



Bi 213 General Biology III: Populations

Syllabus for Fall Quarter 2019

Instructor: Dr. Peter Wetherwax



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 evolutionary change over the past 4.5 billion years that have led to the diversity of life that exist on earth today. We begin by examining mechanisms that cause genetic change 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 time periods. 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 two or more species interact, how ecological communities are formed and organized, and apply these ideas to current issues such as invasive species and loss of biodiversity. We end the term by examining how energy flows and nutrient cycle in ecosystems, how we 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 of understanding evolution of land plants, succession and diversity.

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

Skill-based goals:

1. To develop competency in the basic terminology and methodologies used in the biological sciences.
2. To learn the process of scientific inquiry and its applications.
3. To learn how to learn about biology.
4. To learn to communicate knowledge, ideas and reasoning clearly and effectively in oral and written forms appropriate to the biological sciences; to prepare an oral presentation and practice public speaking.
5. To become familiar with the use of science relevant search engines, and learn to identify primary work; to develop the ability to think critically about information, evaluate the validity of arguments, and weigh the merits of disparate scientific conclusions.
6. To experience the collaborative nature of the biological sciences.

Course Format

Lectures (Mondays, Wednesdays and Fridays, 11:00-11:50 in room 100 Willamette)

You should do the assigned readings before coming to the lectures. During most of the lectures there will be activities that will help you to learn concepts; these will often be done collaboratively with students discussing the problem together for a few minutes before independently writing your own solution. You will not turn these in but your active participation will help you understand the material and prepare you for exams.

Lab/Discussion (Wednesdays and Thursdays in room 112 Huestis)

We consider the labs to be an integral part of the course. We have tried to design active learning experiences that will broaden your understanding of what ecology and evolution are about. Often you will be working in groups, posing questions, designing experiments or making observations, and presenting your findings in written or oral form. There

will be labs dealing with natural selection, population genetics, plant biodiversity, phylogenetics and behavior. Lab handouts will usually be turned in at the end of each lab. Each lab will be graded on a 10-point scale. Part of this grade will be based on participation in lab. Most labs cannot be made up because they involve special material or equipment. Late lab reports will not be accepted. If you let us know in advance about a lab you cannot attend, it may be possible to attend another lab section. This is only an option if arrangements are made in advance and permission is granted from your instructor.

Clickers (Personal Response Systems) Clickers will be used in almost every class to encourage participation and to provide valuable feedback to instructors and students. Each student is expected to purchase a clicker for use in this class. You should register your clicker on the course Canvas site. Questions during lecture that require clickers will be multiple choice. Points will be earned two different ways: (1) 2-point questions: 2 points will be awarded based on participation alone, not on whether the question is answered correctly; (2) 4-point questions: 4 points for correct answer, 2 points for incorrect answer. Total percent for the clicker portion of your grade will be based on 85% of the total possible points: your clicker grade = total points earned/85% of total possible (not to exceed 100%).

Issues Project You will investigate an issue in ecology or evolution and give an oral group presentation in lab during week 8 or 10. Projects will consist of a thesis statement, rough and final draft of an annotated bibliography, a peer review, and a google slide done by each person individually. As a group, you will create a presentation outline during week 7 and give your final presentation during week 8 or 10. Late work on the bibliography will be accepted but discounted for each weekday that it is late. There will be no late presentations. See issues project handout in course packet for more details.

If you are retaking this course, you will NOT be allowed to resubmit issues 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 and Pre-lab Quizzes There will be two types of short Canvas quizzes: "single-quizzes", worth 3 pts each, will be based on the latest lecture; "double-quizzes", worth 6 pts each, will be based on both the latest lecture and the upcoming lab. We will drop your two lowest single-quizzes but count all of your double-quizzes. The quizzes will be posted on Canvas right after most lectures. You will need to read the pre-lab handout posted on Canvas in order to answer the lab questions. The due dates of the quizzes are shown on the "Lecture and Lab Schedule" later in this syllabus. **All quizzes are due by 10:30AM on their due dates (see syllabus).** Solutions will be made available in the afternoon.

Problem Sets (not graded) There will be several practice problem sets that will be posted on Canvas during the term. It is very important that you work on these during each week. We will help you to understand how to solve these problems in the help sessions. 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.

Field Trip Each student will take a field trip with the class to the Mohawk Resource Natural Area to investigate succession of woody plants. The material covered on the trip is an integral part of the course. If you cannot attend the trip, you will be given an alternative assignment (see handout on *Canvas*): a 4-5 page paper on plant succession in Cascade forests that will be graded - Due by 5PM on Friday Oct 25th . See schedule for field trip days and times. Each student will attend one of the trips. We will ask for your preferred date(s) during the first week of classes.

