

# Ecology: Cool science that matters

Fall 2018, LSC room 201, Period 10

## 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 an ecosystem of your choice and be able to apply ecological principles to your system and compare and contrast how your ecosystem functions with other systems.**

**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 reading scientific literature, 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 (LSC 349); Office hours Thurs 1:05-2:30 pm & by appt.  
Additional hours around exam times will be announced in class and on Canvas.

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

*Graduate Assistants:* Swetha Kasetty (Monday Lab), Office hours to be announced  
Amelia Fitch (Tuesday Lab), Office hours to be announced  
Christopher Callahan (Wednesday Lab), Office hours to be announced

*Undergraduate Assistants:* Kevin Griffie (Monday Lab)  
Alexa Wing (Tuesday Lab)  
Grace Callahan (Wednesday Lab)

**TEXTS and READINGS:**

Many lecture readings will come from the following text:

*Ecology: The economy of nature*. Robert Ricklefs and Rick Relyea. 2013. 8<sup>th</sup> Edition.  
ISBN-10: 1319060412; ISBN-13: 9781319060411

Other readings will be announced in class and made available on Canvas

**EXAMINATIONS:**

The two mid-term examinations will be held in class. The final will be held during our assigned examination period.

**LECTURE: M, W and F 10:10 to 11:15 in LSC 201; x-period TH 12:15-1:05**

Your attendance at all lectures and X-periods is expected. Please be on time. Announcements are generally made at the beginning of class. Careful attention to lectures and participation in group activities are the most effective (and time-efficient) preparation for examinations. Many lectures will include small group activities such as brainstorming and problem solving, as well as lecturing by the professor. The exams will cover materials in lectures, X-hours, and labs. Please note that due to classes starting on Wednesday this year, we will have a make-up class on Saturday, October 20<sup>th</sup> from 10:10 to 11:15.

**LABORATORIES: Monday 2:15-6:15, Tuesday 2:30-6:30, or Wednesday 3:30-7:30**

Attendance in all laboratories is mandatory. Labs meet in LSC 102 beginning with the first full week of class. Via previous correspondence with Craig Layne, the Lab Coordinator, you should already have been assigned to one of the laboratory sections. If not, please contact Craig or Prof. Hicks Pries immediately. Laboratories consist of field and laboratory activities such as sample collection and enumeration, experimental manipulation, data analysis, interpretation, and discussion. Come dressed appropriately for each week's laboratory: labs happen rain or shine, warm or cold.

**SPECIAL NEEDS:**

We are happy to accommodate students requiring disability related accommodations. Students with disabilities who may need disability-related academic adjustments and services are encouraged to see Prof. Hicks Pries privately by September 21. Students requiring disability-related academic adjustments and services must consult the Student Accessibility Services office (205 Collis Student Center, 646-9900, [Student.Accessibility.Services@Dartmouth.edu](mailto:Student.Accessibility.Services@Dartmouth.edu)). Once SAS has authorized services, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to Prof. Hicks Pries. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.

**RELIGIOUS HOLIDAYS:**

We realize that some students may wish to take part in religious observances during fall term. Should you have a religious observance that conflicts with your participation in the course, please come speak with me by the end of the second week of classes (September 21) to discuss appropriate accommodations.

**ILLNESS:**

If you become ill and cannot make it to an exam, please alert the Prof. Hicks Pries prior to the exam. If you must miss a laboratory due to illness please alert your TA prior to the lab.

**CANVAS**

We will make *extensive* use of the Canvas system in all aspects of this course. Please check Canvas regularly for the reading assignments, lecture materials, and laboratory information including assignments. In particular, the current course calendar, reading assignments, in-class group activities, and laboratory handouts will be posted on Canvas.

**USE A 3-RING BINDER FOR LECTURE AND LAB:**

You will need to take notes during class. Our powerpoint files are typically visualizations rather than words and are not designed for taking notes nor as a primary source for your studying. We will provide the powerpoint files on Canvas after lectures so that you can use as a resource for studying, but we highly recommend that you get a 3-ring binder and use that to organize your lecture notes and lab materials. All course and lab handouts will be triple punched for insertion into a binder. Additional notes can be easily incorporated on separate sheets of punched paper.

