

BIO 416/516 MICROBIAL ECOLOGY LABORATORY

Tuesday/Thursday 11:30 am - 1:25 pm

Location: Science Building 405

Instructor: Dr. Rachel Larsen	Office Location: Science Building 477
Email: rachel.larsen@maine.edu	Office Phone: 207-780-4273
Office hours: TBD (via zoom)	Zoom meeting ID: 966 617 3813

Course Materials & Books:

Textbook: There is no formal textbook required for this class but a guide to lab protocols will be very helpful. I will provide you with a copy of the custom lab manual used for our general biology course as a resource.

There is also a photographic atlas available for free on the internet (which will hopefully remain available for the entire semester!):

[https://iums.ac.ir/files/microb/files/A Photographic Atlas for the Microbiology Laboratory.pdf](https://iums.ac.ir/files/microb/files/A%20Photographic%20Atlas%20for%20the%20Microbiology%20Laboratory.pdf)

Other resources will be provided as needed.

Technology Requirements:

Brightspace, USM email, Zoom, and Google Drive

Word processing (Word, Google doc, or similar), graphing (Excel, Google sheets, or similar), presentation (Powerpoint, Google slides, or similar) and other Google suite programs

Course Description:

Learning Outcomes:

- ❖ To learn about microbes in their natural environments
- ❖ To learn about techniques used to investigate the ecology of microbes
- ❖ To learn to read and critique research studies

Independent Projects:

Most of your work will be an independent project that you will work on with a partner. We will start out with less in-person contact (Covid!) but then plan on meeting in person most of the time after that. Your projects will focus on exploring a particular microbial community and the interactions between these organisms and we have the opportunity to collaborate with Dr. Karen Wilson and Dr. Theo Willis in the Environmental Science department on a small grant that will provide us with extra funding to collect DNA sequence data. This is a great opportunity! One of their projects is an aquaponics system (located in Bailey Hall on the Gorham campus) and other projects involve local lakes and wetlands.

Class side projects:

Additionally, throughout the semester, where there is time, we will set up and observe a few small exploratory projects that provide an opportunity to view microbial communities in action. These may include a Winogradsky column, which is a classic model of a microbial ecosystem; sauerkraut, which is produced through a successional microbial community that some find delicious; yogurt, a quick and simple microbial ecosystem; and nitrogen-fixing bacteria associated with leguminous plants.

These projects are secondary to your main project and will be incorporated when time allows.

Grading Criteria:

Written assignments		60%
<i>Bibliography</i>	4%	
<i>Proposal</i>	1%	
<i>Introduction</i>	15%	
<i>Methods</i>	5%	
<i>Mid-semester report</i>	15%	
<i>Final Paper</i>	20%	
Presentations		15%
<i>Weekly update</i>	5%	
<i>Mid-semester update</i>	5%	
<i>Final presentation</i>	5%	
Notebooks		15%
Participation/Performance		10%

Grading Scale: Final grades will be awarded using a typical scale: 93-100 = A, 90-92 = A-, 87-89 = B+, 83-86 = B, 80-82 = B-, 77-79 = C+, 73-76 = C, 70-72 = C-, 67-69 = D+, 63-66 = D, 60-62 = D-, <60 = F

Assessments:

Written assignments:

You are going to work on one long independent project, so throughout the semester there will be checkpoints due on the dates noted in the schedule below. These dates are subject to change if necessary. Detailed instructions will be provided.

Assignments include the following:

Annotated bibliography = the result of your first effort to learn about your research topic

Project proposal = a hypothesis and a short outline of your experimental approach

Written introduction = similar to an introduction section in a primary research paper that reviews the state of the field and incorporates specific examples to justify your own project proposal

Methods write-up = (once or twice during the semester) a precise, numbered protocol as interpreted from a methods section of a journal article

Mid-semester report = a formal reporting of your results to this point

Final report = a full report of your work from the semester that includes all the appropriate sections of a primary research paper

Even though you may be working with a partner in the lab, your written work should be completed independently. It is very important that you understand what constitutes plagiarism by reading through the academic integrity guidelines laid out by the university (<http://usm.maine.edu/deanofstudents/student-academic-integrity-policy-0>). Any evidence of copying or plagiarism will result in a "0" for that assignment and will likely be reported to the Dean of Students Office.

Presentations:

Communicating your research is an essential skill. In this class you will practice this skill in a couple of different ways:

Each week, each pair will provide short, informal updates to keep us all up to date on your progress and for discussion.. You and your partner will take turns leading this presentation. Halfway through the semester you will give a short, formal presentation to share your progress.. And lastly, you will present your final poster in a formal oral presentation to the class.

