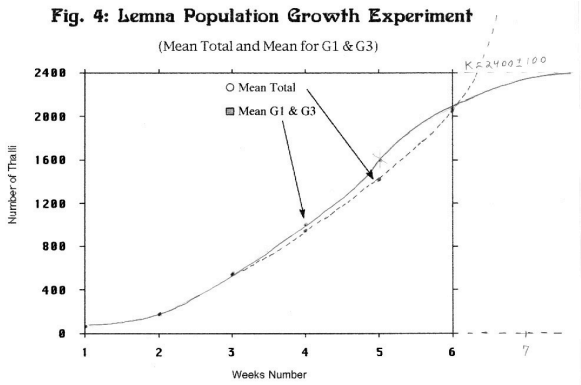
Bi 213 General Biology III: Populations
Information Sheet and Syllabus for Fall Quarter 2010



Personnel	office hours/locations	e-mail	Course Role (lab times)
Peter Wetherwax	(1) Weds 10 -10:50 in 313 Pacific (2) Problem Solving Session most Fridays from 12-12:50 in 112 Huestis (lab room) (see schedule for exact dates)	pwax@uoregon.edu	lectures, course planning
Misty McLean	by appointment in 120-F Huestis	mistym@uoregon.edu	lab preparation and coordination
Adam Burns	Mondays 10-10:50 in 360 Onyx	aburns2@uoregon.edu	GTF for Labs: Wed 2 and Thurs 10
Nicole Nishimura	Mondays 1-1:50 in 360 Onyx	nnishimu@uoregon.edu	GTF for Labs: Wed 12 and Thurs 12
Leah Hall	Thursdays 12-12:50 in 25 Klamath (Biology Peer Tutor Center)	lhall3@uoregon.edu	Biology Peer Tutor for Labs: Wed 12 and Thurs 10
Austin Pliska	Thursdays 4-4:50 in 25 Klamath (Biology Peer Tutor Center)	apliska1@uoregon.edu	Biology Peer Tutor for Labs: Wed 2 and Thurs 12

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 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 (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 Foundations sequence (Bi 251 to 253).

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 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 (Monday, Wednesday and Friday, 11:00-11:50 in room 123 Pacific)
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 (Wednesday 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 population genetics, phylogenetics, biodiversity, behavior, and, population growth 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 or to do an alternative assignment (e.g., term paper). This is only an option if notified in advance and with a written excuse.

Problem Solving Sessions (most Fridays 12:00-12:50 in room)
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 these sessions on a regular basis, or to regularly attend the office hours of one of the GTFs or tutoring session of one of the Biology Peer Tutors.

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), and an oral group presentation. Late work on the first two parts will be accepted but discounted 2% for each day (including weekends) 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.

Homework Problems There are several homework assignments that will be posted to the course blackboard site. Check the course schedule for due dates. Homework solutions will also be posted on the blackboard site immediately after each homework is due. 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, in peer tutor center sessions and during the problem solving sessions. The times and locations of the sessions will be posted on the course blackboard site during the first week of classes. **Late homework will not be 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 (see description in course packet lab handout section): a 3-5 page paper on plant succession in Cascade forests. See schedule for field trip days and times.

Exams There will be four exams: three 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 person grades each question. **There will be no early or late exams given.** Your final grade will be based on your top two midterm grades (i.e. your lowest midterm grade will be dropped) and your final exam grade. If you miss a midterm, for any reason, that will be the midterm that is dropped.

Evaluation

COMPONENT	PERCENT of GRADE
Laboratory (8 labs)	**8%**
Homework (6)	**6%**
Clicker questions in lecture (total points earned/85% of total possible)	**5%**
Field Trip	**3%**
Exams (56% total)	
Top two Midterm Exams (14% each)	**28%**
Final Exam	**28%**
Project	**22%**
annotated bibliography (10%)	
presentation plan (2%)	
oral presentation to peers in lab (10%)	

Posting of Grades Scores for assignments and exams will be posted on the web four times during the term: right after each midterm and during the 10th week of class. Check your scores every times we post them, as you will have only <u>one week</u> after the posting to notify us about mistakes or omissions.

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 at lab and lecture on time and stay until class is over without making unnecessary noise that could distract your classmates (please turn cell phones off). Please be familiar with the student conduct code (http://studentlife.uoregon.edu/LinkClick.aspx?fileticket=puLfAzFDbsg %3D&tabid=69); academic dishonesty includes cheating, plagiarizing (taking credit for the work of others) or knowingly supplying false information -- it is a serious offense. We want you to learn and to do well in the course, but we will not tolerate academic dishonesty. Sanctions for academic dishonesty include a lowered or failing course grade. 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 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.

