BIOL 2305: Microbiology for Health Sciences

Fall 2023 • CRN # 64996 • Lecture & CURE Lab Syllabus

VALENCIA

Face to Face

Lecture: Mon. & Wed. 9:00am-10:15am
Health Sciences Building Rm. 101
Lab: Wed. 10:30am-1:15pm
Health Sciences Building Rm. 110

Course Description

This course introduces the basic principles of microbial structure, genetics and physiology, virology, parasitology, disease, pathogenicity, epidemiology, and immunology. Only some emphasis is given to basic biological principles. The course is designed for those obtaining a career in the health sciences.

Course-based Undergraduate Research Experience (CURE) Lab

Our lab will be an application-based and instructor-guided CURE research project. Students will be practicing novel research to develop skills in researching primary literature, observing and analyzing results, listening, applying teamwork, and communicating their knowledge gained to the broader population about their first-hand research projects.

Welcome Students

I love teaching Microbiology—the study of microorganisms. We will start by learning about the different types of microorganisms, bacteria, fungi, and viruses. We will focus most of the semester on bacteria—such interesting little organisms that have more helpful roles to humans than harmful. Can you imagine, we are each a planet to the bacteria on our bodies? First, we will learn about the bacterial cell components and how they grow- environmental requirements, nutrients, and metabolism. Next, we will discuss bacterial DNA- Yes, most microorganisms have it. We will observe that the process of DNA replication is universal, bacteria do have the same DNA components and proteins needed for replication. Have you ever thought about how bacterial cells dividing contribute to microbial pathogenicity? How does pathogenicity contribute to cause disease? These questions will be answered during our discussion of understanding the principles of pathogenicity, disease, and epidemiology. We will also discuss how our immune cells build and maintains a defense against microbial infections in our discussion of Innate and Adaptive Immunity. The last part of the semester we briefly study viruses, an acellular microorganism. Now, you know why I love teaching Microbiology— we learn about microorganisms that are too small to be seen with a naked eye, but can have huge impacts, more helpful than harmful, to humans and ecosystems everywhere on Earth.

Bring the knowledge that you have and take the journey with me as you continue reaching toward your educational goals.

Hand print on a large TSA plate from my 8 1/2 year old son after playing outside.

"I hope to continue to inspire our nation's youth to pursue careers in science, technology, engineering, and math so they, too, may reach for the stars."
--ELLEN OCHOA The First Hispanic Woman to Go to Space.

Dr. Tammi Duncan-Teller

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Student Course Learning Outcomes (CLOs)

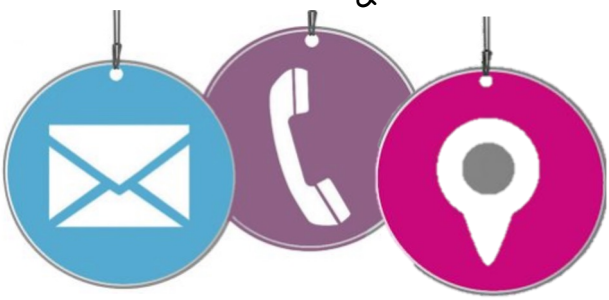
At the completion of this course, students will be able to:

Health-related Critical Thinking CLO 1: Apply critical thinking and the information learned to problems encounter in Health-related professions
Prokaryotic Cell Structure CLO 2: Have a basic understanding of cell structure for different types of bacteria.
Microbial Metabolism CLO 3: Understand the metabolic mechanisms of prokaryotes and the use of these in classification systems
Microbial Genetics and Mutations CLO 4: Understand the genetic mechanisms of prokaryotes and the nature of mutations
Acellular Pathogen CLO 5: Have basic understanding of virus structure and function
Immune system CLO 6: Be able to describe the basic functions of the immune system with respect to infectious disease processes
Microbial Pathogenicity and Epidemiology CLO 7: Understand the principles of pathogenicity, disease, and epidemiology
Antimicrobial Drugs CLO 8: Be able to explain the basics of antimicrobial and antiviral chemotherapy.
Lab skills CLO 9: Be able to apply microbiological lab skills and evaluate results to discover an unknown microbe.

The overall goal of the course is to help you become literate in these scientific concepts and be able to apply them in your life as you move forward in reaching your educational goal.

Dr. T's Contact Information

Email: tammid31@unm.edu
Office: 505.925.8726
Front office: 505. 925. 8600
Office: Rm 132, Arts & Sciences Building



Talk to Me Hours

- Mon. 10:30am-11:30am
- Tues. 10:30am-11:30am
- Thurs. 10:30am-12:30pm (Microbiology lab-VAHS 110)
- Fri. Remotely only: 10:30am-12:30pm

Zoom meets: Available by appt.
https://unm.zoom.us/j/5736149969
Password: biology

Grading Criteria

Exams: Each of the three exams is worth 100 pts and their total is 300 pts. You will be given one hour and 15 min to complete each exam. You will not be able to use your notes, textbook, or online resources. Review your homework, Reviews, OneNote class notes to prepare for your exam.

Homework (HW): Homework are question sets that are each worth 8 pts. Homework is due to UNM Canvas at 11:59pm on the due date. Bring a printed copy to class. *Failure to submit to UNM Canvas by due date will result in an automatic deduction of 4pts.* Submitted HW with no name will be deducted 1 pt. Late -2pts. Will not grade pass 10 days late. Submitted an incomplete -1pt.

