Course Syllabus

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BIOLOGY 349: Principles of Microbiology, Spring 2023

The BIOL 349 course will be held in person (ISC 131; TR 12:30-1:45 pm)

Prerequisites:

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

Instructor:

Dr. Betsy Hutchison

Office: ISC 359

Email: hutchison@geneseo.edu

Phone: 585-245-5038

Office Hours: Tues and Thurs 2-3 pm, and Wed from 12:30-1:30. Office hours held in ISC 359, and via zoom (by request)

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

Caption: this table summarizes the point breakdown for your semester grades.

Lecture Grades	
Exams (3)	35%
Semester Project (3 parts)	15%
Weekly quizzes (10)	10%
Participation (varies)	5%
Lab Grades	
Lab Presentation	8%
Group Lab Report (draft + final)	10%
Short reports (3 total) + Peer Eval	10%
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.

Caption: this table summarizes the grade point scales for the course.

	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.

Semester Project

- The semester project is broken up into three parts (see syllabus and assignments tab for due dates and more information). Briefly, students will work in teams to create a fictional bacterium, based on concepts and principles that we cover in class. This project will require you to use higher order thinking skills to apply what you know about microbiology to a new situation, and will hopefully allow opportunities for creativity (and fun!) when developing your new bacterium. The project will culminate in a short presentation to the class at the end of the semester. You will complete peer evaluations for all of your group members, and it's expected that group members contribute equally to group work.

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). Depending on the COVID-19 situation I may need to modify the exam delivery format (i.e. administer exams online), but this will not be done without advance notice to students.

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. Please see the **Participation assignment (https://canvas.geneseo.edu/courses/30352/assignments/265517)** on Canvas for more details on this part of the course, and for a rationale on why I'm using random calling for this course.

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, (mailto:access@geneseo.edu) www.geneseo.edu/accessibility-office. (https://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). Finally, please note that there are programs (e.g. GPTZero, **created by student Edward Tian (https://www.npr.org/2023/01/09/1147549845/gptzero-ai-chatgpt-edward-tian-plagiarism)** !) that can detect AI-written work.

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.

Caption: this table shows the syllabus dates and content covered, as well as the assigned readings, for the semester.

	Tentative Schedule (subject to change at instructor's discretion)	
Date	**Subject**	**Reading**
(T) 01/24	Introduction	-
(R) 01/26	History of Microbiology; *Mycobacterium tuberculosis*	Ch 1; 3.14 (pg 956-957)
(T) 01/31	Basics of microscopy; Microbial size & shape; *Thiomargarita*	Ch 1
(R) 02/02	Microbial cell wall & membrane; *Borrelia burgdorferi;* **Quiz 1 (covers 01/26, 01/31)**	2.1-2.5, 32.4

(T) 02/07	Antibiotics & Antibiotic Resistance; *Staphylococcus aureus*	28.5-28.7, 31.9
(R) 02/09	Extracellular & intracellular microbial structures; *Neisseria gonorrhoeae;* **Quiz 2 (covers 02/02, 02/07)**	2.6-2.8; 31.13 (section on gonorrhea)
(T) 02/14	Microbial Motility – chemotaxis & other taxes; *Listeria monocytogenes*	2.9-2.12, 7.6, 33.13
(R) 02/16	Microbial Growth I; **Quiz 3 (covers 02/09, 02/14)**	4.2-4.9; 4.11-4.13, 4.16
(T) 02/21	Microbial Growth II; **semester project part 1 due**	8.1-8.3, 8.5
(R) 02/23	Nutrition & Metabolism - Introduction; *Yersinia pestis*; **Quiz 4 (covers 02/16, 02/21)**	3.1-3.10; 32.7; much of ch 3 will be review depending on your prerequisite knowledge of bioenergetics concepts such as PMF generation, energy storage, delta G, etc.
(T) 02/28	NO CLASS - DIVERSITY SUMMIT SPRING 2023	-
(R) 03/02	**EXAM I (material up to and including 02/21)**	-
(T) 03/07	Metabolic diversity– Photosynthesis	14.3-14.6; 14.2 (Calvin cycle section)

(R) 03/09	Metabolic diversity – Fermentation; **Quiz 5 (covers 02/23, 03/07)**	14.17-14.22
(T) 03/14	NO CLASS - SPRING BREAK	-
(R) 03/16	NO CLASS - SPRING BREAK	-
(T) 03/21	Metabolic diversity – Chemolithotrophy	14.7, 14.9-14.11
(R) 03/23	Microbial Genomes; CRISPR; **Quiz 6 (covers 03/09, 03/21)**	10.1-10.3; 9.12
(T) 03/28	Genetic Regulation; *Aliivibrio fischeri*	7.1-7.3, 7.5, 7.7; 23.10
(R) 03/30	Genomic data, microbial evolution, & systematics; **Quiz 7 (covers 03/23, 03/28)**	13.11-13.12
(T) 04/04	Archaea; **semester project part 2 due**	(no required textbook reading; I'm going to assign an article instead)
(R) 04/06	Eukaryotes; **Quiz 8 (covers 03/30, 04/04)**	18.1-18.5; 18.9-18.10
(T) 04/11	Host defenses against pathogens - innate immunity	26.1-26.8, 26.10

(R) 04/13	**EXAM II (material from 02/23-04/04)**	**-**
(T) 04/18	Host defenses against pathogens - adaptive immunity; human immunodeficiency virus (HIV)	27.1-27.3; 31.15
(R) 04/20	Viruses I; **Quiz 9 (covers 04/11, 04/18)**	Ch 5; 11.1-11.2
(T) 04/25	Viruses II	32.1; 31.7-31.8; pg 342-343 (section on coronaviruses)
(R) 04/27	Symbiosis; **Quiz 10 (covers 04/20, 04/25)**	23.1-23.2, 23.5, 23.8 (leafcutter ant section only), 23.14-15; 24.1
(T) 05/02	Epidemiology I; **Semester project part 3 due; groups #1-5 present**	30.1-30.7
(R) 05/04	Epidemiology II**; Quiz 11 (covers 04/27, 05/02)**	30.1-30.7
(T) 05/09	**Semester project part 3 presentations for groups #6-12**	
Thurs 05/18	**Final exam, cumulative - ISC 131, 8:00-10:30 am**	**EXAM**

Course Summary: