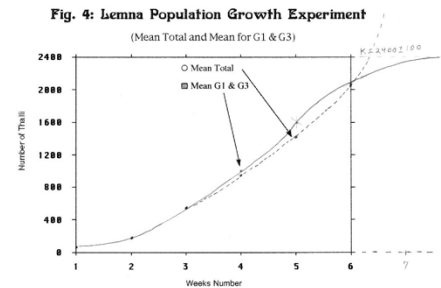


BI 213 GENERAL BIOLOGY III: ECOLOGY & EVOLUTION

CRN: 31502

Instructors: Dr. Tobias Policha & Dr. Laurel Pfeifer-Meister
(tpolicha@uoregon.edu; lpfeife1@uoregon.edu)



Office Hours and Tutor Sessions will be posted to Canvas.
Please email one of us to make an appointment outside of these posted times.

SYLLABUS CONTENTS

Overview -> Goals -> Materials -> Format -> Policies -> Resources -> Schedule -> Readings

COURSE OVERVIEW

In this third term of the general biology sequence, we build on concepts of how cells and organisms function to study the patterns and mechanisms of 4.5 billion years of evolutionary change that led to the diversity of life that exists on earth today. We begin by examining mechanisms that cause genetic changes in populations over time with a special focus on natural selection. We then examine the species concept and look at patterns of evolutionary change over long periods of time. In the second half of the term, we examine ecological theory, including different models of population growth and factors that regulate population growth in various organisms. We study ways in which species interact and how ecological communities are formed and organized and apply these ideas to current issues such as the loss of biodiversity. We end the term by examining how energy flows and nutrients cycle in ecosystems, how humans have altered these functions, and consider the consequences of these changes for global biodiversity. Students participate in a field trip to collect data on plant diversity in a local forest which is used as the basis for understanding the evolution of land plants, ecological succession, and community diversity. The prerequisite for this course is the successful completion of BI 211; you will be expected to remember some key concepts from that course.

COURSE GOALS

The goals for BI 213 fall into two general categories: (1) to learn the foundational concepts related to evolution and ecology (2) to build on the skills developed in BI 211, including critical thinking, quantitative reasoning, and the development of communication skills.

Concept-Based Goals:

1. Identify the mechanisms that cause biological evolution in populations; to identify and explain the tenets of natural selection.
2. Investigate evolution by applying the Hardy-Weinberg model to populations.
3. Understand the connections between some of the major events in the history of life on earth.
4. Apply mathematical models to understand growth in populations; describe factors regulating population growth.
5. Identify types of species interactions, such as competition and predation, that are important for shaping biological communities.
6. Describe diversity at the genetic, species, and functional level, including mathematical indices.
7. Become familiar with how communities change across space and time. Describe how matter and energy flows through ecosystems and understand some of the major fluxes and stores in biogeochemical cycles.
8. Understand some of the ways in which humans have impacted the natural world.

Skill-Based Goals:

1. Develop competency in the basic terminology and methodologies used in the biological sciences.
2. Learn the process of scientific inquiry and its applications.
3. Learn to communicate knowledge, ideas, and reasoning clearly and effectively in oral and written forms appropriate to the biological sciences; prepare an oral presentation and practice public speaking.
4. Become familiar with science-relevant search engines, and learn to identify primary work; develop the ability to think critically about information, evaluate the validity of arguments, and weigh the merits of disparate scientific conclusions.
5. Experience the collaborative nature of the biological sciences by working productively in teams with diverse perspectives.

This course is designated as a Natural Science Core Education course. At UO, core education is designed to provide a broad, interdisciplinary education that helps students think critically and creatively, communicate clearly, and reflect ethically. In this class, you will learn and practice critical thinking through laboratory exercises and problem sets, and written communication through researching and preparing a presentation on a topic of interest.

