

Ecology: Cool science that matters

Spring 2020, The Internet, Period C

COURSE OBJECTIVES

To explore the central theories and principles in ecology, to survey the evidence that supports them, and to see how they apply to real-world environmental problems. Major topics will include:

- *Limits to Distribution.* What determines where species do and do not occur?
- *Population Ecology.* What determines the abundance, dispersion, age structure, and dynamics of biological populations?
- *Species Interactions.* What is the nature of species interactions such as competition, predation, parasitism, and mutualism? How do these interactions influence species distribution and abundance?
- *Community Ecology.* What determines the structure, organization, and dynamics of groups of species? How are communities of species affected by disturbance?
- *Ecosystem Ecology.* How do energy and matter move through the biological and physical components of ecosystems? How do organisms and abiotic factors influence the function of ecosystems and the services they provide to society?
- *Applied Ecology.* How do humans influence biological systems and vice versa?

To become an expert in the ecosystem where you are currently residing and be able to apply ecological principles to your system and compare and contrast how your ecosystem functions with other ecosystems.

To learn the process of science:

- Understand how ecologists gain and structure knowledge.
- Learn how to ask ecological questions, formulate hypotheses, generate predictions, design and conduct experiments, perform quantitative analyses, interpret data, and report findings.
- Become proficient in interpreting graphs and data, evaluating and manipulating simple mathematical models, and applying empirical data to evaluate theoretical predictions.
- Apply ecological principles to real-world environmental problems.

STAFF & OFFICE HOURS:

Professor: Caitlin Hicks Pries (Zoom/LSC 349); Office hours Fridays 11:45-12:45 pm & by appt.

Laboratory Director: Craig Layne (LSC 121); Office hours by appt

Graduate Assistants: Alice Goldstein-Plessner, Office hours to be announced

Mia Phillips, Office hours to be announced

Jonathan Alperstein, Office hours to be announced

TEXTS and READINGS:

Readings will be announced at the start of each week and made available on Canvas. This term we are trying something new as we will not be relying on a textbook and will instead be reading shorter articles and the primary literature. However, if you want a reference, I suggest:

Ecology: The economy of nature. Robert Ricklefs and Rick Relyea. 2018. 8th Edition.

EXAMINATIONS:

In lieu of midterms and a final, there will be five quizzes, one occurring every two weeks throughout the term. These will be timed (30-45 minutes each) and taken via Canvas. They will be posted on Friday afternoon and must be completed by Monday at 11:59 EST. The first four quizzes will cover the material from the previous two weeks of class. The last quiz will be twice the length of the previous quizzes and half of it will be on the material from the previous two weeks and half of it on more comprehensive questions covering the whole term. The exact timing of the last quiz is TBA.

LECTURE: Synchronous Zoom lectures on Mondays 10:20-11:30 plus recorded lectures

We will be holding synchronous lectures during the C block on Mondays. Your attendance on Zoom is expected. Typically, this class consists of a mix of lecture and small group activities such as brainstorming and problem solving. Sometimes these group activities will occur during the Monday lectures in breakout rooms and other times, you will be asked to complete these activities on your own but are encouraged to work with other students from your group through Zoom. Some activities you may be asked to complete after the lecture and upload to Canvas or include in your Nature Notebook. I reserve the right to hold additional synchronous lectures if the material warrants it.

DISCUSSION: Synchronous X-hour Zoom discussion TH 12:30-1:20 EST

Our X-period will consist of discussions of the primary literature and guest lectures followed by discussions with actual Ecologists. Your attendance on Zoom during X-hours is expected. Prior to these class periods, you will be reading and annotating a scientific paper and coming up with questions.

LABORATORIES: synchronous Zoom Lab Group Meetings to be arranged

Attendance in weekly Zoom Lab Group Meetings is required. Via correspondence with Craig Layne, the Lab Coordinator, you should have been assigned to one of the TA-led laboratory groups by the first day of classes. If not, please contact Craig immediately. Laboratories consist of activities such as hypothesis generation, data collection, spreadsheet simulations, data processing, data analysis, data visualization, results interpretation, discussion, and team presentations.

CLASSROOM POLICIES:

In order to have productive discussions and breakout groups during synchronous classes, you need to be present on zoom with your *video turned on*. Please have your microphone muted unless you are talking.

We firmly believe that you need to engage with this course and the material to master it. This means completing the assigned reading, taking notes during live and recorded lectures, and completing the assignments that accompany lectures. Given the remote nature of this course, more of the burden of learning this material is on your shoulders than is typical. It is highly recommended that you watch all lecture material and complete all activities in the week they are assigned.

We will be recording all discussions and office hours on Zoom. By taking this course, you consent to being recorded (see RECORDING INFORMATION on last page of syllabus).

DISCLAIMER: We reserve the right to change the format during the course if the proposed format is not working. This change may take the form of an additional synchronous lecture during one of our regularly scheduled C periods.

