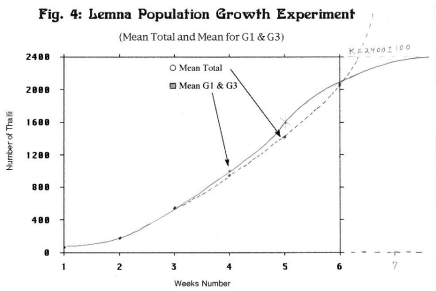
Bi 213 General Biology III: Populations
Information and Syllabus for Spring 2015



Tobias Policha (Lecturer) tpolicha@uoregon.edu; Office hour: Fri. 9:00. 119 Fenton
Heather Roblin (GTF) hroblin@uoregon.edu; Office hour: Wed. 16:00. 360 Onyx
Hana Kamata (Lab Assistant) hkamata@uoregon.edu; Tutor session: Thurs. 12:00. 32 Klamath

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, evolutionary patterns, population genetics, population growth, species interactions and biodiversity, and factors affecting ecosystem productivity.

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 (Chem 211 or higher), and genetics (Bi 211). 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 Foundations sequence (Bi 251 to 253).

Course Goals

There are three major kinds of goals in the general biology sequence. This session 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 not only the findings, but how the science was conducted. You will practice being a scientist by learning to form and test hypotheses, 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 come to 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 105 Fenton)
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 difficult concepts; these will often be done collaboratively with two or three students discussing the problem together for a few minutes before discussing the problem as a whole class. Your active participation in lecture will help you to better understand the material and prepare you for exams.

Lab/Discussion
(Thursday 18:00-19:50 in 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 the science of biology is all about. There will be labs dealing with population genetics, plant diversity, phylogenetics, and behavior. Lab handouts will usually be turned in at the end of each lab or at the beginning of class the following day (we will announce this during each lab). Each lab will be graded on a 5-point scale, with part of the grade based on participation in lab. Some labs cannot be made up because they involve special material or equipment. Labs that involve computer exercises may possibly be made up during office hours **only if arrangements are made in advance of the lab**.

Problem Sets
There are four problem sets due during the session. The problem sets will be posted to blackboard. They will be graded on a 5-point scale. We will collect these at the beginning of lab on the day that each is due (see schedule for specific due dates). The solutions to the problem sets will be available on blackboard. We will be prepared during office hours to help you work through the problem sets.
No late homework accepted.

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 will be available online): 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. Field trip sign-up will take place during lab in week 4.

Clickers (Personal Response Systems)
Clickers will be used in class to encourage participation and to provide valuable feedback to instructors and students. You will need to register your clicker on the course blackboard site. 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.

Issues Project
Working in groups of 2-3, you will do a class project culminating in an oral presentation given during one of the last two labs of the session. Projects will focus on a scientific issue pertaining to ecology or evolution. Projects, worth 20% of your grade, will consist of three parts: annotated bibliography (8%), presentation plan (2%) and a group oral presentation (10%, group grade). There will be no late presentations. Project guidelines, requirements, and suggested topics can be found in the course packet.

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.

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 Thurday June 11. 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

Component	% of Total Grade
Labs	**12**
Field Trip	**5**
Problem Sets	**4**
Clicker Scores	**4**
Midterm Exam	**25**
Final Exam	**30**
Project	**20**

Lecture and Lab Schedule

Week	Date	Topic	Notes & Additional Readings
1	3/30	1. Introduction to evolution	Rennie 2002
1	4/1	2. Population genetics I: Hardy-Weinberg principle	
1		**LAB 1: Population genetics I**	Fern spore inoculations
1	4/3	3. Natural selection: Case study Darwin's finches	
2	4/6	4. Population genetics II: evolutionary forces	
2	4/8	5. Species definitions	
2		**LAB 2: Population genetics II**	Select issues project topic. **PS 1 DUE**
2	4/10	6. Speciation	
3	4/13	7. Using phylogenetics to understand evolution	
3	4/15	8. Evolutionary trends in the plant kingdom	Leslie 2009
		LAB 3: Plant evolution and diversity	
3	4/17	9. History of life on Earth I	
4	4/20	10. History of life on Earth II	
4	4/22	11. Behavioral ecology I: social behavior	Pollard 2009
		LAB 4: Phylogenetic analysis of plant diversity	**PS 2 DUE**
4	4/24	12. Behavioral ecology II: bees	Dugatkin 1997 (just sections on reciprocal altruism and kin selection)
5	**4/27**	**MIDTERM EXAM I**	
5	4/29	13. Populations: exponential growth	
		LAB 5: Honey bee behavior	Plan for fieldtrip
5	5/1	14. Populations: logistic growth	
6	5/4	15. Populations continued	
6	5/6	16. Communities: species interactions	
		no regular lab, field trip Thurs, Fri, Sat.	**PS 3 DUE**
6	5/8	17. Communities: competition	