COURSE MATERIALS

Textbook(s)

We will use "**Biological Science**" by **Scott Freeman et.al.** You can use the older 5th (ISBN: 978-0321841810) or 6th (ISBN: 978-0321976499) editions, or the newest 7th (ISBN: 978-0134678320) edition for this course. You can save money by purchasing a used copy of the 5th edition. The readings include background material useful for preparing you for lecture and for studying for exams. You aren't expected to necessarily remember all the details in the text. A good strategy would be to skim over the entire chapter first, concentrating on the major concepts. Read the headings, bolded font, and understand the figures first, then read more carefully the specific pages that are assigned. There are several copies of the textbook on reserve in the Science Library.

Two optional books that you may want to purchase include: '**Braiding Sweetgrass**' by **Dr. Robin Wall Kimmerer** (ISBN: 978-1571313560; the Common Reading book for the University of Oregon last year; we will read one chapter together that will be posted to Canvas) and '**The Beak of the Finch**' by **Jonathan**

Weiner (ISBN: 978-0679733379; a good, and accessible narrative of the work done by Peter and Rosemary Grant, and their students, on evolution in the Galapagos finches). We will not draw directly on the latter book in class.

Calculator

You will need a scientific calculator capable of doing natural logarithms and square roots for use on problem sets, in lab, and on exams. Calculators that have the ability to store text will not be allowed. Cell phone calculator apps cannot be used during exams.

iClickers

Please purchase an iClicker for this course. We will use clickers on the first day of class. You will need to register your clicker ID number on the Canvas page.

COURSE FORMAT

Lectures [Mondays, Wednesdays, and Fridays, 11:00-11:50 in 180 Prince Lucien Campbell (PLC)]

Do the assigned readings before coming to the lectures. During most of the lectures, you will participate in activities to learn concepts. These will often be done collaboratively with students discussing the problem together for a few minutes before each independently writes their own solution. You will not turn these in but your active participation will help you understand the material and prepare for exams.

Lab/Discussion [Wednesdays or Thursdays in 5 Klamath (KLA)]

Labs are an integral part of the course. We have designed active-learning experiences to broaden your understanding of what ecology and evolution are about. Often you will work in groups, pose questions, design experiments, or make observations, and present your findings in written or oral form. Labs will cover natural selection, population genetics, plant biodiversity, phylogenetics, and behavior. You will usually be expected to turn in lab handouts at the end of each lab. Part of your grade is based on lab participation. **Most labs cannot be made up because they involve special materials or equipment.** We do not accept late lab reports. We will drop your lowest lab score to accommodate any absences.

iClickers (Personal Response Systems)

We will pose iClickers questions in almost every class to encourage participation and to provide valuable feedback to both instructors and students. Each student is expected to purchase a clicker for use in this class. Register your clicker on the course Canvas site before coming to the first class. Clicker questions during lecture will be multiple-choice. You can earn points through both participation and by choosing the correct answer (when appropriate). The total points for the clicker portion of your grade will be based on 85% of the total possible points: your grade = points earned/85% of total possible points (not to exceed 100%).

Presentation Project (Trends in Ecology & Evolution TrEE)

You will investigate a current topic in ecology or evolution and give a group **oral presentation** in lab during week 9 or 10. Each person will individually contribute a thesis statement, rough and final draft of an **annotated bibliography**, a peer review, and a Google slide. We will accept the bibliography up to a week late but discounted by 10% for each day (or fraction thereof) that it is late. **There will be no late presentations.** See TrEE Project' handout on Canvas for more details.

If you are retaking this course, you are NOT allowed to resubmit project work from the previous time you took Bi213. **The work you do this term must be original** and on a different topic.

Post-Lecture Quizzes

Each session will be accompanied by short Canvas quizzes corresponding to the lecture and reading material. We will post the quizzes on Canvas right after most lectures. **Quizzes are due by 8:50 AM on their due dates** (typically the morning before the next lecture). We will provide the solutions in the afternoon via Canvas. We will drop your lowest quiz score.