Case studies: Three case studies, each worth 12 pts each, will help you build your critical thinking and self-assessment skills. Due to UNM Canvas by due date. Same submission guidelines as Homework.

Reflections: Three Reflections on what and how you're are learning and your approach/adjustments to learning the material will be issued. This is a practice of metacognition, (the process of "thinking about thinking," or reflecting on personal habits, knowledge, and approaches to learning) in order to help you adjust your learning. These Reflections are due to UNM Canvas by due date. Same submission guidelines as Homework.

Reviews: There are four Reviews. The total is 40 pts. The goal of the review is to be used as one tool to help you start/prepare for your exams. Be sure to review homework and lectures notes too.

Attendance/Participation: You must be in the class on time to get the most out of this course and participate. You are responsible for "signing-in" to document your attendance in class. If you are missing more than 15 minutes of class, it will count as an absence. 0.5pt/class or 1pt/week.

Cumulative Final: The Final is worth 125pts and given at the end of the semester. You will have 2 hr to take the final face to face.

Lab Activities: See page 12 for details.

In summary, every point counts. There is no extra credit. The due dates are firm. Communicate. Be on time. Study every week. Ask questions. Try your best. -Dr. T

	**Points per assignment:**	**Total Points:**	**Percentage of overall Biol 2305 grade (out of 850pts):**
Intro. to Homework	5 pts	5 pts	~0.6%
Intro. to Quiz	5 pts	5 pts	~0.6%
Homework (11)	8 pts each	88 pts	10%
Case Studies (3)	12 pts each	36 pts	4%
Reflections (3)	5 pts each	15 pts	~1.7%
Attendance/Participation (16)	1 pt/week	16 pts	~1.8%
Reviews (4)	10 pts each	40 pts	5%
Exams (3)	100 pts each	300 pts	35.3%
Cumulative Final Exam (1)	120 pts each	120pts	~14%
Lecture total		625pts	
Lab Activities	(see page 11 for assignments)	225pts	26.5%
TOTAL		850 pts	100 %
A+ 100% or higher **A** 91-99% **A-** 90% **B+** 88-89% **B** 81-87% **B-** 80%	**C+** 78-79% **C** 71-77% **C-** 70%	**D+** 68-69% **D** 61-67% **D-** 60%	**F** <60%

Required Learning Resources

1. Electronic Textbook: **Microbiology** by N. Parker, M. Schneegurt, A. Tu, B. Forster, and P. Lister, 2018, OpenStax Rice University. **REQUIRED.** Free download https://assets.openstax.org/oscms-prodcms/media/documents/Microbiology-OP_C34GvqP.pdf

2. UNM Canvas: http://canvas.unm.edu The webpage contains resources you need to succeed in the course. Login using your UNM username and password. ***You are responsible for all announcements, assignments, tests and/or any changes to the syllabus that will be posted on the webpage. Announcements are sent every Friday. Please check email regularly.***

3. Technology and computer: In this course, you will need a dependable computer, reliable internet connection, computer speakers, Microsoft PowerPoint and Word, and Adobe Flash Player.

This is a 4 credit-hour Face to Face course. Class meets face to face for two 75-minute session of direct instruction for sixteen weeks during the Fall 2023 semester. Students are expected to complete a *minimum* of six hours of out-of-class work (readings, homework, study, assignment completion, and class preparation) each week.

Attendance. You must be in the class on time to get the most out of this course, participate in class discussions, and to get a good grade. You are responsible for "signing-in" to document your attendance in class. If you are missing more than 15 min. of class, it will count as an absence. The student will be held responsible for all material and information regardless of whether the student was in class. Exception will be made per student basis dependent on emergency.

Make-up Exams. Make-up exams will be given to students with a documented emergency. You must notify the instructor prior to the day of the missed exam.

Homework. These will be assigned weekly to help you master the concepts presented. They are due to UNM Canvas at 11:59pm the evening before class. Be sure to include your name on each submitted homework assignment. A deduction of one point will be given if not. Be sure to answer each question before submission. A deduction of one point will be given if not.

Review. There will be four Reviews. These will help you apply the knowledge that you have gained. One will be due before each regular exam. Be sure to include your name on your Review. One point will be deducted if not.

Late assignment/homework. Late assignments/homework will only be accepted within the first 10 days following the due date. There will be a 50% reduction in grade.

Course Policy/Information Continue…

Withdrawal. Last day to withdraw from class without a "W" on your transcript is **Sept. 8, 2023** at 5:00pm using UNM Canvas. Last day to withdraw from class with out Dean's signature/permission on LoboWEB is **Nov. 10, 2023.** See https://registrar.unm.edu/semester-deadline-dates/index.html. Click on –Fall 2023. *Note- I don't submit "W" after the 12th week of classes.

Cell phones. As a courtesy to the class, please silence any cell phones. Any sight of a cell phone during exams or quizzes will result in an automatic fail for that assignment. If you need a to step out during a test/quiz, please leave your phone on your table.

Disruptive behavior. Please avoid any disruptive behaviors in the classroom and online communications. For class, this includes going in and out of the class, texting, talking. For online communication and interactions follow netiquette.

