BIOLOGY 349: Principles of Microbiology, Fall 2024

ISC 131; TR 8:00-9:15 am

Prerequisites:

BIOL 222 or BIOL 271, minimum grade of D. It is assumed that you have the knowledge from these courses and their prerequisites.

Instructor:

Dr. Betsy Hutchison

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Office Hours: Tues, Wed, & Thurs from 9:30-10:30 in ISC 359, or by appointment.

Course Description

This course focuses on the structure, cultivation, physiology, ecology, and importance of microorganisms (including bacteria, archaea, eukaryotes, and viruses). Interaction of these microbes with each other and with humans, including aspects of symbiosis and disease, will be examined. Laboratory activities complement lecture material.

Required Texts

Biology of Microorganisms, Brock, Michael T. Madigan, John M. Martinko, Paul V. Dunlap, David P. Clark. Pearson Benjamin Cummings, San Francisco, CA 16th Edition ISBN 9780135860717.

*If you're using an older edition or an international edition, please note that you're responsible for the material in the required version of the textbook.

Calculator

You'll need a simple calculator (with basic functions and logs) in order to complete some assignments for the course.

Grading

Lecture Grades	
Exams (3)	35%
Homework Assignments (3)	15%
Weekly quizzes (10)	10%
Participation (varies)	5%
Lab Grades	
Unknown Bacterium Presentation	8%
Group Lab Report (draft + final)	10%
Short reports (3 total)	10%
Final Practical	7%

The following scale will be used to calculate final grades. Student point totals or grading scheme may be adjusted to reflect course difficulty or section differences at the instructor's discretion.

	B+ 87.0-89.9%	**C+** 77.0-79.9%		
A 93.0-100%	**B** 83.0-86.9%	**C** 73.0-76.9%	**D** 60.0-69.9%	**E** <60%
A- 90.0-92.9%	**B-** 80.0-82.9%	**C-** 70.0-72.9%		

Standard rounding procedures will apply. For example, an 82.94 would be rounded to a B-, and an 82.95 would be rounded to a B.

- Grade disputes must be initiated within one week from when the assignment was handed back. If you have a grade dispute, you must submit your original assignment along with a written justification of your answer.

Late Assignments

Late assignments will have a 10% grade reduction per day, and will not be accepted more than 2 days late.

Homework Assignments

- Homework assignments will be completed in groups, and one copy will be turned in per group. For each homework assignment, there will be a chance to evaluate your group members and their contributions to the group homework. The peer eval grades are worth a portion of your HW grade, and the lowest peer eval grade you receive will be dropped. Late homework assignments will NOT be accepted. There will be 3 homework assignments, and each will deal with solving microbiology-related problems and/or reading a scientific article.

Weekly Quizzes

- Quizzes will occur on **Thursdays** (of most weeks), and will cover the material from the previous two classes. Quizzes are designed to help you keep up with the lecture and reading material for the course, and assess your knowledge of the material on a weekly basis. We will have 10 quizzes, and I will drop your lowest quiz grade. Since I drop the lowest quiz grade, I will not administer make-up quizzes except for extenuating circumstances or for university approved absences.

Exams

- Make up exams are not administered without prior approval to missing the exam. Safety is a priority, and please do not attend class or an exam if you have tested positive for COVID. It is your responsibility to be in contact with me for (1) approval to miss the exam and (2) scheduling a make up exam.
- Please note the exam dates for this course. If you have a legitimate scheduling conflict you must notify me within the first 2 weeks of class. Otherwise, you will have to take exams as scheduled in the syllabus. If you are ill or have another unexpected issue come up, you must have approval for a make up exam *before* missing it, otherwise you cannot make up the exam.
- Exam format: exams will be administered in class (75 min).

Participation

I will intersperse lecture with practice problems and questions, or group discussions/problems, and part of your grade is determined by participation in class. I will randomly call on individuals to answer a question or contribute a thought, and you earn points by participating. And/or, I will

have groups work on a problem and turn in their answer at the end of class. You are not penalized for incorrect answers or for asking for help from other students.

COVID policy

Per Geneseo's policy, masks are not required. If you feel unwell, please take a rapid COVID test before attending class. If the result is negative, please wear a (properly fitted) mask to class. If positive, please contact me (and the health center) as soon as possible, and do not attend class. If you'd had a recent COVID exposure, I'd also ask that you mask when interacting with myself or other students in the course, out of courtesy, even if you've not tested positive.

Tips for Success

Be sure to keep up with the lectures, practice problems, and quizzes, and attend office hours as often as you can; don't procrastinate - if you're struggling or don't understand something, get help from me during class or office hours as soon as possible. There are many resources available if you need help.

Assigned readings for class: My suggestion is to read over the assigned reading before class. This will help familiarize you with the topics that will be covered, and if any topics are completely unfamiliar to you then you can do a more in-depth reading of that section. After lecture, take a more careful look at the assigned readings, using what we covered in class to focus your reading, and to prepare yourself for the quiz on Thursday.

Asking for help

My goal for the course is for you to learn about microbiology. My job is to create learning materials and assessments that promote learning, and provide you with clear guidelines on how to succeed. My job is also to answer your questions and help to foster your scientific curiosity. I'm here to help, and in fact chatting with students and answering their questions is one of the best parts of my job! So, please don't hesitate to reach out if you have questions about the course material, or other general student questions. Asking for help is a sign of self awareness and strength.

