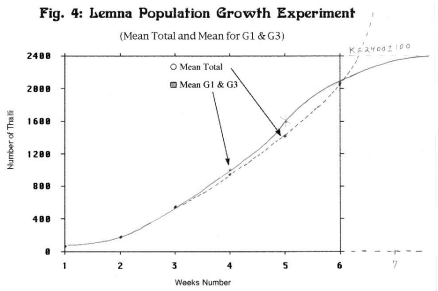
Bi 213 General Biology III: Populations

Information Sheet and Syllabus for Fall Quarter 2013

Instructor: Dr. Peter Wetherwax



Course Overview

In this third term of the general biology sequence, we build on concepts learned in Bi 211 to study processes and patterns that occur between different organisms and with organisms and their environments. Major areas of study include processes of evolution, analysis of evolutionary patterns, population genetics, population growth, species interactions, biodiversity, and ecosystem-level processes.

The course is designed primarily for students who are science majors, but is open to any student with knowledge of math (Math 95 or greater), chemistry (Ch 111, 113, 221 or 224), and genetics (Bi 211 or equivalent). Bi 212 is not a prerequisite for Bi 213. Students who complete Bi 211 through 214 and have taken organic chemistry are eligible to take any of the 300-level biology courses. Biology majors must complete either this sequence (Bi 211 to 214) or the Honors sequence (Bi 281H to 283H).

Course Goals

There are three major kinds of goals in the general biology sequence. This term we emphasize:
concepts You will gain some basic knowledge about the fundamental concepts of ecology and evolution that will help you better understand Earth's biological history, how living organisms function and how human actions influence other life on the planet.
skills It is important for all citizens to be scientifically literate, whether or not they are practicing scientists. Part of literacy is the ability to find information, evaluate the information and communicate or act on that information. We will practice these skills in this course and will work on the ability to analyze and understand quantitative information.
science To learn to be a better scientist you will read papers from various sources and discuss both the findings and how the science was conducted. You will practice doing science by forming and testing hypotheses (even in lecture), by doing experiments, by making observations, and by using models and simulations. You will gain an understanding of how ecologists and evolutionary biologists work. In particular, we hope you will appreciate that science is not just a body of facts, but a way of learning about the world.

Course Format

Lectures (Mondays, Wednesdays and Fridays, 11:00-11:50 in room 282 Lillis)
You should do the assigned readings before coming to the lectures. During some 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 each independently writes a solution. You will not turn these in but your active participation will help you to better 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 behavior, plant biodiversity, phylogenetics, population genetics and population growth. Lab handouts will be turned in at the end of each lab. Each lab will be graded on a 5-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. This is only an option if arrangements are made in advance and permission is granted from instructors.

Problem Solving Sessions (Mondays in room 112 Huestis on weeks where problem sets are due. Times of this session, office hours and tutoring sessions will be posted on Blackboard after the start of classes.)
The single biggest problem students have in general biology is solving the kinds of problems presented in homework problems and exams. These are similar to the kinds of questions that biologists ask; they can't be solved by memorization of facts. In the problem solving sessions we will go over practice problems and discuss ways to approach these problems. Although attendance is not required, we strongly encourage you to attend the sessions on a regular basis, or to regularly attend the office hours of one of the GTFs. There are also undergraduate tutors who hold regular tutoring session hours in the biology peer tutor center (Klamath 32) and are prepared to help you with practice problems and general course material. The GTF office hour schedule and the schedule for the undergraduate tutors is available on blackboard.

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 blackboard site. (If you've already registered your clicker *this term*, for another class, then you don't need to register it again.) 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.

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 an annotated bibliography done by each person individually, a written plan for your presentation (one per group for lab 8 grade), and an oral group presentation. Late work on the first two parts will be accepted but discounted 2% for each weekday during the first week that it is late; it will not be accepted if turned in more than one week late. Each group will present their project in lab. There will be no late presentations.

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.

Problem Sets (practice and graded) There will be five practice problem sets that will be posted on Backboard during the term. It is very important that you work on these each week. We will help you to understand how to solve these problems in the office hours, tutoring sessions and problem solving sessions. The practice problems are very similar to the types of questions you will see on the exams (in fact, most of the problems are from past exams). The practice problems are designed to help you master the material needed to successfully solve the graded problem sets and to do well on the exams.

There will be five graded problem sets posted on Blackboard from Tuesday 5PM until Thursday 12PM. You will submit your answers to these graded questions on Blackboard. No late homework will be accepted. The solutions to each week's practice problems will be posted on Blackboard by Thursday afternoon. You must do your own work on these graded questions. Copied work will be treated as academic dishonesty.

