

ECOL 4000/6000 Population and Community Ecology

Fall 2024

Time: Tu Th 2.20 – 3.35 pm. (3 credit hours)

Place: Science Learning Center, Room 345

Instructor: Alex Strauss, Ph.D.

Email: at Strauss@uga.edu

Office hours: By appointment. **Office:** Ecology 194D

Overview: Population and community ecology are active fields of research with important applications for management and conservation. This course links conceptual foundations and basic quantitative models to active analysis of data and discussion of primary literature. My goal is to provide students with the tools to better understand the processes and mechanisms that structure ecological populations and communities. Unit 1 (Populations) focuses on birth, death, and movement of organisms and how these processes determine the population dynamics of a single species. Unit 2 (Species Interactions) introduces several canonical forms of interactions among multiple species, including competition, predation, mutualism, and disease. Unit 3 (Communities) adds further complexity to explore the causes, consequences, and maintenance of biodiversity in ecological communities.

Format: This course meets on Tuesdays and Thursdays. Tuesdays are typically lectures (denoted L's), interspersed with active learning activities such as think-pair-share and iClicker questions. Readings and associated quizzes (denoted Q's; always embedded in eLC) are due BEFORE class on Tuesdays and cover topics introduced by readings. Thursdays are a mix of supplementary workshops and lectures, paper discussions (D's), in-class work time for problem sets (PS's). There are three exams, one for each Unit. Enrollment in lab (4000L/6000L) is optional; lab topics are described in the separate lab syllabus.

Grade Scale: Fractional final grade percentages will be rounded (e.g., 89.4% = B+; 89.6% = A-)

A	94-100%	B-	80-83%	D+	67-69%
A-	90-93%	C+	77-79%	D	64-66%
B+	87-89%	C	74-76%	D-	60-63%
B	84-86%	C-	70-73%	F	less than 60%

Readings & Slides: We will use Nicholas Gotelli's *Primer of Ecology* for most assigned readings. This text is available at the UGA bookstore and Amazon. The current (Gourth) Edition of the book is preferred, because towards the end of the semester we will read Chapter 8 (introduced in the Fourth Addition) and Chapter 9 (only included in the Fourth Edition. Contact Dr. Strauss within the first week of class if you are encountering difficulty finding a copy of it, or if you have an earlier Edition that is missing one or both of these chapters.

Supplemental required readings will be uploaded to eLC. All supplemental readings will be labeled with an "R" following by a number (e.g., R1), and will be posted to eLC at least one week before they are due. Lecture slides will typically be posted to eLC shortly before class begins on Tuesdays.

iClicker: You must register for iClicker for this class. iClicker will primarily be used to assess the participation portion of your grade. To register for iClicker, go to join.iclicker.com and use the join code HRZA. Confirm that you are adding yourself to Population and Community Ecology 4000/6000. Slides with step-by-step instructions are posted to eLC with more details. Let me know if you need help obtaining a device (smart phone, tablet or laptop) that will enable you to use this software in class.

Assessment: Grades will be determined from the following six categories:

- 1) Quizzes: 10% total. (12x; drop 2; 1% each)
- 2) Attendance & Participation: 12% total.
- 3) Problem Sets: 27% total. (9x; 3% each)
- 4) Paper Discussions: 21% total. (8x; drop 1; 3% each [1.5% pre; 1.5% post])
- 5) Exams: 30% total. (3x; 10% each)

- 1) **Quizzes (Q's).** Quizzes are designed to reinforce content from assigned readings so that students come to class with a foundation of knowledge that allows us to explore these topics in greater depth. Quizzes are typically 5 questions, including a mix of multiple choice, multiple select, and other question types. Quizzes must be completed on eLC BEFORE class on Tuesdays. Quizzes are made available two weeks before they are due and may be completed any time before then.

Allowances: You cannot make up missed quizzes, because I go over answers at the beginning of class. However, you may attempt each quiz twice. eLC will tell you which (if any) questions were answered incorrectly the first time, and only the higher score will be graded. Additionally, although there are 12 total quizzes, you may drop your lowest two quiz scores at the end of the semester. Each of the 10 remaining quizzes will constitute 1% of your final grade.

