POPULATION BIOLOGY **BIOLOGICAL SCIENCES 1320/2320** **FALL 2015**

INSTRUCTOR: Dr. Alison Hale
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157 Crawford Hall

OFFICE HOURS: Tues. 2:30-4:00 p.m., Weds. 3:00-4:30 p.m., or by appointment.

LECTURES: Tuesdays and Thursdays 1:00 - 2:15 p.m., A221 Langley Hall

COURSE OVERVIEW: This course addresses population dynamics from ecological and evolutionary perspectives. We begin with the methods and models used to study demography and population growth of single species. We will build on these ideas in models of disease transmission, multi-species interactions including competition, predation, and mutualism, and models of how both genes and individuals move within populations (inbreeding) and between populations using a meta-population approach. Throughout the course we emphasize the application of these models to conservation and management issues including: extinctions and invasions of species and human population growth and stability. You will become familiar with a variety of analytical models used to understand population dynamics, and have the opportunity to discuss, in depth, some of the current topics in population biology in smaller groups.

TEXT: Most of the assigned readings come from *A Primer of Ecology* by NJ Gotelli and *A Primer of Ecological Genetics* by JK Conner and DL Hartl. These books and other assigned readings are either on reserve in Langley Library or will be posted on Courseweb.

GRADED WORK: Your grade in this course will be based on the following:
1. CLASS DISCUSSIONS: Papers from the primary literature on population biology will be posted on Courseweb and discussed in class one week later (see syllabus). Understanding and evaluating papers from the primary literature requires a different approach from general reading. To help you interpret and critically evaluate the scientific literature, you will complete a discussion assignment and upload it to Courseweb by 1PM on the day of the discussion. In the discussion assignments, you will describe the techniques the scientists used to obtain the data, what the data demonstrate, and lastly, you will need to prepare two questions regarding the conclusions and/or broader impacts of the study (25 possible points for each discussion assignment). Grades will be reduced 10% per 24-hour period following assignment due dates.

This is a great blog post that has several tips that will help you in comprehending the assigned discussion papers and completing the discussion assignments.
http://violentmetaphors.com/2013/08/25/how-to-read-and-understand-a-scientific-paper-2/

2. i>Clicker Questions: Student progress will be assessed in-class using a student response system (i>Clickers) to work through thought exercises. For each question, students will be given 2 points for participating, and an additional ½ point for answering correctly. i>Clickers will be used beginning the second day of class, but will not count towards the course grade until after the Add/Drop period ends on September 11th. On average, 5 i>Clicker points will available in each lecture, with a guaranteed 4 points for each student who answers all i>Clicker questions. At the end of the term, these points will constitute the "In-Class Participation" portion of the grade. i>Clicker points will be scaled to a total of 90 possible points out of 100.

Thus, over the course of the semester, more i>Clicker points will be available than are required to achieve a full score for this aspect of grading, so points lost to the occasional low battery, i>Clicker failure or other technical difficulty should not impact a student's grade in the course. Students who forget their i>Clicker for a given class will not be eligible for that day's i>Clicker points even if they can answer the questions correctly in person or in writing.

Students may use EITHER a standard i>Clicker remote OR may install the REEF polling app on their smartphone, tablet, or laptop (check out the website for more details: https://www1.iclicker.com/students-get-started/). It is the student's responsibility to make sure that their i>Clicker device is registered, working correctly, and has sufficient battery power to last through the class. If a student loses or breaks their i>clicker device, it is the student's responsibility to replace and register it before the next class. If this happens, please email the instructor with the new Remote ID.

TO REGISTER YOUR i>CLICKER: Go to http://www1.iclicker.com/register-an-iclicker. Complete the fields with your first name, last name, student ID, and remote ID. Your student ID should be your Pitt User ID (part of your email address that precedes @pitt.edu). Do not use your PeopleSoft or Pitt Card ID number when you register. Check to make sure that your i>Clicker is properly registered and working by checking that points are being recorded on Courseweb. You should be able to see these points prior to Add/Drop, although they will not count until afterwards.

PUT YOUR NAME ON YOUR i>CLICKER: These remotes can be easy to confuse with those other students.

DO NOT GIVE YOUR i>CLICKER TO A FRIEND: Cheating with i>Clickers will not be tolerated. Any student caught entering answers with multiple i>Clickers will lose their i>Clicker and all associated i>Clicker points for the remainder of the term, as will the students who own the other i>Clickers. In addition, all students involved will be reported to the Dean's office for a violation of academic integrity.

3. EXAMINATIONS: There will be 4 examinations, each worth 100 points. The exam dates are given on the schedule. Exams will include terms, definitions, interpretation of tables and graphs, analytical problems, and essays. The questions will be based primarily on the material covered in the lectures but will include material in selected readings. The final exam, like the 3 mid-term exams, will test proficiency with new material since the previous exam. Because we hope you will emerge with a synthesis of material from throughout the course, questions will sometimes make use of material covered prior to previous exam(s). You may miss an exam only under exceptional circumstances of illness, severe personal trauma, or (rarely) University business, and only if you bring a signed note from a doctor (illness), parent (personal trauma), or a University official (University business) within one week of the exam. If you miss one exam with a valid excuse, your final grade will be based on your average on the other three exams, i>Clicker, and discussion grades. If you miss more than one exam with a valid excuse, you must meet with the instructor to consider dropping the course and other options. If you miss an exam without a valid excuse, you will receive a score of "0" on the exam. *There are no make-up exams*.

