

General Ecology

BIOL 2335-Rm. #B6 Boggs

Spring 2007

General Course Description. This course covers basic ecological theory and practice. The emphasis will be describing basic processes within and among populations, while also covering some elements of higher levels (communities and global systems), and lower levels (individuals). We will examine theoretical, empirical and experimental approaches to these problems. Mathematical treatments of these issues will be an important, although not predominant, aspect of this course. We hope to stress the conceptual utility of these formulations rather than their derivations. Material from the text *Ecology: The experimental analysis of distribution and abundance* (5th ed), by Krebs will be supplemented by other literature, and we will attempt to incorporate problems in so-called applied ecology, such as fisheries sciences, conservation issues, and biological control. Unless otherwise stated, students will be responsible for all material outlined in the syllabus and/or covered in lectures. Since the text book and lectures occasionally disagree, what we say in class is correct in case of a conflict. **It is probably best to lightly skim the text book prior to lecture, and then read it more carefully after the lecture, since we often emphasize different aspects of this material.** This will save you from concentrating on material in the book that is not relevant to the presentation in class.

Grading Policy. Grades will be based on 2 mid-term exams, a final exam, and 3 independent projects. We will occasionally give pop quizzes during class on a random basis. Quizzes will be no more than 5 points, consisting of 1-2 short questions taken from recent lectures, for a maximum of 50 points during the semester- these quizzes will count towards your class participation grade, as will some other in class assignments. There will also be a variety of extra-credit homework assignments throughout the semester, amounting to no more than 2% of your total grade. You should do them for two reasons- first, they can tip the scales to give you a higher grade if you are on the borderline. **Second, these assignments give you practice solving problems you are likely to see on exams.** The point distribution is as follows: 10% for class participation, 30% for the independent projects (3 x 10%), 30% for the midterms (2 x 15%), and 30% for the final. Grades will be assigned based on a percentage scale. Nominally: A \geq 90%; B \geq 80 %; C \geq 70% D \Rightarrow 60 %. We may curve the exams if necessary, and reserve the right to change these standards based on class performance. **Because of the extra credit, we generally are not inclined to give you a break if you are on the border and haven't shown us YOU are taking responsibility for your education. In other words, if you are 0.01 % away from an 'A', with no extra-credit and minimal participation, don't expect the benefit of the doubt.**

Exams. The exams will be a combination of short answer/essay and multiple choice. One half of the final exam will be on material covered from the 2nd mid-term until the end of the course, while the other half will be cumulative. These are a closed-book, closed-note format; bring only your brain and a pencil. Or bring only your pencil- your choice. You should have a calculator that can do logarithms and power functions as well, since there WILL BE calculations. Make-up exams will not be given (i.e. you will receive a 0) unless one of us are notified prior to the exam, or a message with a valid, verifiable reason is left on my phone machine during the exam. We reserve the right to make this exam more difficult than normal. To prevent certain groups of students undue access to previous exams, students will be required to return their exam questions. Failure to turn in an exam will result in a grade of 0 for that particular exam. Don't worry, you will find there is no word on these tests anyway! We will make sample questions available via the course web page at least one week prior to the exam. Cheating on exams is a most serious offense, and is grounds for disciplinary action including, but not limited to, receiving a 0 for that exam. Cheating consists of, but is not limited to, copying answers from other students, bringing in and/or using other material during a test unless specifically authorized by me. These guidelines are consistent with the Student Honor Code detailed in your handbook and on the web (<http://www.deanofstudents.gatech.edu/Honor/>), and you are urged to consult this source for a full definition of your rights and responsibilities. Good luck, Mr. Phelps.

Independent Projects: There will be three independent projects during the course. The assignment date for each is listed on the syllabus, and will be announced in class on that date, and posted on the web as well. This project will consist of a brief report on a topic of ecological importance, and you will be expected to use primary scientific literature (journals, newspaper articles, technical reports) rather than text books (which will generally not be helpful anyway). Details of the format will be announced in class, but it will not be longer than 5-7 pages. You will work in small groups, and the group will submit one report on which your grade will be based. We encourage you to submit your report in html or electronic format, although that is not strictly necessary. Each group will be expected to give a short (10 minute) oral presentation of your findings once during the semester.

