

Microbiology BI 330 Spring 2022 Course Syllabus

Class Meetings: Wednesdays & Fridays, 8:30-9:50am, 129 McKenzie Hall

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Important notes about BI 330:

- **This course is only 3 credits**, while most Biology courses are 4 or 5 credits. Please keep this in mind when calculating how many total credits you need (BI 331, micro lab, is also 3 credits)
- **This course is separate from BI 331.** While the information in the lecture (BI 330) and lab (BI 331) will be similar, you do not have to be enrolled in the lab to take this course. However, to take the lab, you must be either currently enrolled in BI 330 or have previously taken BI 330.
- **Please keep track of due dates.** All problem sets and the online portion of weekly quizzes will be submitted on Canvas. The due dates for these assignments will be the same throughout the term (unless otherwise stated by me).

Course Description: This course in Microbiology introduces students to the cell biology, physiology, evolution, and ecology of microorganisms. Students will gain an appreciation for the diversity and elegance of microbial life strategies and will become familiar with modern experimental methods for studying microorganisms in the laboratory and in their natural habitats. This course is organized into three units.

Unit 1: Microbial Cell Biology & Genetics. In the first third of the class (3/30-4/20), we will consider how microbial populations grow, experimental approaches for measuring this growth, and practical approaches for inhibiting microbial growth. We will then study the structure and function of microbial cells, including the cell wall, the cell membrane, and the genetic material. We will consider how genetic information is exchanged between microbial cells, giving rise to their remarkable phenotypic plasticity. Finally, we will consider how genetic approaches have been used to study cellular behaviors of microbial species, including their ability to communicate, to move and sense chemical gradients, and to develop into different cell types.

Unit 2: Diversity of Microbial Physiologies. The second third of the class (4/22-5/11) explores the metabolic diversity of microorganisms. We will consider the origins of life on earth and how microbial physiologies have diversified and changed our planet. We will study the metabolic strategies used by different classes of microorganisms that make their livings in remarkable ways from limited resources. The focus of this unit is on the metabolic strategies and energetics of different physiologies, rather than the details of chemistry or enzymology.

Unit 3: Microbial Ecology & Interactions with Macroorganisms. The final third of the class (5/13-6/3) focuses on the ecology of microbes and considers how microbial metabolisms function in concert in different environments. We will familiarize ourselves with modern experimental approaches to study microbial communities in nature and will survey the types of microbial communities that inhabit our planet. Then we will focus our attention on the microbial communities that live in association with plants and animals. We will investigate the molecular mechanisms by which microbes and their hosts orchestrate their co-existence, ranging from pathogenic to mutualistic relationships.

Learning objectives: As a student in Microbiology, you will be able to:

- Describe the basic features of microbial cells, their lifestyles, and metabolisms, and how they exist in their natural habitats
- Explain seminal scientific experiments in the history of microbiology and become familiar with the scientific strategies used by microbiologists to study microorganisms
- Form educated opinions about microbes in your daily life, including issues of food safety, public health, and climate change
- Imagine the future of microbiology: what will be the next great discoveries and application of microbiology, from new innovations in health care to alternative energy strategies?
- Consider how you could harness the knowledge you have gained in this course to better your life, your career, the human condition, and the planet

Lecture Schedule:

Week	Date	Unit	Topic
1	3/30	Microbial Cell Biology & Genetics	Course Overview & Introduction to Microbiology
	4/1		Microbial Structures & Classification
2	4/6		Growth & Growth Control
	4/8		Quorum Sensing, Motility, & Chemotaxis
3	4/13		Genetics & Gene Exchange
	4/15		Molecular Regulation
4	4/20		Genomics & Evolution
	4/22		Origins of Life
5	4/27	Diversity of Microbial Physiologies	Fermentation & Respiration
	4/29		Photosynthesis
6	5/4		Chemolithotrophy
	5/6		Anaerobic metabolism & Syntrophy
7	5/11	Interactions & Impacts of Microorganisms	Industrial Microbiology & Genetic Engineering
	5/13		Ecology Methods
8	5/18		Microbial Ecology
	5/20		Microbial Symbioses
9	5/25		Microbiomes
	5/27		Immunology
10	6/1		Animal Pathogens
	6/3	Animal Pathogens	

Prerequisites: The prerequisites for this course are BI214 or BI282H. The course assumes knowledge of biologically important macromolecules and familiarity with basic cellular processes such as DNA replication, transcription, translation, and regulation of gene expression. Much of this material is covered in the textbook, and relevant review readings can be found in modules on Canvas. Students should review these pages to make sure they are comfortable with this background material.