SPECIAL NEEDS:

Students requesting disability-related accommodations and services for this course are encouraged to schedule a phone/video meeting with Prof. Caitlin as early in the term as possible. This conversation will help to establish what supports are built into my online course. In order for accommodations to be authorized, students are required to consult with Student Accessibility Services (SAS; student.accessibility.services@dartmouth.edu; SAS website; 603-646-9900) and to email me their SAS accommodation form. We will then work together with SAS if accommodations need to be modified based on the online learning environment. If students have questions about whether they are eligible for accommodations, they should contact the SAS office. All inquiries and discussions will remain confidential.

TECHNOLOGY EXPECTATIONS:

We will make *extensive* use of the Canvas system in all aspects of this course. Please check Canvas regularly for announcements, lecture videos, assignments, readings, quizzes, and laboratory information including assignments. Furthermore, we will utilize the Discussions feature on Canvas as part of the Nature Notebook series of assignments.

Given the online nature of this course, it is required that students have the ability to stream 1 hour or less of video content each day and participate in live Zoom lectures, X-hours, and lab sections with their video on.

Finally, some assignments will need to be submitted electronically on Canvas as PDF files. This means that you will need to find a way to scan hand-written documents while preserving legibility. There are several free mobile apps that can perform this function.

We will do our very best to accommodate any limitations to your access to the required technology. It is impossible for us to plan for every possible technology constraint. Therefore, please let Prof. Caitlin know what barriers you have to completing the online course as soon as possible.

RELIGIOUS HOLIDAYS:

Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please e-mail Prof. Caitlin before the end of the second week of the term to discuss appropriate accommodations.

ILLNESS:

If you become ill and cannot make it to a Zoom Lecture/X-hour or complete your work or quiz for the week, please alert Prof. Caitlin. If you will miss a laboratory due to illness, please alert your TA prior to when your lab section has their Zoom meeting.

HONOR PRINCIPLE:

We take the Dartmouth Honor Principle very seriously (<http://www.dartmouth.edu/judicialaffairs/honor/index.html>). Violations have major consequences. In lab, you are encouraged to collaborate fully with fellow students while conducting research and interpreting data. However, as soon as you begin writing a lab report, the writing must be entirely your own. Everything you write must be entirely your own work. Please just ask if you ever have questions about the boundaries of collaboration. Quizzes are open book and notes, but you are NOT allowed to work with other students on quizzes.

EXAMINATIONS AND GRADING:

For the overall course grade, the lecture and lab material will contribute 70% and 30%, respectively. The breakdown of lecture and lab grades will be as follows:

<i>Lectures</i>	Participation (includes lecture activities and Zoom X-hours)	10%
	Annotation of Selected Readings	10%
	Nature Notebook	20%
	Quizzes (5 total, 10% first four, 20% last one)	60%

		100%
<i>Laboratories</i>	Bioindicator Calculations and Interpretations	10%
	Deer Browsing Figure and Interpretations	15%
	Turtle Population Dynamics Figure and Interpretations	15%
	Soil Respiration and Carbon Storage Write-up	20%
	White Pine Weevils Figure and Interpretations	15%
	Vernal Pools Figure and Interpretations	15%
	Eddy Worksheet and Carbon Balance Calculation	10%

	TOTAL	100%

We will use a variety of approaches to assess your learning in this course, including online quizzes, group assignments, laboratory assignments, doing the assigned readings and annotation, working on your Nature Notebooks, and course participation. Final letter grades will follow the guidelines in the online ORC, available at: <http://dartmouth.smartcatalogiq.com/en/current/orc/Regulations/Undergraduate-Study/Requirements-for-the-Degree-of-Bachelor-of-Arts/Scholarship-Ratings>. By department policy, the target median grade in all foundation courses is a B, indicative of good mastery of course material; student performance with a high degree of originality, creativity, or both; good performance in analysis, synthesis, and critical expression, oral or written; and working well independently. To earn scores with >90% of the points on individual assignments, students will need to demonstrate excellent mastery of course material; a very high degree of originality, creativity, or both; excellent performance in analysis, synthesis, and critical expression; and unusual effectiveness in working independently.

MENTAL HEALTH:

We recognize that the academic environment at Dartmouth is challenging, that our terms are intensive, and that classes are not the only demanding part of your life. There are a number of resources available to you on campus to support your wellness, including: your undergraduate dean (<http://www.dartmouth.edu/~upperde/>), Counseling and Human Development (<http://www.dartmouth.edu/~chd/>), and the Student Wellness Center (<http://www.dartmouth.edu/~healthed/>). We encourage you to use these resources, to take care of yourself throughout the term, and to feel free to e-mail or attend Prof. Caitlin's virtual office hours when needed.

