BIOL 2305: Microbiology for Health Sciences

Spring 2026 • CRN # 50384 • 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 as eukaryotes. 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 identify 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
Arts & Sciences
Front office: 505. 925. 8600
Office: Rm 111, Health Sciences Building

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

Talk to Me Hours

Drop-in Hours (Office hours):

- Monday: 10:30am-11:30am (In Office)
- Tuesday: 12:00pm-1:00pm (In Office)
- Wednesday: none
- Thursday: 1:00pm-2:00pm (In Microbiology lab-VAHS 110)
- Friday: ZOOM Meets only from 10:30-11:30am by appointment only.

***I'm happy to meet outside these listed times with an appointment ☺

Grading Criteria

Preps: Preps are worth 3 pts and due to UNM Canvas at 11:59pm the evening before class. *Late -1pts.* Only accepted within 10 days late. First submission used for grade.

Follow up Assignments (FA): FAs are worth 8pts and are assigned at the end of each chapter. If submitted with no name will result in deduction of 1 point. Late *-2pts.* Only accepted within 10 days late. First submission used for grade. Same submission guidelines as Preps.

Exams: There are three exams each worth 85 pts. You will be given one hour and 15 min to complete each exam in class. You will not be able to use your notes, textbook, or online resources. Review your homework, Reviews, OneNote class notes, and Class Activities to prepare for your exams.

Reflections: Two Reflections on your learning of 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) will be used to help you make adjustments of your learning. Same submission guidelines as Preps.

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. Lab Attendance is required. See lab guidelines.

Cumulative Final: The Final is worth 123pts and given at the end of the semester. You will have 2hr to take the final on Monday, May 11, 2026 at 9:00-11:00am. If an emergency comes up, with documentation, you must contact instructor within 24 hours of final to make up final. No final make up after 24hours.

Lab Activities: See page 12 for details.

Grade scale

****All Late assignments, including extra credit will be deducted for late submission.**

A+ 100% or higher **A** 91-99% **A-** 90%	**B+** 88-89% **B** 81-87% **B-** 80%	**C+** 78-79% **C** 71-77% (Passing) **C-** 70% (Not Passing)	**D+** 68-69% **D** 61-67% **D-** 60%	**F** <60%

	**Points per assignment:**	**Total Points:**	**Percentage of overall Biol 2305 grade (out of 740pts):**
Preps (10)	3pts each	30pts	4.1%
Follow up Assignment (10)	8pts each	80pts	10.8%
Intro. to Online Prep (1)	3 pts	3 pts	0.4%
Intro. to Online Follow Up (1)	3 pts	3 pts	0.4%
Reflections (2)	5 pts each	10 pts	1.4%
Attendance/Participation (16)	1 pt/week	16 pts	2.2%
Exams (3)	85 pts each	255pts	34.5%
Cumulative Final Exam (1)	125 pts each	123pts	16.6%
Lecture total		**520pts**	**70.3%**
Lab Activities	(see page 11 for assignments)	**220pts**	**29.7%**
TOTAL		**740 pts**	**100 %**

Required Learning Resources

1. Electronic Textbook: **M i c r o b i o l o g y** 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 and Announcement on Canvas 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 2024 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. Exam make-up will not be given after 10days after exam date.

Prep and Follow up. These will be assigned 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.

Late assignment/homework. Late assignments/homework will only be accepted within the first 10 days following the due date. Points will be deducted for late assignments.

In summary, every point counts. The due dates are firm. Communicate. Be on time. Study every week. Ask questions. Try your best. -Dr. T

Course Policy/Information Continue…

Withdrawal. Last day to withdraw from class without a "W" on your transcript is **Fri. Feb. 5, 2026** at 5:00pm using UNM Canvas. Last day to withdraw from class with out Dean's signature/permission on LoboWEB is **Fri. Apr. 17, 2026.** See https://registrar.unm.edu/semester-deadline-dates/index.html. Click on –Spring 2026. *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. Please quietly step into lab or class quietly and try not to disrupt your classmates who are working with side conversations.

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.

