I. Course Information

Course Number:	ECOL 8310
Course Name:	Population Ecology
Course webpage:	current and past years available at: http://osenberglab.ecology.uga.edu/courses/
Meeting time:	Tuesdays and Thursdays, 9:35-11:35am
Format:	Lecture and discussion
Location:	Ecology 12

II. Instructor

Instructor:	Craig W. Osenberg
Office:	Odum School of Ecology, 25 Ecology Bldg. (osenberg@uga.edu)
Office hours:	Please email him for an appointment (can meet in person or via zoom).

III. Readings

Foundational readings

I expect you to read about topics prior to each lecture. I expect you to have your own copy of Mittelbach & McGill (2019); I also encourage you to purchase Gotelli (2008), although readings from Gotelli will be available on the webpage. I also encourage you to read from other sources, such as the web, or review papers, or books intended for advanced (graduate) courses in ecology.

Required:

- Mittelbach, GG and BJ McGill 2019. Community Ecology. Oxford.
- Gotelli, NJ. 2008. A Primer of Ecology. Sinauer.

Other sources:

- Case, TJ. 2000. An Illustrated Guide to Theoretical Ecology. Oxford.
- Vandermeer, JH and DE Goldberg. 2003. Population Ecology. Princeton.
- Gurney WSC and RM Nisbet. 1998. Ecological Dynamics. Oxford.
- Otto, SP and T Day. 2007. A Biologist's Guide to Mathematical Modeling in Ecology and Evolutiion. Princeton.

Required readings

Papers from the primary literature will be assigned to accompany lectures and provide the focus for student-led discussions.

IV. Course Description and Design

This course provides an advanced view of the concepts that underlie the spatial and temporal dynamics of populations and the communities within which they are embedded. Topics to be covered will include population growth and regulation, species interactions, meta-populations, metabolic theory, foodwebs, patterns of diversity.

We will study population and community ecology, as revealed through mathematical and graphical analyses and empirical investigations. Lectures will emphasize concepts and models. Readings from the primary literature will facilitate the students' abilities to critically evaluate the primary literature. Discussions will be student-led and will enhance the students' communication skills and their abilities to assess and debate relative merits of different ideas and approaches. During each discussion, which will last approximately 45 minutes, you will give a $\leq$10 minute introductory presentation (which lays out history and context for the

paper; highlights major findings; sets up the foundation for the discussion); and then you will facilitate a 30-40 minute discussion involving the entire class. Other time will be devoted to going over homework and exams.

V. Pre-requisites and Co-requisites

All participants are expected to have had an undergraduate course in ecology. The course targets graduate students with focal interests in ecology who are in their first or second year of graduate work at UGA; advanced undergraduates also are welcome to enroll.

VI. Course Overview and Schedule

Lecture topics for this course are listed below. The course syllabus is a general plan for the course; deviations will be necessary and will be announced. A more detailed schedule with assigned readings will also be made available on the course webpage and updated over the course of the semester.

Week	*Lecture Topics (very rough)*
1	Introduction to population growth and population regulation
2	Effects of demographic and environmental variation; structured-population dynamics
3	Structured-population dynamics (continued)
4	Metapopulations and spatial patterns
5	Foraging theory; habitat selection; ideal free distributions; cryptic density-dependence; metabolic theory
6	Evolutionary dynamics
7	Competition and R*
8	Exam and debrief (exact date TBD)
9	Predator-prey dynamics
10	Coexistence mechanisms
11	Disease ecology
12	Indirect effects; trophic cascades; higher order interactions; trait-mediated interactions
13	Alternative stable states; tipping points
14	Drivers of biodiversity; biodiversity and ecosystem function
15	Communities in space

VII. Expectations and Philosophy

My Responsibilities: As the instructor of this course, I will endeavor to help you understand the fundamental concepts of population and community ecology. I will be prepared for each lecture and will address your concerns and questions regarding the subject matter, and course policies. You are also welcome to stop by my office, and if I do not have time at that moment, I will be happy to make an appointment with you during a more convenient time period. I also will respond to your emails promptly (within 24 hrs). I will have read the papers for our discussions, and I will have prepared my own ideas about issues that I think are important to bring up during discussion (if needed). I will respect your opinions, and when I disagree with your interpretations, I will explain why. I will listen, and I will encourage everyone in the class to participate in

discussion. I will welcome your questions during my lectures.

Your Responsibilities: Be prepared for class -- this means that you will have read all required material as well as the specific readings for the discussions. I'm hopeful that you also will investigate issues beyond the required readings. As you read, you will think about the material in a deep way; you will challenge yourself; when you don't understand, you will seek input from your peers prior to class and be prepared to share your insights during class. I expect you to discuss these issues outside of class and bring your revised ideas to class. You will thoughtfully participate in class discussions. You will challenge others when you disagree, but you will do this in a respectful manner. When others challenge you, you will take the opportunity to explain your ideas more fully, without taking the challenge as a personal attack. When you are responsible for leading a discussion section, you will have read widely, thought carefully, and prepared sufficiently to facilitate an interesting exchange of ideas. You will encourage others to participate. If you are not leading the discussion, you will do the readings, you will have thought deeply about the material and you will have prepared some interesting ideas (questions, interpretations, implications) that can help with the analysis and discussion of the paper. Bottomline: you will have fun and you will be curious.