WEEK BY WEEK SCHEDULE:

Week		Lecture Topic	Lab Activity	Lab Assignment*
1	14-Sep	Live: What is Ecology?	Inaugural Meeting	
	17-Sep	X-hour: How to read a scientific paper	Introductions, Syllabus, and Logistics	
	recorded:	Soils and Global Change: Research Lecture Biomes		
2	21-Sep	Live: Climate	Soil Respiration & Carbon Storage I	
	24-Sep	X-hour: Primary Literature Discussion		
	recorded:	Climate cont'd Soils: The foundation of terrestrial ecosystems		
		QUIZ 1		
3	28-Sep	Live: Limits to Distribution I	Bioindicator Species Assemblages	
	1-Oct	X-hour: Primary Literature Discussion		
	recorded:	Limits to Distribution II: Matt Ayres Research lecture Limits to Distribution III: Niche and Habitat Selection Limits to Distribution IV: Dispersal		
4	5-Oct	Live: Population Ecology I: Abundance and Growth	Deer Browsing	Bioindicator Calculations and Interpretations
	8-Oct	X-hour: Primary Literature Discussion		
	recorded:	Population Ecology II: Abundance and Growth cont'd Population Ecology III: Life Histories and Life Tables An Introduction to the Central Limit Theorem		
		QUIZ 2		
5	12-Oct	Live: Population Ecology IV: Population Dynamics	Sea Turtle Population Dynamics	Deer Browsing Figure and Interpretations
	15-Oct	X-hour: Dr. Cottingham Guest Talk		
	recorded:	Species Interactions I: Herbivory Species Interactions II: Predation		
6	19-Oct	Live: Species Interactions III: Competition	Soil Respiration & Carbon Storage II	Sea Turtle Population Dynamics Figure and Interpretations
	22-Oct	X-hour: Dr. ter Hofstede Guest Talk		
	recorded:	Species Interactions IV: Mutualism Species Interactions V: Disease Ecology Community Ecology I: Biodiversity		
		QUIZ 3		
7	26-Oct	Community Ecology II: Food Webs	White Weevil Nest Site Selection	Soil Carbon Write-up (Hypotheses, Data Collection, Results, and Interpretations)
	29-Oct	X-hour: Dr. Emakovitch Guest Talk		
	recorded:	Community Ecology III: The Yellowstone Story Community Ecology II: Disturbance and Succession		
8	2-Nov	Live: Ecosystems I: Energy=Food	Vernal Pool Leaf Decomposition	White Pine Weevil Presentation
	5-Nov	X-hour: Primary Literature Discussion		
		Ecosystems I: Energy=Food cont'd Ecosystems II: Ecological Stoichiometry		
		QUIZ 4		
9	9-Nov	Live: Ecosystems III: The Carbon Cycle	Carbon Balance Using Eddy Covariance	Vernal Pools Figure and Interpretations Eddy Covariance Worksheet and Carbon Balance Calculation
	12-Nov	X-hour: Primary Literature Discussion		
		Ecosystems IV: The Nitrogen Cycle Ecosystems V: The Phosphorus Cycle		
10	16-Nov	Biodiversity and Ecosystem Function	Denotes guest lecture from Matt Ayres	
		Review Session TBA	Denotes guest lecture from Mark McPeck	
		QUIZ 5	*see Canvas for instructions and specific due dates	

RECORDING INFORMATION:

(1) Consent to recording of course and group office hours

a) I affirm my understanding that this course and any associated **group** meetings involving students and the instructor, including but not limited to scheduled and ad hoc office hours and other consultations, may be recorded within any digital platform used to offer remote instruction for this course;

b) I further affirm that the instructor owns the copyright to their instructional materials, of which these recordings constitute a part, and distribution of any of these recordings in whole or in part without prior written consent of the instructor may be subject to discipline by Dartmouth up to and including expulsion;

b) I authorize Dartmouth and anyone acting on behalf of Dartmouth to record my participation and appearance in any medium, and to use my name, likeness, and voice in connection with such recording; and

c) I authorize Dartmouth and anyone acting on behalf of Dartmouth to use, reproduce, or distribute such recording without restrictions or limitation for any educational purpose deemed appropriate by Dartmouth and anyone acting on behalf of Dartmouth.

(2) Requirement of consent to one-on-one recordings

By enrolling in this course, I hereby affirm that I will not under any circumstance make a recording in any medium of any one-on-one meeting with the instructor without obtaining the prior written consent of all those participating, and I understand that if I violate this prohibition, I will be subject to discipline by Dartmouth up to and including expulsion, as well as any other civil or criminal penalties under applicable law.

Proposed notification to faculty [from Dean's Office and/or Department Chair]

Please be aware that any recording you make within any digital platform used to offer remote course instruction may be regarded as an education record within the meaning of the Family Educational Rights and Privacy Act, which prohibits the disclosure to a third party of any student's personally identifiable information from such records, in the absence of that student's prior written consent, unless a specified exception to prior written consent applies.

Please also be aware that you are prohibited from making a recording in any medium of any one-on-one meeting with a student without obtaining that student's prior written consent. If you violate that prohibition, please understand that you will be subject to discipline by Dartmouth up to and including dismissal, as well as any other civil or criminal penalties under applicable law. **This prohibition does not apply to recordings of the course and any associated group meetings, to which students are being asked to consent via their enrollment in this course.**

Finally, please be reminded that the instructor owns the copyright to their instructional materials, of which these recordings constitute a part. Distribution of another instructor's recordings in whole or in part without prior written consent of that instructor may be subject to discipline by Dartmouth up to and including dismissal.

If you have any questions about any of these prohibitions or instructions, please consult your Dean's Office.