Microbiology for Non-Science Majors Lab (BIOL 2120)

Instructor Contact Information

Instructor: Yunyan (Anna) Cheng
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Office Hours: Monday-Friday 9am-5pm
Please email me or message me on Blackboard.

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

Meet: Online

Prerequisite/Co-requisite: Must be enrolled in BIOL 2320 at the same time

Course Description

Applying microbiological experiments to the study of the 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.

Required Textbook and Materials:

Textbook: OpenStax Microbiology https://openstax.org/details/books/microbiology

McGraw Hill Connect Virtual Labs: register at McGraw Hill Connect to access Virtual Labs. Here is a tutorial on how to register: https://www.mheducation.com/highered/support/connect/first-day-of-class/ia-blackboard-ultra-ltia.html

Course Objectives

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

1. Apply aseptic techniques 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 tests to identify differences among bacteria.
5. Understand the effect of physical and chemical agents on microbial growth.
6. Perform and interpret antibiotic sensitivity and resistance tests.
7. Describe microbiological diagnostic techniques, as well as factors that may interfere with the interpretation of results.

Course Outline

Module 1: Introduction to Microbiology
Module 2: Microbes Diversity
Module 3: Biochemistry, Metabolism & Growth
Module 4: Molecular Biology & Genetics
Module 5: Microbial Control & Pathogenicity
Module 6: Diseases, Epidemiology & Host Defenses

Grade Scale

A 90 – 100 points
B 80 – 89 points
C 70 – 79 points
D 60 – 69 points
F 59 or below

Course Evaluation

1. Midterm and Final Exams	30%
2. Four Quizzes	25%
3. Lab Assignments	25%
4. Group Project	20%

COURSE POLICIES

1. Cheating of any type will not be tolerated. This includes copying and pasting information.
2. Late submissions of assignments/quizzes/exams will be accepted with a deduction of 10% for the first two weeks after the due date, followed by a 20% deduction thereafter. To avoid late penalties, official documents such as doctor's notes are needed.
3. Students will receive a zero for assignments not completed.
4. Four quizzes, a midterm exam, and a final exam are required with 2 attempts given per quiz/exam using Respondus Lockdown Browser. The final score of the quiz/exam will be calculated by averaging all attempts.
5. Make-up Exams: If you are unable to take an exam when scheduled due to unforeseen illnesses, deaths in the family, or other traumatic events, contact me within 24 hours of the event to schedule a make-up exam. Please provide documentation (letters from family are NOT acceptable) of the events that may conflict with exam dates. I will work with you to schedule a makeup exam.
6. Students will complete an individual project and a group project. Everyone needs to contribute to the group project. Please be attentive to your LIT email box and Blackboard messages for essential updates from your group member regarding your project. To ensure a collaborative and productive effort, we want to emphasize that every group member has the right to address any concerns about a lack of contribution from any team member. If necessary, **we can consider removing students who consistently do not contribute to the project**. We hope it won't come to that, and we encourage open communication to resolve any issues promptly. **Individual submission to the group project will have a penalty of 20% off and is by permit only.**
7. If you wish to drop this course, you must drop it administratively. If you stop logging in to the course and do not complete the course drop process, then you will receive an "F" grade for the course.
8. Internet usage- students are to use proper netiquette when participating in course email, assignment submissions, and online discussions.

TECHNICAL REQUIREMENTS

The latest technical requirements, including hardware, compatible browsers, operating systems, etc. can be online at https://lit.edu/online-learning/online-learning-minimum-computer-requirements. A functional broadband internet connection, such as DSL, cable, or Wi-Fi is necessary to maximize the use of online technology and resources.

Quizzes and Exams in this course are administered through Blackboard. Exams will be administered

with **Respondus LockDown Browser + Respondus Monitor (webcam).**

Requirements to take exams include:

- A reliable computer, desktop or laptop (phones, chromebooks, tablets, and iPads are not allowed).
- Windows: 10, 8, 7
- Mac: OS X 10.10 or higher
- Adobe Flash Player (bundled with the LockDown Browser installation)
- Web camera (internal or external) & microphone
- A reliable internet service provider. A broadband internet connection.
- A room to take the exam where you are alone (other individuals in the room are not allowed)

Watch these overview videos to understand the tools you will be using to take the exam.
Respondus LockDown Browser: https://www.youtube.com/watch?v=XuX8WoeAycs#action=share
Respondus Monitor: https://www.youtube.com/watch?v=hv2L8Q2NpO4 - action=share

Respondus LockDown Browser + Respondus Monitor (webcam)
Download Instructions:

- Select the quiz in the course
- Under Quiz Requirements you will see "To take this quiz you must use the Respondus LockDown Browser"
- Below this will appear: "You can use the button below if you have not already downloaded LockDown Browser". Click the button to go to the download page and then follow the instructions
- Use the link to download Respondus LockDown Browser to your computer; follow the installation instructions
- Return to the Quiz page in Brightspace (it may still be open in another tab) and select the quiz
- Select "Launch LockDown Browser"
- The quiz will now start

Note: LockDown Browser only needs to be installed once on a computer or device. It will start automatically from that point forward when a quiz requires it.

Guidelines while taking online quiz, follow these guidelines

- Ensure you're in a location where you won't be interrupted.
- Turn off all other devices (e.g. tablets, phones, second computers) and place them outside of your reach.
- Before starting the test, know how much time is available for it, and also that you've allotted sufficient time to complete it.
- Clear your desk or workspace of all external materials not permitted - books, papers, other devices.
- Remain at your computer for the duration of the test.
- If the computer, Wi-Fi, or location is different than what was used previously with the "Webcam Check" and "System & Network Check" in LockDown Browser, run the checks again prior to the exam.
- To produce a good webcam video, do the following:
    - Avoid wearing baseball caps or hats with brims.
    - Ensure your computer or device is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed, or other surface where the device (or you) is likely to move.
    - If using a built-in webcam, avoid readjusting the tilt of the screen after the webcam setup is complete.

- Take the exam in a well-lit room, but avoid backlighting (such as sitting with your back to a window)
- Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted.

The following violations during testing will result in a grade of zero or reduction in points:

- Using technology or electronic devices including, but not limited to, iPads, phones, smart glasses, earbuds, smartwatches.
- Leaving the testing environment or face missing from frame or obscure.
- Noises that might indicate external help.
- Any other questionable activities indicating cheating.

DROP POLICY

If you wish to drop a course, you are responsible for initiating and completing the drop process by the specified drop date as listed on If you stop coming to class and fail to drop the course, you will earn an "F" in the course.

Academic Dishonesty

1. Cheating and Plagiarism are two types of academic dishonesty.
2. Cheating is taking an examination or test dishonestly, as by improper access to answers. Plagiarism is taking someone else's work and misrepresenting it as your own.
3. A 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 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.

AI STATEMENT

Lamar Institute of Technology (LIT) recognizes the recent advances in Artificial Intelligence (AI), such as ChatGPT, have changed the landscape of many career disciplines and will impact many students in and out of the classroom. To prepare students for their selected careers, LIT desires to guide students in the ethical use of these technologies and incorporate AI into classroom instruction and assignments appropriately. Appropriate use of these technologies is at the discretion of the instructor. Students are reminded that all submitted work must be their own, original work unless otherwise specified. Students should contact their instructor with any questions as to the acceptable use of AI /ChatGPT in their courses.