7	5/11	18. Communities consumption	
7	5/13	19. Communities: keystone and introduced species	
		no regular lab, field trip Thurs, Fri, Sat.	
7	5/15	20. Communities: ecological succession	
8	**5/18**	**MIDTERM EXAM II**	
8	5/20	21. Communities: biodiversity and conservation	Worldwatch Institute 2002
		LAB 6: Work on issues presentation	
8	5/22	22. Communities: conservation biology continued	
9	5/25	MEMORIAL DAY (NO CLASS)	
9	5/27	23. Ecosystems: productivity	
		LAB 7a: Project presentations (only required to attend the week you present)	**PS 4 DUE**
9	5/29	24. Ecosystems: energetics	
10	6/1	25. Ecosystems: nutrient cycles	
10	6/3	26. Ecosystems: carbon cycle	EPA 2009 & IPCC 2013
		LAB 7b: Project presentations (only required to attend the week you present)	
10	6/5	27. Global change	
FINALS	**6/11**	**FINAL EXAM** (Thursday at 10:15)	

Course Materials

Textbook
The text, Biological Science, by S. Freeman 4th or 5th edition, should be used as a general reference. The readings (see separate document) include background material useful for preparing 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. See the 'Preface to Students' right before Chapter 1 for a good introduction to using the text.

Articles
Several articles from scientific journals will be assigned throughout the session. They will be available for download from blackboard.

Course Packet
This packet contains lab handouts, and the issues project instructions.

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. NO CELL PHONES.

Journal Articles
These articles will be used in lectures, homework problem sets and exams. They are listed in the order in which you will read them. See the reading list for specific dates. They will be available on the Bi213 course blackboard site.

Natural Selection and Population Genetics
Rennie, J. 2002. 15 common misconceptions about evolution (excerpted from a slightly longer article). Scientific American 287(1): 78-85.

Earth History
Leslie, M. 2009. On the origin of photosynthesis. Science 323: 1286-1287.
Pollard, K.S. 2009. What makes us human? Scientific American 300(5): 44-49.

Behavior
Dugatkin, L.A. 1997. The Evolution of Cooperation. Bioscience 47(6): 355-362.

Conservation Biology
Worldwatch Institute. 2002. The Plight of Birds. Available at:
http://www.worldwatch.org/node/518

Ecosystems
Environmental Protection Agency. 2009. Frequency asked questions about global warming and climate change: back to basics. Available at:
http://www.epa.gov/climatechange/Downloads/ghgemissions/Climate_Basics.pdf.

IPCC (Intergovernmental Panel on Climate Change). 2013. IPCC Fifth Assessment Report (AR5). 'Summary for Policymakers'.
http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf

Accessible Education Center
The University of Oregon is working to create inclusive learning environments (more info at http://aec.uoregon.edu). Please notify us if there are any aspects of the instruction or design of this course that result in barriers to your participation. If you have a documented disability and anticipate needing accommodations in this course, please talk to your instructors during the first 2 days of classes. Please request that the Accessible Education Center Counselor send a letter verifying your need. Please call 541-346-1155, email uoaec@uoregon.edu, or drop by 164 Oregon Hall to schedule an appointment.

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 do not use and put away your personal computers, cell phones, tablets 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://uodos.uoregon.edu/StudentConductandCommunityStandards/tabid/68/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 http://library.uoregon.edu/guides/plagiarism/students/index.html.

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 happen --if you are having difficulties that interfere with your ability to do well in the class, please tell one of the instructors 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 assistance. Their phone number is (541) 346-4488. Finally, we promise to respect you as students and as individuals, and ask that you return that respect to the staff and to your classmates.

Non-discrimination Policy

The University of Oregon affirms the right of all individuals to equal opportunity in education and employment, without regard to race, color, religion, sex, gender, age, handicap, national origin, sexual orientation, or any other extraneous consideration not directly and substantively related to effective performance.