Accommodations: UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact the UNM-Valencia Equal Access Services (Sarah Clawson, Coordinator), at (505) 925-8840 or by email at sjclawson@unm.edu. Also available is the Accessibility Resource Center at UNM-Albuquerque at arcsrvs@unm.edu or 505-277-3506.

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:

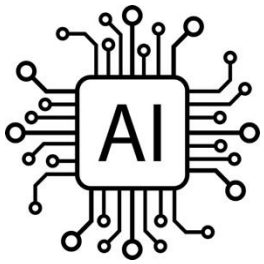
Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or who otherwise fails 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.

Use of AI (Artificial Intelligence) applications/programs for coursework:

Generative AI can be used in the classroom.



In Biol 2305, **acceptable** ways of using AI would be to help shorten your own writing, to help provide bullet point notes from primary literature papers, and to help in translating. Be mindful that generative AI programs can Fabricate (lie), carry biases (ranging from gender and racial biases), and have Privacy concerns. Thus, always critically consider answers and check the cited resources.

Unacceptable ways are using Generative AI programs to paste from for completing questions for Preps, Follow ups, CURE Activities and Writing assignments. Understand that by putting in the work to applying and understanding the material will help you develop trust and confidence in your critical thinking and learning. These are skills that you need in your respective career fields. I strongly encourage you to write, analyze, and complete assignments on your own, because this helps more then memorizing answers that were generated. If you are not sure about your use of Generative AI, please ask.

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

Equal Opportunity and Non-discrimination: UAP 2720 and 27400. Our classroom and university should foster mutual respect, kindness, and support. If you have concerns about discrimination, harassment, or violence, please seek support and report incidents. Find confidential services at LoboRESPECT Advocacy Center, the Women's Resource Center, and the LGBTQ Resource Center. UNM prohibits discrimination on the basis of sex (including gender, sex stereotyping, gender expression, and gender identity). All instructors are "responsible employees" who must communicate reports of sexual harassment, sexual misconduct and sexual violence to Compliance, Ethics and Equal Opportunity. For more information, please see UAP 2720 and UAP 2740.

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.

Spring 2026 Lecture Course Schedule

Week	Date	Chapter: Topic	Items Due	Due Date @ 11:59pm
1	Jan. 19 Mon.	**No class- Martin Luther King Day**		
	Jan. 21 Wed.	Overview of Microbiology 1: Invisible World (1.2, 1.3)	Intro. Online Prep Intro. Online Follow Up Attendance 1	Mon 1/26 Mon. 1/26 Fri. 1/23
2	Jan. 26 Mon.	3: The Cell (3.2, 3.3, 3.4)	Prep 1: Ch 1 & 3	Sun. 1/25
	Jan. 28 Wed.	3: The Cell (3.2, 3.3, 3.4) (Fr. Feb. 6 Last day to drop class without "W" with 100% tuition refund on LoboWeb)	Follow Up 1: Ch 1 & 3 Attendance 2	Sun. 2/8 Fri. 1/30
3	Feb. 2 Mon.	Ch 4.1 Prokaryotic Diversity	Prep 2: Ch 4.1 & 9	Sun. 2/1
	Feb. 4 Wed.	9: Microbial Growth (9.1, 9.2, 9.3, 9.4, 9.6)	Attendance 3	Fri. 2/6
4	Feb. 9 Mon.	9: Microbial Growth (9.1, 9.2, 9.3, 9.4, 9.6)		
	Feb. 11 Wed.	9: Microbial Growth (9.1, 9.2, 9.3, 9.4, 9.6)	Follow Up 2: Ch 4.1 & 9 Attendance 4	Sun. 2/15 Fri. 2/13
5	Feb. 16 Mon.	**Exam 1 (Ch. 1, 3, 4.1, 9)**		
	Feb. 18 Wed.	8: Microbial Metabolism (8.1, 8.2, 8.3, 8.4)	Prep 3: Ch 8 Attendance 5	Tues. 2/17 Fri. 2/20
6	Feb. 23 Mon.	8: Microbial Metabolism (8.1, 8.2, 8.3, 8.4)	Follow Up 3 : Ch 8	Sun. 3/1
	Feb. 25 Wed.	11: Mechanisms of Microbial Genetics Part 1 (11.2, 11.3, 11.4)	Prep 4: Ch 11 Part I **Reflection 1** Attendance 6	Tues. 2/24 **Mon. 3/3** Fri. 2/27
7	Mar. 2 Mon.	11: Mechanisms of Microbial Genetics Part 1 (11.2, 11.3, 11.4)	Follow up 4: Ch 11 Part I	Sun. 3/8
	Mar. 4 Wed.	11: Mechanisms of Microbial Genetics Part 2 (11.5, 11.6, 11.7)	Attendance 7 Prep 5: Ch 11 Part II	Fri. 3/6 Tues. 3/3
8	Mar. 9 Mon.	11: Mechanisms of Microbial Genetics Part 2 (11.5, 11.6, 11.7)	Follow up 5: Ch 11 Part II	Wed. 3/11
	Mar. 11 Wed.	**Exam 2 (Ch. 8, 11 Part 1&2)**	Attendance 8	Fri. 3/13
9	Mar.15-22	**Spring Break- No Class**		
10	Mar. 23 Mon.	13: Control of Microbial Growth (13.1, 13.2, 13.3, 13.4)	Attendance 9 Prep 6: Ch 13	Mon. 3/25 Sun. 3/22
	Mar. 25 Wed.	13: Control of Microbial Growth (13.1, 13.2, 13.3, 13.4)	Attendance 10 Follow up 6: Ch 13	Fri. 3/27 Sun. 4/6

