BI 282H Genetics and Molecular Biology

Winter 2019 Lab Syllabus and Schedule, University of Oregon

Course Personnel

Lab Instructor: **Dr. Laurel Pfeifer-Meister**
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Lecture Instructor: **Dr. Tory Herman**
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GEs: **Ian Petersen**
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BULAs: **Rachael Allison**
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Lab Description

In this lab course, you will explore the key principles of genetics and molecular biology. Our hope is that you will gain a better understanding of the lecture material by encountering it from a different, and often "hands on," perspective. We are not trying to train you in research techniques, though you will be introduced to some. Rather, the material presented in lecture will be reinforced and elaborated upon through the manipulation of biological materials and models.

Much of the work that has led to an understanding of the molecular mechanisms of growth and inheritance has been performed with a few key organisms. We believe that by performing exercises with these organisms, you will be better able to appreciate some of the basic biological phenomena that we deal with in the course, and how our present understanding of these phenomena was achieved. You will get the most out of all of the activities if you approach them with questions in mind. Thus, the labs include many questions designed to prompt additional questions from you. This process of posing questions and finding solutions is is an important part of the scientific method. So, when you are working on the labs, remember that it is much more important to try to understand what you are doing, while you are doing it, than to mindlessly collect data.

Learning Outcomes

Upon successful completion of this course, you should:

- Understand how DNA directs the synthesis of proteins, including how these proteins are regulated.
- Understand some of the causes and consequences of variation in DNA sequences.
- Understand how DNA is inherited and thus specifies the phenotypes of subsequent generations.
- Begin to develop intuition and analytical tools to think about life quantitatively and molecularly.
- Gain exposure to common model organisms and understand some common lab techniques used to study molecular biology.
- Apply quantitative reasoning and analysis to biological science problems.
- Gain experience communicating science.

Lab Format

Though the exercises in this manual are called "labs," they involve not only measurements and

analyses of biological materials, but models, computer simulations, computer-based problem analysis, and hypothetical data. In this way, some of the sessions will be "tutorials." Lab handouts describe the exercises for each week, give some conceptual background relevant to the exercises, and pose questions pertaining to the problems being addressed. We expect that you will have read and have tried to understand the material in the lab handout when you arrive at your session each week. Short pre-lab homework assignments are designed to motivate you to read and think about the lab exercises for that day. Following an introduction that emphasizes key concepts and practical issues, students will perform the activities with assistance from the faculty and TAs. Generally, students work together in pairs, but collaborations involving larger groups sometimes occur.

How to succeed in this class

- Attend and participate actively in all labs.
- Ask questions and seek help when you need it (that's what we are here for).
- Prior to coming to lab, read the lab handout in its entirety (as well as any other assigned reading). Don't try to answer the pre-lab questions 5-minutes before class starts.
- As you proceed with the exercises, complete the written questions as you go. This is advantageous for two reasons: you'll understand what you are doing, as you do it, and your lab report will be nearly complete when you finish the session. The idea is to avoid having to reconstruct the important concepts from a bunch of incomprehensible data the night before the lab report is due.
- Get together in small study groups regularly to go over key concepts (this will also help you with the midterms and final). Try to do this without referring to the lab, book or your notes. This will let you know where the gaps in your knowledge are. There is no better way to learn than teaching others.
- Don't get bogged down in the details, but instead ask yourself what is the big picture and how can I apply these concepts.

Assignments, Grading Policy, and Academic Integrity

Lab exercises, most of which include a pre-lab assignment, a lab report, and a quiz based upon the exercises and concepts of the previous week will account for 34.6% of your overall BI282H grade; the remaining 65.4% comes from clickers, midterms and the final exam. **Pre-labs** are worth 4 points (3.2% of overall grade) and are due at the beginning of your lab session. These will not be accepted late. **Lab reports** are worth 20 points each (18% of overall grade) and are usually due at the beginning of the lab session the following week. See the Lab schedule for those deadlines. Reports must be complete, legible, and written in your own words. Even though lab reports are graded and submitted individually, we expect and encourage you to cooperate with your partner and colleagues in preparing your reports. In addition, you should consult with your instructors during the lab session and at office hours if you have questions. 10% will be deducted each day an assignment is late, except in cases of approved emergencies. **Lab quizzes** are worth 18 points each and are graded on a continuous scale (10.8% of your grade). The lowest quiz score will be dropped. These will be open on Canvas Saturday morning and will be due by 9 am the following Tuesday. Once you begin your quiz you will have 60 minutes to complete it. During week 7, students will give a short **presentation** in groups of 3-4 on the early development of their chosen model organism (see lab packet for details, 2.2% of overall grade). Finally, there is also 4 points available for students who are consistently courteous and respectful during lab (e.g., on time, working on course related activities, etc.–see lab courtesy below). Point values are listed below (note this class is out of 1000 points) and due dates are listed in the Lab Schedule table for each assignment.