Exams There will be three exams: two midterms and a final. All exams will be the same format: short-answer with occasional multiple choice or true/false questions. The final is cumulative. The exams will cover material from all aspects of the course including lectures, labs, the field trip, quizzes, readings and practice problems. Exams will be designed to probe a deep understanding of the concepts and principles discussed, and an ability to apply the concepts to novel situations rather than a memorization of detail. Exams cannot be made up. Exams are graded by the GEs under the supervision of the faculty. To promote consistency, a single GE grades each question. **There will be no early or late midterms or final exams given. Everyone is required to take the final on Thursday December 12th at 10:15 AM.**

The exam portion of your grade will be calculated 2 ways and we will use whatever way gives you the highest total (you don't need to tell us which version to use). Version 1 will give a higher number of points for the midterms and lower points for the final. Version 2 counts the midterms less and the final more. See the Evaluation table for the exact breakdown.

Exam 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.

Evaluation

Component	Percent	Points (1000 total)
Lab Handouts (9 total, 10 pts each)	9%	90
Field Trip	3%	30
Project Annotated Bibliography (thesis statement: 10 pts; peer review: 15 pts; rough draft: 15 pts & final draft: 80 pts)	12%	120
Project Presentation (one slide: 10 pts; in-lab presentation: 80 pts)	9%	90
Clicker (total points earned/85% of total possible)	3.8%	38
Single Quizzes: Post-Lecture (18 quizzes, drop lowest two, 3 pts each)	4.8%	48
Double Quizzes: Post-Lecture plus Pre-Lab Quizzes (4 quizzes, none dropped, 6 pts each)	2.4%	24
<i>Exams Version 1</i> Two Midterm Exams (140 pts each, 28% total)	56%	280
		Final Exam (cumulative, 28%) 280
<i>Exams Version 2</i> Two Midterm Exams (80 pts each, 16% total)	56%	160
		Final Exam (cumulative, 40%) 400

Posting of Grades Scores for assignments and exams will be posted 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 Materials

- **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.
- **Textbook** The text, *Biological Science*, 5th or 6th edition (4th ok, but not recommended—you will be responsible for determining the appropriate reading by comparing to a later version on reserve) by Scott Freeman, should be used as a general reference. The readings include background material useful for preparing you for lecture and for studying for exams. We don't expect you to remember all the details in the text. A good strategy would be to skim over the entire chapter first, concentrating on the major concepts, then to read more carefully the specific pages that are assigned. There are copies of the text on reserve in the Science Library.

Lecture, Laboratory and Issues Project and Exam/Quiz Schedules

Week	Date	Quiz	Lecture Topic	Laboratory and <i>Issues Project</i>
1	9/30 10/2 10/4	L	No class: Rosh Hashanah L1 Natural Selection I L2 Natural Selection II	Lab 1: Plant Diversity & Sow Fern Spores & Artificial Selection (AS) 1: Survey Trichomes of P _o
2	10/7 10/9 10/11	L LL L	L3 Population Genetics I L4 Population Genetics II L5 Evolutionary Trends in Plants	Lab 2: Population Genetics & Issues Project Introduction AS2: Pollinate Hairiest P _o <i>Read project handout and choose top three choices on Wednesday's quiz; select final issue in lab</i>
3	10/14 10/16 10/18	L LL	L6 Defining Species and Speciation L7 Phylogenetics I no lecture:field trips Fri 11-4, Sat 10-3 and Sun 10-3	Lab 3: Plant Phylogenetics I, Field Trip Planning <i>Initial thesis statement uploaded by Monday 10/14 10AM</i>
4	10/21 10/23 10/25	L LL L	L8 Phylogenetics II L9 History of Early Life on Earth L10 Evolution	Lab 4: Plant Phylogenetics II & Midterm Review <i>Project: Initial annotated bibliography uploaded by Wednesday 10/23 10AM; group members must have different references and write separate papers</i>
5	10/28 10/30 11/1	LL L	Midterm Exam #1 (lectures 1-10) L11 Behavioral Ecology I L12 Behavioral Ecology II	Lab 5:Honey Bee Behavior AS 3: Harvest and Plant F1 Seeds <i>Peer review of bibliography uploaded by Wed. 10/30 10AM</i>
6	11/4 11/6 11/8	L L L	L13 Population Ecology: Exponential Growth L14 Population Ecology: Logistic Growth L15 Population Ecology: Life Histories and Cycles	Lab 6: Population Ecology Review <i>Create shared google slide document for each group in lab Final annotated bibliography uploaded by Mon. 11/4 10AM</i>
7	11/11 11/13 11/15	L L L	L16 Community ecology: species interactions L17 Community ecology: consumption L18 Community ecology: competition	Lab 7: <i>Issues Presentation Planning</i> AS 4: Survey trichomes of F ₁ & Using Excel for Data Analysis <i>Upload a single shared Google-doc slide by Tu 11/12 10AM</i>
8	11/18 11/20 11/22	L L L	L19 Community ecology: mutualism L20 Community ecology: succession L21 Community ecology: biodiversity	Lab 8: <i>Project presentations</i> AS5: data analysis <i>Final presentation pdf uploaded by Wed 11/20 10AM for students presenting week 8</i>
9	11/25		Midterm Exam #2 (lectures 11-21) no class on Wednesday Thanksgiving	Thanksgiving: no labs this week
10	12/2 12/4 12/6	L L	L22 Ecosystem ecology: productivity/energetics L23 Ecosystem ecology: nutrient cycling L24 Conservation biology	Lab 9: <i>Project Presentations and final exam review</i> <i>Final presentation pdf uploaded by Wed 12/4 10AM for students presenting week 10</i>
Finals	12/12		Final Exam on Thursday 10:15 -12:15 on entire course	