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

Spring 2026 Lecture Course Schedule Continue

Week	Date	Chapter: Topic	Items Due	Due Date @ 11:59pm
11	Mar. 30 Mon.	13: Control of Microbial Growth (13.1, 13.2, 13.3, 13.4)	Follow up 6: Ch 13	Sun. 4/5
	Apr. 1 Wed.	14: Antimicrobial Drugs (14.2, 14.3, 14.5, 14.6)	Prep 7: Ch 14 Attendance 11	Tues. 3/31 Fri. 4/3
12	Apr. 6 Mon.	14: Antimicrobial Drugs (14.2, 14.3, 14.5, 14.6)	Follow Up 7: Ch 14	Sun. 4/12
	Apr. 8 Wed. **REMOTE**	15: Microbial Mechanisms of Pathogenicity (15.1, 15.2, 15.3)	Prep 8: Ch 15 & 16 Attendance 12	Tues. 4/7 Fri. 4/10
13	Apr. 13 Mon.	15: Microbial Mechanisms of Pathogenicity (15.1, 15.2, 15.3)		
	Apr. 15 Wed.	16: Disease and Epidemiology (16.1, 16.2) Fri. Apr. 17 Last day to drop class without Deans Permission	Attendance 13	Fri. 4/17
14	Apr. 20 Mon.	16: Disease and Epidemiology (16.1, 16.2)	Follow Up 8: Ch 15 &16	Wed. 4/22
	Apr. 22 Wed.	**Exam 3 (Ch. 13, 14, 15&16)**	Attendance 14	Fri. 4/24
15	Apr. 27 Mon.	Host Defenses 17: Innate Nonspecific (17.1/17.2, 17.4/17.5)	Prep 9: Ch 17&18	Sun. 4/26
	Apr. 29 Wed.	Host Defenses 17: Innate Nonspecific (17.1/17.2, 17.4/17.5) May 1 Course Feedback open UNM Canvas	Attendance 15	Fri. 5/2
16	May 4 Mon.	Host Defenses 18: Adaptive Specific (18.1/18.3, 18.5)	**Reflection 2** Follow Up 9: Ch 17&18	**Mon. 5/5** Fri. 5/8
	May 6 Wed.	6: Acellular Pathogens (6.1, 6.2) May 8 at 5pm Course Feedback Closes UNM Canvas	Prep 10: Ch 6 Attendance 16 Follow Up 10: Ch 6	Tues. 5/5 Fri. 5/8 Sun. 5/10
Final	**May 11 Mon.**	***Cumulative Final Exam Due 9:00-11:00am***	**Final Exam**	**Mon. 5/11**