Notebooks:

Laboratory notebooks are essential to documenting the scientific process. Think of them as a diary of your work in the lab and your thoughts about the experimental design and results. Throughout the semester, I will be checking to see that you have your notebook with you in lab and are using it appropriately. These spot checks may be graded. Include the following information:

1. Date on each page (mm/dd/yy), brief title, and brief purpose of the experiment or statement of the work being done for that day.
2. Outline or drawing of your plan for the day (some experiments will require more planning than others)
3. Reference to any sources you are using for protocols and/or information.
4. Notes about anything you did differently from the published protocol or anything you varied as part of your experiment, including any mistakes that you made. It is very important to write these notes as you are doing the experiment.
5. Calculations (culture labels, weights, dilutions, etc.)
6. Your observations and results for each experiment or measurement made.
7. A summary or conclusion at the end of every experiment and thoughts about what you might do next

Performance and Participation:

Because this class is based very heavily on your active participation, you will receive a score for the effort you put forth in the class and your level of participation. This score includes attendance, engagement, effort, and collaboration with your partner. If you work carefully and try your best, then failed experiments will not count against you. However, poor results that are a result of inattention and/or sloppiness will lead to point deductions. Because this type of score is very subjective, you are welcome to talk to me at any point during the semester to find out how you are doing.

Communications and Citizenship

I make every effort to respond to emails in a timely manner but please be mindful that I am not available 24/7. I treat you with respect in class and via email and expect respect in return. In general, email is the best way for us to communicate with each other so it is important that you check your email and keep up with Brightspace routinely.

Classroom etiquette (“netiquette”): The same level of professional etiquette is important both in the physical classroom and in the online environment. Following these simple rules will ensure a constructive learning environment for all of us:

- ❖ Respect the classroom environment (whether in person or online) and never forward in-class communications or posts by people in this class to others outside this class.
- ❖ Refrain from inappropriate language and derogatory or personal attacks
- ❖ Do not dominate any discussion. Give other students the opportunity to join in the discussion
- ❖ You may disagree with ideas, but avoid statements that may be interpreted as a personal attack

In any setting where you are interacting with us or your classmates **it is very important to be civil and respectful**. Any language or behavior that is deemed disrespectful or non-inclusive will not be tolerated.

Class Schedule:

Note: *This schedule is subject to change if necessary! Changes will be highlighted here and announced on Brightspace.*

Date	Topic	Assignment due dates
Week 1 1/26	Introduction to the class	
1/28	Virtual tour of the aquaponics lab	Bibliography by Sunday 1/31
Week 2 2/2	Introductory lab techniques	
2/4		Project proposal due by Sunday 2/7
Week 3 2/9	Work on project	
2/11	Work on project	
Week 4 2/16	<i>President’s Day (No class)</i>	
2/18	Work on project	
Week 5 2/23	Work on project	
2/25	Work on project	Written Introduction due Sunday 2/28
Week 6 3/2	Work on project	
3/34	Work on project	
Week 7 3/9	Work on project	
	Work on project	Mid-semester paper by Sunday 3/14

3/11		
Week 8 3/16	Work on project	
3/18	Mid-semester presentations	
Week 9 3/23	Work on project	
3/25	<i>Spring Break Day (no class)</i>	
Week 10 3/30	Work on project	
4/1	Work on project	
Week 11 4/6	Work on project	
4/8	Work on project	
Week 12 4/13	Work on project	
4/15	Work on project	
Week 13 4/20	Work on project	
4/22	Work on presentations	
Week 14 4/27	<i>Final presentations</i>	
4/29	Wrap-up	Final paper due by Sunday 5/2

COURSE POLICIES

ATTENDANCE POLICY

There is a direct correlation between student success and engagement with the class and the instructor. My first goal is to help you succeed. We will generally meet in person this semester unless it seems prudent to hold some of our meetings via zoom, or unless USM decides to close the campus to in-person class meetings.

CLASS CANCELLATION AND TECHNOLOGY CHALLENGES

In the event that class must be cancelled or materials cannot be posted as scheduled, an announcement will be posted in Brightspace. When short notice, this announcement will also be sent as an email. In the event of snow cancellations, please check your email and/or Brightspace for an update. In general we can meet via zoom to avoid missing any class days, but if it is a particularly big storm then cancelling class completely might be the best choice.

If any challenges arise as a result of issues including (but not limited to) power outages or technology malfunctions, it is your responsibility to contact me as soon as possible to arrange an alternative plan.

ACADEMIC INTEGRITY / PLAGIARISM

Everyone associated with the University of Southern Maine is expected to adhere to the principles of academic integrity central to the academic function of the University. Any breach of academic integrity represents a serious offense. Each student has a responsibility to know the standards of conduct and expectations of academic integrity that apply to academic tasks. Violations of academic integrity include any actions that attempt to promote or enhance the academic standing of any student by dishonest means. Cheating on an examination, stealing the words or ideas of another (i.e., plagiarism), making statements known to be false or misleading, falsifying the results of one's research, improperly using library materials or computer files, or altering or forging academic records are examples of violations of this policy which are contrary to the academic purposes for which the University exists. Acts that violate academic integrity disrupt the educational process and are not acceptable.