Plagiarism. Only submit work that is yours. Always cite any work used using APA format. https://libguides.unm.edu/c.php?g=326014&p=2187071 Copy and Paste from Google, your classmates, or your book is considered plagiarism. Write answers in your own words.
You will receive two warnings with the assignment given a zero. A third time you will be dropped from the course and the UNM Science & Wellness Department Chair notified.

Netiquette. The rationale of providing **Rules of Netiquette** for students is to provide guidelines for online behavior and communication between you and your classmates. We (myself included) are all held to the following guidelines that will provide a safe and respectful online classroom space for constructive critiques, discussion, and scholarly reports between you and your classmates.
These guidelines are expected to be upheld in any online communications (Email, Discussion Board Forums, Messaging, and Blogs) between all of us.

Rules of Netiquette continue.
1. Your online behavior and communication should be similar to how you would treat and speak to a person in standing in front of you.
2. Be mindful of different backgrounds, which include cultural, linguistic, political, and religious differences.
3. Be respectful of other's views and opinions and try to remain open minded. You can have respectful disagreements. Avoid flaming, which is publicly attacking or insulting another person's view.
4. Provide constructive and concise responses to the subject of the posts in Discussion Forums and Blogs. Stay on topic, read all comments/viewpoints in discussion before contributing to discussion, avoid slang and profanity, be prepared to correct information if your comment is misunderstood or misinterpreted, and avoid using personal identifying information.
5. Practice good grammar and spelling skills. Use 12 pt. font Times New Roman or Calibri, avoid text shortcuts, define acronyms, use correct spelling, limit use of emoticons, and use clear and concise language.
6. Avoid the use of all CAPITAL LETTERS. It suggests shouting, impoliteness, or can be aggressive. Reread you post, checking for sarcasm, slang or anger, before submitting it. Avoid sending a message out of anger or written if you are angry.
7. Call your instructor if you are in conflict with them or another student.
8. In relation to security, protect your passwords and don't send confidential information through email. If you suspect your password has been used, change your password.
9. There are specific listings of practices for email netiquette and message board netiquette below.

Email Netiquette
-Write a concise email to @unm.edu accounts.
-Include “Biol 2305” in your subject line to me.
-Ask for permission of author before forwarding an email to classmate.
-Include a formal salutation to your recipient.

Discussion Forum and Journal Netiquette
Include “topic-your name” in subject line.
Write concise paragraph on the topic.
Paraphrase and cite your references with APA and credit classmates work if appropriate.
Read all messages in thread before replying.
Don’t repeat another person’s post.

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Accommodations: UNM-Valencia is committed to providing courses that are inclusive and accessible for all participants. As your instructor, it is my objective to facilitate an accessible classroom setting, in which students have full access and opportunity. If you are experiencing physical or academic barriers, or concerns related to mental health, physical health and/or COVID-19, please consult with me after class, via email tammid31@unm.edu or during talk-to-me hours. I am not legally permitted to inquire about the need for accommodations. We can meet your needs by collaborating with the Director of Student Affairs, Hank Vigil, by email vigilh@unm.edu or by phone (505) 925-8581.

Academic Integrity:
Having academic integrity is paramount to your success in any class. Plagiarism or cheating is not tolerated. Any instance of this will result in a grade of zero for that assignment. Here is the link to the UNM Academic Dishonesty Policy: https://policy.unm.edu/regents-policies/section-4/4-8.html.
The policy states:
Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or who otherwise fails to meet the expected standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.
Academic Dishonesty is defined as:
"Academic dishonesty" includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Student Support: Our campus is dedicated to your successes, and we provide services that offer guidance. If you are not sure, please feel free to ask. Whether it is academic or not.
- PASOS Resource Center: http://valencia.unm.edu/campus-resources/pasos/pasosresource-center/resource-guide.html
- UNM-Valencia Learning Commons (Tutoring): http://valencia.unm.edu/campusresources/learning-commons/index.html
- TRIO Student Support Services: http://valencia.unm.edu/students/ssstrio/index.html
- UNM-Valencia Campus Food Pantry (free snacks, meals, goodies): http://valencia.unm.edu/campus-resources/pasos/pasos-resource-center/campusfood-pantry.html
- Jobs on campus: https://valencia.unm.edu/students/financial-aid/studentemployment.html
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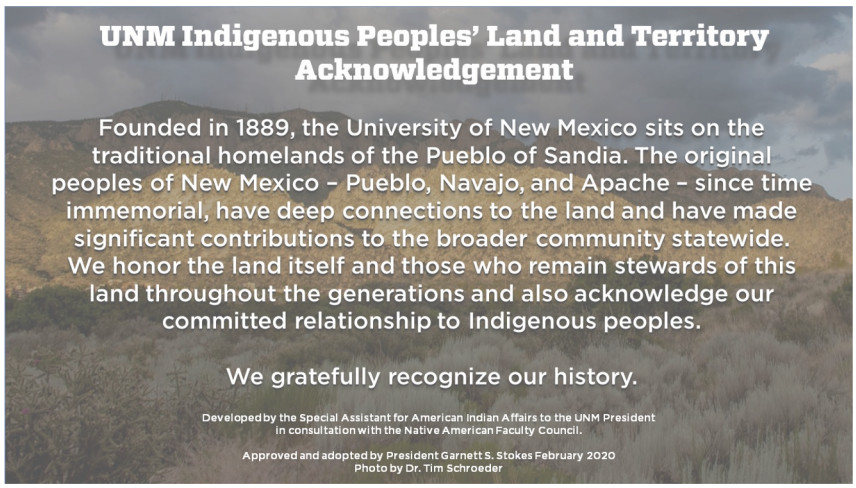
Equal Opportunity and Non-discrimination In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered "responsible employees" by the Department of Education (see page 15--offices/list/ocr/docs/qa-201404-title-ix.pdf). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct, and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity (oeo.unm.edu). For more information on the campus policy regarding sexual misconduct, see: https://oeo.unm.edu/title-ix/index.html

Citizenship and/or Immigration Status: All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration's welcome is found on our website: http://undocumented.unm.edu/.