- 2) **Attendance & Participation.** Attendance is mandatory and will be monitored with iClicker. iClicker will also be used to gauge engagement during class. iClicker questions during lectures will typically be graded on completion, not correctness. However, I may switch to a correctness-based grading scale if students do not demonstrate a good faith effort in participation. Logging in to another student's iClicker profile constitutes a violation of UGA's Academic Honestly Policy.

Allowances: You may miss up to 4 of the 28 "regular" class days (excluding exams) without penalty. Excused absences *may* be granted but must be cleared with Dr. Strauss via email. I generally try to accommodate absences due to planned events like participation in research conferences, but students should discuss these plans with me during the first full week of class. Absences due to health issues will be excused if they are accompanied by a note from the health center or a medical professional. More than 4 unexcused absences will result in an automatic deduction of 0.5% for each additional day missed. Students who attend class and participate in class activities are likely to achieve high participation grades.

- 3) **Problem Sets (PS's).** Problem sets are designed to scaffold students' skills in quantitative reasoning and computer programming in a way that builds confidence and enables a deeper understanding of key concepts in population and community ecology. If reading that previous sentence is already stressing you out, please know that I try to design these problem sets to meet you where you are and help you overcome fear of math and coding. Some questions will require sketching graphs or modifying equations that are introduced in the readings or lecture. Other questions will require coding in R or interpreting model simulations. The semester-long scaffolding provided with these problem

sets is further intended to provide you with computational skills that will enable you to complete more satisfying and meaningful group research projects, if you are enrolled in lab. Problem sets are typically posted on eLC on Thursdays and due one week later. Problem sets can be turned in up to 5 days late, but will be automatically deducted 10% per day. After 5 days I will post the key and no additional late problem sets will be accepted.

Allowances: You must complete all 9 problem sets. However, ~20-30 minutes of in-class work time will be reserved for each problem set, and you are encouraged to work in groups during (and outside of!) this time. In fact, students are expected to work together and ask me and each other for help. While you are encouraged to work on problem sets together, the work that you turn in must be your own; for example, you cannot take a picture of somebody else's sketch of a graph.

- 4) **Paper Discussions (D's).** Paper discussions are designed to engage students with the primary literature and reinforce concepts introduced in readings and lectures. We will use the Jigsaw method to discuss 8 papers throughout the semester. Students must turn in a pre-discussion and post-discussion assignment for each paper. The pre-discussion assignment is due before class on the day of the discussion. The post-discussion assignment is due the day after the discussion (Friday) by midnight. More details are provided in the Paper Discussion Instructions, posted on eLC.

Allowances: You may drop or miss 1 of the 8 paper discussions (both pre and post assignments). If you miss one of the discussions due to an excused absence then you can make up the discussion with additional work (see the Paper Discussion Instructions for details).

- 5) **Exams.** Exams are designed to test both breadth and depth of knowledge. There are three exams, one for each unit, and each exam is worth 10% of your final grade. Exams include a mixture of true/false questions, multiple choice/select, and six short answer responses. Students enrolled at the 4150 level must answer four short answer questions, and students enrolled at the 6150 level must complete five. The first two exams are taken during normally scheduled class time, and the third exam is taken during the final exam period (December 7th 3:30-6:30pm). Exams are non-cumulative, except in the sense that some topics build naturally off each other (e.g., communities are assemblages of populations).

Allowances: Students may answer more than the required number of short answer questions for extra credit opportunities.

Prerequisites: This course assumes you are familiar with general ecology and biology, and have taken ECOL 3500.

Accommodations: Please contact the instructor if you require special accommodations due to learning disabilities, religious practices, physical or medical needs, or for any other reason.

Academic Honesty & Honor Code: All academic work must meet the standards of the UGA Student Honor Code: "I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others." A Culture of Honesty, the University's policy and procedures for handling cases of suspected dishonesty, can be found at www.uga.edu/ovpi. Logging into iClicker as anyone other than yourself constitutes a violation of this honor code.