Component	Number	Points	Total
Pre-labs	8	4	32
Lab Reports	9	20	180
Lab quizzes	7-1*	18	108
Presentation	1	22	22
Lab courtesy	1	4	4
Total			**346**

*Low score dropped.

Lab Courtesy. Please arrive to lab on time. Late arrivals distract me and the other students. Use your laptop only for class activities. Ask questions if you did not hear or understand something.

Class rosters are provided to us with your legal name. We will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the quarter (or before) so that we may address you properly.

Open inquiry, freedom of expression, and respect for differences are fundamental to a comprehensive and dynamic education. We are committed to upholding these ideals by encouraging the exploration, engagement, and expression of divergent perspectives and diverse identities. Classroom courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Our classroom is a learning environment, and as such should be a safe, inclusive and respectful place. Being respectful also includes using preferred pronouns for your classmates. Disrespecting fellow students as well as combative approaches, tones and/or actions are not acceptable. Please make me aware if there are classroom dynamics that impede your (or someone else's) full engagement.

Crises happen. If you are having problems that are interfering with your ability to do the work in this class, please let me know promptly. I am willing to make arrangements when the need is real and when you have done your best to deal with the situation in a timely manner. If you must miss a lab session and cannot attend a different section for that week (valid reasons include verifiable medical emergencies, essential travel, or family emergencies), you may arrange to use data from another student in the class to complete the lab report on your own. Make this request in writing to me (lpfeife1@uoregon.edu) ahead of time.

Academic integrity. We expect students to complete assignments and exams in a manner consistent with academic integrity as outlined in the Student Conduct Code: https://policies.uoregon.edu/vol-3-administration-student-affairs/ch-1-conduct/student-conduct-code. This includes cheating ("any act of deception by which a student misrepresents or misleadingly demonstrates that the student has mastered information on an academic exercise that the student has not mastered"), and plagiarism ("using the ideas or writings of another as one's own.") I have a zero tolerance policy for academic dishonesty. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures.

Discrimination and Harassment: Any student who has experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at safe.uoregon.edu. To get help by phone, a student can also call either the UO's 24-hour hotline at 541-346-7244 [SAFE], or the non-confidential Title IX Coordinator at 541-346-8136. From the SAFE website, students may also connect to Callisto, a confidential, third-party reporting site that is not a part of the university. Students experiencing any other form of prohibited discrimination or harassment can find information at respect.uoregon.edu or aaeo.uoregon.edu or contact the non-confidential AAEO office at 541-346-3123 or the Dean of Students Office at 541-346-3216 for help.

Reporting: I am a Student-Directed Employee. As such, if you disclose to me, I will respond to you with respect and kindness. I will listen to you, and will be sensitive to your needs and desires. I will not judge you. I will support you. As part of that support, I will direct students who disclose sexual harassment or sexual violence to resources that can help. I will only report the information shared to the university administration when you as the student requests that the information be reported (unless someone is in imminent risk of serious harm or is a minor). Please note the difference between 'privacy' and 'confidentiality.' As a Student-Directed Employee I can offer privacy because I am not required to report certain information to the university. However, I cannot be bound by confidentiality in the same way that a counselor or attorney is. Confidential resources such as these means that information shared is protected by federal and state laws. Any information that I as a student-directed em-

ployee receive may still be accessed by university or court proceedings. This means, for example, that I could still be called as a witness or required to turn over any related documents or notes that I keep.

Please note also that I am required to report all other forms of prohibited discrimination or harassment to the university administration. Specific details about confidentiality of information and reporting obligations of employees can be found at titleix.uoregon.edu. UO employees, including faculty, staff, and GEs, are mandatory reporters of child abuse. Child abuse pertains to individuals who are under the age of 18. This statement is to advise you that your disclosure of information about child abuse to the instructor may trigger my duty to report that information to the designated authorities.

