

Biology 301- Cell Biology Laboratory  
Dr. H. Hoops, Spring 2022  
Monday 1:00-3:50, Tuesday 1:30-4:20

Learning outcomes (in order of importance)

- 1) **To learn and practice skills in data collection and manipulation, interpretation and design of scientific experiments.** By the end of this course you will have acquired and/or improved your ability to collect, organize and interpret data, to integrate the results of a scientific experiment with what is known about the topic and to design novel experiments to test hypotheses.
- 2) **To be able to master technical aspects of some techniques in cell biology.** You will develop skills in working with chemicals and biological organisms, spectroscopy, enzymology, organelle isolation, etc.
- 3) **To reinforce important concepts in cell biology.** By the end of this course you will have reinforced lecture concepts involving the following: protein structure, the relationship between substrate concentrations and the rate of an enzyme catalyzed reaction, membrane surface carbohydrates, tubulin-microtubule dynamics, and cell signaling.

Course Philosophy: **"Develop skills, not accomplish tasks"**

Throughout the semester we will be pipetting, mixing, measuring, counting, calculating, graphing, problem solving and more. To succeed in this lab, you will have to be able to do all these things. But just doing these tasks is not enough—the real purpose of the lab is to build skills that you can use after leaving this lab. So, if you can follow instructions to measure enzyme activity and construct a Michaelis-Menten graph (accomplish the task), that is necessary. But what I *really* want for you is to understand it well enough that you could adopt the assay to answer a different question or to interpret results of another investigator using a different enzyme and different assay (to develop skills). I want everyone to succeed, and I enjoy helping students. But, be aware that I will be focusing on developing *your* skills, including reasoning and problem-solving ones. Therefore, I will do my best to help *you* reason things out (to develop skills) rather than simply tell you answers so you can get a good grade on the report (to accomplish the task of the lab writeup). You will probably also notice that I often ask questions that require you to analyze material in novel ways (again developing skills). Finally, we will have two investigative labs that require you to design the experiment, carry it out, and interpret the results. This requires much more skill in experimental design and interpretation than following a set of canned lab instructions and answering questions that your instructor designs.

Schedule:

Month	day (week)	topics
Jan/F	01, 01 (1)	Isolation of DNA from bacteria. "Solutions and Dilutions" minilecture
Feb	07,08 (2)	Cutting of plasmid using restriction endonucleases; S & D quiz; into to yeast lab
	14,15 (3)	Enzymology I (graphs due in 1 week, D&Q due in 2 weeks)
	21,22 (4)	Yeast transformations, enzymology discussion, preparation for investigative lab,
Feb/M	28,01 (5)	Investigative lab on enzymology (graphs due in 1 week, LR due in 2 weeks)
Mar	07,08 (6)	Discussion of investigative lab reports, excel graph quiz, set up for transformant analysis
	14,15 (none)	<i>Spring break, no classes</i>
	21,22 (7)	Analysis of yeast transformants (D&Q due in one week)
	28,29 (8)	Mitochondrial isolation and characterization parts I and II (graphs due in 1 week, D&Q due in two weeks)
April	04,05 (9)	Discussion/Analysis of mitochondrial isolation parts I and II and preparation for part III
Apr.	11,12 (10)	Mitochondrial iso. char. part III. Graphs due in one week, D&Q due in two weeks.

	18,19 (11)	Review of mitochondrial isolation (D&Q), excel graph quiz (mito), pre-trials for cell signaling
	25,26 (12)	Cell signaling I,
May	02,03 (13)	Cell signaling II,
	09,10 (14)	Wrap-up and writing time (LR – due noon, Mon May 16)

### **Health and Wellbeing in the COVID-19 era:**

The changes brought on by COVID-19 have impacted us all in a number of ways, and will continue to do so at various times and to varying degrees during the upcoming semester. Your health and wellbeing are foundational to your ability to learn, and if you find that you are feeling unwell and it is impacting your ability to complete your coursework, please reach out. Because the learning environment will be different than it has been in the past, the indicators that usually let you know something is wrong may not be as clear to you or those around you as they would be during a typical semester. Please remember that it's never too late to ask for help.

In a similar way, I will occasionally ask for some patience and flexibility on your part. The pandemic is affecting faculty as well as students and creating demands that would not be present in an ordinary semester. If I am slow responding to an email, if I take some time to grade an assignment, if I am a bit late posting materials, please be patient. But feel free to send me a reminder e-mail. I will not be offended, and perhaps grateful. (There have been times when I thought I had posted something, but had not hit the "save" button in Canvas.)

### **This is a Face-to-face Lab:**

We greatly value the learning opportunities we'll have in our in-person class meetings and hope that you will actively participate in this important element of the learning process. The COVID-19 pandemic presents challenges to in-person learning, but by working together we can make this a safe experience.

It is essential that all students in in-person classes follow some basic processes to help keep themselves, other students, and our faculty and staff safe. Although these processes may seem inconvenient, they reflect current public health guidance that helps minimize the spread of coronavirus. Please incorporate these essential health and safety measures into your normal routine, consider the ways that your actions may affect the health and wellbeing of those around you, and try to approach this semester with a spirit of empathy and compassion.

