

# Biology 349 Microbiology

## Lecture Syllabus

**Fall 2023**

Section 01: T/R 8:00am – 9:15am (ISC 131)

**Instructor:** Dr. Matthew Hatkoff

**Office:** ISC 139A

**Email:** mhatkoff@geneseo.edu

### **Office Hours**

Tuesday 9:30am – 12:00pm

Thursday 10:00am – 12:30pm

Or By Appointment (Face to Face or Virtual)

### Course Description

An introduction to microorganisms, including Bacteria, Archaea, Eukaryotes, and Viruses. Topics include cell structure and function, cultivation, genetics, metabolism, ecology, evolution, and diversity of microbes. The role of microorganisms in human health and disease will also be examined. Laboratory activity complements lecture material. **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.**

After completing the BIOL 349 course, successful students will be able to:

- (1) List and describe major microbial cell structures, growth rate parameters, and metabolic pathways.
- (2) Apply basic concepts of microbial cell structure, growth, and metabolism to understanding pathogenic and symbiotic interactions.
- (3) Explain similarities and differences between Bacteria, Archaea, and Eukaryotes, and understand how these concepts relate to the evolutionary history of these three domains.
- (4) Isolate bacterial cultures using aseptic technique, and assess microbial phenotypes, growth parameters, and metabolic capabilities in the laboratory.
- (5) Describe and demonstrate methods for assessing microbial diversity and setting up enrichment cultures.
- (6) Understand and analyze primary literature in the microbiology field, and communicate data on microbial experiments through posters and lab reports.

### Required Text

Brock Biology of Microorganisms By Madigan, Michael T. et al.

Pearson. 16<sup>th</sup> Edition

ISBN 10: 0134874404

ISBN 13: 9780134874401

\*If you are using an older or international edition, please note that you are responsible for the material in the required version of the textbook and associated pages/sections may not correspond\*

## Calculator

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

## Grading

Your final grade in BIOL 349 a combination of your lecture and lab grade. Please see the table Below for the full breakdown of your semester grades.

<b>Lecture Grades</b>	
Exams (3)	35%
Semester Project (3 parts)	10%
Weekly Quizzes (10)	10%
Homework (varies)	5%
Participation (varies)	5%
<b>Lab Grades</b>	
Lab Presentation	8%
Group Lab Report (Draft and Final)	10%
Short Reports (3 total)	10%
Final Practical	7%

Any grade disputes by initiated within one week from when the assignment was returned.

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

	<b>B+</b> 87.0% - 89.9%	<b>C+</b> 77.0% - 79.9%		
<b>A</b> 93.0% - 100%	<b>B</b> 83.0% - 86.9%	<b>C</b> 73.0% - 76.9%	<b>D</b> 60.0% - 69.9%	<b>E</b> <60%
<b>A-</b> 90.0% - 92.9%	<b>B-</b> 80.0% - 82.9%	<b>C-</b> 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.

## Late Assignments

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

## Digital Communication (Email and Brightspace Messages)

The best way to reach me is via Brightspace Email. This will ensure that I can easily see the section you are in as well as any associated materials you may be referencing. Secondly you can use your Geneseo email to reach me at [mhatkoff@geneseo.edu](mailto:mhatkoff@geneseo.edu). What can expect from me regarding digital communication? I will respond to messages within 24-36 hours, M-F unless otherwise announced. However, emails and messages sent after 5pm may not be answered until the next day. Emails sent late Friday or over the weekend may not be answered until the following Monday. Please know that I do not expect that you will read or respond to my messages outside of normal business hours should I send one during those times.

## Semester Project

The semester project is broken up into three parts (see assignments tab on Brightspace for due dates and more information). Briefly, students will work in teams to create a fictional microorganism, based on the concepts and principles that we cover in class. The project will require you to use higher order thinking to apply what you know about microbiology to a new situation. This will hopefully allow opportunities for creativity (and fun) when developing your new microorganism. 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 is expected that group members contribute equally to this 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 9 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

Exams will be administered in class (75 min) and will consist of a variety of types of questions covering the previous Unit, including all information from lecture and the assigned readings (textbook, articles, etc).

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.

## Homework

Through the semester there will be a number of homework assignments completed through Brightspace. These will focus on a number of topics and will be designed to reinforce key principles, allow for some creativity, or tie into the “Ideas that Matter” for the semester (Myth and Science). At times you will be encouraged to work with students from lecture or lab, but all work should be uniquely yours.

## 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. I will also 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. These activities are meant to stimulate intriguing conversations and explore topics that may not have “right” or “wrong” answers.

## 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.

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.

## Student Accommodations and 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 physical, emotional, or cognitive disabilities to ensure equal access to academic programs, activities, and services at Geneseo. Students with letters of accommodation should submit a

letter to each faculty member and discuss their needs at the beginning of each semester. Please contact the Office of Accessibility Services for questions related to access and accommodations.

Office of Accessibility Services

Erwin Hall 22

(585) 245-5112 [access@geneseo.edu](mailto:access@geneseo.edu); (<mailto:access@geneseo.edu>);

[www.geneseo.edu/accessibility-office](http://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.

## Guidelines for Attendance and Public Health

As we continue to deal with variants of the COVID-19 virus well into the future, I share these expectations for classroom attendance and protecting public health. SUNY Geneseo is a residential liberal arts college where we all learn together in a shared space. This classroom community is vital for engaging in discussions, solving problems, and answering questions together. Learning is an active process, and it requires engagement - on my part and yours. I promise to create an interactive and collaborative classroom space, and in return I expect you to attend and engage in the activities.

