University of North Texas at Dallas

Spring 2025

SYLLABUS

BIO 3107: Microbiology Lab; 3 hrs.

Department of	**School of Liberal Arts and Sciences**
Instructor Name	Dr. Anshu Singh
Office Location	NA
Email Address	Anshu.Singh@unt.edu
Office Hours	Monday and Wednesday shortly before the class
Virtual Office Hours	By appointment through email
Course Format/Structure	Laboratory
Classroom Location	Founders 255
Class Meeting Days & Times	**Monday/Wednesday 2:30PM – 4:20PM**
Course Catalog Description	Laboratory techniques in general microbiology. Survey of microorganisms including bacteria, fungi, protozoa, and algae. Culture, staining, and identification of bacteria.
Prerequisites	BIOL 1710, 1730, 1720, and 1740 required to enroll in this course. 1720/1740 may be taken concurrently.
Corequisites	BIO 3307
Required Text	**Benson's Microbiological Application. Concise Lab Manual (Loose Pgs), 14th Ed. (Short Version). Brown and Smith. McGraw Hill. 2016.** **ISBN: 9781259705236**
Access to Learning Resources	**UNT Dallas Library:** Phone: (972) 338-1616; Website URL: http://www.untdallas.edu/library **UNT Dallas Bookstore:** Phone: (972) 780-3652; Website URL: http://www.untdallas.edu/bookstore Email: untdallas@bkstr.com

Canvas Resources **Supported Browsers:** • Chrome 67 & 68 • Firefox 60 & 61 • Flash 29, 30 (for audio/video) • Respondus Lockdown Browser • Safari 10, 11 **Supported Devices:** • iPhone • Android • Chromebook *Note: Tablet users can use the Canvas app* **Screen Readers:** • VoiceOver (Safari) • JAWS (Internet Explorer) • NVDA (Firefox) *Note: There is no screen reader support for Canvas in Chrome*	Canvas will be used in this course for several key functions including: • Gradebook management • Course Quizzes • Submission of digital assignments **Getting Help with Canvas:** **Canvas 24/7 Phone Support for Students: 1-833-668-8634** **Canvas Help Resources:** **Canvas Student Guide - https://community.canvaslms.com/docs/DOC-10701** For additional assistance, contact Student Assistance (UNT Dallas Distance Learning): DAL1, Room 157 Phone: 972-338-5580 Email: distancelearning@untdallas.edu **If you are working with Canvas 24/7 Support to resolve a technical issue, please keep me updated on the troubleshooting progress.** **If you have a course-related issue (e.g., course content, assignment trouble, quiz difficulties), please contact me during office hours or by email.**

Course Overview

Course Goals/Overview:

The goal of this course is to give students a deeper understanding of the microscopic life forms on Earth. Lecture topics will include surveys of the common microbiota (bacteria, archaea, viruses, protists), common biological foci such as metabolism for those group, and emphasis on the medical and clinical approaches needed to study such small forms of life. **Special emphasis is placed in the lab course on the *practical* study of microbes and the techniques involved with culturing, evaluating, and manipulating these microscopic species.**

Learning Objectives/Outcomes:

At the end of this course, the student will
1. Understand the ubiquity of microorganisms in the biosphere.

2. Identify the morphological, biochemical and anatomical features of microorganisms.

3. Demonstrate proper microbiology laboratory technique.

4. Understand and explain the environmental factors that influence the growth of microorganisms.

Course Schedule

This schedule is subject to change by the instructor. Any changes will be communicated in course announcements on Canvas, in class, and in updated syllabi

Week	Dates	Monday	Wednesday
1	Jan. 13-16	**Classes Begin, NO LABS**	
2	Jan. 20-23	**1/20 MLK Day, No Lab**	Lab Introduction/Lab Safety PPE Distribution Lab Notebook Set-up **(OPTIONAL)**
3	Jan. 27-30	(1) Brightfield Microscopy (5) Microbiology of Pond Water – Protozoa, Algae, and Cyanobacteria	(6) Ubiquity of Bacteria (8) Aseptic Technique (9) Pure Culture Techniques
4	Feb. 3-6	Results of (6), (8), (9) (10) Smear Preparation (11) Simple Staining	(12) Negative Staining (13) Capsular Staining (14) Gram Staining
5	Feb. 10-13	(15) Endospore Staining (16) Acid-Fast Staining (17) Motility Media	Results of (17) (23) Phage Typing (24) Determination of Bacteriophage Titer
6	Feb. 17-20	Results of Previous Lab **Lab Notebook for first check**	(24) Effects of Oxygen on Growth (25) Temperature: Effects on Growth (26) pH and Microbial Growth
7	Feb. 24-27	Results of Previous Lab	(30) Evaluation of Alcohol (31) Antimicrobial Sensitivity Testing (32) Evaluation of Antiseptics and Disinfectants
8	Mar. 3-6	Results of Previous Lab Review	**Lab Exam 1**
	Mar. 10-14	**Spring Break, NO LABS**	
9	Mar. 17-20	Unknown Lab (34) Morphological Study (35) Cultural Characteristics (36) Physiological characteristics: Oxidation and Fermentation Tests	Unknown Lab Results of (34), (35), & (36) (34) Morphological Study: Gram staining
10	Mar. 24-27	Unknown Lab (37) Physiological Characteristics: Hydrolytic and Degradative Reactions (38) Physiological Characteristics: Multiple Test Media	Unknown Lab Results of (37) & (38)
11	Mar. 31-Apr. 3	Unknown Lab (39) Use of Bergey's Manual Test & Staining "Spillover" Writing Workshop?	(53) The Staphylococci: Isolation and Identification
12	Apr. 7-10	(53) The Staphylococci: Isolation and Identification	(53) The Staphylococci: Isolation and Identification
13	Apr. 14-17	Results from Previous Lab	(43) Bacterial counts of foods (44) Bacteriological examination of water
14	Apr. 21-24	Results from Previous Lab • **Lab Notebook for Second Check** • **Lab Report Due**	(58) Slide Agglutination Test for S. aureus (60) Enzyme-Linked Immunosorbent Assay (ELISA)
15	Apr. 28-May 1	Review	**Lab Exam 2**
16	May 5-10	Final Exams, NO LABS	

Course Evaluation Methods

This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course.

- **Exams –** Two non-cumulative exams will be given during the assigned class meeting time. While the exams will not be directly cumulative, biology is a subject in which content builds on itself. Exams are based on lab content and will be available on Canvas using Respondus.
  Exams will be composed of multiple-choice questions or similar (~75% of exam points) and short answer (~25% of exam points). Example exam questions will be reviewed in the lecture period directly before the exam.
- **Quizzes –** There will be a total of 10 quizzes given on the Friday of each week where labs meet. Quizzes will be given by canvas and will be a mix of fill in the blank or multiple choice questions based on photos.
- **Lab Notebook:** For the weekly lab exercises, students are expected to state the purpose of the lab, record observations, include any handouts given, and answer questions and conclusions from the lab manual for each lab exercise that is covered in lab in a separate **Laboratory Notebook** for the corresponding Lab exercises. The lab notebook will be collected two times and graded for accuracy and completeness. The notebooks are due **at the beginning of the lab** listed in the course schedule and are considered late after the start of lab. Ten (10) points will be deducted for a late lab notebook.
- **Unknown Bacterial ID –** The final class meetings for the semester will focus on each student being provided one bacterial species to identify using techniques learned throughout the semester

Point Breakdown:

Instrument	Value (points or percentages)	Total
Exams (2)	2 x 100 points	200 points
Lab Notebook	10 x 10 points	100 points
Quizzes	10 x 10 points	100 points
Unknown ID (Lab Report)	100 Points	100 points
Total		**500 points**

Grade Determination:

A = 90% or better
B = 80 – 89 %
C = 70 – 79 %
D = 60 – 69 %
F = 60

Course-Specific Policies

Attendance and Participation Policy:

The University attendance policy is in effect for this course. Please refer to Policy 7.005 Student Attendance at https://www.untdallas.edu/hr/upol. While the normal university policy applies – I also strongly suggest you attend lecture because I use a lot of interactive elements like Q&A about assignments and daily bonus point polls which can only be accessed fully during class time.