GRADING: Relative weight of each portion of graded work:

Discussion Questions	100 points
i>Clicker "In-Class Participation"	90 points
Exams	400 points
TOTAL	**590 points**

For example, if you earn 498 out of 590 points during the term, your percentage is 84%. During the term you can estimate your performance based on the following scale: percentages in the 90's = A range; 80's = B range; 70's = C range; 60's = D range; 50's or below =F.

LEARNING TOOLS

PRACTICE PROBLEM SETS AND SOFTWARE: Four sets of practice problems will be posted on Courseweb, each associated with ¼ of the course material. These practice problems emphasize application of models and methods introduced in lecture. Some questions will use POPULUS, freeware available for download from http://cbs.umn.edu/populus/download-populus. This program is designed to run on either PCs or Macs-- please download it to your own computer if you have one. The answers to the practice problems will be posted on Courseweb one week before each exam.

GENERAL INFORMATION

EMAIL COMMUNICATION POLICY: I will rely on e-mail for communication with you. Each student is issued a University email address (username@pitt.edu) upon admittance. This email address is the only one I will use for communication with you. You are expected to read email sent to this account on a regular basis. Failure to read and react to my communications in a timely manner does not absolve you from knowing and complying with the content of the communications. The University provides an email forwarding service that allows students to read their email via other service providers (e.g., Gmail). If you choose to forward your email from your pitt.edu address to another address you do so at your own risk. If email is lost as a result of forwarding, it does not absolve you from responding to official communications sent to your University email address. To forward email sent to your University account, go to http://my.pitt.edu log in to your account, click on Manage My Account, then go to Set Email Preference and follow the instructions on the Email Forwarding page.

ACADEMIC INTEGRITY POLICY: Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity, noted below, will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score for the exam or discussion questions will be imposed. You may not use unauthorized materials during an exam, including notes, dictionaries, pagers, telephones, and any device that can connect to the internet. You must submit for grading only material that is written exclusively in your own words and written or drawn in your own handwriting. Violation of the Academic Integrity Code requires the instructor to submit an Academic Integrity Violation Report to the Dean's Office. See: http://www.as.pitt.edu//fac/policies/academic-integrity.

DISABILITY SERVICES: If you have a disability for which you are, or may be, requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services, 216 William Pitt Union, 412–648–7890/412–383–7355 (FTY), as early as possible in the term. Disability Resources and Services will verify your disability and determine reasonable accommodations for this course.

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MO	DAY	SESSN	LEC	HANDOUT	2015 TOPIC	READINGS
SEPT	1	1	1		INTRO TO POPULATION BIOLOGY & SAMPLING	On Courseweb: Applied Pop. Bio.
	3	2	2		DENSITY-INDEPENDANT POPULATION GROWTH	Gotelli Chapter 1
	8	3	3	PP1	POPULATION BIOLOGY OF INVASIVE SPECIES	On Courseweb: Levine 2008
	10	4	4	D1	HUMAN POPULATION DYNAMICS	On Courseweb: TBA
	15	5	5		DENSITY-DEPENDENT POPULATION GROWTH	Gotelli Chapter 2
	17	6	D1		**CLASS DISCUSSION I**	On Courseweb: D1 PDF
	22	7	6		DENSITY DEPENDANT MECHANISMS	Gotelli Chapter 2
	24	8	E1		*EXAM I - COVERING SESSIONS 1-6*	***
	29	9	7		POPULATION LIFE TABLES	Gotelli Chapter 3
OCT	1	10	8	PP2	AGE-SIZE STAGE STRUCTURED GROWTH & DEMOGRAPHY-PROJECTION MATRICES	Gotelli Chapter 3
	6	11	9	D2	LIFE HISTORY VARIATION & TRADE-OFFS	On reserve: Neal Chapter 16
	8	12	10		EXTINCTION	TBA
	13	13	D2		**CLASS DISCUSSION II**	On Courseweb: D2 PDF
	15	14	11		ECOLOGICAL METAPOPULATION MODELS	Gotelli Chapter 4
	20				NO CLASS – FALL BREAK	***
	22	15	E2		*EXAM II - COVERING SESSIONS 7 - 13*	***
	27	16	12		INBREEDING AND GENETIC DRIFT	Conner & Hartl Chapter 3
	29	17	13	PP3	GENETIC METAPOPULATION MODELS I	no new readings
NOV	3	18	14	D3	GENETIC METAPOPULATION MODELS II	no new readings
	5	19	15		APPLIED ECOLOGICAL GENETICS	Conner & Hartl Chapter 7, pp. 231-245
	10	20	D3		**CLASS DISCUSSION III**	On Courseweb: D3 PDF
	12	21	16		COMPETITION I - LOTKA-VOLTERRA MODELS	Gotelli Chapter 5
	17	22	E3		*EXAM III - COVERING SESSIONS 14 -20*	***
	19	23	17		COMPETITION II - RESOURCE MODELS	On Courseweb: Crawley Chapter 8
	24	24	18	PP4 & D4	PREDATION	Gotelli Chapter 6
	26				HAPPY THANKSGIVING!	***
DEC	1	25	19		DISEASE DYNAMICS	On reserve: Vandermeer & Goldberg Chapter 7
	3	26	D4		**CLASS DISCUSSION IV**	On Courseweb: D4 PDF
	8	27	20		MUTUALISM	On Courseweb: Bronstein 1994
	10	28	E4		*EXAM IV - COVERING SESSIONS 21 - 27*	***