Field Trip Each student will take a field trip with the class to Fall Creek 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 description in course packet lab handout section): a 4-5 page paper on plant succession in Cascade forests that will be graded. See schedule for field trip days and times. Each student will attend one of the 4 trips. We will ask for your preferred date(s) during the first lab.

Exams There will be three exams: two midterms and a final. All exams will be the same format: short-answer. The final is cumulative. The exams will cover material from all aspects of the course including lectures, labs, the field trip, readings and homework 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 GTFs under the supervision of the faculty. To promote consistency, a single GTF 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.**

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 blackboard 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 of GRADE
Laboratory Handouts (8 labs)	**8%**
Problem Sets (5 sets)	**5%**
Clicker questions in lecture (total points earned/85% of total possible)	**4%**
Field Trip	**3%**
Exams (60% total)	
Two Midterm Exams (15% each)	**30%**
Final Exam	**30%**
Project	**20%**
annotated bibliography (10%)	
oral presentation to peers in lab (10%)	

Posting of Grades Scores for assignments and exams will be posted on the web three times during the term: right after each exam. Check your scores every times we post them, as you will have only one week after the posting to notify us about mistakes or omissions.

Learning Environment The University of Oregon and we are working to create inclusive learning environments. Please notify us if there are aspects of the instruction, or design of this course that result in barriers to your participation. You may also wish to contact the UO Accessible Education Center in 164 Oregon Hall at 346-1155 or uoaec@uoregon.edu

Professional conduct We will work hard to make this course valuable to your learning. We welcome suggestions from you at anytime about things you think could be done to improve the course. In return, we ask that you arrive to lab and lecture on time and stay until class is over without making unnecessary noise that could distract your classmates. **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.

Cheating devalues the reputation of our institution, its faculty, its students, and your academic degree. Academic misconduct is particularly unfair for students who do their work with integrity and honor. The University Student Conduct Code (http://studentlife.uoregon.edu/StudentConductandCommunityStandards/StudentConductCode/tabid/69/Default.aspx) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at www.libweb.uoregon.edu/guides/plagiarism/students.

We want you to learn and to do well in the course, but we will not tolerate academic dishonesty. Sanctions for academic dishonesty will be a lowering of the final grade or failure. If you find yourself in trouble, or if you are aware of academic dishonesty occurring, please talk to one of the instructors.

Personal crises do 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 the need is real and if you have done your best to deal with the situation in a timely manner. There is a crisis center on campus that you should not hesitate to call if you, or a friend, are in need of assistant. Their phone number is 346-4488. Finally, we promise to respect you as students and as individuals, and ask that you return that respect to us and to your fellow classmates.

Lecture and Lab Schedule

Week	Date	Lecture Topic	Lab/Discussion
1	9/30 10/2 10/4	L1 History of life on earth L2 Evolutionary trends in the plant kingdom L3 Species definitions	Lab 1 Plant diversity
2	10/7 10/7 10/9 10/10 10/11	L4 Speciation **Problem solving session on Monday** L5 Phylogenetics **Problem set #1 due by 12PM Thursday** **no lecture: field trips 10-5 on Fri and Sun**	Lab 2 1) Phylogenetic analysis of plant diversity 2) Plan for field trip
3	10/14 10/16 10/18	L6 Evolution and natural selection L7 Behavioral ecology of honey bees **no lecture: field trips 10-5 on Fri and Sun**	Lab 3 Honey bee behavior **Select issue topic**
4	10/21 10/21 10/23 10/24 10/25	L8 Behavioral ecology of social organisms **Problem solving session on Monday** L9 Population genetics **Problem set #2 due by 12PM Thursday** **Midterm Exam #1 (lectures 1-8)**	Lab 4 Population genetics: part 1
5	10/28 10/30 11/1	L10 Population genetics L11 Population ecology: exponential growth model L12 Population ecology: logistic growth model	Lab 5 Population genetics: part 2 **Annotated bibliography due in lab**
6	11/4 11/4 11/6 11/7 11/8	L13 Population ecology: human demography **Problem solving session on Monday** L14 Community ecology: species interactions **Problem set #3 due by 12PM Thursday** **Midterm Exam #2 (lectures 9-13)**	Lab 6 Population ecology and genetics
7	11/11 11/13 11/15	L15 Community ecology: consumption L16 Community ecology: competition L17 Community ecology: mutualism	Lab 7 Issues presentation planning
8	11/18 11/18 11/20 11/21 11/22	L18 Community ecology: keystone/introductions **Problem solving session on Monday** L19 Community ecology: succession **Problem set # 4 due by 12PM Thursday** L20 Community ecology: biodiversity	Lab 8A Project presentations (only required to attend the week you present)
9	11/25 11/27	L21 Ecosystem ecology: productivity L22 Ecosystem ecology: energetics Thanksgiving	Thanksgiving: no labs this week
10	12/2 12/2 12/4 12/5 12/6	L23 Ecosystem ecology: nutrient cycling (nitrogen) **Problem solving session on Monday** L24 Ecosystem ecology: nutrient cycling (carbon) **Problem set # 5 due by 12PM Thursday** L25 Conservation biology	Lab 8B Project Presentations (only required to attend the week you present)
Finals	12/12	**Final Exam on Thursday at 10:15**	