We know that COVID is shifting from a pandemic to endemic stage, and it's possible that some of you may get infected over the course of the semester. Because we want you to be successful and because we value your contribution to the course, we expect you to prioritize attendance.

If you are experiencing symptoms associated with COVID\* on a day we have class, please take a COVID test. Testing is available through the Health Center, or you may take a self-test if you have one. If you test negative and feel well enough to attend (no fever without fever-reducing medication), put on a well-fitting mask, come to class, and maintain physical distance as much as possible. If your symptoms do not allow you to attend class, stay home (except to go to the health center), rest, and take care of yourself. I expect you to communicate with me directly about your absences. I can support you to keep up with class if you are out for COVID-related reasons, but I need you to take responsibility for being transparent and clear in letting me know when you are out and why. Although I can work with you on keeping up, you may miss some course content and extended absences may impact your ability to realize your full potential in this class. For extended absences (i.e., more than a couple of days of classes), you should contact the Dean of Students who can assist with reaching out to your faculty. Finally, I want you to succeed and learn in this class, and I want to protect our community from COVID as best as I can.

## Policies Governing Religious Observances

Under state law (Education Law, Section 224-a) students should be excused from course requirements, such as examinations, class attendance, or other academic study and work requirements, for religious observance. Students must be permitted to make up missed work without penalty. It is the student's responsibility to notify the College about any religious practices that may interfere with their attendance. See the full policy and links to holidays.

## Additional Student Success Resources and Policies

Additional policies and resources can be found at the Geneseo Wiki page below.

<https://wiki.geneseo.edu/display/PROVOST/Syllabus+Resources+Related+to+Student+Success>

## Tentative Schedule (subject to change at instructor's discretion)

It is expected that you check Brightspace at the beginning of each week for extra lecture materials and instructions and for any assignments that may be submitted through the LMS.

Date	Subject (Assignments)	Reading
Aug 29	Introduction	
Aug 31	History of Microbiology; <i>Mycobacterium tuberculosis</i>	Ch. 1; Ch. 31.4
Sept 5	Microbial Size, Shape, and Diversity; <i>Plasmodium</i>	Ch. 1; Ch. 34.5
Sept 7	Microbial Cell Wall and Membrane; <i>Borrelia burgdorferi</i> (Quiz 1)	Ch. 2.1-2.5; Ch. 32.4
Sept 12	Cell Surface Structures and Motility; <i>Vibro cholerae</i>	Ch. 2.6-2.12; Ch. 33.3
Sept 14	Bacterial Secretion Systems; <i>Yersinia pestis</i> (Quiz 2)	Ch. 6.11-6.13; Ch 32.7; Bacterial Secretion Systems Paper
Sept 19	Microbial Metabolism; Diphtheria and Pertussis	Ch. 3.1-3.10; Ch. 31.3

Sept 21	Microbial Growth I; <i>Streptococcus ssp.</i> (Quiz 3) (Semester Project Part 1)	Ch. 4.2-4.9; 4.11-4.13, 4.16; Ch. 31.2
Sept 26	Microbial Growth II; Mycoses (Homework 1)	Ch. 8.1-8.3, 8.5; Ch. 34.2
Sept 28	Antibiotic and Antibiotic Resistance; <i>Staph aureus</i> (Quiz 4)	Ch. 28.5-28.7; Ch. 31.9
Oct 3	<b>EXAM I</b>	
Oct 5	Viruses I; Ebola	Ch 5; Ch. 31.12
Oct 10	<b>No Lecture</b>	
Oct 12	Viruses II; MMR and Chickenpox	Ch 11.1-11.7; Ch. 31.6
Oct 17	Viruses III; Yellow & Dengue Fevers, Chikungunya, and Zika (Homework 2)	Ch 11.8-11.13; Ch. 32.5
Oct 19	Genetic Regulation I; Influenza (Quiz 5)	Ch 7.1-7.7; Ch. 31.8
Oct 24	Genetic Regulation II; Tetanus & Gangrene	Ch. 7.8-7.16; Ch. 32.9
Oct 26	Genetic Regulation III; <i>Clostridium</i> Food Poisoning (Quiz 6)	Ch 9.1-9.8; Ch. 33.9
Oct 31	Eukaryotes; Leishmaniasis, Trypanosomiasis, & Chagas (Semester Project Part 2)	Ch. 18.1-18.5; 18.9- 18.10; Ch. 34.6
Nov 2	Synthetic Biology (Quiz 7)	Ch. 12.1-12.2; 12.6- 12.10; Synthetic Biology Paper
Nov 7	<b>EXAM II</b>	
Nov 9	Host-Pathogen Interactions; <i>E. coli</i>	Ch. 25.1-25.7; Ch. 33.11
Nov 14	Innate Immune Response; HIV	Ch. 26.1-26.4; Ch. 31.15
Nov 16	Innate Immune Response; Hepatitis (Quiz 8)	Ch. 26.5-26.10; Ch. 31.11
Nov 21	Adaptive Immune Response; Rabies	Ch. 27.1-27.4; Ch. 32.1
Nov 23	<b>No Lecture</b>	
Nov 28	Adaptive Immune Response (Homework 3) (Semester Project Part 3)	Ch. 27.5-27.8
Nov 30	Epidemiology; Group Presentations (Quiz 9)	Ch. 30.1-30.4
Dec 5	Epidemiology/Vaccines	Ch 30.5- 30.9
Dec 7	<b>Group Presentations</b>	
<b>Dec 14</b>	<b>CUMULATIVE FINAL EXAM 12:00pm-2:30pm</b>	<b>EXAM</b>

Congratulations, you have made it to the end of the syllabus!