Assignment Policy:

Assignments are due by the due date and are eligible for full credit at that time. Late assignments are accepted:
-For half credit if submitted by the exam the assignment is on – no credit is given after the exam the chapter notebook check accounts for.

Exam and Quiz Policy:

Exams should be taken as scheduled. No makeup examinations will be allowed except for documented emergencies (See Policy 7.005 Student Attendance at https://www.untdallas.edu/hr/upol).

Quizzes are available for two days (Thursday and Friday) via Canvas and are timed. Only documented emergencies open exams after the deadline for quiz completion.

- Notes on getting help out of the classroom:

1) Office hours are by appointment by sending an email if need assistance outside of the class time.

2) I try very hard to respond to emails within 24 hours! If you do not hear from me within that time frame please try resending your email. In the event of high email volume, I may reply to you to acknowledge your message and give you a time frame for a full response. **Please include your course number and a brief subject in the subject of your email to make tracking/resolving your issue easier.**

3) If you have a general question/issue ("I can't find the PowerPoint for chapter 6" "Where is the homework for this week?") Try posting to the course help discussion on Canvas! This might help other students and I will check the forum every day for issues.

Lab Safety

Lab Guidelines are designed to keep you safe as well as the instruments that you use in lab in working condition as you perform your lab exercises and experiments. Certain chemicals and equipment used in the bio lab have the potential to cause harm.

BE PREPARED

Before you enter the lab, you should be prepared and knowledgeable about what exercises you will perform in the lab. This means that you are to have read the assigned procedures in the lab manual ahead of coming into the lab. Make sure in reviewing the lab manual you take note of anywhere in the procedure that alerts you to specific safety precautions that are needed.

BE NEAT

When working in the lab, ensure that you keep that area on your lab bench where you work free of clutter and organized. If you happen to spill something, ask the instructor for cleanup assistance. Have your personal belongings put away from your lab bench work area. Follow the instructions given for how to clean up your area after lab. WASH YOUR HANDS PRIOR TO LEAVING THE LAB.

BE CAREFUL AND BE CAUTIOUS WITH CHEMICALS, SLIDES & SPECIMENS

Handle items, especially sharp and those made of glass, careful. Be aware of your surroundings as you work and work on task. Keep conversation with peers to a minimum and only relevant to the work at hand. The best way to help ensure safety when handling chemicals is to assume any chemical you handle is dangerous. Seek instructions from the instructor during lab for specific information on handling chemicals known to be dangerous. If any chemical comes in contact with your skin or eyes, *immediately* notify your instructor. Your instructor will notify you if/when additional precaution is needed including use of hand and/or eye protection. ***You are provided with Lab coat; Safety goggles and disposable lab gloves are available in lab for use.***

WEAR PROPER CLOTHING

Accidents in the lab do happen. Certain chemicals have the potential to damage fabric and clothing. Consider what you wear. Avoid open-toed shoes/flip flops/sandals as such is not appropriate nor safe for wearing in the lab. Tie long hair back as this is a known danger when working in the lab.

LOCATE SAFETY EQUIPMENT

Be sure to locate all the safety equipment in the lab in which you are working. This includes items such as fire extinguishers, first aid kit, broken glass receptacles, chemical waste containers, eye wash station, shower pull, and sink. Also note where exits are located in case of an emergency.

Laboratory Specimen Care & Safety Rules

I. GENERAL GUIDELINES:

- ***Treat all specimens with respect and care. We are obtaining knowledge through work with species that are small but still alive.*** The specimens are for educational learning use only. All specimens and cultures must remain in the lab

- Secure gloves, and any other personal safety protective apparel or equipment stated by the instructor.

- Alert instructor ASAP if you have any allergies to preservatives and or latex.

- Clear off your lab station and follow the appropriate lab procedures when asked to do so. Do not perform your own unguided experiments.
- Exercise caution when getting up from your lab station. Be aware of your surroundings and conscious of others.
- If any accidents occur, you must notify your instructor IMMEDIATELY.