Accessibility

SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. The Office of Accessibility will coordinate reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities, as well as medical conditions related to pregnancy or parenting. Students with letters of accommodation should submit a letter to each faculty member at the beginning of the semester and discuss specific arrangements. Please contact the Office of Accessibility Services for questions related to access and accommodations: Erwin Hall 22, (585) 245-5112, access@geneseo.edu, www.geneseo.edu/accessibility-office.

Use of AI and writing assignments

Technology changes almost as rapidly as microbes mutate! This is not a bad thing, but it's important to be aware of how it can impact learning, and there are significant potential academic dishonesty issues that can arise. Most of you are likely aware of the wildly popular AI program chatGPT. It's fascinating! However, I strongly recommend ***not*** using it for your coursework for several reasons: (1) if you don't complete assignments yourself, you are not learning. If you're not going to do the work, honestly it's a waste of your time to take this course; (2) chatGPT is not an expert in microbiology, and will likely be prone to errors in writing assignments.

If you do use chatGPT to generate any text you must cite the program in your references or works cited section. Assignments containing text written by chatGPT will not receive full credit compared to assignments that contain original work. Using AI-written work without citing it constitutes an academic dishonesty violation (see section below).

Academic Dishonesty & Plagiarism

Students are expected to adhere to the University's policy on academic dishonesty and plagiarism, located in the student handbook. Academic dishonesty and plagiarism have serious consequences, and if you're struggling in class, please ask for help rather than resort to academic dishonesty! Academic dishonesty will result in a zero on the assignment or exam. In addition, a report will be filed to the department chair and Dean of the College, and a record of academic dishonesty will be placed in the student's file at the Dean of Students Office.

	Tentative Schedule (subject to change at instructor's discretion)	
Date	**Subject**	**Reading**
(T) 08/27	Introduction	
(R) 08/29	History of Microbiology; *Mycobacterium tuberculosis*	Ch 1; 3.14 (pg 956-957)
(T) 09/03	Basics of microscopy; Microbial size & shape; *Thiomargarita*	Ch 1
(R) 09/05	Microbial cell wall & membrane; *Borrelia burgdorferi;* **Quiz 1 (covers 08/29, 09/03)**	2.1-2.5, 32.4

(T) 09/10	Antibiotics & Antibiotic Resistance; *Staphylococcus aureus*	28.5-28.7, 31.9
(R) 09/12	Extracellular & intracellular microbial structures; *Neisseria gonorrhoeae;* **Quiz 2 (covers 09/05, 09/10)**	2.6-2.8; 31.13 (section on gonorrhea)
(T) 09/17	Microbial Motility – chemotaxis & other taxes; *Listeria monocytogenes;* **HW #1 due**	2.9-2.12, 7.6, 33.13
(R) 09/19	Microbial Growth I; **Quiz 3 (covers 09/12, 09/17)**	4.2-4.9; 4.11-4.13, 4.16
(T) 09/24	Microbial Growth II	8.1-8.3, 8.5
(R) 09/26	Nutrition & Metabolism - Introduction; **Quiz 4 (covers 09/19, 09/24)**	3.1-3.10; much of ch 3 will be review depending on your prerequisite knowledge of bioenergetics concepts
(T) 10/01	Finish up Nutrition and Metabolism Introduction; **HW #2 due**	3.1-3.10; much of ch 3 will be review depending on your prerequisite knowledge of bioenergetics concepts such as PMF generation, energy storage, delta G, etc.
(R) 10/03	**Exam 1 (material up to and including 09/24)**	**Exam 1**
(T) 10/08	Metabolic diversity– Photosynthesis	14.3-14.6; 14.2 (Calvin cycle section)

(R) 10/10	Metabolic diversity – Fermentation; **Quiz 5 (covers 09/26, 10/01)**	14.17-14.22
(T) 10/15	No Class - Fall Break	No Class
(R) 10/17	Metabolic diversity – Chemolithotrophy*;* **Quiz 6 (covers 10/08, 10/10)**	14.7, 14.9-14.11
(T) 10/22	Microbial Genomes; CRISPR	10.1-10.3; 9.12
(R) 10/24	Genetic Regulation; *Aliivibrio fischeri;* **Quiz 7 (covers 10/17, 10/22)**	7.1-7.3, 7.5, 7.7; 23.10
(T) 10/29	Archaea**;** **HW #3 due**	(no required textbook reading; I'm going to assign an article instead)
(R) 10/31	Eukaryotes; **Quiz 8 (covers 10/24, 10/29)**	18.1-18.5; 18.9-18.10
(T) 11/05	Viruses I	Ch 5; 11.1-11.2
(R) 11/07	Viruses II; **Quiz 9 (covers 10/31, 11/05)**	32.1; 31.7-31.8; pg 342-343 (section on coronaviruses)
(T) 11/12	Host defenses against pathogens - innate immunity	26.1-26.8, 26.10
(R) 11/14	**EXAM II (material from 09/26 - 11/05)**	**-**

(T) 11/19	Host defenses against pathogens - adaptive immunity	27.1-27.3
(R) 11/21	Adaptive Immunity Continued; human immunodeficiency virus (HIV); **Quiz 10 (covers 11/12, 11/19)**	27.1-27.3; 31.15
(T) 11/26	Symbiosis	23.1-23.2, 23.5, 23.8 (leafcutter ant section only), 23.14-15; 24.1
(R) 11/28	No Class - Thanksgiving Break	No Class
(T) 12/03	Epidemiology I	30.1-30.7
(R) 12/05	Epidemiology II**; Quiz 11 (covers 11/26, 12/03)**	30.1-30.7
Fri 12/13	**Semi-Cumulative Final Exam, 12:00-2:30 pm**	**-**