Biology 349 Microbiology Lab Syllabus
Fall 2024

Section 02: Monday 9:30am – 12:20pm (ISC 302)
Section 03: Monday 2:00pm – 4:50pm (ISC 302)
Section 04: Tuesday 2:00pm – 4:50pm (ISC 302)

Instructor: Dr. Matthew Hatkoff
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Office Hours
Tuesday 12:30pm-1:30pm, Wednesday and Friday 9:30am-11:00am
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.**

Required Text

For the laboratory portion of the course there are no required materials. All laboratory materials will be available on Brightspace. Students are expected to print out lab materials before coming to class and to check Brightspace for materials. A three-ring binder is encouraged to organize these materials.

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 is a combination of your lecture and lab grade. Please see the table below for the break down of the lab portion of your grade (30% total of Biology 349)

Lab Grades	
Unknown Bacteria Presentation	7.5%
Group Lab Report (Draft and Final)	7.5%

Short Reports (3 total)	7.5%
Final Practical	7.5%

Any grade disputes by initiated within one week from when the assignment was returned. The following scale will be used to calculate final grades for both Lecture and Lab. Students' 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%		

Unexcused absences from lab will result in a 5% deduction from your lab grade. If you have more than 2 unexcused absences you will get a zero (0) from the lab section of the course.

Late Assignments

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

Digital Communication

The best way to reach me is via email. 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.

Learning Outcomes for Microbiology

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.

Assignment Descriptions

Unknown Bacteria Presentation

During the lab portion of the course, you will collect, grow, stain, and identify an environmentally sampled "unknown" bacteria using various metabolic tests. You will then use Bergey's Manual to determine the identity of this bacteria. We will then take a lab period in which you will present the identity of you bacteria using Powerpoint/Google slides. This presentation will include the logic and tests used to determine the identity of the bacteria, as well as a background and important information on your unknown.

Group Lab Report

As a lab group there you will write a formal lab report on one of the labs during the semester. Both a rough and final draft will be required to be submitted, and this should be properly cited, formatted, and follow standard conventions of lab reports.

Short Reports

There will be three submissions expected from various labs throughout the semester. These submission, or short reports, will take on various forms depending on the lab protocol that is followed. More information on these short reports will be covered throughout the semester.

Lab Practical

During the final week of class, a lab practical will be conducted during our normally scheduled lab period. This practical will assess the skills you have been building through the semester and will also test the knowledge you gained through the background information provided in each lab. This practical will be part hands on and part written and serves as a de facto final for the lab portion of the course.

Tips for Success

Laboratory activities will be posted on Brightspace and you are required to read over them before coming to lab.

One of the components of success in the lab is keeping a good lab notebook. Since lab materials are posted on and printed from Brightspace, you can keep your materials in a binder, and add in pages for any notes that you have. I will allow you to use your notebook for the lab practical, so it will greatly benefit you to keep an organized notebook.

To be a good microbiologist, there are some basic skills (aseptic technique, media making, plate streaking, microscopy, etc) that you need to learn, and these skills will be necessary in almost

any microbiology or molecular biology lab. You'll have two opportunities to demonstrate your mastery of these skills in a lab practical. If we have any down time in lab, use this time to practice skills, or you can schedule some extra time outside of lab (for example during office hours) to practice.

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;)
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.

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

It is expected that you check Brightspace at the beginning of each week for lab materials and instructions).

Week	Monday	Tuesday
1	Aug 26 Check In & Intro; Aseptic Technique; Making Media; Effectiveness of Handwashing	Aug 27 Check In & Intro; Aseptic Technique; Making Media; Effectiveness of Handwashing
2	Sept 2 **No Lab Labor Day**	Sept 3 Streaking Bacteria; Serial Dilutions; Isolation of Environmental Unknown
3	Sept 9 Streaking Bacteria; Serial Dilutions; Isolation of Environmental Unknown	Sept 10 Introduction to Microscopy & Simple Staining; 4- way Streak of Unknown
4	Sept 16 Introduction to Microscopy & Simple Staining; 4- way Streak of Unknown	Sept 17 **No Lab**
5	Sept 23 Gram Staining ***(Short Report 1 Due: Serial Dilution Series)***	Sept 24 Gram Staining ***(Short Report 1 Due: Serial Dilution Series)***
6	Sept 30 PCR; BLAST Lab	Oct 1 PCR; BLAST Lab
7	Oct 7 Gel Electrophoresis; Bacterial Growth Curve	Oct 8 Gel Electrophoresis; Bacterial Growth Curve
8	Oct 14 **No Lab Fall Break**	Oct 15 **No Lab Fall Break**

	(Short Report 2 Due: BLAST Lab)	***(Short Report 2 Due: BLAST Lab)***
9	Oct 21 Identification of “Patient Sample”	Oct 22 Identification of “Patient Sample”
10	Oct 28 Read “Patient Sample” Tests; Identification of Unknown	Oct 29 Read “Patient Sample” Tests; Identification of Unknown
11	Nov 4 Read Unknown Tests & Tentative ID of Unknown ***(Rough Draft of Bacterial Growth Curve Report Due)***	Nov 5 Read Unknown Tests & Tentative ID of Unknown ***(Rough Draft of Bacterial Growth Curve Report Due)***
12	Nov 11 Set up Kirby Bauer & Chemical Inhibition Tests; Quantifying Microbial Contamination in Water ***(Short Report 3 Due: Patient Sample ID)***	Nov 12 Set up Kirby Bauer & Chemical Inhibition Tests; Quantifying Microbial Contamination in Water ***(Short Report 3 Due: Patient Sample ID)***
13	Nov 18 Read Kirby Bauer & Chemical Inhibition; Complete Benchwork	Nov 19 Read Kirby Bauer & Chemical Inhibition; Complete Benchwork

14	Nov 25 **Presentation on Unknown Bacteria**	Nov 26 **Presentation on Unknown Bacteria**
15	Dec 2 **Final Lab Practical** ***(Final Draft of Bacterial Growth Curve Report Due)***	Dec 3 **Final Lab Practical** ***(Final Draft of Bacterial Growth Curve Report Due)***