Campus resources to support your learning

Tutoring and Academic Engagement Center: drop-in math and writing support in addition to tutoring, study skills support, and Class Encore. Located on the 4th Floor Knight Library (541) 346-3226, engage@uoregon.edu, https://engage.uoregon.edu/services/

Counseling Center: call anytime to speak with a therapist who can provide support and connect you with resources. Located on the 2nd Floor of the Health Center (541)346-3227

Accessible Education Center: UO is working to create inclusive learning environments. I believe strongly in creating inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your participation, please notify me as soon as possible. You are also encouraged to contact the Accessible Education Center. If you are not a student with a documented disability, but you would like for us to know about class issues that will impact your ability to learn, we encourage you to come visit during office hours so that we can strategize how you can get the most out of this course. Located on the 1st Floor of Oregon Hall (541) 346-1155, uoaec@uoregon.edu

Center for Multicultural Academic Excellence: CMAE's mission is to promote student retention and persistence for historically underrepresented and underserved populations. CMAE develops and implements programs and services that support retention, academic excellence, and success at the UO and beyond. Located on the 1st Floor of Oregon Hall (541) 346-3479, cmae@uoregon.edu

UO Access Shuttle is an on-campus ride service provided at no cost to students with conditions that limit mobility. More information and a sign-up form can be found on the parking & transportation department website: https://parking.uoregon.edu/content/access-shuttle.

Safe Ride: Safe Ride is an assault prevention shuttle that works to provide free, inclusive, and accessible alternatives to traveling alone at night for UO students, faculty, and staff. They are a schedule-ahead service and riders can (1) call once we open to schedule a ride with a dispatcher or (2) leave a voicemail on the day of their ride request. They do not call riders ahead of time to confirm due to capacity constraints, but riders are always welcome to call us to double-check that their ride was scheduled (541-346-7433 ext 2; pages.uoregon.edu/saferide)
Operating hours: Fall/Winter term
Sunday - Thursday | 6pm - midnight
Friday + Saturday | 6pm - 2am
Policy and rules: 1. They are a schedule-ahead service, they do not call ahead, and they can only wait for riders for 5 minutes at their pick-up time and location. 2. They only give rides to groups of 3 or fewer to prioritize groups that are at higher risk. 3. They are a free service and do not accept tips.

Lab Schedule

Week 1 (1/8-9) Chemical Nature of Genetic Material
Due: Nothing.

Week 2 (1/15-16) DNA Structure
Due: Quiz on lab 1 (Canvas) by 9 am 1/15 (**18 pts.**)
Pre-lab 2 questions in lab (**4 pts.**)
Lab Report 1 in lab (**20 pts**.)

Week 3 (1/22-23) Mutation Rates
Due: Quiz on lab 2 (Canvas) by 9 am 1/22 (**18 pts.**)
Pre-lab 3 questions (**4 pts.**)
Lab Report 2 (**20 pts**.)

Week 4 (1/29-30) Yeast Complementation
Due: Quiz on lab 3 (Canvas) by 9 am 1/29 (**18 pts.**)
Pre-lab 4 questions (**4 pts.**)
Lab Report 3 (**20 pts**.)

Midterm 7-9 pm **Wed. 1/30 LIL 282**

Week 5 (2/5-6) Transcription and Translation
Due: Quiz on lab 4 (Canvas) by 9 am 2/5 (**18 pts.**)
Pre-lab 5 questions (**4 pts.**)
Lab Report 4 (**20 pts**.)

Week 6 (2/12-13) Gene Regulation
Due: Quiz on lab 5 (Canvas) by 9 am 2/12 (**18 pts.**)
Pre-lab 6 questions (**4 pts.**)
Lab Report 5 (**20 pts**.)

Week 7 (2/19-20) Early Development Presentations
Due: Quiz on lab 6 (Canvas) by 9 am 2/19 (**18 pts.**)
Lab Report 6 (**20 pts**.)
No pre-lab this week
Presentations on early development **(22 pts.)**

Midterm 7-9 pm Wed. 2/20 LIL 282

Week 8 (2/26-27) Mitosis and Meiosis
Due: NO Quiz this week.
Pre-lab 8 questions (**4 pts.**)

Week 9 (3/5-6) Recombination
Due: Quiz on lab 8 (Canvas) by 9 am 3/5 (**replace low score**)
Pre-lab 9 questions (**4 pts.**)
Lab Report 8 (**20 pts**.)

Week 10 (3/12-13) Mendelian Genetics
Due: Pre-lab 10 questions (**4 pts.**)
Lab Report 9 (**20 pts**.)
Lab Report 10 due in lecture 3/15 at 9 am (**20 pts**)

Week 11 **Final Exam** 10:15 Tuesday 3/19 in Chapman 220

Office Hours

All office hours will be held in ***Klamath 21***, except Dr. Herman who will hold her office hour in Klamath 32. Please also feel free to email us for an appointment.

Monday 11:00 am-12:00 pm; Ian Petersen
3:00-4:00 pm; Tory Herman (Kla 32)

Tuesday 12:00-1:00 pm; Elizabeth Bryan
4:00-5:00 pm; Rachael Allison

Wednesday 12:00 am-1:00 pm; Anna Kulawiec

Thursday 11:00 am-12:00 pm; Zac Bush

Friday 1:00-2:00 pm; Laurel Pfeifer-Meister