

PREREQUISITES:

Ecology is an integrative discipline; it incorporates basic biology to understand the organisms, mathematics to describe population interactions, and statistics to analyze ecological data. Therefore, there are several prerequisites for this class:

Biometry 109: Introductory Biometrics (4). Descriptive statistics, probability, random variables, discrete and continuous distributions, confidence intervals, contingency tests, regression and correlation, tests of hypothesis, analysis of variance. Emphasis: methods and applications used in the biological and natural resource sciences.

AND

Biology 105: Principles of Biology (4). Fundamental processes of life. Structure and function of cells, genetics, evolution, and ecology.

AND

ONE OF THESE { **Botany 105.** General Botany (4). Structure, function, reproduction, life cycles, and phylogenetic relationships of major plant groups. Relationships of plants to other organisms and to human activities.
Zoology 110 General Zoology (4). Animal life processes.Emphases: vertebrate form and function.Selected groups illustrate the diversity of animals and their relations with the environment.
Zoology 210. Principles of Zoology (4). Fundamental processes shaping lives of animals. Emphases: vertebrate form/function. Selected groups illustrate the diversity of animals and their relations with the environment.

GRADING

Your grade will be based your laboratory and lecture performance; points are distributed as follows:

LECTURE	
Midterm Exams (2 @ 100 points)	200
Final Exam (1 @ 150 points)	150
Homework Assignments (4 @ 25 points)	100
Readings (4 @ 25 points)	100
LECTURE TOTAL 550	
LABORATORY	
Lab Exercise I	25
Lab Exercise II	25
Class Project First Draft	20
Class Project Paper Peer-Review	20
Class Project Second Draft	30
Class Project Final Paper	50
Group Project Proposal	40
Group Project Draft Paper	40
Group Project Final Paper	80
Group Project Presentation	80
Review by Group Members	40
LAB TOTAL 450	
TOTAL POINTS	1000

LECTURE**EXAMS**

There will be two midterm in-class examinations; each midterm is worth 100 points. These will be closed book exams; any necessary equations will be provided with the exam. Exams will consist of multiple choice questions and short answer questions and you will have the 50-min class period (or 110-min final exam period) to complete the exam. The format of the final examination will be similar to the midterms. It will be cumulative, but will emphasize material from the final third of the class, on which you have not been previously tested. The exams will cover lecture and lab material and assigned readings. I will give more information about the exams in class.

There will be no make-up exams. If you miss an exam, you will receive no credit on the exam unless you can provide me with a doctor's note or other evidence of extraordinary circumstances. If you can provide evidence, then I will either drop that exam or let you make it up, at my discretion. If you know ahead of time that you must miss an exam, come talk to me.

HOMEWORK

There will be four homework assignments during the term, each worth 25 points. The homework is designed to help you to integrate your quantitative and conceptual understanding of the course material. I encourage you to work together on the homework assignments – your understanding will be enhanced through discussion with your peers. PLEASE NOTE that each student is required to turn in his/her own work reflecting his/her understanding of the assignment. Test questions will be drawn from the homework. Homework will be graded for content and for clarity of prose and presentation.

Homework is due by noon on Friday (see schedule) to the envelope outside my office. Late homework will lose 10 points and will not be accepted after 8am Monday or after the posting of homework solutions, whichever comes first.

The homework assignments will use a computer package called *Populus*. This package was developed by a faculty member at the University of Minnesota to help students visualize the population models you will be learning in class. You will be introduced to *Populus* in your laboratory section. If you would like to install it on your own computer, it is a free download from www.cbs.umn.edu/populus/. Detailed download instructions are available on the *Populus* website. It is available for both Mac and PC.

ASSIGNED READINGS

During the term, we will read several papers from the primary literature. The primary literature is the communication medium of research scientists and it consists of papers that have been rigorously peer-reviewed and published in professional journals, such as *Science*, *Nature*, *Ecology*, *Ecology Letters*, and *The American Naturalist*. It is distinct from magazines on scientific topics, such as *Scientific American*, *National Geographic*, or *Discover* because these magazines are not subjected to peer-review and typically publish reviews of the primary literature digested for a lay audience. Learning to read the primary literature is an important part of your ecological education and I will dedicate some lecture time to our discussions of these papers.

The assigned readings and their respective deadlines will be posted on the course website on Moodle. **On the day that a reading is due, you will come to class with two copies of**

the following: *three discussion questions and two short-answer test questions and answers based on the reading.* You will turn in one copy of this at the beginning of class (no later than 10min past the hour) and use the other copy during our discussion in the last 15-20 min of class. Each set of reading questions is worth *up to 25* points and will be graded on of the main points of the paper and thoughtfulness of the questions. **Late reading questions will not be accepted.**

EXTRA CREDIT

You may earn extra credit by attending Biology Department seminars. In order to receive extra credit, you must turn in a ~250 word summary of the main points of the seminar by one week after the seminar. For each seminar summary you turn in, you can earn *up to 10* points; scores will be assigned based on the adequacy of your summary and the quality of your writing. You may turn in no more than five such summaries for the semester. Seminars are scheduled for noon on Fridays. See the department website (<http://www.humboldt.edu/~biosci/>) for seminar details. The Biology Department will have several job candidates coming through this term. Each candidate gives a research seminar and a teaching seminar. Research seminars by job candidates are also open for extra credit.