Office Hours: My office hours will be Fridays from 10-11am in 129 McKenzie Hall. If this time does not work for you, you may schedule an appointment to meet with me at another time. You may also email me with questions or comments at anaftaly@uoregon.edu. **Please include BI330 in the subject line of any emails.** Your email correspondences are an extension of your class participation, so please maintain a professional tone.

Course materials:

Textbook: Brock Biology of Microorganisms, 16th ed

Pearson+ offers this textbook as an eText and you can directly rent it through them:

<https://www.pearson.com/store/en-us/pearsonplus/p/9780135860717.html>

Other resources will be made available on canvas in the modules for the week they are due as needed.

iClickers: We will use iClickers in this course. These will be used for in-class problem sets as well as class attendance. Please register your clicker before the first day of class. If your clicker is not registered, you will not be able to receive points.

Course website: All materials, assignments, and submissions will be made through Canvas, with the exception of the in-class portion of the weekly quiz. This course will use Modules to provide content for each week. Each module will include all of the assigned readings, lecture slides, problem sets, and the online quiz portion for each week.

Lectures:

I will post lecture slides by the evening before each class, but keep in mind that I may modify these after posting. These slides represent an outline of what will be discussed during class and **are not a substitute for coming to class**. We will do in-class exercises using iClicker and will work through problems like what will be on quizzes.

Assessments:

The final course grade will be calculated out of 525 total points based on the following criteria:

Weekly Quizzes (25 points each, 225 points total): Each weekly quiz will cover the material discussed during the previous week's lectures. These quizzes will be pseudo-cumulative as topics covered will build upon each other. There will be an online and in-class components.

- The online portions will be available on Canvas. Quizzes will be open from 12pm on Friday to 8 am on Wednesday each week. The quiz can be accessed anytime during this window. You will have 1 hour to complete the quiz once it is open, unless stated otherwise by me. This portion of the quiz is open note.
- The in-class portion will take place in the last 20 minutes of the Wednesday lecture. This portion will focus on application-based questions of the material and will consist of 1-3 questions max. You cannot use your notes for this portion of the quiz.
- Your lowest three quizzes can be replaced by the optional final (see below). Therefore, no make-up quizzes will be offered.

There will also be 1 syllabus/icebreaker quiz that is worth 9 points. This will be due Friday, April 1st at 5pm. The first half of the quiz will focus on the syllabus and will be graded for accuracy. The second half of the quiz will focus on general information about you and will be graded for completion.

Problem Sets (15 points each, 255 points total): Each lecture (excluding the first lecture) will have an assigned problem set. There will be 19 problem sets total, each worth 15 points. These problem sets will be available every Wednesday at 10am and close the following Wednesday at 8am. The last two problem sets (PS 18 & PS 19) will close on June 5th at 5pm. These sets are designed to be practice problems to solidify your understanding of the material. The problem sets will be in a similar format to the quizzes and represent topics that may show up on the following week's quiz. **At the end of the term, your two lowest scoring problem sets will be dropped** (15 points x 19 problem sets – 2 problem sets = 255 points).

Attendance & Participation (2 points per day, 36 points total): I will pose review questions throughout lectures where you can discuss with other students around you. Therefore, it is important that everyone show up on time and with iClickers ready to go. To get full credit for each day, you must answer at least 75% of the iClicker questions during the lecture. **At the end of the term, your two lowest scoring attendance/participation days will be dropped** (2 points x 20 classes – 2 classes = 36 points).