Respectful and Responsible Learning: We all have shared responsibility for ensuring that learning occurs safely and equitably. UNM has important policies to preserve and protect the academic community, especially policies on student grievances (Faculty Handbook D175 and D176), academic dishonesty (FH D100), and respectful campus (FH CO9). These are in the *Student Pathfinder* (https://pathfinder.unm.edu) and the *Faculty Handbook* (https://handbook.unm.edu). Please ask for help in understanding and avoiding plagiarism or academic dishonesty, which can both have very serious consequences.

Support in Receiving Help and in Doing What is Right: I encourage students to be familiar with services and policies that can help them navigate UNM successfully. Many services exist to help you succeed academically and to find your place at UNM, see students.unm.edu or ask me for information about the right resource center or person to contact. UNM has important policies to preserve and protect the academic community, especially policies on student grievances (Faculty Handbook D175 and D176), academic dishonesty (FH D100), and respectful campus (FH CO9). These are in the *Student Pathfinder* (https://pathfinder.unm.edu) and the *Faculty Handbook* (https://handbook.unm.edu) Please ask for help in understanding and avoiding plagiarism or academic dishonesty, which can both have very serious disciplinary consequences.



Fall 2023 Lecture Course Schedule

Week	Date	Chapter: Topic	Items Due	Due Date @ 11:59pm
1	Aug. 21 Mon.	Overview of Microbiology	Intro. Online Homework Intro. Online Quiz	Fri. 8/25 Sun. 8/27
	Aug. 23 Wed.	1: Invisible World (1.2, 1.3)	Homework 1: Ch 1 Part A	Tues. 8/22
2	Aug. 28 Mon.	3: The Cell (3.2, 3.3, 3.4) **Case Study 1**	Homework 1: Ch 3 Part B	Sun. 8/27
	Aug. 30 Wed.	3: The Cell (3.2, 3.3, 3.4)		
3	Sept. 4 Mon.	No Class-Labor Day		
	Sept. 6 Wed.	4.1: Prokaryotic Diversity (Sept. 8 Last day to drop class without "W" with 100% tuition refund on LoboWeb)	Homework 2: Ch 4.1 & 9	Tues. 9/5
4	Sept. 11 Mon. ***(Remote Lecture)***	9: Microbial Growth (9.1, 9.2, 9.3, 9.4, 9.6)	**Case Study 1**	**Fri. 9/15**
	Sept. 13 Wed.	9: Microbial Growth (9.1, 9.2, 9.3, 9.4, 9.6)		
5	Sept. 18 Mon.	Review 1 (Ch. 1, 3, 4.1, 9)		
	Sept. 20 Wed.	**Exam 1 (Ch. 1, 3, 4.1, 9)**	Review 1	Wed. 9/20
6	Sept. 25 Mon.	8: Microbial Metabolism (8.1, 8.2, 8.3, 8.4)	Homework 3: Ch 8	Sun. 9/24
	Sept. 27 Wed.	8: Microbial Metabolism (8.1, 8.2, 8.3, 8.4)	**Reflection 1**	**Fri. 9/29**
7	Oct. 2 Mon.	11: Mechanisms of Microbial Genetics Part 1 (11.2, 11.3, 11.4)	Homework 4: Ch 11 Part 1	Sun. 10/1
	Oct. 4 Wed.	11: Mechanisms of Microbial Genetics Part 1 (11.2, 11.3, 11.4)		
8	Oct. 9 Mon.	11: Mechanisms of Microbial Genetics Part 2 **Case Study 2**	Homework 5: Ch 11 Part 2	Sun. 10/8
	Oct. 11 Wed.	11: Mechanisms of Microbial Genetics Part 2 (11.5, 11.6, 11.7)		
9	Oct. 16 Mon.	11: Mechanisms of Microbial Genetics Part 2 (11.5, 11.6, 11.7)		
	Oct. 18 Wed.	Review 2 (Ch. 8, 11 Part 1 &2)		

