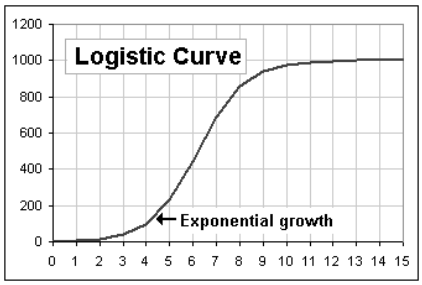
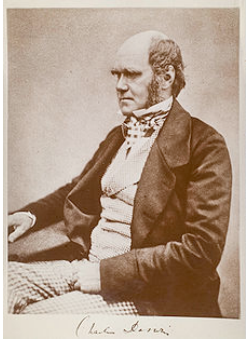
Bi213 General Biology III: Populations
Information Sheet and Syllabus for Spring 2012
Instructor: Dr. Cristin Hulslander





Course Overview

In this third term of the general biology sequence, we build on concepts learned in Bi 211 and Bi 212 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 such as graphs.
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 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 (Monday, Wednesday and Friday, 10:00-10:50 in room 180 PLC)
You should do the assigned readings before coming to lecture. 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.

Laboratories (Wednesdays, Thursdays in room 5 Klamath)
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, making observations, and presenting your findings in written or oral form. There will be labs dealing with population genetics, phylogenetics, biodiversity, behavior, and species interactions. Lab handouts will be turned in at the end of each lab or at the beginning of your lab the following week. The due date for each lab will be announced in 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 (held during weeks with homeworks due, time & location TBA)
The single biggest problem students have in general biology is solving the kinds or 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 both homework 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 homework problems and general course material. The GTF office hour schedule and the schedule for the undergraduate tutors is available on blackboard.

Problem sets (homeworks) There will be three problem sets due this term (see class schedule for due dates). Many of the problems are similar to the types of problems you will see on exams. The teaching staff will be happy to discuss the problems during office hours. Homework solutions will be posted on the course blackboard site immediately after they are due. **Late homework will not be accepted.**

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 most likely be multiple choice or true/false. 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 9 or 10. Projects, worth 20% of your grade, will consist of 1) a proposal and annotated bibliography done by each person individually (worth 8% of your grade), 2) a written plan for your presentation (one per group and worth 2% of your grade), and 3) an oral group presentation (worth 10% of your course grade). Late work on the first two parts will be accepted but discounted 3% for each day (including weekends) during the first week that it is late; it may 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.

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 (description available on blackboard): a 4-5 page paper on plant succession in Cascade forests. Thursday and Friday trips depart at 1 p.m. and return by 7 p.m; Saturday trips depart at 10 a.m. and return no later than 5 p.m. See syllabus for exact dates. Field trip sign-up will take place during lab in week 4.

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, 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 person grades each question. Everyone is required to take the final exam which is on **Monday** of final's week. **There will be no early or late exams given.** Your final grade will be automatically calculated two ways and the better grade will be assigned. Version A uses the score of all three exams. Version B uses the score of your best midterm and the final. If you miss a midterm, **for any reason**, then we will use Version B to calculate your final grade.

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

Laboratory activities (1% each)	7%
Problem sets (homeworks) (2% each)	6%
Clicker questions	4%
Field Trip	3%
Exams Version A	60%
midterm exams (15% each)	
final exam (30%)	
Exams Version B	60%
best midterm exam (20%)	
final exam (40%)	
Issues Project	20%
proposal & annotated bibliography (8%)	
presentation plan (2%)	
oral presentation to peers in lab (10%)	

Posting of Grades Scores for assignments and exams will be posted online a couple of times during the term; usually following each midterm exam. Check your scores each time we post them as you will have only **one week** after the posting to notify us about mistakes or omissions.