***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. *Lab coats will remain in microbiology lab.*
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 Gram Stain of Toothbrush microbe. ii. Complete Kirby Bauer Antibiotic resistance for Toothbrush Microbe. iii. Analyze and interpret results of Biofilm assay, Kirby Bauer Antibiotic Disk Diffusion Test to environment collected from.	i. Gram stain of isolated Toothbrush microbe. ii.Description and preparation of the processes (culturing, Biofilm Assay, and Kirby Bauer Disk Diffusion, and BLAST usage) of Toothbrush Microbe. iii. Application of instructor feedback for preparation of Research Posters.
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. Describe and present their research project to campus community and the public.	i. Research Poster Session ii. Instructor assessment of Individual Presentations

Lab Grade Criteria

Learning Log: You will have an opportunity to start/complete your Learning Log prompt for the day. There will be 6 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 subtract the points of the question.
Research Poster Drafts/Complete: At 2 times during the semester you will individually 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.
CURE Activities: There will be 7 total for the semester. You'll have to upload to Canvas. Late -2pts. Will not grade pass 10days late. Submitted an incomplete assignment, subtract the points of the question.
Researcher Biography: There will be one oral presentation by your team. Dates and pairs will be assigned randomly.
Team Assessments: These assessments will be completed by another team on your research biography presentation at time of your presentation. You will also participate in Team assessment.
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. Keep in mind that a drop from the lab, means you are also dropped from lecture.

	Points each assignment:	**Total Points:**	**Percentage of overall Biol 2305 grade (out of 740pts):**
Learning Log (4)	*10 pts*	*40pts*	*5.4%*
CURE Activities (5)	10pts	50pts	6.8%
Researcher Biography (1)	24pts	24pts	3.2%
Research Poster Drafts (2)	15pts	30pts	4.1%
Research Posters Instructor Evaluation (1)	50pts	50pt	6.8%
Team Assessment (1)	10pts	10pts	1.4%
Attendance and Participation (16)	1pt/week	16pts	2.2%
TOTAL		220 pts	29.7%

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** 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.

Spring 2026 Lab course schedule

Week	Wed. 10:30am-1:15pm	Lab Activity	Assignments	Due Dates at 11:59pm or in class
1	Jan. 21	Lab Introduction of Research Lab 1: Lab Safety Exercise 1-1/1.2: Glo Germ Hand Washing *Learning Log 1:* Why is Lab Safety important? Results of Exercise 1-1 Table Q1&2 What is the objective of aseptic technique?	Learning Log 1	Sun. 1/25
2	Jan. 28	Lab 2: Primary Literature Scavenger Hunt Apply Aseptic Technique for inoculation of TSB broth cultures. Quadrant streak with Toothbrush Microbes *Learning Log 2:* Results of Ex. 1-2 Table with Q1 and Q2. Results of your Primary Literature Hunt.	Learning Log 2	Sun. 2/1
3	Feb. 4	Lab 3: Gram stain with Toothbrush microbe. Analyze Gram stain of toothbrush microbe using light microscope. *Learning Log 3:* Report Gram stain results for Toothbrush Microbe. Why did you complete the gram stain method at the same time for *E.coli, S. epidermidis,* and Toothbrush Microbe. Analyze your Quadrant streak Toothbrush Microbe: Include picture of Quadrant Streak, How can you improve your Quadrant streak.	Learning Log 3 Researcher Biography presenter-Dr. T	Sun. 2/8
4	Feb. 11	Lab 4: How to micropipette? Measure optical density. Repeat Gram stain of Toothbrush Microbes. CURE Activity 1: How to Read a Primary Research Article?—How does it relate to your Lab Research Poster.	CURE Activity 1	Sun. 2/15