VIII. Assessments and Grading

A. Grading:

You will be evaluated on four activities:

1. *Homework:* I will be giving homework assignments throughout the semester. These are intended to: a) give you practice with some basic tools and concepts; and b) give you a chance to evaluate how well you understand the material. I expect to assign about 10 homeworks. Each homework will be given a discrete score (0, 1, 2, 3), based in large part on completeness (and not correctness). You will not get individual feedback on your homework; instead, we will go over homework in class to assure that everyone understands the material. The goal is to try to do the HW and then to be sure (after we go over it) that you understand it. All homework combined will contribute 34% of total score.
2. *Exams:* There will be three exams (you will have the entire class time for each exam). I am not keen on exams, but because this course is required by OSE, some form of objective assessment is needed. The exams will each cover material presented in lectures, from the readings and discussion, and from the homework. All exams combined will contribute 36% of the total score.
3. *Class participation*. This is essential. I expect everyone to contribute to discussions on a daily basis. Each week, I will assign you a score (0, 1, 2, 3) based on the quality of your contributions. If you sit quietly and don't participate, you'll get a 0. If you talk too much and spout meaningless banter, you'll also get a low score. The highest score will be given to students who are engaged, provide others the opportunity to participate, and offer thoughtful contributions. Please note that "thoughtful contributions" do not require that you "know" the concepts; only that you are thinking and working through ideas in a thoughtful way. 15% of total score.
4. *Discussions*. Each student will lead (or co-lead) several discussions. You will be given a score (0, 1, 2, 3) based upon the quality of your presentation and the way in which you guide the subsequent discussion. Note -- this counts more than a single exam; take this preparation seriously. 15% of total score.

Your final grade will be based on a final score, based upon the above four components, relative to the highest score in the class (i.e., "X"):

A:	$\geq$93% of X
A-:	$\geq$90% of X
B+:	$\geq$87% of X
B:	$\geq$83% of X
B-:	$\geq$80% of X

C+:	≥77% of X
C:	≥73% of X
C-:	≥70% of X
D:	≥60% of X
F:	<60% of X

IX. Email Communication

All email correspondence to me should be sent to my uga email (osenberg@uga.edu). Phone calls may not be answered.

X. Attendance

Students are expected to attend all classes. If you miss class due to illness, please let me know as soon as possible (ideally ahead of time). If you are ill and can transmit a pathogen to another student, please stay home until you have recovered and are no longer contagious. If you alert me prior to class, we might also be able to arrange a zoom session if you are healthy enough to attend remotely.

If you have to attend a conference, then you should let me know at the start of the term or several weeks prior to the absence.

If you miss a class, you are still expected to have done the readings for the day, to have obtained notes from another one of the students, and to have completed the homework. I also can provide you with access to prior recorded lectures on the topic.

Excused absences for class participation will have missing dates replaced with the mean from the other dates; missed exams will be taken before or immediately after your absence; homework should be turned in before or immediately after your absence; discussion assignments will be re-assigned to accommodate your absence.

XI. Conduct in Class

Please be courteous and do not talk privately during lecture. All discussion should engage the entire class. Silence your cell phones prior to class. You can take notes on your laptops or tablets and use them to view pdfs of the readings. But (obviously) do not check email, text your buddy, etc. Your attention should be focused on the class material and the person speaking.

XII. Academic Honesty and the Honor Code

I expect all students to adhere to (and to have read) the University's *A Culture of Honesty*. I expect that each student "will be academically honest in all of [her/his] academic work and will not tolerate academic dishonesty of others".

That said, I encourage you to work with other students in the class, to share your ideas freely, to work together through homework assignments, and to collaborate when jointly leading discussions or giving class presentations. However, I expect all graded work that is submitted to be reflect your work. Any contribution from another individual must be credited (e.g., include an acknowledgement section that says "I thank Joe Y and Gabriela Z for their helpful comments about phase-planes, Khalil M for help with coding, and Suzanne B for providing helpful insights as we collaborated on homework problem 2".

XIII. Accommodations for Students with Disabilities

Students who will require a classroom accommodation for a disability must contact the Disability Resource Center and inform the instructor of any special accommodations that are required.

XIV. Counseling Services

Graduate school can be stressful. If you are having challenges that exceed the support offered by your normal social network and professional mentors and peers, help is available on-campus. Please contact Student Care and Outreach or Counseling and Psychiatric Services at UGA.