Students with disabilities The University of Oregon is 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 Disability Services in 164 Oregon Hall at 346-1155 or disabsrv@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 (available at 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. 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	Laboratory Topic
1	4/2 4/4 4/6	L1: Introduction to evolution L2: Population genetics I: Hardy-Weinberg principle L3: Natural selection: case study Darwin's Finches	Lab 1 1) Population genetics: part 1 2) Fern spore inoculations
2	4/9 4/11 4/13	L4: Population genetics II: evolutionary forces L5: Defining species L6: Speciation	Lab 2 1) Population genetics: part 2 2) Select issues project topic
3	4/16 4/17 4/18 4/20	L7: Using phylogenetics to understand evolution **HW1 due by 4 p.m Tuesday** L8: Evolutionary trends in the plant kingdom L9: History of life on Earth I	Lab 3 Plant evolution & diversity
4	4/23 4/25 4/27	L10: History of life on Earth II L11: Behavioral ecology: social behavior L12: Behavioral ecology: bees and fish **** Project proposal & annotated bib due by 4 p.m.**	Lab 4 Phylogenetic analysis of plant diversity
5	4/30 5/2 5/4	**Midterm Exam on L1-11** L13: Population ecology: exponential growth L14: Population ecology: logistic growth	Lab 5 1) Honey bee behavior 2) Plan for field trip to Fall Creek
6	5/7 5/8 5/9 5/11	L15: Population ecology: human demography **HW2 due by 4 p.m Tuesday** L16: Communities: species interactions L17: Communities: competition	No regular lab Field trip Thurs, Fri & Sat
7	5/14 5/16 5/18	L18: Communities: consumption L19: Communities: keystone species & species introductions L20: Communities: biodiversity **** Presentation plan due by 4 p.m Friday**	No regular lab Field trip Thurs, Fri & Sat
8	5/21 5/23 5/25	**Midterm Exam 2 on L12-19** L21: Communities: conservation biology L22: Communities: ecological succession **** Field trip make-up assignment due by 4 p.m Friday**	Lab 6 Work on issues presentation
9	5/28 5/29 5/30 6/1	**Memorial Day no class** **HW3 due by 4 p.m Tuesday** L23: Ecosystems: productivity L24: Ecosystems: energetics	Lab 7A Project presentations (only required to attend if this is the week you are presenting)
10	6/4 6/6 6/8	L25: Ecosystems: nutrient cycles, nitrogen cycle L26: Ecosystems: carbon cycle L27: Global change	Lab 7B Project presentations (only required to attend if this is the week you are presenting)
Finals	6/11	**Monday at 10:15 -12:15**	

Course Materials

Course Packet This packet contains many of the handouts you will need during the quarter including lab and lecture handouts, and the issues project instructions.
Calculator You will need a scientific calculator capable of doing natural logarithms and square roots for use on homework problems, 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,* 3rd or 4th ed., 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 both editions of the text on reserve in the Science Library.
Journal Articles There may be some articles assigned as required reading throughout the term. Assigned readings will be made available on blackboard and announced in lecture.