Lecture and Lab Schedule

Week	Date	Lecture Topic	Lab/Discussion
1	9/27 9/29 10/1	L1 Evolution and natural selection L2 Behavioral ecology of honey bees L3 Behavioral ecology of social organisms **Problem solving session at 12 on Friday**	Lab 1 1) Honey bee behavior 2) Fern spore inoculations
2	10/4 10/6 10/8	L4 History of life on earth **HW1 due by 5PM Monday** L5 Evolutionary trends in the plant kingdom L6 Species definitions **Problem solving session at 12 on Friday**	Lab 2 1) Plant diversity 2) Select issue topic
3	10/11 10/13 10/15	L7 Speciation **HW2 due by 5PM Monday** L8 Phylogenetics **no lecture: field trip Fri 10-5 or Sat 10-5**	Lab 3 1) Phylogenetic analysis of plant diversity 2) Plan for field trip
4	10/18 10/20 10/22	**Midterm Exam #1 (lectures 1-8)** L9 Population genetics L10 Population genetics **Problem solving session at 12 on Friday**	Lab 4 Population genetics: part 1
5	10/25 10/27 10/29	L11 Population ecology: exponential growth model **HW3 due by 5PM Monday** L12 Population ecology: logistic growth model L13 Population ecology: human demography **Problem solving session at 12 on Friday**	Lab 5 Population genetics: part 2 **Annotated bibliography due in lab**
6	11/1 11/3 11/5	L14 Community ecology: species interactions **HW4 due by 5PM Monday** L15 Community ecology: competition & herbivory **Midterm Exam #2 (lectures 9-13)**	Lab 6 Population ecology
7	11/8 11/10 11/12	L16 Community ecology: species introductions (Guest lecturer: Nicole Nishimura) L17 Community ecology: predation and mutualism L18 Community ecology: succession **Problem solving session at 12 on Friday**	Lab 7 1) Species interactions 2) Work on issues presentation **Presentation Plan due by 5PM Friday**
8	11/15 11/17 11/19	L19 Measuring biodiversity **HW5 due by 5PM Monday** L20 Ecosystem ecology: productivity L21 Ecosystem ecology: energy **Problem solving session at 12 on Friday**	Lab 8A Project presentations (only required to attend if this is the week you are presenting)
9	11/22 11/24 11/26	L22 Ecosystem ecology: nutrient cycling **HW6 due by 5PM Monday** **Midterm Exam #3 (lectures 14-21)** Thanksgiving: no class	Thanksgiving: no labs this week
10	11/29 12/1 12/3	L23 Ecosystem ecology: carbon cycling L24 Global change L25 Conservation biology	Lab 8B Project Presentations (only required to attend if this is the week you are presenting)
Finals	12/6	Final Exam Monday at 10:15AM	

Course Materials

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.

Textbook The text, *Biological Science,* 3rd or 4th edition 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.

Journal Articles These will be posted on the course blackboard site, and announced on homeworks or lecture, during the term.