Expectations. This course will stress the ability to think, problem solve, synthesize science concepts and communicate them. Thus, mere memorization of facts is unlikely to get you much beyond a B. Your ability in these other skills will be assessed in both the exams and the projects. **Exams.** Exams will typically have three sections, multiple choice, short answer and essay. The multiple choice questions test your knowledge of the facts. We try not to trick you, **but the questions are designed to prevent you from doing well simply by guessing** (e.g. *none of the above* is frequently an answer). Short answer questions are of several formats. We use calculations to assess your ability with the quantitative aspects of the course. We frequently ask questions about data interpretation and analysis using both figures and written text, or ask how you would design an experiment to examine a particular issue. **Thus, in the examples I present, you must understand how the facts that come from a particular experiment or model are used to derive statements about the way the world works. How are experiments done, what can they tell us, what are their limitations etc..?** You must then be able to apply this reasoning to new situations. Essay questions test your knowledge of the big picture—that is, the ability to bring together several different areas of knowledge to address a larger issue. Questions of this sort will come from common themes or major topics I examine during the course. **Projects.** These projects are designed for you to research an important practical problem that ecology can help solve. You will be required to read **original scientific papers** (not text books, newspaper or magazine articles) and assemble these studies into a coherent essay. Since you will be reading works by others, **we expect you to cite papers not only when you take a fact or observation, but also when you take their ideas or words unchanged into your own work.** Failure to give credit where it is due constitutes plagiarism. We expect that you will **argue logically for your position** based on the facts at your disposal, will be **able to cite facts that back up your conclusions, and connect the abstract concepts in class to the examples you present to me.** The best essays **go beyond mere reporting** of what you have read.

Web site. This website will be a repository of all lecture notes, assignments, exam questions/answers and supplementary material. It is for your private use, and is not meant to be copied or dispersed in any electronic or printed format. We have attempted to incorporate links between the sections of material to reinforce how interconnected ecology is, and to allow you to easily refer back to important concepts when they occur in multiple places. Obviously, you will lose this aspect on the printed version. We encourage you to submit questions to me via e-mail, to check the site, and to send answers to these questions, which we will post. Questions and answers will be anonymous if desired. Lectures are often updated prior to being given in class so please be aware that things may change. **We will make every effort to provide you with the current material, but make no guarantees that all material in class will be on the web. Thus, the existence of the web documents does not substitute for being in class, and you should expect that you will not be fully up to date unless you attend class regularly. It is our experience that poor class attendance is nearly always reflected in the final grade.**

Team Teaching: Team teaching is an advantage for you in that each of us can cover material that we are most familiar with. It is a disadvantage because it means that you will have to get used to different styles. We will make every effort to make sure that we present a consistent set of expectations for you, but your best policy is to check with us if you are unsure about particular issues. **All tests and grades will reflect the joint expectations of both of us.**

Office hours: You are free to (encouraged to!) consult with whomever you feel comfortable with, but all of us will be happy to guide you during the semester, if you run into trouble. MW and LJ's office hours will be directly after class on Tu-Th (11-12), or by appointment, and we will be happy to go over material then. We will not answer questions about course material over the phone. Grades will not be distributed by phone either, to protect your anonymity and our sanity. Under no circumstances will a student's grade be discussed with any other individual besides the student.

Marc Weissburg & Lin Jiang



marc.weissburg@biology.gatech.edu, lin.jiang@biology.gatech.edu

Address:

Marc Weissburg, 2238 ES&T Bldg , Phone: 4-8433

Lin Jiang, C120 Cherry Emerson Bldg., Phone: 5-2514



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Lecture Schedule

Date	Topic	Reading
Jan 9	Introduction; Ecology and Evolution, Why study ecology? (MW)	Chpt. 2
Jan 9	Population Distributions (MW)	Chpt. 3
Jan 11	Population Parameters and Life-tables (MW)	pp 133-144
Jan 16, 18	Population growth & density dependent regulation (MW) Independent Project 1 Assignment	pp. 160-169
Jan 23, 25	Competition and speciation (LJ)	Chpt. 12
Jan 30, Feb 1	Predation and pred-prey cycles; Biological control; Harvesting populations (LJ)	209-224, 305-316; 319-325 331-342; 350-352
Feb 6, 8	Life-history strategies (MW)	145-146; 149-154
Feb 13	Exam I (Populations to Life History)	
Feb 15	Coevolution (MW)	228-231; 235-242; 275-277
Feb 16	Midterm Progress Grades	

Feb 20	Project 1 Catch-up, Presentations	
Feb. 22	Project 1 Presentations (continued)	
Feb 27, March 1	Community structure I-Succession; Assign Independent Project 2 (Feb 27) (LJ)	386-392; Chpt. 21
March 2	Last day to drop a course with a "W"	
March 6	Community structure II: Biodiversity (LJ)	Chpt.22
March 8, 13	Community Structure III- stability, persistence and resilience (MW)	463-474; 495-501
March 15	Island Biogeography, Design of natural preserves (LJ)	
March 16	Last day to withdraw from school with a "W" in all courses	
March 19-23	Break	
March 27	Island Biogeography, Design of natural preserves (LJ)	501-508; 355-371
March 29, April 3	Independent Projects 2; Assign independent Project 3: Global Warming	
April 5	Exam II (Coevolution to Islands)	
April 10, 12	Community Metabolism I-Ecological efficiency of plants; Primary Production (LJ)	Chpt. 25
April 17, 19	Community Metabolism II-Energy flow (MW)	Chpt. 26
April 24-26	Independent Projects 3	
May 3, 8:00 AM	Final Exam	