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

Spring 2026 Lab course schedule

Week	Wed. 10:30am-1:15pm	Lab Activity	Assignments	Due Dates at 11:59pm or in class
5	Feb. 18	Lab 5: What is a Research Poster? Complete Biofilm assay on Toothbrush microbes.	Researcher Biography presenters-3 teams	
6	Feb. 25	Lab 6: Process and make graph for Biofilm Results. Kirby Bauer method –Antibiotics Collect and organize Biofilm Assay Figure. What are Figures? How to write Methods? CURE Activity 2: How to Prepare Research Figures and Figure legends and write Materials and Methods.	CURE Activity 2 Researcher Biography presenters-3 teams	Sun. 3/1
7	Mar. 4	Lab 7: Kirby Bauer Antibiotics Results, Figure, and Methods and Kirby Bauer – Mouthwash CURE Activity 3: Write the Results for all your Figures	CURE Activity 3 Researcher Biography presenters-3 teams	Sun. 3/8
8	Mar. 11	Lab 8: Write and organize Research Paper Draft 1. Polymerase chain reaction for Toothbrush Microbe. [Draft 1 includes, Methods: Biofilm Assay Methods: Biofilm Assay; Figure, Figure Legend: Biofilm assay picture and chart; Results: Biofilm assay results, Kirby Bauer Disk Diffusion Test-Antibiotics Figure, Figure Legend, and Table, Results: Biofilm Assay results, KBDD Antibiotics Assay Results.]	**Research Poster Draft 1.** Researcher Biography presenters-3 teams	**Sun. 3/15**

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

Spring 2026 Lab course schedule

Week	Wed. 10:30am-1:15pm	Lab Activity	Assignments	Due Dates at 11:59pm or in class
9	Mar. 16-23	**Spring Break- No class**		
10	Mar. 25	Lab 9: Write your Introduction. The significance Gel Electrophoresis of Toothbrush microbe. CURE Activity 4: Organize your introduction more specific to your toothbrush.		
11	Apr. 1	Lab 10: Write your Discussion and Conclusions BLAST of 16S rRNA Gene Sequencing. CURE Activity 5: Write the Discussion and Conclusions	CURE Activity 4	Sun. 3/29
12	Apr. 8	No lab-2026 Conference	CURE Activity 5	Sun. 4/5

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

Spring 2026 Lab course schedule

Week	Wed. 10:30am-1:15pm	Lab Activity	Assignments	Due Dates at 11:59pm or in class
13	Apr. 15	Lab 11: **Complete your Research Posters** Start overnight cultures for Toothbrush Microbes [Final Draft 2: Title: Intro: Materials and Methods: Biofilm Assay Kirby Bauer Disk Diffusion-Antibiotics, Figures for Biofilm Assay and KBDD Disk Diffusion-Antibiotics Results: Biofilm Assay and KBDD-Antibiotics; Discussion: 3pts Conclusion: References:]	**Research Poster Draft 2**	**Sun. 4/19**
14	Apr. 22	Lab 12: DNA Extraction for subset of Toothbrush Microbes		
15	Apr. 29	Lab 13: Transformation of *E.coli* with Green Fluorescence Protein Learning Log 4: Research Project Abstract	Learning Log 4	Sun. 5/3
16	May 6	Lab 14: Research Presentations Evaluations by Dr. T Microbiology Research Poster Session in Health and Sciences Lobby	Poster Evals completed by Dr. T (*Note-Posters Evals may go pass lab time).	

***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 you 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."

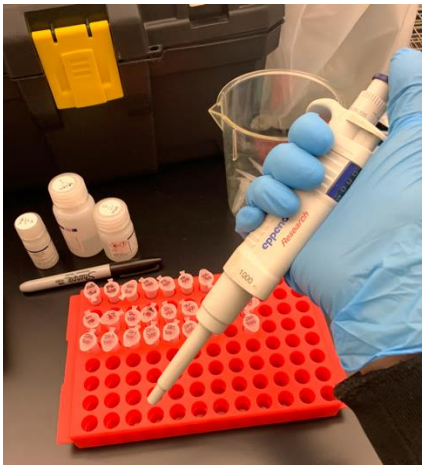
"I would also be careful about what I was doing in the lab. My team's research had a couple of flaws because we were not extra careful."

"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.