L =lecture only (single-quiz) due dates

LL = lecture + pre-lab (double-quiz) due dates

all quizzes are posted by the afternoon after previous lecture and due by 10:30AM

Exams and quizzes are in bold; *Issues project assignments are in bold italic*

**Assigned Readings from Textbook
(5th or 6th editions are recommended)**

Lecture	6th edition		5th edition		Subject
	Ch.	Pages	Ch.	Pages	
1-2	25	435-437, 445-455	25	444-446, 453-463	evolution and natural selection
3-4	23	456-465, 469-477	26	465-475, 478-486	population genetics
4	27	540-541	30	554-555	sickle-cell anemia & malaria
5	28	565-587,	31	580-609	evolution of land plants
6-7	24	480-493	27	489-502	species concepts and speciation
7-8	25	496-503	28	505-511	phylogenetics
	Bioskills 13	47-48	BS7	B10-B11	reading a phylogenetic tree
9-10	25	504-506,	28	513-516	history of life
	26	525-532	29	536-542	metabolic diversity
	27	546-549	30	559-563	origin of eukaryotes
11-12	50	1051-1054	53	1082-1085, 1091-1093	behavior ecology, communication in bees
12	50	1064-1067	53	1095-1098	altruism
13	51	1070-1079	54	1101-1108	population growth models
14-15	51	1079-1080	54	1108-1112	regulation of population growth
16-19	52	1092-1103	55	1123-1135	species interactions
17	51	1081-1083	54	1113-1115	consumption
19	52	1104-1105	55	1137-1138	keystone species
20	52	1103-1111	55	1135-1142	succession
21	52	1111-1113	55	1142-1145	biodiversity and biogeography
22	49	1039-1048	52	1068-1079	types of ecosystems
	53	1116-1117	56	1148-1149,	intro to ecosystem ecology
22	53	1117-1123	56	1149-1156	ecosystem energetics
23	53	1123-1129	56	1156-1162	biogeochemical cycles
23	53	1129-1136	56	1163-1169	human impacts on ecosystems
24	54	1139-1151	57	1172-1182	conservation

Campus resources to support your learning

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

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 The University of Oregon is working to create inclusive learning environments. The instructor believes 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 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, 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, uoacc@uoregon.edu

Center for Multicultural Academic Excellence (CMAE) mission is to promote student retention and persistence for historically underrepresented and underserved populations. We develop and implement programs and services that support retention, academic excellence, and success at the UO and beyond. We reaffirm our commitment to all students, including undocumented and tuition equity students. Located on the 1st Floor of Oregon Hall (541) 346-3479, cmae@uoregon.edu

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>.

Class Courtesy

Please arrive in class on time. Late arrivals distract the instructor and the other students. Please put away and do not use your own computers, cell phones, or other electronic devices during lecture or lab. Computers are not a very good way for taking notes in biology courses and they are distracting to other students. Do not leave class early unless you have cleared it with the instructor in advance. Ask questions if you did not hear or understand something.

Class rosters are provided to the instructor with the student's legal name. I 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 I may address you properly.

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. 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.

Academic integrity

All students will be expected to adhere to the University's guidelines on academic integrity as outlined in the Student Conduct Code: <https://policies.uoregon.edu/vol-3-administration-student-affairs/ch-1-conduct/student-conduct-code>. As detailed in the policy, academic misconduct means the violation of university policy involving academic integrity. 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.") The

instructor has 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

Prohibited 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. As UO policy has different reporting requirements based on the nature of the reported harassment or discrimination, additional information about reporting requirements for discrimination or harassment unrelated to sexual assault, relationship violence, sex or gender based bullying, stalking, and/or sexual harassment is available at [Discrimination & Harassment](#).

Reporting

The instructor of this class is 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 employee 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.

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 my duty to report that information to the designated authorities. Please refer to the following links for detailed information about mandatory reporting: [Mandatory Reporting of Child Abuse and Neglect](#).

Safe Ride

541-346-7433 ext 2 pages.uoregon.edu/saferide

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**.

We 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. We 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. We are a feminist, 'for-the-students/by-the-students' organization and operate out of the Women's Center in EMU 12F.

Operating hours:

Spring term Summer term Fall/Winter term

Sunday - Thursday | 7p - midnight Friday + Saturday | 7p - 2a

Sunday - Thursday | 9p - midnight Friday + Saturday | 9p - 2a

Sunday - Thursday | 6p - midnight Friday + Saturday | 6p - 2a

Policy and rules:

1. We are a **schedule-ahead service**, we **do not call ahead**, and we can only wait for riders for 5 minutes at their pick-up time and location.
2. We only give rides to groups of **3 or fewer** to prioritize groups that are at higher risk.
3. We are a **free service** and do not accept tips.