



## ***BI 283H Ecology and Evolution***

Spring 2017 Lab Syllabus and Schedule, University of Oregon

“Biodiversity starts in the distant past and it points toward the future.”—Frans Lanting

### **Course Information**

Lab Instructor: Dr. Laurel Pfeifer-Meister, 541-346-1549, lpfeife1@uoregon.edu  
Office Hour: Tuesday 12:00 — 1:00 pm or by appointment, room 21 Klamath

GEs: Lucas Nebert, lnebert@uoregon.edu  
Office Hour: Wednesday 11:00 — 12:00 pm, room 360 Onyx Bridge  
Ian Petersen, iap@uoregon.edu  
Office Hour: Thursday 9:30 — 10:30 am, room 21 Klamath

BULAs: Sally Claridge, sclaridg@uoregon.edu  
Office Hours: by appointment only  
Joshua Braunstein, jbrauns2@uoregon.edu  
Office Hours: by appointment only

Field Trip: Mandatory “Going Coastal” Field trip Sat. April 29<sup>th</sup> Depart 6:00 am Millrace Parking Lot (north side of Franklin at Onyx), Return 7:00 pm, lunch provided

### **Lab Description**

In this lab course, you will explore the key principles of evolution and ecology. 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. 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 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 the fundamental processes involved in the generation, maintenance, classification, and consequences of biological variation.
- Understand some common techniques used in studying plant and animal species, phylogenetics, communities, and ecological interactions.
- Apply quantitative reasoning and analysis to biological science problems.
- Be able to read and critically evaluate primary literature in the fields of evolution and ecology.
- Ask questions, test hypotheses, and write a report in the format of a scientific journal.

## 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 a 20-minute quiz (see below) the laboratory will be introduced, and key concepts and practical issues will be stressed. Students will then 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 and field trips.
- 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 with 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 35% of your overall BI283H grade; the remaining 65% comes from pre-lecture quizzes, participation, midterms and the final exam. Most **pre-labs** are worth 5 points (4% of overall grade) and are due at the beginning of your lab session. These will not be accepted late. **Lab reports** vary from 15-20 points in value (15.5% 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. For the coast field trip, you will be analyzing data we collect in the intertidal zone during lab week 7 and will be expected to write a report in the format of a scientific journal (9.5% of your grade). A late first draft of the field report or peer review will not be accepted. **Lab quizzes** are worth 15 points each and are graded on a continuous scale (6% of your grade). The lowest quiz score will be dropped. Point values (note this class is out of 1000 points) and due dates are listed in the Lab Schedule table for each assignment.

**Crisis 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 special 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 pre-lab and lab report on your own. Indicate in your lab report whose data you are using. Make this request in writing to me (lpfeife1@uoregon.edu) ahead of time.

**Academic integrity and Diversity.** We expect students to complete assignments and exams in a manner consistent with academic integrity. Stu-

dents must produce original work and cite all relevant sources for ideas, quotations, etc. Academic dishonesty is a serious offense and will be treated according to the guidelines in the Student Conduct Code. Moreover, we expect students to adhere to the University's commitment to freedom of thought and expression of all its members by encouraging open inquiry and respecting a diversity of opinions in this course. Please refer to the Student Conduct Code for more information on the University's Academic Dishonesty Policy and Diversity Education: <http://uodos.uoregon.edu/>

## Lab Schedule

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|----------|---|---------|--|
| Week 1   | (4/4, 5) Begin Evolution by Artificial Selection (ongoing throughout the term). Introduction to PCR and a human polymorphism: collect and prepare cheek cell DNA for PCR amplification of the <i>Alu</i> repeat in Chromosome 16.<br>Lab Discussion of Science paper. | Week 5  | (5/2, 3) Cemetery Demography<br>We will be outside during a portion of the lab, dress accordingly.   |
|          | <b>Due:</b> Nothing.  |         | <b>Due:</b> Pre-lab questions (5 pts.)<br>Lab Report 4 (20 pts.)<br>Quiz on lab 4 and field trip (15 pts.)   |
| Week 2   | (4/11, 12) Hardy Weinberg Equilibrium and Population Genetics of Cat Coat Variation   | Week 6  | (5/9, 10) Keystone Predator<br>You may bring your own computer (not required).   |
|          | <b>Due:</b> Pre-lab questions (5 pts.)<br>Lab Report 1 (15 pts.)<br><b>NO quiz</b> this week.   |         | <b>Due:</b> Pre-lab questions (5 pts.)<br>Lab Report 5 (20 pts.)<br>Quiz on lab 5 (15 pts.)  |
| Week 3   | (4/18, 19) Genetic Drift, Natural Selection and Sickle Cell Alleles<br>Artificial Selection: Assess "hairiness" of $P_0$ plants, make selection   | Week 7: | (5/16,17) Factors that influence Biodiversity in the Intertidal Zone (OIMB cont.)<br>Introduction to R and Statistics<br>Artificial selection: Remove plants from water. |
|          | <b>Due:</b> Pre-lab questions (5 pts.)<br>Lab Report 2 (20 pts.)<br>Quiz on lab 2 (15 pts.)   |         | <b>Due:</b> Pre-lab (hypotheses for diversity in intertidal zone) (10 pts.)<br>Lab Report 6 (20 pts.)<br><b>NO Quiz</b> this week.                                       |
| Week 4   | (4/25, 26) Primate Phylogenetics: Reconstructing Evolutionary History Using Morphology and Amino Acid Sequences to Determine Phylogeny<br>Artificial Selection: Pollinate selected $P_0$ plants with bee sticks   | Week 8  | (5/22, 23) Molecular Fossils: Introduction to Biology Workbench<br>Artificial selection: Harvest seeds and plant $F_1$ generation.                                       |
|          | <b>Due:</b> Pre-lab questions (5 pts.)<br>Lab Report 3 (20 pts.)<br>Quiz on lab 3 (15 pts.)   |         | <b>Due:</b> Pre-lab questions (5 pts.)<br>Rough Draft of Formal Report (20 pts.)<br><b>NO Quiz</b> this week.  |
| Saturday | (4/29) Field trip to OIMB. Depart 6 am.<br>Lunch provided (30 pts.)   | Week 9  | (5/30, 31) Visit to Global Change Biology research site  |
|          |   |         | <b>Due:</b> No pre-lab<br>Peer Review (15 pts.)<br>Lab Report 8 (20 pts.)<br>Quiz on lab 8 ( <b>Replace low score</b> ).   |
|          |   | Week 10 | (6/6, 7) Artificial selection: Assess hairiness of $F_1$ generation.<br>Final Review session.  |
|          |   |         | <b>Due:</b> No pre-lab<br>Final draft of Formal Report (30 pts.)<br><b>NO Quiz</b> this week.  |
|          |   | Week 11 | (6/13) <b>Due:</b> Artificial selection report at 5PM (20 pts.); Location TBA.   |