***I reserve the right to make necessary changes.**

Fall 2023 Lecture Course Schedule Continue

Week	Date	Chapter: Topic	Items Due	Due Date @ 11:59pm
10	Oct. 23 Mon.	**Exam 2 (Ch. 8, 11 Part 1&2)**	Review 2 **Case Study 2**	Mon. 10/23 **Fri. 10/27**
	Oct. 25 Wed.	13: Control of Microbial Growth (13.1, 13.2, 13.3, 13.4)	Homework 6: Ch 13	Tues. 10/24
11	Oct. 30 Mon.	14: Antimicrobial Drugs (14.2, 14.3, 14.5, 14.6)	Homework 7: Ch 14	Sun. 10/29
	Nov. 1 Wed.	14: Antimicrobial Drugs (14.2, 14.3, 14.5, 14.6)	**Reflection 2**	**Fri. 11/3**
12	Nov. 6 Mon.	15: Microbial Mechanisms of Pathogenicity (15.1, 15.2, 15.3)	Homework 8: Ch 15	Sun. 11/5
	Nov. 8 Wed.	15: Microbial Mechanisms of Pathogenicity (15.1, 15.2, 15.3) Nov. 10 Last day to drop class without Deans Permission		
13	Nov. 13 Mon.	16: Disease and Epidemiology (16.1, 16.2)	Homework 9: Ch 16	Sun. 11/12
	Nov. 15 Wed.	Review 3 (Ch. 13, 14, 15&16)		
14	Nov. 20 Mon.	**Exam 3 (Ch. 13, 14, 15&16)**	Review 3	Mon. 11/20
	Nov. 22 Wed.	Host Defenses 17: Innate Nonspecific (17.1/17.2, 17.4/17.5)	Homework 10: Ch 17 &18	Tues. 11/21
15	Nov. 27 Mon.	Host Defenses 18: Adaptive Specific (18.1/18.3, 18.5) **Case Study 3**		
	Nov. 29 Wed.	6: Acellular Pathogens (6.1, 6.2) Nov. 24 Course Feedback open UNM Canvas	Homework 11: Ch 6	Tues. 11/28
16	Dec. 4 Mon.	6: Acellular Pathogens (6.1, 6.2)	**Case Study 3** **Reflection 3**	**Fri. 12/8** **Fri. 12/8**
	Dec. 6 Wed.	Semester Final Review Dec. 10 Course Feedback close at 5pm	**Review 4**	Mon. 12/11
Final	**Dec. 11 Mon.**	***Cumulative Final Exam Due 9:00-11:00am***	**Final Exam**	**Mon. 12/11**

***I reserve the right to make necessary changes.**

Microbiology for Health Sciences Lab

Meeting time: Wed. 10:30am-1:15pm Health Sciences Rm. 110
Lab coat or lab apron is required.
There is no lab manual for this class. Handouts will be provided via in class or Canvas.

Course-based Undergraduate Research Experience (CURE) Description:

For the microbiology lab, we will be completing a CURE. The goal of this program is to increase exposure of research to more undergraduate students within the classroom, rather than a traditional research experience. Conducting research has shown many benefits to students, which include improved retention, increased sense of belonging, and an increased interest in science. During this semester your research team will complete a research project that will aim to uncover novel information in the field of microbiology. This project will be composed of four phases:

1.) *Preparation:* Background research to understand the research question, **"Is the overall health of an individual affected by their oral microbial diversity?"**
2.) *Application*: Culture and Identify an oral microbe from an individual's toothbrush using microbiological research methods.
3.) *Analyze*: Interpret the data that you collect in your experiment and discuss the implications of oral microbial roles to health.
4.) *Presentation:* Share your findings with the class and a broader population of students and faculty.

During the semester, you will be guided by your instructor in carrying out each phase so that you are managing your time well, and that you are using proper means to address your problem and analyze your data.

CURE Learning Map:

Learning Goals By the end of the course, students will be able to:	Learning Objectives By the end of the course, students will be able to:	Evidence from key learning activities
1. Develop an understanding of scientific research in health-related fields.	i. Distinguish between primary and secondary literature articles. ii. Find relevant literature for a given topic.	i.Literature scavenger hunt ii.Prepare a bibliography for their research posters.
2. Gain appreciation for current microbiological research methods.	i. Complete sample collection using aseptic techniques. ii. Complete the preparation of samples for sequencing. iii. Analyze and interpret results of sequencing of samples to environment collected from.	i.Isolation of sample from a toothbrush. ii.Description and preparation of the processes (culturing, DNA extraction, PCR amplification, Electrophoresis, BLAST usage) of identifying Unknown Bacterium. iii. Description and preparation of the processes for biochemical tests.
3. Appreciate the value of research by sharing knowledge gained to the broader population.	i.Create and organize a research poster of their project. ii. Clearly describe their research project.	i. Research Poster Session ii. Peer assessment iii. Team assessment

Lab Grade Criteria

Learning Log: You will have an opportunity to start/complete your Learning Log prompt for the day. There will be 15 total for the semester. You'll have to upload to Learning Log on UNM Canvas. Late -2pts. Will not grade pass 10 days late. Submitted an incomplete –the pts/question.
Research Poster Drafts/Complete: At 3 times during the semester your team will turn in an updated Research Poster Draft that begins with an outline and drafts will be updated as the semester progresses. Submission guidelines are similar to Learning Logs.
Team Assessments: These assessments will be completed by one other teams on your research poster at the end of the semester.
Peer Assessments: These assessments will be completed anonymously and the average score from teammates will be given as your score.
Instructor Assessments: One assessment will be given at the end of the semester of your team's presentation on your team research poster graded according to a rubric for your poster.
Attendance and Participation: It's important that you attend each lab course, due to the practical nature of the lab, it might be difficult to catch up if you fall behind. Additionally, research methods are set up to be completed during the lab period. Students may be dropped from the class after 3 absences.