Wk	Tuesday			Thursday			Friday
	date	due before class	in class lecture	date	due before class	in class activities	due by midnight
Unit 1: Populations							
1				Aug 15		• Course introduction	
2	Aug 20	GPE Ch1; Q1	L1: Population Growth and Decline	Aug 22		• Coding workshop 1 • Begin PS1 in class	
3	Aug 27	GPE Ch2; Q2	L2: Density Dependence	Aug 29	PS1	• Coding workshop 2 • Begin PS2 in class	
4	Sep 3	GPE Ch4; Q3	L3: Meta-populations	Sep 5	PS2	• Intro zooplankton data • Begin PS3 in class	
5	Sep 10	GPE Ch3; Q4	L4: Age Structure	Sep 12	D1-pre; PS3	• Paper Discussion 1 • PS1-3 & Unit 1 review	D1-post
6	Sep 17	GPE Ch5	L5: Interspecific Competition	Sep 19		Exam 1	
Unit 2: Species Interactions							
	Sep 24	R1; Q5	L6: Resource Competition	Sep 26	D2-pre	• Paper Discussion 2 • Begin PS4 in class	D2-post
8	Oct 1	R2; Q6	L7: Host-Parasite Interactions	Oct 3	D3-pre; PS4	• Paper Discussion 3 • Begin PS5 in class	D3-post
9	Oct 8	GPE Ch6; Q7	L8: Predator-Prey Interactions	Oct 10	D4-pre; PS5	• Paper Discussion 4 • Begin PS6 in class	D4-post
10	Oct 15	R3; Q8	L9: Mutualism	Oct 17	D5-pre; PS6	• Paper Discussion 5 • PS1-4 & Unit 2 review	D5-post
11	Oct 22	R4	L10: Indirect Interactions	Oct 24		Exam 2	
Unit 3: Communities							
12	Oct 29	GPE Ch9; Q9	L11: Measuring Biodiversity	Oct 31		• Begin PS7 in class	Fall Break
13	Nov 5	GPE Ch7; Q10	L12: Diversity in Space	Nov 7	D6-pre; PS7	• Paper Discussion 6 • Begin PS8 in class	D6-post
14	Nov 12	GPE Ch8; Q11	L13: Diversity in Time	Nov 14	D7-pre; PS8	• Paper Discussion 7 • Begin PS9 in class	D7-post
15	Nov 19	R5; Q12	L14: Biodiversity Function	Nov 21	D8-pre; PS9	• Paper Discussion 7 • PS1-4 & Unit 2 review	D8-post
16	Nov 26		Course Wrap-Up	Nov 28		Thanksgiving	
17	Dec 3		No class (Friday schedule in effect)	Dec 10		Final Exam (3:30-6:30)	

Key to color coding:

- Assigned readings (book chapters and R's) due on Tuesdays. GPE = Gotelli's *Primer of Ecology*
- Quizzes (Q's) are due on eLC before class on Tuesdays and cover content from readings
- Problem sets (PS's) are assigned on Thursdays and due one week later.
- Pre- and post- assignments are due for each paper discussion (D's).

Modifications: The course syllabus is a general plan for the course. If deviations are necessary, they will be announced to the class by the instructor and a revised syllabus will be posted on eLC.

Generative AI: Unless explicitly stated, artificial intelligence-based technologies, such as ChatGPT, must not be used to generate responses for student assignments.

ECOL 6000 and Honors Students: Students taking the class at the 6000 or Honors level are required to answer one more Short Answer response on each exam than ECOL 4000 students. Students enrolled at the 6000 or Honors level may also be required to answer an additional question on certain problem sets.

Well-being, Mental Health, and Student Support: If you or someone you know needs assistance, you are encouraged to contact Student Care & Outreach in the Division of Student Affairs at 706-542-7774 or visit <https://sco.uga.edu/>. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services. UGA has several resources to support your well-being and mental health: <https://wellbeing.uga.edu/>. Counseling and Psychiatric Services (CAPS) is your go-to, on-campus resource for emotional, social and behavioral-health support: <https://caps.uga.edu/>, TAO Online Support (<https://caps.uga.edu/tao/>), 24/7 support at 706-542-2273. For crisis support: <https://healthcenter.uga.edu/emergencies/>. The University Health Center offers FREE workshops, classes, mentoring and health coaching led by licensed clinicians or health educators: <https://healthcenter.uga.edu/bewelluga/>