Lecture	Assigned readings for Freeman 3rd edition
1	Ch 24: pgs. 481-491, 495-498 (evolution and natural selection)
2	Ch 25: pgs. 503-508 (population genetics)
3	Ch24: pgs. 491-495, 499 (natural selection)
4	Ch25: pgs. 508-520 (population genetics and forces of evolution) Ch16: pgs. 347-348; Ch29: pgs. 595-596 (sickle-cell anemia & malaria)
5	Ch 26: pgs. 526-531 (species concepts)
6	Ch 26: pgs. 531-535 (speciation) Ch 27: pgs. 558-560 (adaptive radiations)
7	Ch 27: pgs. 543-548 (phylogenetics) BioSkills 2: pgs. B3-B5 near back of book (reading a phylogenetic tree)
8	Ch 30: pgs. 630-648, 653-661 (evolution of land plants)
9	Ch 27: pgs. 550-557 (life's time line and Cambrian explosion), 560-564 (extinction episodes)
10	Ch 34: pgs. 762-767 (hominin radiation)
11	Ch 51: pgs. 1149-1150, 1167-1170 (intro to behavioral ecology & altruism)
12	Ch 51: pgs. 1161-1166 (communication in bees & honest vs. deceitful communication)
13	Ch 52: pgs. 1173-1180 (population growth models)
14	Ch 52: pgs 1181-1183 (regulation of population growth)
15	Ch 52: pgs 1187-1190 (human population growth)
16	Ch 53: pgs. 1196-1209 (introduction to community ecology)
17	Ch 53: pgs. 1197-1202 (competition)
18	Ch 52: pgs 1202-1205
19	Ch 53: pgs. 1211-1212 (keystone species) Ch 55: pgs. 1249-1252 (species introductions)
20	Ch 53: pgs. 1217-1219 (biodiversity and biogeography) Ch 55: pgs. 1244-1254
21	Ch55: pgs. 1250-1254 (conservation)
22	Ch 53: pgs. 1209-1211, 1212-1216 (succession)
23	Ch 50: pgs. 1127-1139 (skim descriptions of aquatic and terrestrial ecosystems) Ch 54: pgs. 1222-1225 (introduction to ecosystem ecology, productivity)
24	Ch 54: pgs. 1226-1230 (ecosystem energetics)
25	Ch 54: pgs. 1230-1237 (biogeochemical cycles; focus on nitrogen cycle)
26	Ch 54: pgs. 1230-1237 (biogeochemical cycles; focus on carbon cycle)
27	Ch 50: pgs. 1142-1143 (how global warming affects ecosystems) Ch 54: pgs. 1238-1241

Lecture	Assigned readings for Freeman 4th edition
1	Ch 24: pgs. 414-424, 429-432 (evolution and natural selection)
2	Ch 25: pgs. 435-440 (population genetics)
3	Ch24: pgs. 424-429 (natural selection)
4	Ch25: pgs. 440-452 (population genetics and forces of evolution) Ch29: pgs. 520-521 (sickle-cell anemia & malaria)
5	Ch 26: pgs. 458-462 (species concepts)
6	Ch 26: pgs. 462-471(speciation) Ch 27: pgs. 484-486 (adaptive radiations)
7	Ch 27: pgs. 474-479 (phylogenetics) BioSkills 3: pgs. B4-B6 near back of book (reading a phylogenetic tree)
8	Ch 30: pgs. 549-564, 569-577 (evolution of land plants)
9	Ch 27: pgs. 481-484 (life's time line), 486-492 (Cambrian explosion and extinction episodes) Ch 29: pgs 526-529 (origin of eukaryotes)
10	Ch 34: pgs. 668-673 (hominin radiation)
11	Ch 51: pgs. 1019-1020, 1031-1034 (intro to behavioral ecology & altruism)
12	Ch 51: pgs. 1027-1031 (communication in bees & honest vs. deceitful communication)
13	Ch 52: pgs 1037-1044 (population growth models)
14	Ch 52: pgs 1044-1047 (regulation of population growth)
15	Ch 52: pgs 1051-1053 (human population growth)
16	Ch 53: pgs. 1058-1070 (introduction to community ecology)
17	Ch 53: pgs. 1059-1062 (competition)
18	Ch 52: pgs 1063-1066
19	Ch 53: pgs. 1072-1073 (keystone species) Ch 55: pgs. 1110-1111 (species introductions)
20	Ch 53: pgs. 1077-1080 (biodiversity and biogeography) Ch 55: pgs. 1105-1114
21	Ch55: pgs. 1110-1114 (conservation)
22	Ch 53: pgs. 1070-1072, 1073-1077 (succession)
23	Ch 50: pgs. 998-1008 (skim descriptions of aquatic and terrestrial ecosystems) Ch 54: pgs. 1083-1092 (introduction to ecosystem ecology, productivity)
24	Ch 54: pgs. 1084-1089 (ecosystem energetics)
25	Ch 54: pgs. 1092-1097 (biogeochemical cycles; focus on nitrogen cycle)
26	Ch 54: pgs. 1092-1097 (biogeochemical cycles; focus on carbon cycle)
27	Ch 50: pgs. 1011-1012 (how global warming affects ecosystems) Ch 54: pgs. 1098-1102