Lab Activities	Points each assignment:	Total Points:	Percentage of overall Biol 2305 grade (out of 850pts):
Sign Team Contract (1)	2 pts	2pts	~0.2%
Learning Log (15)	3 pts	45pts	~5%
Lab Quizzes (4 of 5)	15pts	60pts	~7%
CURE Activities (5)	5pts	25pts	~3%
Researcher Biography (1)	8pts	8pts	~1%
Research Poster Drafts/Complete (3)	10 pts	30pts	~3.5%
Research Poster (1)	20pts	20pt	~2%
Team Assessment (2)	10 pts	10pts	~1%
Peer Assessment (1)	10 pts	10pts	~1%
Attendance and Participation (15)	1pt/week	15pts	~2%
TOTAL		225 pts	~26.5%

Lab Policies

1.) Attendance is **Required**. **These are practical, hands-on activities and cannot be made up.** Students may be dropped from the class after 3 absences. Attendance will be taken via a daily sign-in sheet. Excessive tardiness (greater than 10 minutes) will be counted as an absence.

2.) No food, drink or chewing gum is allowed in the lab.
3.) You must wear a **lab coat or apron** during lab.
4.) Wash your hands before leaving the lab for the day.
5.) You must tie your hair back.
6.) Treat all lab equipment carefully and with respect.

Fall 2023 Lab course schedule

Week	Wed. 10:30am-1:15pm	Lab Activity	Assignments	Due Dates at 11:59pm or in class
1	Aug. 23	Lab Introduction of Team-based Research Lab 1: Lab Safety Exercise 1-1/1.2: Glo Germ Hand Wash/Hand Cleansing Agents *Learning Log 1:* Why is Lab Safety important? How can teams work effectively? Results of Exercise 1-1 Table Q1&2 **Early Semester ECURE Survey** https://esurvey.unm.edu/opinio/s?s=152611	Sign Team Contract Learning Log 1	**Fri. 8/25** **Sun. 8/27**
2	Aug. 30	Lab 2: Apply Aseptic Technique for inoculation of TSB broth cultures. Practice Quadrant streak and complete with *E.coli.* *Learning Log 2:* What is the objective of aseptic technique? Results of your practice streak with Dry erase markers. Results of Exercise 1-2 Table & Q1-Q2 One question you have about your Research Poster.	Learning Log 2 CURE Activity 1: What is a Research Poster? –Peer mentor to talk about poster.	Fri. 9/1
3	Sept. 6	Lab 3: Spread Toothbrush onto Blood Agar plate. Isolation Streak 2 with *E.coli.* How to micropipette? *Learning Log 3:* What is one overall indicator that a research paper is primary literature? Compare and contrast a a primary literature article and a research poster. How will you use the Quadrant streak method in your Research Project? Analyze Quadrant streak for isolated colonies. Repeat by taking one from Quadrant streak and re-streak on new TSA plate. **Pre-Performance-Based Assessment**	Learning Log 3 **Lab Quiz 1** CURE Activity 2: Literature Scavenger Hunt for Primary Literature	Fri. 9/15 **Wed. 9/6** Fri. 9/8
4	Sept. 13	Lab 4: Complete Quadrant streak for one colony from Toothbrush. Practice Gram stain technique. Apply Gram stain with *E.coli* and *Streptococcus epidermis*, and unknown gram bacteria. *Learning Log 4:* Include a picture of your *E.coli* Quadrant streak result. How can you improve or maintain getting isolated colonies? Why did you complete the gram stain method at the same time for *E.coli, S. epidermidis,* and unknown A.	Learning Log 4 **Early Semester ECURE Survey** CURE Activity 3: How to Read a Primary Research Article?	Fri. 9/22 Fri. 9/15

***I reserve the right to make necessary changes.**

Fall 2023 Lab course schedule

Week	Wed. 10:30am-1:15pm	Lab Activity	Assignments	Due Dates at 11:59pm or in class
5	Sept. 20	Lab 5: Analyze results for your practice Gram stain using Light Microscope. Complete a Quadrant Streak 2 with Toothbrush Microbe. *Learning Log 5:* List and include the picture of each at 100X magnification of the Gram stain results from last week. How will you improve your staining method, if you didn't get expected Gram stain result? How will Gram stain be used in your research project? Draw a Research poster figure in Powerpoint of your Toothbrush microbe Gram stain results. Include your positive and negative controls. It will take up the entire slide of a powerpoint slide.	Learning Log 5 Researcher Biography presenters (4)	Fri. 9/20
6	Sept. 27	Lab 6: Complete Gram Stain for Unknown Toothbrush Microbe and evaluate results with microscope. Inoculate two TSB with Unknown Toothbrush using the same colony to prepare for DNA extraction next lab. Practice with micropipettes. *Learning Log 6:* What diseases can be caused by oral microbes? Include 1 citation. Update your Gram stain figure with the rest of your teams Toothbrush Microbe. Include Table 1: Toothbrush Microbe Gram Stain Results with columns-Organism or source, Cellular morphology and arrangement, color, Gram Reaction (+/-).	Learning Log 6 **Lab Quiz 2** **Research Poster Draft 1-Includes Petri plates and Toothbrush microbes Gram stains**	Fri. 9/27 **Wed. 9/27** **Sun. 10/1**
7	Oct. 4	Lab 7:DNA Extraction of your Unknown toothbrush microbes. *Learning Log 7:* What did you find interesting about your Gram stain results in your Gram Stain Table from Learning Log 6.Describe any worries about how your team completed your team's DNA extractions today? How will DNA Extraction of your toothbrush microbe be used in your research project?	Learning Log 7 Researcher Biography presenters (4)	Fri. 10/6
8	Oct. 11	Lab 8: Polymerase Chain Reaction (PCR) 16S rRNA gene amplification Toothbrush microbes and *E.coli*-control. Practice agarose gel loading with micropipettes. *Learning Log 8:* What is known about 16S rRNA sequencing of human oral bacteria? Include 1 citation. How will the PCR of your toothbrush microbe be used in your research project? Include a flow chart of your methods so far.	Learning Log 8 **Lab Quiz 3**	**Wed. 10/11**