Problem Sets (not graded)

We will post several practice problem sets to Canvas during the term. Although these assignments are not graded, it is very important that you work on them each week. The practice problems are very similar to the types of questions you will see on the exams (in fact, many of the problems are from past exams!). The practice problems are designed to help you master the material needed to do well on the exams. Come to office hours and help sessions and we will help you understand how to solve these types of problems.

Field Trip

Each student will join a field trip with the class to the Mohawk Resource Natural Area to practice field survey methods, learn some local natural history, and investigate ecological succession. The material covered on the trip is an integral part of the course. If you cannot attend the trip, you must complete an alternative assignment (see handout on Canvas). The field trip will be run on Wednesday, Thursday, and Friday of Week 7 (5/17-19). You will only go on one of those days, but it will take three days to cycle through all of the students. We will ask for your preferred date(s) early in the term. Please try to make yourself as available as possible during that week. There will not be regular labs during that week.

iNaturalist Observations

As a way to get you out and observing nature on your own, you are responsible for making and posting ten observations (~1/week) to the iNaturalist community science platform. You will need to make an account at <https://www.inaturalist.org/> and you will need access to a digital camera (phones work well). Further details will be available on Canvas.

Exams

This class has three exams: two midterms and a final. All exams consist of short-answer questions, with occasional multiple-choice or true/false questions. The final is cumulative. The exams cover material from all aspects of the course including lectures, labs, the field trip, quizzes, readings and practice problems. Rather than requiring you to memorize intensive detail, we design the exams to probe for a deep understanding of the concepts and principles discussed and for your ability to apply the concepts to novel situations rather than memorization of details. Exams cannot be made up. Exams are graded by the GEs under faculty supervision. To promote consistency, a single GE grades each question. **We will not allow early or late exams. The final will be on Tuesday, June 13th at 10:15 AM. To accommodate potential conflicts we will drop your lowest exam score.**

Midterm regrade policy To be fair to all students, it is essential that all exams be graded according to the same criteria. If you wish to submit a midterm for a regrade, you must use the following guidelines. First, refer to the exam key available on Canvas to see how closely your answer(s) match the key. If you still wish to have a midterm exam answer regraded, you must submit a written statement within one week of the return of the exam, along with your original exam, explaining specifically why your answer merits a higher score. Keep in mind that **we will regrade the entire exam** and a regrade may result in a higher, lower, or unchanged score. Please do not abuse this system. We reserve the right to eliminate this option at our discretion.

COURSE EVALUATION

Assessment	Number	points each	Total
Exams	3 (drop lowest)	190	380
Labs	9 (drop lowest)	20	160
TrEE Presentation Project	1	160	160
Lecture Quizzes	26 (drop lowest)	5	125
Pre-lab Quizzes	7 (drop lowest)	10	60
iClickers	tbd	tbd	50
Field Trip	1	40	40
iNaturalist	10	2.5	25
		TOTAL	1000

Workload Allocation

Activity	Hours	Explanation
Lecture	22	~three 50-min. lectures/week
Lab	18	9 two-hour lab sessions/term
Field trip	5	One all day trip during week three
Problems sets	10	~1 hr./week
Reading	22	~25 pages from the textbook/week @ 11 pages/hour = 2.2 hours/week
Pre-lab	4.5	Short quizzes that take ~half an hour (1/week)
Lecture quizzes	14	Short quizzes that take ~half an hour (2-3/week)
Bibliography	13	We estimate that a successful annotated bibliography will take ~10 hours of work outside of class time (includes thesis statement, rough draft, peer review and final draft).
Issues Presentation	12	We estimate that a successful presentation will require ~10 hours of work outside of class time.
TOTAL HOURS	~120	

Grading

Final grades will follow typical >90%=A, >80%=B, >70%=C, >60%=D cutoffs with '+/-'s assigned within ~2% of each cutoff. We reserve the right to lower these thresholds, but we will never raise them.

