semester as well as their answers to additional.
2. The lab manual (or exercise printed from Blackboard) is required and must be brought to each lab meeting.
3. Students are expected to follow safety and all lab instructions and standard operating procedures, including:
    - Cleaning benches before and after lab work
    - Retrieving and properly returning equipment
    - Incubating, storing, or disposing of cultures properly
    - Being prepared for lab by reading the lab assignment in advance

Lab reports: 200 pts

1. A lab manual should be purchased for the current semester in order to record observations and take notes during lab exercises.
2. Students are expected to read the lab exercise in the lab manual (or provided on Blackboard) prior to the lab and are encouraged to read pages in the lecture textbook related to the laboratory exercise for additional background information.
3. Worksheets are due **at the beginning** of lab on days indicated on the lab schedule.

Final practical and written exam: 200 pts

Practical examinations will include questions based on material covered prelab talks, laboratory exercises, laboratory notes and in textbook (assigned reading). Each exam may include a variety of question styles, i.e. multiple choice questions, true and false, fill in the blanks, case-based, etc. More details will be given in class.

You must be present for the Practical Exams – no make-up exams given.

Course Policies

1. No food or drinks, or use of tobacco products in class.
2. Beepers, telephone, headphones and any other electronic devices must be turned off while in class.
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. Student that miss a test will receive a grade of ‘0’.
6. 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.
7. Attendance policy. Two absents are allowed. If a student is tardy to class or departs early (3) times, it will be equal to one (1) absence. Each absence beyond two absences wil result in a 5 point deduction from your final grade.

8. 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.
9. 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.
10. 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
Aug. 22	Course Overview and Introduction Lab 1 **(Laboratory safety, equipment, and material**)	
Aug. 29	Lab 2 (**Exe. 01, Use of Microscope**)	Lab Manual, Blackboard
Sep. 5	Lab 3 (**Exe. 02, Aseptic techniques**)	Lab Manual, Blackboard
Sep. 12	Lab 4 (**Environmental sampling**)	Lab Manual, Blackboard
Sep. 19	Lab 5 (**Exe. 03, Streak plate method to isolate single colonies and study characteristic of bacteria**)	Blackboard
Sep. 26	Lab 6 (**Exe. 06, Mycology**) and **review**	Lab Manual, Blackboard
Oct. 3	**EXAM I** - Practical and written (100 pts)	Lab Manual, Blackboard
Oct. 10	Lab 7 (**Exe. 8 and 11, Simple staining; Gram Staining**)	Lab Manual, Blackboard
Oct. 17	Lab 9 (**Exe. 14, 15, and 17 Biochemical Microbial Tests; Blood Agar; Mannitol salt agar; MacConkey Agar**)	Lab Manual, Blackboard
Oct. 24	Lab 10 (**Exercises 19 Microbial growth and count; Milk Microbiology**)	Lab Manual, Blackboard
Oct. 31	Lab 11 (**Exercises 25 Antibiotic Sensitivity Test**)	Lab Manual, Blackboard
Nov. 7	Lab 12 (**Exercises 26 Effect of physical and chemical against on microbial growth; Effectiveness of hand washing**)	Lab Manual, Blackboard
Nov. 14	Lab 13 (**Respiratory and mouth bacteria**)	Lab Manual, Blackboard
Nov. 21	Lab 14 Review and prepare for Final Exam	Lab Manual, Blackboard, Textbook
Nov. 28	Lab 15 **Exam II** – Practical and written (100 pts) Reports Due	Lab Manual, Blackboard, Textbook
Dec. 5	Last Lab Reports Due	

Contact Information:

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Office Hours: see the door schedule
(Or by appointment)