Tentative Course Schedule

Instructor reserves the right to modify as needed

Week:	To Do:	Due Date:
Week 1 Aug 25th – 29th Lab Safety	☐ 1st Lab - Virtual Labs Tutorial ☐ Lab Safety – Hand Washing Procedure ☐ Lab Safety – Personal Safety ☐ Join a group for Group Project: Gram Stain by 9/6/25	08.30.25
Week 2-3 Holiday Sep 1st Sep 2nd –12th Module 1 Quiz 1	☐ Aseptic Technique – Broth Culture to Sterile Broth ☐ Aseptic Technique – Broth Culture to Sterile Agar Plate ☐ Aseptic Technique – Slant Culture to Sterile Agar Slant ☐ Microscopy – Operation of Brightfield Microscope ☐ Microscopy – Oil Immersion ☐ Join a group for Group Project: Gram Stain by 9/6/25 ☐ Quiz 1: Module 1 (09.12.25 – 09.13.25)	09.06.25 09.13.25
Week 4-6 Sep 15th – Oct 3rd Module 2 Quiz 2	☐ Staining - Preparing a Smear Sample from a Bacterial Sample ☐ Staining – Gram Staining ☐ Staining – Acid-Fast Staining ☐ Staining – Capsule Staining ☐ Staining – Spore Staining ☐ Microscopy – Diversity of Microorganism ☐ Ubiquity of Microorganisms – Sampling Surfaces for Bacteria ☐ Microscopy – Euglena Wet Mount ☐ Microscopy – Pond Water Wet Mount ☐ Organismal Diversity – Fungi ☐ Quiz 2: Module 2 (10.03.25 – 10.04.25) ☐ Work on Group Project: Gram Staining due 11.08.25	10.04.25
Week 7-9 Oct 6th – 24th Module 3 Midterm Exam	☐ Isolation Methods: Pour Plating ☐ Isolation Methods: Quantification by Colony Counting ☐ Isolation Methods: Quantitative Dilution of Bacteria ☐ Isolation Methods: Quadrant Streak Plate Method ☐ Isolation Methods: Subculturing of Bacteria ☐ Isolation Methods: Optical Density ☐ Microbial Growth: Effects of Osmotic Pressure ☐ Microbial Growth: Effects of pH ☐ Microbial Growth: Effects of Temperature ☐ Microbial Growth: Oxygen Requirements and Anaerobic Jar ☐ Microbial Growth: Oxygen Requirements and Fluid Thioglycolate Medium Tubes ☐ Midterm Exam: Module 1-3 (10.24.25 – 10.25.25) ☐ Work on Group Project: Gram Staining due 11.08.25	10.25.25
Week 10-11 Oct 27th – Nov 7th Module 4 Quiz 3 Group Project	☐ Bacterial Genetics – DNA Profiling ☐ Bacterial Genetics – Bacterial Transformation ☐ Bacterial Genetics – Polymerase Chain Reaction (PCR) ☐ Quiz 3: Module 4 (11.07.25 – 11.08.25) ☐ Due: Group Project: Gram Staining 11.08.25	11.08.25

Week 12 Nov 10th – 14th Module 5 Quiz 4	▯ Control of Microbial Growth – Antimicrobic Sensitivity Testing (Kirby-Bauer Method) ▯ Control of Microbial Growth – Effect of Antiseptics and Disinfectants ▯ Control of Microbial Growth – Effect of Ultraviolet Light ▯ Quiz 4: Module 5 (11.14.25 – 11.15.25)	11.15.25
Week 13-15 Nov 17th – Dec 5th Module 6	▯ Unknown Bacterial Identification – Sample #1 ▯ Unknown Bacterial Identification – Sample #2 ▯ Unknown Bacterial Identification – Sample #3 ▯ Unknown Bacterial Identification – Sample #4 ▯ Unknown Bacterial Identification – Sample #5 ▯ Unknown Bacterial Identification – Sample #6 ▯ Unknown Bacterial Identification – Sample #7 ▯ Unknown Bacterial Identification – Sample #8 ▯ Unknown Bacterial Identification – Sample #9 ▯ Unknown Bacterial Identification – Sample #10	12.06.25
Week 16 Dec 8th – 10th Final Exam	▯ Final Exam: Module 4-6 (12.07.25—12.08.25)	12.08.25