- A:** Quality of performance is outstanding relative to that required to meet course requirements; demonstrates mastery of course content at the highest level.
- B:** Quality of performance is significantly above that required to meet course requirements; demonstrates mastery of course content at a high level.
- C:** Quality of performance meets the course requirements in every respect; demonstrates adequate understanding of course content.
- D:** Quality of performance is at the minimal level necessary to pass the course, but does not fully meet the course requirements; demonstrates a marginal understanding of course content.
- F:** Quality of performance in the course is unacceptable and does not meet the course requirements; demonstrates an inadequate understanding of course content.

Posting of Grades

We will post scores for assignments and exams on Canvas. Check your scores every time we post them, as you will have only one week after the posting to notify us about mistakes or omissions.

COURSE POLICIES**Absences and Late Work**

Generally speaking, *attendance is required in this course* and students do better when they show up for class. That being said, things come up. We have adopted a few policies in order to provide some flexibility and avoid people coming to class when they are sick. We do not explicitly take attendance, but your participation (via iClicker) is part of your final grade. To allow reasonable flexibility, we only grade you on 85% of your possible iClicker points. This effectively gives you a pass on about one and a half weeks' of lectures. Additionally, we will drop your lowest lab grade, including zeros received for an absence. The two alternative ways we can calculate your exam scores (laid out above) allow you to miss an exam if necessary. You can turn in all work (except the presentation and lab reports) up to a week late for credit, with a 10% penalty accrued for each day it is late. We do not ask for reasons for absences and shall not distinguish between 'excused' and 'unexcused' absences.

Professional Conduct

We work hard to make this course valuable to your learning and we welcome suggestions from you at any time about things you think could be done to improve the course. In return, we ask that you arrive on time and stay until class is over without making unnecessary noise that could distract your classmates. Please keep computer, cell phone, or other electronic device use to a minimum needed to ensure your learning during lecture or lab. We promise to respect you as students and as individuals, and ask that you return that respect to us and to your fellow classmates. Class rosters are provided to the instructor with the student's legal name. We will gladly honor your preferred name and any pronouns you share with us. Please advise us of this preference early in the quarter (or before) so that we can address you properly. We're happy to talk to you in person or over email about this. You can also update your Canvas profile, which is how we most often refer to class lists.

Academic Integrity

All students must complete assignments with academic integrity. Students must produce their own work and properly acknowledge and document all sources. You can find more complete information about the University of Oregon's Policy on Academic Dishonesty in the student conduct code (located at dos.uoregon.edu/conduct).

Inclusiveness

Open inquiry, freedom of expression, and respect for difference 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. Our classroom is a learning environment, and as such should be a safe, inclusive and respectful place. Being respectful includes using correct pronouns for your classmates. Disrespecting fellow students as well as combative approaches, tones and/or actions, are not acceptable. Please tell us if there are classroom dynamics that impede your (or someone else's) full engagement.

Communication

In general, our class will communicate through our Canvas site. **Check Canvas daily.** Announcements and emails are archived there and automatically forwarded to your UO email, and can even reach you by text or push notification. Consider getting the phone app to receive the quickest up-to-date information. Check and adjust your settings under Account > Notifications. We will have a running Discussion forum on our Canvas site called “Question Board” for the entire group to ask and answer questions.

The teaching staff tries to be as available as possible for questions related to course material. However, we ask that you make an honest effort to find the answers yourself, including posing questions to fellow students first (you can do this through Canvas). If it pertains to course administration, double-check the syllabus and Canvas. If you email after regular business hours you may not hear back from us until the next day. We reserve the right to reply to messages received over the weekend on the next business day. Please add “BI 213” at the beginning of the subject line of all emails.

Prohibited Discrimination and Harassment

UO is committed to providing an environment free of all forms of prohibited discrimination and harassment, including sex or gender-based violence. As an instructor, one of our responsibilities is to help create a safe learning environment for students and for the campus as a whole.

Students experiencing any form of prohibited discrimination or harassment may seek further information on safe.uoregon.edu, respect.uoregon.edu, titleix.uoregon.edu, or aaeo.uoregon.edu or contact the Title IX office (541-346-8136), Office of Civil Rights Compliance office (541-346-3123), or Dean of Students offices (541-346-3216), or call the 24-7 hotline 541-346-SAFE for help.