LAB

Lab sections may meet in either the biology labs or the computer labs – please check the schedule to make sure you go to the correct place. Come to the first lab prepared to go into the field rain or shine.

BEFORE COMING TO LAB, CHECK THE WEBSITE FOR ANY LAB HANDOUTS. PRINT THEM OUT AND BRING THEM WITH YOU TO LAB. Your lab instructor will not have copies of the handout.

LAB EXERCISES

The lab exercises are designed to increase your facility with Excel, SPSS, and statistical analyses. Similar to your homework assignments, each is worth 25 points. You should be able to complete most of each exercise during your lab time. **Lab exercises are due Friday at noon (see schedule) to your Lab Instructor.**

SHORT CLASS PROJECT

Your first lab meeting will start in the biology labs, but come prepared to go into the field. We will be head into the field to sample the first day of lab. The data we collect during the first lab (combined from all lab sections) will become the data for your Short Class Project paper. A primary goal of this course is to develop your scientific writing skills. To that end, you will turn in a concise write-up of the SCP in abbreviated scientific format, which will undergo successive revisions. You will earn points for (i) the draft of your SCP paper, (ii) your peer-review of others' drafts, and (iii) your final SCP paper. In lab, we will further discuss the expectations for this assignment.

GROUP PROJECT

The main lab activity for the second half of the term is your Group Project. You will work in groups of 3-4 on a short ecological study, which you will design under the

guidance of your lab instructor. During this part of the term, we forego most (*but not all – watch the schedule*) formal lab instruction to give you time to work on your Group Project. Each group will turn in a proposal, a draft paper, and a final paper, and will give a final presentation during the last meeting of your lab section. In addition to the evaluation of the lab instructor, group members will evaluate one another's performance on the project. More information on your Group Project will be provided later in the term.

LATE POLICY ON LAB WORK

Lab assignments will lose 10% *per day* late (regardless of weekends/holidays).

FINAL GRADES

Your final grades will be based on your point totals and will roughly correspond to the following grading scale. Although I do not anticipate any reason to modify this grading plan, I reserve the right to do so.

A: 935-1000	B+: 865-899	C+:765-799	D+: 665-699
A-: 900-934	B: 835-865	C: 735-764	D: 600-664
	B-: 800-834	C-: 700-734	F: <600

ATTENDANCE AND PREPARATION

It is important that you attend lectures, labs, and group activities during and outside of class. You will be responsible for material covered whether you were present or not. Some assignments will be performed in class (or lab); therefore, missing class may also mean missing points. It is my intention to have a handout available the night before each class with some key points for the next day's lecture and room for you to take notes on the course material. You may want to print these out and bring them with you to class. I will not bring copies to class. I will not be posting my lectures online.

In addition to the primary literature readings that will be discussed in class, there are also sections of Begon, Townsend & Harper (2006) (BTH) associated with each lecture on the schedule. Your experience in this course will be considerably enhanced if you keep up with the readings. BTH typically covers more ground on a topic than I am able to cover during lecture and this material is fair game for the exams. I find BTH a thorough and well-written text and I expect that it will also serve you as an excellent resource in future courses. (If you are planning to take Community Ecology with me next year, I recommend that you hang onto it.)

MOODLE & CLASS COMMUNICATION

This course has a Moodle site that you should check frequently. The Moodle site will be my primary mode of communicating with you outside of the classroom. I will post any general announcements on the Announcements section of the Moodle site. There is also a discussion forum on the Moodle site. Please post any general questions relating to the course on this forum. In turn, I will post my answers on the forum. If you have a question, it is likely that other students in the class have the same question and this will help me to address all of those questions at once.

All of the course readings (except for the textbook) will be posted on Moodle, including the readings for class discussion. I will also post other resources that you may find helpful for your comprehension of course material. Lab exercises and other lab handouts will also be provided via Moodle. Be sure you print these out before coming to lab.

STUDENTS WITH DISABILITIES

If you have a disability that requires accommodation, please come and talk to me. We will work with the Student Disability Resource Center to find accommodations appropriate for you in this course. If you require extra time on exams due to a SDRC-certified disability, please notify me soon and no later than one week before the scheduled exam.

CAMPUS RESOURCES

In the lab, both your peers and your lab instructor will be critiquing your scientific writing. You will turn in at least one draft before your final paper. If you find writing difficult and you are getting poor evaluations of your writing, I encourage you to seek writing-specific help at the University Writing Center (www.humboldt.edu/~english/wrtgcntr.html , x3758, 205 Founders Hall) or at the campus Learning Center (www.humboldt.edu/~learning/writingassistance.htm, x5217, House 71). The Learning Center also provides services to help you improve your study skills and reading comprehension.