OPTIONAL Final Exam (75 points): **Exam time slot: 6/9/22 from 10:15am to 12:15pm.**

The final exam will be in the same format as the quizzes, but longer in length. It will test your ability to apply knowledge and synthesize concepts learned throughout the term. You can use the final exam to replace your lowest three quiz scores.

COVID-restrictions:

Since the beginning of the pandemic, we have all needed to be flexible with the rules and regulations regarding COVID precautions. Starting in the spring term 2022, masks will no longer be required to be worn indoors at the University of Oregon as per CDC guidelines (excepting health care settings on campus); however, individuals may still choose to wear them. Please be respectful of each individual's decision regarding masks. Furthermore, since policies are constantly in flux, please realize the University's stance on masks could change at any time. Last, while not required, you are encouraged to partake in regular COVID testing provided by the Monitoring and Assessment Program (MAP) at the University of Oregon. It is free and testing is conducted via collection of saliva. For more information on these services and to pre-register weekly, please use the following web address:

- <https://coronavirus.uoregon.edu/map-testing>

Other information:

Accessible Education: If you need assistance to fully participate in this course, please contact the Accessible Education Center (<http://aec.uoregon.edu/>) to set up your accommodations. Participation includes access to lectures, web-based information, in-class activities, and exams. The Accessible Education Center works with students to provide an instructor notification letter that outlines accommodations and adjustments to class design that will enable better access. Contact the Accessible Education Center for assistance with access or disability-related questions or concerns. You are also welcome to talk with me directly about any assistance you need. Please email me if you would like to meet privately to discuss.

Academic integrity: The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at <https://researchguides.uoregon.edu/citing-plagiarism>.

Reporting Obligations: I am a student-directed employee. For information about my reporting obligations as an employee, please see Employee Reporting Obligations on the Office of Investigations and Civil Rights Compliance (OICRC) website. Students experiencing any form of prohibited discrimination or harassment, including sex or gender-based violence, may seek information and resources at safe.uoregon.edu, respect.uoregon.edu, or investigations.uoregon.edu

or contact the non-confidential Title IX office/Office of Civil Rights Compliance (541-346-3123), or Dean of Students offices (541-346-3216), or call the 24-7 hotline 541-346-SAFE for help. I am also a mandatory reporter of child abuse. Please find more information at Mandatory Reporting of Child Abuse and Neglect.

Mental Health and Wellness

Life at college can be very complicated. Students often feel overwhelmed or stressed, experience anxiety or depression, struggle with relationships, or just need help navigating challenges in their life. If you're facing such challenges, you don't need to handle them on your own--there's help and support on campus. As your instructor if I believe you may need additional support, I will express my concerns, the reasons for them, and refer you to resources that might be helpful. It is not my intention to know the details of what might be bothering you, but simply to let you know I care and that help is available. Getting help is a courageous thing to do—for yourself and those you care about. University Health Services help students cope with difficult emotions and life stressors. If you need general resources on coping with stress or want to talk with another student who has been in the same place as you, visit the Duck Nest (located in the EMU on the ground floor) and get help from one of the specially trained Peer Wellness Advocates. Find out more at health.uoregon.edu/ducknest. University Counseling Services (UCS) has a team of dedicated staff members to support you with your concerns, many of whom can provide identity-based support. All clinical services are free and confidential. Find out more at counseling.uoregon.edu or by calling 541-346-3227 (anytime UCS is closed, the After-Hours Support and Crisis Line is available by calling this same number).

Basic Needs:

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course is urged to contact the Dean of Students Office (541-346-3216, 164 Oregon Hall) for support. This UO webpage includes resources for food, housing, healthcare, childcare, transportation, technology, finances, and legal support:

<https://blogs.uoregon.edu/basicneeds/food>

Religious Accommodation:

The university makes reasonable accommodations, upon request, for students who are unable to attend a class for religious obligations or observance reasons, as outlined by the university discrimination policy (Section GG). To request accommodations for this course, visit the Office of the Registrar's website and complete and submit the "Student Religious Accommodation Request" form prior to the end of the second week of the term.