Assigned Readings from Textbook and Posted Articles

Week	Lecture	Assigned Readings using 3rd Edition of textbook and articles	Assigned Readings using 4th Edition of textbook and articles
1	1-2	Ch 24: pgs. 481-484, 489-500 (evolution and natural selection) article by Rennie: 15 misconceptions about evolution	Ch 24: pgs. 414-416, 422-432 (evolution and natural selection) article by Rennie: 15 misconceptions about evolution
	2-3	Ch 51: pgs. 1149-1150, 1161-1164, 1167-1170 (intro to behavioral ecology, honey bee communication & altruism) article by Dugatkin (just read sections on reciprocal altruism and kin selection)	Ch 51: pgs. 1019-1020, 1027-1030, 1031-1034 (intro to behavioral ecology, honey bee communication & altruism) article by Dugatkin (just read sections on reciprocal altruism and kin selection)
2	4	Ch 27: pgs. 550-557 (life's time line and Cambrian explosion), 560-564 (extinction episodes) Ch 29: pgs 603-607 (origin of eukaryotes) article by Leslie: origin of photosynthesis	Ch 27: pgs. 481-484 (life's time line), 486-492 (Cambrian explosion and extinction episodes) Ch 29: pgs 526-529 (origin of eukaryotes) article by Leslie: origin of photosynthesis
	5	Ch 30: pgs. 630-648, 653-661 (evolution of land plants)	Ch 30: pgs. 549-564, 569-577 (evolution of land plants)
	6	Ch 26: pgs. 526-531 (species concepts) article by Ostrander: dog genetics and evolution	Ch 26: pgs. 458-462 (species concepts) article by Ostrander: dog genetics and evolution
3	7	Ch 26: pgs. 531-541 (speciation) Ch 27: pgs. 558-560 (adaptive radiations)	Ch 26: pgs. 462-471(speciation) Ch 27: pgs. 484-486 (adaptive radiations)
	8	Ch 27: pgs. 543-548 (phylogenetics) BioSkills 2: pgs. B3-B5 near back of book (reading a phylogenetic tree)	Ch 27: pgs. 474-479 (phylogenetics) BioSkills 3: pgs. B4-B6 near back of book (reading a phylogenetic tree)
4	9	Ch 25: pgs. 503-508 (population genetics)	Ch 25: pgs. 435-440 (population genetics)
	10	Ch25: pgs. 508-520 (population genetics and forces of evolution) Ch16: pgs. 347-348; Ch29: pgs. 595-596 (sickle-cell anemia & malaria)	Ch25: pgs. 440-452 (population genetics and forces of evolution) Ch29: pgs. 520-521 (sickle-cell anemia & malaria)
5	11	Ch 52: pgs. 1173-1180 (population growth models)	Ch 52: pgs. 1037-1044 (population growth models)
	12	Ch 52: pgs 1181-1183 (regulation of population growth)	Ch 52: pgs 1044-1047 (regulation of population growth)
	13	Ch 52: pgs 1186-1190 (human population growth) article by Carnevale: world human population growth	Ch 52: pgs 1050-1053 (human population growth) article by Carnevale: world human population growth
6	14	Ch 53: pgs. 1196-1209 (introduction to community ecology)	Ch 53: pgs. 1058-1070 (introduction to community ecology)
	15	Ch 52: pgs 1184-1186 article by Krebs: snowshoe hare populations	Ch 52: pgs 1047-1050 article by Krebs: snowshoe hare populations
7	16-18	Ch 53: pgs. 1209-1216 (keystone species, species introductions, succession) Ch 55: pgs. 1249-1252	Ch 53: pgs. 1070-1077 (keystone species, species introductions, succession) Ch 55: pgs. 1110-1111
8	19	Ch 53: pgs. 1217-1219 (biodiversity and biogeography) Ch55: pgs. 1244-1249	Ch 53: pgs. 1077-1080 (biodiversity and biogeography) Ch55: pgs. 1105-1110
	20-21	Ch 50: pgs. 1130-1139 (skim descriptions of aquatic and terrestrial ecosystems) Ch 54: pgs. 1222-1230 (introduction to ecosystem ecology, ecosystem energetics)	Ch 50: pgs. 998-1008(skim descriptions of aquatic and terrestrial ecosystems) Ch 54: pgs. 1083-1092 (introduction to ecosystem ecology, ecosystem energetics)
9	22	Ch 54: pgs. 1230-1237 (biogeochemical cycles)	Ch 54: pgs. 1092-1097 (biogeochemical cycles)
10	23	article by Knapp et. al: role of bison in tallgrass prairies	article by Knapp et. al: role of bison in tallgrass prairies
	24	Ch 50: pgs. 1142-1143 (how global warming affects ecosystems) Ch 54: pgs. 1238-1241 pgs. 1-6 of IPCC Climate Change 2007 Synthesis Report (summary for policymakers)	Ch 50: pgs. 1011-1012 (how global warming affects ecosystems) Ch 54: pgs. 1098-1102 pgs. 1-6 of IPCC Climate Change 2007 Synthesis Report (summary for policymakers)
	25	Ch55: pgs. 1249-1254 (conservation) article by Tolme: shadegrown coffee	Ch55: pgs. 1110-1114 (conservation) article by Tolme: shadegrown coffee

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 on the preceding page for the specific dates. They are available on the Bi213 course blackboard site. There may be additional journal articles that we would like you to read. These will be announced in lecture or on homeworks, and posted on blackboard.

Evolution and Natural Selection

Rennie, John. 2002. **15 common misconceptions about evolution (excerpted from a slightly longer article).** *Scientific American* 287(1): 78-85.

Behavior

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

Speciation and Phylogenetics

Ostrander, Elaine. 2007. **Genetics and the Shape of Dogs.** *American Scientist* 95 (5): 406-413.

Earth History

Leslie, Mitch. 2009. **On the origin of photosynthesis**. *Science* 323: 1286-1287.

Populations

Carnevale, Ellen, and others at the Population Reference Bureau. 1999. **World Population: more than just numbers.** viewed at http://www.prb.org/ on March 5, 2008

Community Ecology

Krebs, C.J., et al. 2001. **What Drives the 10-yr Cycle of the Snowshoe Hares?** *BioScience* 51(1): 25-35

Ecosystems

Knapp, A.K., J.M. Blair, J.M. Briggs, S.L. Collins, D.C. Hartnett, L.D. Johnson, E.G. Towne. 1999. **The Keystone Role of Bison in North American Tallgrass Prairie**. *BioScience* 49(1):39-50.

IPCC (Intergovernmental Panel on Climate Change). 2007. **IPCC Fourth Assessment Report (AR4)**. Pages 1-6 of summary for policymakers. Viewed at http://www.ipcc.ch/ on March 5, 2008.

Conservation Biology

Tolme, P. 2004. **Made in the Shade.** *Audubon* July/August: 56-69.