Evidence of a violation of the academic integrity policy will normally result in disciplinary action. A copy of the complete policy may be obtained from the office of Community Standards and Mediation, online at usm.maine.edu/community-standards-mediation/academic-integrity or by calling and requesting a copy at (207) 780-5242.

FINAL EXAMINATIONS/FINAL PROJECT

Your work in this class culminates in a final poster and presentation to summarize and analyze the results of your project. It is a USM academic policy that no tests or exams may be scheduled during the last week of classes.

UNIVERSITY POLICIES AND RESOURCES

DISABILITY ACCOMMODATIONS

The university is committed to providing students with documented disabilities equal access to all university programs and services. If you think you have a disability and would like to request accommodations, you must register with the Disability Services Center. Timely notification is essential. The Disability Services Center can be reached by calling 207-780-4706 or by email dscusm@maine.edu. If you have already received a faculty accommodation letter from the Disability Services Center, please provide me with that information as soon as possible. Please make a private appointment so that we can review your accommodations.

TUTORING AND WRITING ASSISTANCE

Tutoring at USM is for all students, not just those who are struggling. Tutoring provides active feedback and practice, and is available for writing, math, and many more subjects. Walk-in tutoring is available at the Glickman Library in Portland, the Gorham Library, and the LAC Writing Center. For best service, we recommend making an appointment at <https://usm.maine.edu/learningcommons/schedule-tutoring-appointment>

Questions about tutoring should be directed to Naamah Jarnot at 207-780-4554. Interested in becoming a more effective, efficient learner? Check out <https://usm.maine.edu/agile>

COUNSELING

Counseling is available at USM. The best way to schedule an appointment is by phone at 780-5411. More information is available at <https://usm.maine.edu/uhcs>

RECOVERY ORIENTED CAMPUS CENTER (ROCC)

A peer support community for students in recovery from substance abuse and other mental health conditions is available at USM. More information may be found online at <https://usm.maine.edu/recovery> or by contacting ROCC at 207-228-8141.

NONDISCRIMINATION POLICY AND BIAS REPORTING

The University of Southern Maine is an EEO/AA employer, and does not discriminate on the grounds of race, color, religion, sex, sexual orientation, transgender status, gender expression, national origin, citizenship status, age, disability, genetic information or veteran's status in employment, education, and all other programs and activities. The following person has been designated to handle inquiries regarding non-discrimination policies: Amie Parker, Interim Director of Equal Opportunity, The Farmhouse, University of Maine Augusta, Augusta, ME 04333, 207.581.1226, TTY 711 (Maine Relay System). Incidents of discrimination or bias at USM should be reported to Associate Vice President for Student Affairs David Roussel at 207-780-5242.

STATEMENT ON RELIGIOUS OBSERVANCE FOR USM STUDENTS

Absence for Religious Holy Days: The University of Southern Maine respects the religious beliefs of all members of the community, affirms their rights to observe significant religious holy days, and will make reasonable accommodations, upon request, for such observances. If a student's religious observance is in conflict with the academic experience, they should inform

their instructor(s) of the class or other school functions that will be affected. It is the student's responsibility to make the necessary arrangements mutually agreed upon with the instructor(s).

TITLE IX STATEMENT

The University of Southern Maine is committed to making our campuses safer places for students. Because of this commitment, and our federal obligations, faculty and other employees are considered mandated reporters when it comes to experiences of interpersonal violence (sexual assault, sexual harassment, dating or domestic violence, and stalking). Disclosures of interpersonal violence must be passed along to the University's Deputy Title IX Coordinator who can help provide support and academic remedies for students who have been impacted. More information can be found online at <http://usm.maine.edu/campus-safety-project> or by contacting Sarah E. Holmes at sarah.e.holmes1@maine.edu or 207-780-5767.

If students want to speak with someone confidentially, the following resources are available on and off campus: University Counseling Services (207-780-4050); 24 Hour Sexual Assault Hotline (1-800-871-7741); 24 Hour Domestic Violence Hotline (1-866-834-4357).

POLICY ON ACCEPTABLE CONDUCT IN CLASS SETTINGS

If a student substantially disrupts a class, the professor may ask the student to align with this policy on conduct in a class setting. If the student refuses, the professor may, at their discretion, ask the student to leave. If the professor takes this step, they must attempt to communicate with the student and provide informal counsel and advice. The professor may elect to notify their dean of the situation as well. If the student disrupts the class again, the professor may, at their discretion, provide a written notification to the student, describe the offending behavior, and refer the student's case to the appropriate academic dean and notify the dean of students that an official student conduct code violation has occurred.

<https://usm.maine.edu/community-standards-mediation/conduct-process>

COVID FACE COVERING REQUIREMENT

Per USM and the University of Maine System, all students, faculty, and staff members are required to wear a face covering, including during all face-to-face classes. Resident students are exempted from this requirement when in their own room in the residence hall. Students seeking additional exceptions from this requirement should refer to the DISABILITY ACCOMMODATIONS section of this syllabus.

<https://www.maine.edu/together/community-guidance/everyone/>