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.
- ***iClickers*** There will be clicker questions in most lectures, including the first day of class.
- ***Textbook*** The text, *Biological Science,* 4th or 5th edition (3rd ok, but not recommended) 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.
- ***Course Packet*** The packet is available in the UO Bookstore. It includes lecture handouts, lab handouts and the issues project instructions. A copy is also available in the Science Library.
- ***Journal Articles*** These will be posted on the course blackboard site during the term and announced in lecture or on the problem sets.

Assigned Readings from Textbook
(4th or 5th editions are recommended)

Lecture	5th edition		4th edition		3rd edition		Subject
	Ch.	Pages	Ch.	Pages	Ch.	Pages	
1	**28**	513-516, 518-520	**27**	481-484	**27**	550-557	history of life
	29	536-542	**28**	506-510	**28**	579-584	metabolic diversity
	30	559-563	**29**	526-529	**29**	603-607	origin of eukaryotes
2	**31**	580-599, 601-609	**30**	549-564, 569-577	**30**	630-648, 653-661	evolution of land plants
3	**27**	489-502	**26**	458-471	**26**	526-541	species concepts and speciation
4	**28**	516-517	**27**	484-486	**27**	558-560	adaptive radiations
5	**28**	505-511	**27**	474-479	**27**	543-548	phylogenetics
	BS7	B10-B11	**BS3**	B4-B6	**BS2**	B3-B5	reading a phylogenetic tree
6	**25**	444-446, 453-463	**24**	414-416, 422-432	**24**	481-484, 489-500	evolution and natural selection
7	**53**	1082-1085	**51**	1019-1020	**51**	1149-1150	intro to behavioral ecology
8	**53**	1095-1098	**51**	1031-1034	**51**	1167-1170	altruism
	53	1091-1095	**51**	1027-1030	**51**	1161-1166	communication in bees
9	**26**	465-475, 478-486	**25**	435-452	**25**	503-520	population genetics
10	**30**	554-555	**29**	520-521	**29**	595-596	sickle-cell anemia & malaria
11	**54**	1101-1108	**52**	1037-1044	**52**	1173-1180	population growth models
12	**54**	1109-1112	**52**	1044-1047	**52**	1181-1183	regulation of population growth
13	**54**	1115-1118	**52**	1050-1053	**52**	1187-1190	human population growth
14	**55**	1123-1135	**53**	1058-1070	**53**	1196-1209	species interactions
15	**54**	1113-1115	**52**	1047-1050	**52**	1184-1186	species interactions con'd
18	**55**	1137-1138	**53**	1072-1073	**53**	1211-1212	keystone species
19	**55**	1135-1137, 1138-1142	**53**	1070-1072, 1073-1077	**53**	1209-1211, 1212-1216	succession
20	**55**	1142-1145	**53**	1077-1080	**53**	1217-1219	biodiversity and biogreography
21	**52**	1068-1079	**50**	998-1008	**50**	1127-1139	types of ecosystems
	56	1148-1149, 1153-1156	**54**	1083-1086	**54**	1222-1225	intro to ecosystem ecology
22	**56**	1149-1153	**54**	1087-1092	**54**	1226-1230	ecosystem energetics
23	**56**	1156-1162	**54**	1092-1097	**54**	1230-1237	biogeochemical cycles
24	**56**	1166-1169	**54**	1098-1102	**54**	1238-1241	human impacts on ecosystems
	56	1163-1166	**50**	1011-1012	**50**	1142-1143	global warming
25	**57**	1172-1182	**55**	1105-1113	**55**	1244-1254	conservation