IMPORTANT DATES:

- Jan. 23: deadline to add an open course without instructor approval.
- Jan. 24 – Feb. 13: students can add a class with instructor approval.
- Jan. 31: deadline to file for Spring 2006 graduation.
- Feb. 13: deadline to drop without instructor approval.
- Feb. 13 – Apr. 14: period to drop with a “serious and compelling reason”
- Mar. 20: Deadline to change to C/NC.

Week	Lecture Topics	Lecture Assignments	BT&H
Jan-17	What is Ecology?		1.5 - 1.5.1
Jan-23	Resources and conditions		2.1 - 2.3.4, 2.4 - 2.7
Jan-25	Niches and Niche Space		3.1 - 3.2.1, 3.2.4
Jan-30	Population Attributes and Population Growth (Continuous)		4.1 Gotelli: Chapter 1
Feb-1	Population Growth (Discrete) & Intro to Population Regulation		5.1, 5.10 - 5.12 Gotelli: Chapter 2
Feb-6	Density Dependence & Environmental Stochasticity		5.2 - 5.7, 5.8, 5.9, 5.8.3, 5.8.5
Feb-8	Population Fluctuations	Homework 1 due Feb10 at noon	4.1, 4.4 - 4.6.4, 4.7
Feb-13	Life Tables I		4.7.3, Gotelli (Chapter 3)
Feb-15	Life Tables II	Homework 2 due Feb 17 at noon	4.8 - 4.9.5, 4.12, 4.13
Feb-20	EXAM 1	EXAM 1	
Feb-22	Metapopulations		6.0 - 6.2, 6.8 - 6.9 Gotelli (Chapter 4)
Feb-27	Island Biogeography Theory & Reserve Design		21.5, Gotelli (Chapter 7)
Mar-1	Competition I: fugitive species		8-8.3
Mar-6	Discussion of SCP Papers		Common Problems with Moss Papers; SPSS Lab Handout
Mar-8	Competition II: coexistence by competition-colonization tradeoff		8.5
SPRING BREAK			
Mar-20	Competition III: Lotka-Volterra Competition Model	SCP Final Paper Due	8.4, Gotelli (Chapter 5)
Mar-22	Competition IV: Limiting Similarity, Resource Partitioning	Reading 1: Palmer et al 2002	8.8-8.10
Mar-27	Zonation: Competition & Facilitation	Homework 3 due Mar 27 at 5pm	
Mar-29	Predation I: Cycles		9.1- 9.4
Apr-3	EXAM 2	EXAM 2	
Apr-5	Predation II: Herbivory		10.1-10.4
Apr-10	Disease & Parasitism	Reading 2	12.0 - 12.4.1, 12.5
Apr-12	Competition & Predation in Communities: Indirect Effects		8.6, 20.0 - 20.2.6
Apr-17	Species Invasions	Reading 3 (Invasions)	7.2.2, 7.3, 7.4.2
Apr-19	Ecosystems I: Introduction		Ch. 16
Apr-24	Ecosystems II: Energy Cycling	(GP Paper Due)	Ch. 17
Apr-26	Ecosystems III: Nutrient Cycling		Ch. 18
May-1	Historical ecology, Climate Change	(GP Presentations)	1.4, 3.3, 7.6.2
May-3	Biodiversity	Reading 4 Homework 4 due May 5 at 5pm	21.0 - 21.4.2, 21.6 - 21.8, 22.4
May 12	FINAL EXAM: 8:00 – 9:50		

WEEK OF	LOCATION	LAB TOPICS	DUE DATES
Jan-17		No Lab	
Jan-23	Bio Lab /Field	Start SCP	
Jan-30	Computer Lab	Lab Exercise I: Excel Input and graph CSP data in Excel Intro to Populus	Lab Exercise I Due Feb 3 at noon
Feb-6	Computer Lab	Intro to SPSS; begin analysis of SCP data	
Feb-13	Computer Lab	Instructions on SCP Write-up Complete SPSS Lab; Work on Populus Hmwk 2	SPSS Lab Exercise Due Feb 17 at noon
Feb-20	Bio Lab	Peer Review of SCP drafts; Introduction to Group Projects	Bring 3 copies of SCP First Draft to lab
Feb-27	Bio Lab	Meet with Lab Instructor to Discuss Group Project Ideas (bring 4 good ideas)	SCP Second Draft Due in Lab
Mar-6	Bio Lab	GP Proposal Due in Lab; Meet in Lab for Group Project	Group Project Proposal Due in Lab
Mar-13		SPRING BREAK	
Mar-20		No scheduled Lab --Work on Group Project	SCP Final Draft due Monday Mar 20 at 5pm
Mar-27		No scheduled Lab --Work on Group Project	
Apr-3	Computer Lab	Data Entry and Analysis in Computer Lab	
Apr-10		No scheduled Lab --Work on Group Project	Draft of GP Due Apr 14 at noon
Apr-17	scheduled meetings	Lab Instructors return GP Paper Drafts	
Apr-24		No scheduled Lab --Work on Group Project	Final GP Papers due Monday Apr 24 at 5pm
May-1		Group Project Presentations	Presentations