Crises Happen

If you are having difficulties that are interfering with your ability to do well in the class, please tell an instructor as soon as possible. We may be able to refer you to someone for help or to make special arrangements if you have done your best to deal with the situation in a timely manner. There is a Crisis Center (541-346-4488) on campus that you should not hesitate to call if you or a friend are in need of assistance.

Reporting

The instructors of this class, Tobias Policha and Laurel Pfeifer-Meister, are ‘**Assisting Employees**’ under the University’s Prohibited Discrimination and Retaliation Policy. As such, if you disclose to us, we will respond to you with respect and kindness. We will listen to you, and will be sensitive to your needs and desires. We will not judge you. We will support you. As part of that support, we will direct students who disclose prohibited discrimination and harassment, including sexual harassment or violence, to resources that can help and will only report the information shared to the university administration if the student requests that the information be reported (unless someone is in imminent risk of serious harm or a minor). Please note the difference between ‘privacy’ and ‘confidentiality.’ As Assisting Employees we can offer privacy because we are not required to report certain information to the university. However, we 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 we as an assisting employee receive may still be accessed by university or court proceedings. This means, for example, that we could still be called as a witness or required to turn over any related documents or notes that we keep. Please note also that we are 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 <https://investigations.uoregon.edu/>

Mandatory Reporting of Child Abuse

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 our duty to report that information to the designated authorities. Please refer to the following link for detailed information about mandatory reporting: <https://hr.uoregon.edu/policies-leaves/general-information/mandatory-reporting-child-abuse-and-neglect>

CAMPUS RESOURCES**Class Encore**

Class Encore sets up small, structured study groups for challenging classes. Groups meet once a week for 50 minutes, **weeks 2 through 10**, and are **FREE** and **open to ALL students** enrolled in the class. Class Encore sessions give students the opportunity to ask questions, discuss course concepts, practice study strategies, and collaborate to solve problems. Groups are led by students who previously excelled in the class and maintain a high GPA. Encore instructors attend the class, participate in weekly planning sessions, and lead the study groups in reviewing course concepts and study strategies. Registration opens Wednesday April 5th (<https://engage.uoregon.edu/class-encore>). **Sessions Tues. 2-3pm, Weds. 2-3 & 3-4pm, Thurs. 2-3pm, Fri. 10-11am & 11am-12pm.**

Tutoring and Academic Engagement Center

Drop-in math and writing support in addition to tutoring, and study skills support. Located in the 4th Floor Knight Library (541) 346-3226, engage@uoregon.edu. <https://engage.uoregon.edu/services/>

Accessible Education Center (AEC)

The University of Oregon is working to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your participation, please notify us 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, contact us so that we can strategize how you can get the most out of this course. They are available Monday-Friday 8 am-5 pm by calling (541) 346-1155 or emailing uoaec@uoregon.edu. <https://aec.uoregon.edu/>

UO Access Shuttle

The 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>.

Center for Multicultural Academic Excellence (CMAE)

Promoting student retention and persistence for historically underrepresented, excluded, and underserved populations. Programs and services that support retention, academic excellence, and success at the UO and beyond. Committed to all students, including undocumented and tuition equity students. Email cmae@uoregon.edu. or call the front desk at 541-346-3479.

Counseling Center

The Counseling Center provides students with confidential consultation 24 hours a day, 7 days a week. Their number is 541-346-3227. Students often believe that their issues are not “severe” enough for them to call, but at the Counseling Center, no problem is too small. <https://counseling.uoregon.edu/>.

If you’re unable or don’t wish to come to the Counseling Center in person, help is still available. Our after-hours support/crisis line is open to all students, wherever you are located. Call 541-346-3227 when the Counseling Center is closed to speak to a therapist. Counseling Center staff can help you figure out how to find mental health services in your area. Call 541-346-3227 during business hours to schedule a consultation with a case manager.