II. Thoroughly wash your hands after completing your dissection and cleaning up your work area.

University Policies and Procedures

Students with Disabilities (ADA Compliance):

The University of North Texas at Dallas makes reasonable academic accommodations for students with disabilities. Students seeking accommodations must first register with the Disabilities Services Office (DSO) to verify their eligibility. If a disability is verified, the DSO will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, DSO notices of accommodation should be provided as early as possible in the semester to avoid any delays in implementation. Note that a student must obtain a new letter of accommodation for every semester and must meet/communicate with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letter during their designated office hours to protect the privacy of the student. For additional information see the Disability Services Office website at http://www.untdallas.edu/disability. You may also contact them by phone at 972-338-1777; by email at UNTDdisability@untdallas.edu on the first floor of the Student Center.

Canvas Instructure Accessibility Statement:
University of North Texas at Dallas is committed to ensuring that online and hybrid courses are usable by all students and faculty including those with disabilities. If you encounter any difficulties with technologies, please contact our ITSS Department. To better assist them, you would want to have the operating system, web browser and information on any assistive technology being used. The Canvas Instructure Accessibility Statement is provided at https://www.canvaslms.com/accessibility.

NOTE: Additional instructional technology tools, such as Turnitin, Respondus, Panopto, and publisher cartridge content (i.e. MyLab, Pearson, etc.) may NOT be fully ADA compliant. Please contact our Disability Office should you require additional assistance utilizing any of these tools.

Academic Integrity:

Academic integrity is a hallmark of higher education. You are expected to abide by the University's code of Academic Integrity policy. Any person suspected of academic dishonesty (i.e., cheating or plagiarism)

will be handled in accordance with the University's policies and procedures. Refer to the UNT Dallas Academic Integrity Policy in the appropriate Catalog at http://dallascatalog.unt.edu.

Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabrication of information or citations, facilitating acts of dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.

Web-based Plagiarism Detection*:* Please be aware in some courses, students may be required to submit written assignments to Turnitin, a web-based plagiarism detection service, or another method. If submitting to Turnitin, please remove your title page and other personal information.

Artificial Intelligence (AI) technologies:

"UNT Dallas acknowledges the evolving capabilities of Artificial Intelligence (AI) technologies and their various effects on student writing and content creation. The Department of Natural Sciences takes a use-with-permission approach to AI. Students are only permitted to use AI technology in the creation of any course content if permitted by the course instructor. If the use of AI technology is detected, without specific instructor permission, the student will be deemed in violation of the plagiarism policy."

Diversity/Tolerance Policy:

Students are encouraged to contribute their perspectives and insights to class discussions. However, offensive & inappropriate language (swearing) and remarks offensive to others of particular nationalities, ethnic groups, sexual preferences, religious groups, genders, or other ascribed statuses will not be tolerated. Disruptions which violate the Code of Student's Rights, Responsibilities, and Conduct will be referred to the Dean of Students as the instructor deems appropriate (UNTD Policy 7.001 found at https://www.untdallas.edu/hr/upol).

Classroom Disruption:

Students are expected to engage with the instructor and other students in this class in a respectful and civil manner at all times to promote a classroom environment that is conducive to teaching and learning. Students who engage in disruptive behavior will be directed to leave the classroom. A student who is directed to leave class due to disruptive behavior is not permitted to return to class until the student meets with a representative from the Dean of Students Office. It is the student's responsibility to meet with the Dean of Students before class meets again and to provide the instructor confirmation of the meeting. A student who is directed to leave class will be assigned an unexcused absent for that class period and any other classes the student misses as a result of not meeting with the Dean of Students. The student is responsible for material missed during all absences and the instructor is not responsible for providing missed material. In addition, the student will be assigned a failing grade for assignments, quizzes or examinations missed and will not be allowed to make up the work.

The Code of Student's Rights, Responsibilities, and Conduct (UNTD Policy 7.001 found at https://www.untdallas.edu/hr/upol) describes disruption as the obstructing or interfering with university functions or activity, including any behavior that interferes with students, faculty, or staff access to an appropriate educational environment. Examples of disruptive behavior that may result in a student being directed to leave the classroom include but are not limited to: failure to comply with

reasonable directive of University officials, action or combination of actions that unreasonably interfere with, hinder, obstruct, or prevents the right of others to freely participate, threatening, assaulting, or causing harm to oneself or to another, uttering any words or performing any acts that cause physical injury, or threaten any individual, or interfere with any individual's rightful actions, and harassment. You are encouraged to read the Code of Student's Rights, Responsibilities, and Conduct for more information related to behaviors that could be considered disruptive.