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Fall 2023 Lab course schedule

Week	Wed. 10:30am-1:15pm	Lab Activity	Assignments	Due Dates at 11:59pm or in class
9	Oct. 18	Lab 9: Gel Electrophoresis of PCR reaction. Practice micropipette with Gel before PCR. *Learning Log 9:* What is the purpose of Gel Electrophoresis? Draw a figure of your Gel Electrophoresis. Label the Lanes, Molecular Ladder, and size 1500 bp of the 1KB ladder. Include and arrow pointing to the molecular ladder where you expect your PCR product size to be.	Learning Log 9 CURE Activity 4: Write the Results and Discussion for your team's poster. Researcher Biography presenters (4) Peer Mentor about how to write results.	**Fri. 10/20** Fri. 10/20 Results portion due.
10	Oct. 25	Lab 10: *BLAST* results of Toothbrush Microbes. *Learning Log 10*: Include a Table with your 16S rRNA gene sequencing results. Use the example in the class handout. Update your Flow Chart of the materials and methods. We have completed the methods that will be used in your research project, i) which method do you think you did well on and ii) which method do you think you can improve on? Update your poster with the results you have collected.	Learning Log 10 Researcher Biography presenters (4)	**Fri. 10/27**
11	Nov. 1	Lab 11: Analyze and Interpret your data. *Learning Log 11:* What do you not understand about in completing this research poster? In your own words, how would you describe writing a "Discussion" section of your research poster to your peers in class. What are you good at in completing your team research poster? How can you improve your contributions?	Learning Log 11 Research Poster Draft 2 –Teams Assessment due in following week **Lab Quiz 4** CURE Activity 4: Write the Results and Discussion for your team's poster.	Fri. 11/3 Sun. 11/5 **Wed. 11/1** Fri. 11/3 Discussion portion due.
12	Nov. 8	Lab 12: Kirby-Bauer Disk Diffusion Method. *Learning Log 12:* What are the benefits of knowing whether your toothbrush microbes are resistant to a particular antibiotic? Thinking of your research question for your team's poster, write an outline of your Introduction for your research poster. What have you found most interesting about your research project so far?	Learning Log 12 Researcher Biography presenters (4)	Wed. 11/8

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Fall 2023 Lab course schedule

Week	Wed. 10:30am-1:15pm	Lab Activity	Assignments	Due Dates at 11:59pm or in class
13	Nov. 15	Lab 13: Research Poster- Introduction *Learning Log 13:* Describe how your microbe made a living in its environment, include citation. How health diseases affect your community? Do they have a connection to oral microbes, include citation. Include the completed table of your Kirby-Bauer Disk Diffusion results.	Learning Log 13 Draft 3 of Research Poster **Lab Quiz 5** CURE Activity 5: Organize your introduction more specific to your toothbrush.	**Fri. 11/17** **Wed. 11/15** Fri. 11/17
14	Nov. 22	Thanksgiving-No Lab		
15	Nov. 29	Practice Research Poster *Learning Log 14:* Include the powerpoint file of your completed poster. Give an 6-8 sentence summary of your team's research poster. End of Semester ECURE Survey: TBD	Learning Log 14 Researcher Biography presenters (4) (Final Draft submitted with Learning Log 14) -Team Assessments 2 due in following week. ECURE survey Peer mentor about giving poster presentations.	Fri. 12/8
16	Dec. 6	Microbiology Research Poster Session in Health and Sciences Lobby. *Learning Log 15:* How did you contribute to your team's presentation? How do you think you did? What would you do differently in your Research Poster Presentations? Post Performance-based Assessment	-Teams Assessment -Peer Assessment -Instructor Assessment included with final presentations. Learning Log 15	Sun. 12/10 Sun. 12/10 Sun. 12/10

***I reserve the right to make necessary changes.**

Advice from your Biol 2305 Microbiology Peers

- *If you could take Biol 2305 Microbiology again, what would you do differently?*

"I'd probably set up a study schedule and practice it before I started the class so that I could develop those study habits early on."

"Probably [I would] get a tutor and prioritize better."

"I could take Microbiology 2305 again I would study and put more time into my assignments. I would also try to remind myself that it's okay to stress but to not overwhelm myself and that it will be okay. I have always tried to thrive for As, this semester taught that I don't need perfect grades as long as I am trying my best."

"If I took Microbiology 2305 again, I would probably investigate the details of every chapter more. I seem to only grasp on the broad points of a chapter and not really the details. I know that learning the details helped me understand the whole topic more."

"I would work harder to stay organized and try not to miss any assignments. Other than that, it was a great course and I really enjoyed it."