Dean of Students

The Dean of Students website has additional resources targeted to specific communities on campus. Check out <https://dos.uoregon.edu/community> for information on the Black Cultural Center, LGBT+ Support Services, the Women’s Center, as well as resources for Nontraditional students and Veterans.

Duck Rides (formerly ‘Safe Rides’)

Duck Rides is a student-led organization dedicated to providing free and accessible transportation to all university students, staff and faculty. The goal is to provide safe transportation that is an alternative to walking home alone at night, and to prevent sexual assault and driving under the influence. Hours of Operation: 6:00 pm – 12:00 am. 7-days-a-week. 541-346-7433. duckrides@uoregon.edu. <https://duckrides.uoregon.edu/>

Academic Disruption

In the event of a campus emergency that disrupts academic activities, course requirements, deadlines, and grading percentages are subject to change. Information about changes in this course will be communicated as soon as possible by email, and on Canvas. If we are not able to meet face-to-face, students should immediately log onto Canvas and read any announcements and/or access alternative assignments. Students are also expected to continue coursework as outlined in this syllabus or other instructions on Canvas. ***In the event that the instructor of this course has to quarantine, this course may be taught online during that time.***

It is generally expected that class will meet unless the University is officially closed for inclement weather. If it becomes necessary to cancel class while the University remains open, this will be announced on Canvas and by email. Updates on inclement weather and closure are also communicated as described on the [Inclement Weather webpage](#).

COVID-19

The key to keeping our community healthy and safe involves prevention, containment, and support. ***Please do not come to campus if you have symptoms of COVID.*** For information on testing, vaccination, isolation protocols, and other resources go to <https://coronavirus.uoregon.edu>.

SCHEDULE

Week	Date	Lecture Topic	LABS
1	4/3	Natural Selection I	Introduce Artificial Selection (AS) Experiment & Survey Trichomes of P _o (AS1); Introduce TrEE Presentation Project
	4/5	Natural Selection II	
	4/7	Population Genetics I	
2	4/10	Population Genetics II	Population Genetics I & AS2 : Pollinate Hairiest P _o
	4/12		
	4/14	Species & Speciation	
3	4/17	Phylogenetics I	Population Genetics II
	4/19	Phylogenetics II	
	4/21	Evolutionary Trends in Plants (<i>end of material for Midterm I</i>)	
4	4/24	Behavioral Ecology I	Plant Phylogenetics
	4/26	Behavioral Ecology II	
	4/28	MIDTERM EXAM I	
5	5/1	Population Ecology: Distributions & Abundance	Honey Bee Behavior
	5/3	Population Ecology: Exponential Growth	
	5/5	Population Ecology: Logistic Growth	
6	5/8	Population Ecology: Life Histories	Population Growth & Field Trip Methods; AS3 : Harvest and Plant F ₁ Seeds
	5/10	Community Ecology: Species Interactions	
	5/12	Community Ecology: Consumption	
7	5/15	Community Ecology: Competition	NO LAB on account of the field trip. Pre-lab on plant ID.
	5/17	Community Ecology: Mutualism (<i>end of material for Midterm II</i>)	
	5/19	NO CLASS (Field Trip)	
8	5/22	Community Ecology: Succession	Presentation planning; AS4 : Survey F ₁ trichomes
	5/24	Community Ecology: Structure & Dynamics	
	5/26	MIDTERM EXAM II	
9	5/29	NO CLASS (Memorial Day)	Project Presentations I AS5 : Data Analysis
	5/31	Ecosystem Ecology: Energy Capture	
	6/2	Ecosystem Ecology: Energy Flow	
10	6/5	Ecosystem Ecology: Nutrients	Project Presentations II
	6/7	Biodiversity	
	6/9	Conservation Biology	
Finals Week	6/13	FINAL EXAM 10:15 AM	

“Nothing in biology makes sense except in the light of evolution.”

- Theodosius Dobzhansky, 1973

“Nothing in evolutionary biology makes sense except in the light of ecology.”

- Peter and Rosemary Grant, 2008