Course Evaluations:

Student's evaluations of teaching effectiveness is a requirement for all organized classes at UNT Dallas. This short survey will be made available to you at the end of the semester via your campus email, providing you a chance to comment on how this class is taught. I will not have access to the results of the evaluations until after final grades have posted. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider students' evaluations to be an important part of your participation in this class.

Bad Weather Policy:

Campus facilities will close and operations will be suspended when adverse weather and/or safety hazards exist on the UNTD campus or if travel to the campus is deemed dangerous as the result of ice, sleet or snow. In the event of a campus closure, the Marketing and Communication Department will report closure information to all appropriate major media by 7 a.m. That department will also update the UNTD website, Facebook and Twitter with closing information as soon as it is possible. For more information please refer to http://www.untdallas.edu/police/resources/notifications.

Inclement Weather and Online Classes:

Online classes may or may not be affected by campus closures due to inclement weather. Unless otherwise notified by your instructor via e-mail, online messaging, or online announcement, students should assume that assignments are due as scheduled.

Technology Assistance: In order to successfully access the materials in Canvas, UNT Dallas advises that your computer be equipped with the minimum system requirements listed on the first page of the syllabus.

If you experience difficulty accessing or using components of the course, try using Google Chrome browser. If you still experience technical difficulties, first, notify your instructor.

If the problem is still not resolved, call Distance Learning at the phone number listed on the first page of the syllabus. Also, no matter what browser you use, always enable pop-ups.

For more information see:

- UNT Dallas Canvas Technical Requirements: https://community.canvaslms.com/docs/DOC-10721

- Canvas Instructure Support & Unsupported Operating Systems: https://community.canvaslms.com/docs/DOC-10720

Microbiology Laboratory Notebook Guidelines

1. Lab notebook must be bound. It can be a composition type notebook or a 3 ring binder.
2. Use Blue or Black ink, never use a pencil
3. Make sure the front cover of your lab notebook includes your name & class name.
4. The Table of Contents is located in the front of the lab notebook. The format for the Table of Contents
    1. Name of Exercises completed in a given week
5. All pages are to be numbered.
6. Experimental entries must include
    1. **Purpose and expected results:** Answer these questions for each lab exercise covered, unless the instructor tells you otherwise.
    2. **Results:** Record the data for the experiments in the tables, graphs or pictures provided in the lab manual or from handouts.
    3. **Conclusions:** Answer these questions for each lab exercise covered, unless the instructor tells you otherwise. If a part of the lab exercise is skipped, you are not responsible for questions relating to that part.
    4. **If the instructor indicates there are specific questions from the lab manual to answer – include the answers in your lab notebook**
7. Correcting mistakes, do not remove them
    1. Cross out mistakes with a single line
    2. Sign and date all corrections
8. Make sure you enter information into the lab notebook as soon as the lab is performed. It will be difficult to complete the material at the last minute.
9. Make sure your entries are as detailed as possible because you will be using this notebook as a reference on the Unknown Lab Report.
10. You will be given a copy of the grading rubric. This must be attached to the inside front cover of the lab notebook.

Overall Notebook (4 pts)

1.	Table of Contents is complete	1 pts
2.	Pages are numbered	1 pts
3.	Written in blue or black ink	1 pts
4.	Pages are bound in a notebook	1 pts

Individual Labs (96 pts)

Category	Excellent (100% of points)	Average (50% of points)	Not Acceptable (0 points)

Purpose & Expected Results (2 pts)	Stated both purpose of the experiment & the expected results.	Missing one of the required elements.	Section was not completed.
Data (6 pts)	Clear and accurate representation of the data in tables.	Tables are incomplete or contain incorrect results.	No data collected.
Conclusion (8 pts)	All Conclusion questions in this section are answered thoroughly and thoughtfully.	Not all conclusion questions are answered or some questions are answered incorrectly.	No conclusion questions are answered.