"If I could take Microbiology 2305 again, I would take more time to study before an exam or quiz. I feel like I studied but didn't study enough to where I felt 100% confident before taking the test. I would also try to focus on all material equally instead of on one topic more than the other. I made this mistake a lot in past exams and during the exam I noticed it myself. Therefore, studying everything at a certain pace would really help."

"I think I would find a study group outside my normal class."

- *What advice regarding course work, preparation for exams, homework, completing lab material, or preparing for lecture would you like to share with next semester's students?*

"Make time to go over the material (even if it's just a little bit) every day so that you really try to understand what you are learning and how it can be applied to your career field."

"The advice I would give is read and study the material before coming to class. Do not wait until last minute to do homework."

"I would give other students advice to follow the learning objectives from the PowerPoints and take the time to understand them. The learning objectives are what helped me prepare for the exams."

Continue to next page….

Advice from your Biol 2305 Microbiology Peers

"Some advice I would share with next semester's students would be to always try your best and to remember that it will be okay as long as you thrive for your goal. As far as homework and exams, I would study as much as you can [and] really put effort into the class."

"Do not stress too much even if it seems to get hard. Use all the resources such as CAPS or even the instructor's office hours/email for help. Always copy board notes and do your best on the homework. Use past work and notes to help study for tests and exams. The PowerPoints are also good sources to use for studying. What ever happens, do your best and just keep going."

"My biggest piece of advice – focus on the learning objectives when studying for the exams. If you know the learning objectives and understand them well – you'll do great on the exams."

"Make sure to read and understand what the question are asking! That is with just about any class. I have missed so many questions because I mis-read them! Take the time to answer questions completely and don't be afraid to write longer explanations on assignments. Take really good lecture notes and study those because most of the test question come from them. Makes sures to use and review corrections for future exams."

"Study everything as we go and freshen up on all topics on occasion."

"Pay attention in class and make sure to take good notes. Use those to study [from], they will do you wonders in this class."

ASM Agar Art Contesthttps://asm.org/Events/ASM-Agar-Art-Contest/Home

"The advice that I would give future students regarding preparation for exams would be to study the material issued thoroughly and class notes. Another tip regarding completing lab materials would be to make sure to stay on top of it. I say this because if you fall behind it'll be difficult to catch up and you'll end up falling behind in other assignments. Another tip of advice regarding preparing for lecture would be to print the slides from the PowerPoint chapters. It comes in handy when studying and saves time instead of having to go back to UNM learn (Now called UNM Canvas) and look at the slides."

"Advice I would give to future students of this class would be to take notes! Even if you miss a class get notes from a classmate or make sure you get them from canvas. Notes in this class are your best friend. Make sure if you don't understand something ask, whether it's directed to Dr. T or another student, it brings up a conversation and honestly helps everyone in the room, if you don't understand it I guarantee another student wants to ask the same question."

"…Stay organized.." & "Stay on top of homework rather than leaving it to the last minute…"

"Don't procrastinate on doing homework or studying, review the notes, ask questions, strive to be better, [and} make sure to review the material before class."

Advice from your Biol 2305 Microbiology Peers for Research Lab

"I would like to share that even though the project sounds hard but it's fun doing the lab and seeing how people get DNA from just your saliva. If you just have fun, then you will not stress about the project."

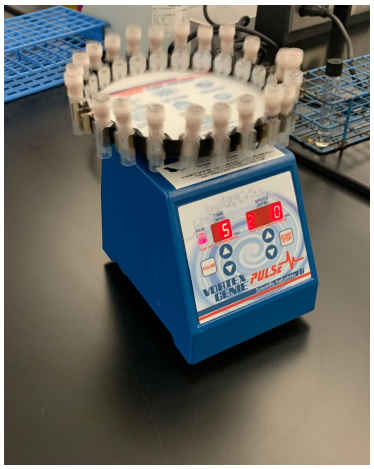
"As for lab, make sure you are able to communicate with your teammates. And overall, make sure your are having fun too."

"… I would also say to take the time to get to know and become friends with your classmates/lab partners. My lab partners this semester were amazing, I really enjoyed working with them and seeing them everyday in class. They made class fun and reminded me that we were all going to make it to the end of the semester, even when I doubted myself."

"I would also be careful about what I was doing in the lab. My team's research had a couple of flaws because we were not extra careful."

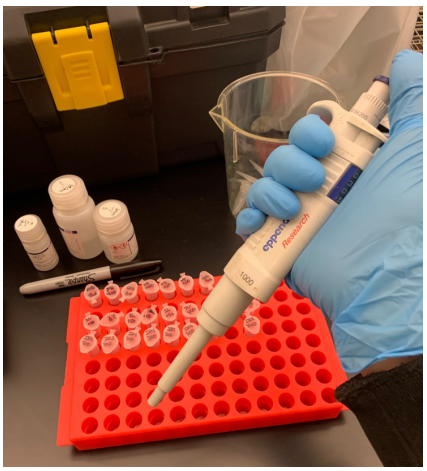
"For lab, I would recommend to work on the poster each week as you are able to. Our group did well at adding to it throughout the semester so we didn't have too much to do at the end of the semester."

Research Action



Lysis of bacterial cells to extract DNA using Vortex Genie Pulse.

Setting up a Polymerase Chain Reaction (PCR) using bacterial DNA to start the process of identification.



P1000 micropipette used to precisely transfer small volumes of liquids.