### **Face Masks and Other Behavior in the Classroom**

Face masks are required in all instructional spaces (including classrooms, lecture halls, and laboratories) and all common areas including residence halls and academic buildings. If you forget your mask, please be sure to pick up a disposable one before entering the classroom. Masks must be worn for the duration of class. If you do not have a mask or are unwilling to wear one, you will be asked to leave the classroom. We cannot safely hold class if all students are not wearing face masks.

If you would feel more comfortable or if my teaching could be more accessible if I wear a clear face mask, please let me know as soon as possible. Students who have concerns about wearing a face mask due to a documented disability need to contact the Office of Accessibility Services ([access@geneseo.edu](mailto:access@geneseo.edu)) to request reasonable accommodations

Please familiarize yourself with our special seating arrangements in the classroom and be sure to practice 6-foot physical distancing at all times.

### **Attendance and Public Health**

In the context of the COVID-19 pandemic, it is vital that we all do what we can to protect the health and safety of each other. ***If you are feeling unwell on a day that class meets in-person, do not attend.*** Remember that it is better to stay home if you are not feeling well than to attend class and risk spreading illness to others. Throughout the semester, please be proactive in communicating about absences and contact the Dean of Students if you expect to

be out for an extended period of time. I've designed our course so that there's a path for you to make up any learning that takes place in a class meeting you miss.

The college has developed an online COVID-19 screening report for students. Be sure to familiarize yourself with this process and complete the brief screening report before leaving for class. If you are experiencing common symptoms of COVID-19, stay home and contact Health and Counseling Services as soon as possible. I strongly encourage you to set a daily reminder to fill out the screening report.

### **Grading**

A laboratory report (LR) or a "data and questions " analysis (D & Q) is due one or two weeks after completion of the laboratory – see the syllabus. To maximize the ratio of learning per hour of effort, graded materials are a mixture of group and individual components. For many labs, I will accept either a common (group) report or individual ones. There are some questions, including the bonus ones where they should be done individually. (Hint: I have designed the workload to be doable if you do the work in groups.) But be sure everyone understands all the components. The two lab reports must be done individually (although the figures can be done together), and both quizzes must be done individually (although you can prepare for them as a group). Your final grade will be based on the solutions and dilutions quiz (7 pts), data and questions (15 pts each for enzymology, and yeast transformation, 30 points for mitochondrial isolation and characterization), 30 points for the enzymology investigative laboratory report and 40 points for the investigative report on cell signaling. There will be two Excel graphing quizzes (3 and 5 points) where I will give you some data and you will prepare a graph as you did for the D&Q. There will also be 5 points at my discretion based on participation and leadership and 5 points based on peer review. There will be a 2-point penalty for each day the reports are late. See "Details of the Reports and Assignments" for information concerning the appropriate formats.

### **Course Materials:**

The labs will be posted in Canvas. ***Please bring a physical print out to the lab.*** It is good practice to make a physical mark on the paper as you complete each step in a procedure. In addition, you may wish to mark up the procedure to help guide you in carrying out the lab. In the past, I have required students to buy a physical copy of the lab manual. However, it is cheaper if you print it than buy a pre-printed manual. Use the money you saved by not having a textbook for your printer balance. In most cases, you should hand-write data into your lab-book rather than directly enter it into the computer. If you lose all your data due to a computer problem (which has happened!) after 3 hours of work, neither you nor your lab partners will be very happy.

### **Attendance:**

Labs, including this one, are inherently participatory. I expect perfect attendance unless you are ill. If there is an unavoidable conflict, please contact me several days (if possible) before class, so that we can work out options. If you are not feeling well, please send me an email no later than the end of the day of a missed class, and preferably before the class starts.

If you are in quarantine or isolation or if you are worried about giving your partners an illness but are otherwise well enough to participate remotely, please contact your group and arrange to participate by zoom/facetime/skype.

### **Laptop and Phone Policy**

Please turn off phones before coming to class. (Emergency contacts are exempted with my permission.) Laptops are permitted and even encouraged for data collection and analysis. If you would like to talk about graphs, tables etc., ***please print them out before coming to see me*** as it is much easier for everyone to view them and it allows me to make comments right on the paper versions.

### **Student Supplies**

Students should bring splash resistant glasses to all classes. (I suggest that you get a pair of comfortable ones rather than the goggles.) I also suggest that you purchase a "sharpie"-type (not water soluble!) marker for marking tubes. I will supply one to all benches, but it's even better to have your own, so that you don't have to wait to use it. Lab coats are optional, but we will be working with some chemicals that stain or eat clothes. If you do not wear a

lab coat and end up damaging your clothes that is your responsibility.

### **Accommodations and Support**

SUNY Geneseo will make reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities. Please see the link for student success resources in Canvas.

### **Contact Information**

Dr. Harold Hoops

ISC 356

phone: x5378, E:mail: Hoops@geneseo.edu

### **Office hours**

Office hours: (subject to change after spring obligations are finalized)

Monday 10:00-11:00 a.m. in person

Tuesday 8:00-9:00 p.m., virtual only

Thursday 2:00-3:00 p.m. in person

If you cannot make it to my office during the in-person office hrs. I can meet virtually during this time by prior arrangement.

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