

**PCB 5423**  
**ADVANCED ECOLOGY: Populations and Communities**  
**Fall 2017**

Meets: MMC ACH-4 room 202, Tues/Thurs 8:00am – 9:15am; BBC MS room 362, Tues/Thurs 10:30-11:45  
 Instructor: Joel Trexler - office MSB 361; 305-348-1966

Textbooks: Gotelli, N. J. 2008. A Primer of Ecology, 4th ed. Sinauer (G) ISBN 978-0-87893-273-9  
 Mittelbach, G. G. 2012. Community Ecology. Sinauer (M) ISBN 978-0878935093  
**Optional:** Ricklefs, R. E., and G. L. Miller. 2000. Ecology, 4<sup>th</sup> ed. W. H. Freeman (R) ISBN 0-7167-2829-X

Other student materials: You must bring a laptop computer or tablet to class with POPULUS installed and functioning (see notes below).

**Class webpage: I will use Google Docs to distribute documents. Watch for emails from me with links.**

Month	Day	Topic	Topical reading	Read these chapters
Aug	T22	Course Overview and Pre-test		G1-2; R15-16
	Th24	Density-independent models		
	T29	Density-dependent models	Strong 1986; Schaffer and Kot1986;	M4
	Th31	Density-dependent models	Coulson et al. 2004	
Sept		<b>September 4 (Monday) Labor Day</b>	<b>University Closed</b>	
	T5	Population Regulation		
	Th7	Population Regulation	Davidson and Andrewartha 1948; McMahon et al. 2009	
	T12	Age-structured models		
	Th14	Age-structured models	Leverich and Levin 1979 plant Levin et al 1987 animal Vendenbos et al. 2006	G3; R15
	T19	TBA		
	TH21	Life History Theories		G4; R17
	T26	Life History Discussion	Pianka 1970; Reznick et al. 2002; Mims et al. 2010	
	TH28	Metapopulation Ecology	Huffaker 1958	
Oct	T3	Metapopulation Ecology	Harrison 1988; Murdoch et al 2006	
	TH5	Competition	Hutchinson 1961; Innoye 2001	G5; M7; R21,22
	T10	Competition	Connell 1961; Poloczanska et al. 2008	M8
	TH12	TBA		
	T17	Predator-prey Ecology	Brooks and Dodson 1965	G:6; M5;R23
	TH19	Predator-prey Ecology	Turessen and Bronmark 2007	M6
	T24	<b>Oral Exam</b>		
	TH26	TBA		
	T31	Community Ecology, Species-Area Relationships	Gotelli and Colwell 2011	M:1; R26, 29
Nov	TH2	Species-Area Relationships		

	T7	Island Biogeography	Simberloff and Wilson 1969	G:7, M2; R27
	TH9	Temporal Ecology and Species Richness		M:2; R27-29
		<b>Nov 10 (Friday) Veteran's Day</b>	<b>University Closed</b>	
	T13	Community Phylogenetics	Davis 1969; Losos 1996	M15
	TH16	Interaction Webs and Food Web	HSS 1960; Paine 1966; Post DM 2002	M11
	T21	Metacommunities	Connell 1978	M13
	<b>TH23</b>	<b>No Class – Thanksgiving Day</b>		
	T28	Metacommunities	Hubbell 1979; Alonso et al. 2006	
	TH30	Review		
Dec	<b>4-9</b>	<b>Final Exam Week</b>	<b>Oral exams TBA</b>	

### Class Notes

**Purpose:** Provide a common foundation for our graduate students training to be ecologists. We will seek to increase your familiarity with the theory and practice of modern population and community ecology. Two textbooks will be used to provide background material for lectures and discussions of current papers from the primary literature. You may also benefit by access to a general ecology textbook as a reference for things you may have forgotten from your undergraduate classes. Students will also employ computer software to familiarize themselves with the basic models of population and community ecology.

**Pedagogy:** I teach this in a ‘flipped’ class format. This simply means that all lectures are to be listened to on your own time and in advance of class. Class time is used for answering student questions, discussions of the material, review of core topics, written and oral tests, and computer simulations.

**Student responsibilities:** You are expected to listen to each lecture in advance of class, do the assigned reading, work problem sets, and participate in class discussions throughout the term. You must bring a laptop computer or tablet to class capable of running POPULUS and EXCEL (or similar) spreadsheets.

**Grades:** Pop tests to be administered frequently this semester. These will be used to document that you listened to the lectures in advance of class time and are staying up to date on the material. Your performance on these tests will account for 30% of your final grade. You will complete two problem sets during the semester (combined 30% of the total points). Finally, 40% of your grade will be derived from your performance on two oral exams designed to simulate comprehensive exams.

**Computing:** Download the free computer program called POPULUS at: <http://www.cbs.umn.edu/populus/>  
You will also be called upon to create some simple spreadsheet models using EXCEL or comparable programs of your choice

## Grading Rubrics

### 1. Factual Material

Passing this class requires mastery of factual material covered in lectures available by downloading from Google Docs. These lectures are supplemented by assigned reading material. In addition to topical material, you must develop some appreciation of the historical development of ideas in population and community ecology. This history will be available in the lecture and reading material, and in technical papers you are assigned to read. This knowledge will be tested in oral exams given at the class mid-term and final exams, as well as on problem sets and class discussions.

### 2. Problem solving: analytical skills, literature research, and synthesis

Making a high grade in this class requires demonstration of quantitative, literature research, and synthetic skills in answers you provide to problem sets assigned throughout the semester. Problems will range from simple quantitative problems solved using computer programs to open-ended questions requiring use of library research tools and analysis of published papers. This knowledge will be tested by problem sets administered throughout the semester. Grading of the problem sets will be based on factual correctness of your answers, as well as thoroughness, creativity, and thoughtfulness of answers. Factual correctness can assure a grade of B, but higher grades will require creativity and thoughtfulness. Examples of excellent answers will be provided to help you get a better feel for what I'm looking for.

### 3. Final grades

Final grades will be determined by your performance compared to other students in your class and compared to the performance of past groups of students. It is possible for all students to make 'A' in this class and historically most students make A or B. Generally, graduate students perform well in this class because it is important for their thesis or dissertation work. In the Biology Department, MS students earning a grade of A in both semesters of Advanced Ecology may be able to skip the comprehensive exam. I have given grades below a C in past semesters, but not often and only to students who basically didn't do the work. Feel free to ask questions about grading at any point in the semester.

### 4. Problem set rubrics

Each problem set will be worth a maximum of 10 points, no matter how many problems are assigned. I will grade each problem set based on these criteria:

1. Are the answers provided correct? Max 5 points
2. Are the answers thorough; does your answer cover all aspects of the question? Max 3 points
3. Is creative thinking present; did you take initiative and find the answer in a novel way or extend the content in a novel way? Max 2 points