**CLASSROOM POLICIES:**

We firmly believe that you need to engage with this course and the material to master it. This means taking notes (by hand) and focusing on what’s going on in the classroom. Multi-tasking with an electronic device (laptop, iPad, smartphone) that distracts you from participating fully during lectures and laboratories – such as checking e-mail or Facebook, making online purchases, reading the newspaper, etc. – is strictly prohibited. If we notice you doing this, we will ask you to turn off your electronics and put them away. Repeated violations will result in a reduced course participation grade. We request that laptops are only out during the group activities in which their use is specified. If you need to use a device for note-taking, please check in with Prof. Hicks Pries during the first week of the term.

We will be taking advantage of the Echo360 capabilities in the Life Sciences Center to record all class meetings. Lectures will then be made available to students to help master the material. The cameras will generally focus on the front of the room, but your voices will be captured and your images may be captured on a few dates during small group activities. Please let us know as soon as possible if this presents a problem.

**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. During exams, I suggest you bring a non-programmable calculator (one that will not store formulas). This is all you may use. Everything you write must be entirely your own work. Please just ask if you ever have questions about the boundaries of collaboration.

**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 in-class group work)	10%
	Ecosystem Blog	15%
	Midterm Exam 1 (10 lectures)	20%
	Midterm Exam 2 (9 lectures)	25%
	Final Exam (6 lectures + cumulative; ~1/2 cumulative)	30%
	-----	100%
<i>Laboratories</i>	Earthworms Inquiry	30
	Pine weevils Inquiry	30
	Stream Inverts Inquiry	40
	TOTAL	----- 100%

We will use a variety of approaches to assess your learning in this course, including in-class examinations and group assignments, laboratory assignments, doing the assigned readings and answering the questions in your computer-based text, 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 come talk with Prof. Hicks Pries when needed.

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Day	Date	Lecture Topic	Readings <sup>a</sup>	Lab Activity	Associated Assignment <sup>b</sup>
Wed	12-Sep	Introduction and Biomes	Ch 1, 6	None	
Thu	13-Sep	X-hour: Biomes, Group introductions and ecosystem planning			
Fri	14-Sep	How to Blog; Global Change Research: Ecosystem Feedbacks to Climate			
Mon	17-Sep	Climate=Water + Energy , <b>Blog DUE</b>	Ch 5	Earthworm Effects on Soil - Data Collection	
Wed	19-Sep	Climate cont'd; Soil texture activity	Ch 5		
Thu	20-Sep	X-hour: Searching the primary literature			
Fri	21-Sep	Soils: The foundation of terrestrial ecosystems	Ch 5, Ch 3		
Mon	24-Sep	Primary literature activity		Earthworm Effects on Soil - Data Analyses	Data Visualizations and Interpretations, Brief Report
Wed	26-Sep	Limits to distribution I: Abiotic factors	Ch 2,3,4		
Thu	27-Sep	X-hour: Lauren Culler			
Fri	28-Sep	Limits to distribution II: Interspecific interactions			
Mon	1-Oct	Limits to distribution III: Habitat selection & niche	Ch 11	Pine Weevil Behavior - Data Collection	
Wed	3-Oct	Limits to distribution IV: Dispersal	Ch 11		
Thu	4-Oct	X-hour: Review <b>Blog DUE</b>			
Fri	5-Oct	Population ecology I: Abundance	Ch 12		
Mon	8-Oct	Population ecology II: Life tables & population structure	Ch 8, Ch 12	Pine Weevil Behavior - Data Analyses	Data Visualizations and Interpretations, Brief Report
Wed	10-Oct	<b>Exam 1 (covers material through Oct 3)</b>			
Thu	11-Oct	No X-hour!!			
Fri	12-Oct	Population Ecology Guest Lecture: Matt Ayres			
Mon	15-Oct	Population ecology III: Population dynamics	Ch 13	Stream Invertebrates - Data Collection	
Wed	17-Oct	Species Interactions I: Herbivory and Predation	Ch 14		
Thu	18-Oct	X-hour: Jeff Kirby, <b>Blog DUE</b>			
Fri	19-Oct	Species Interactions II: Parasitism and Disease	Ch 15		
Sat	20-Oct	Extra class day, 10:00-11:05; Species Interactions III: Competition	Ch 16		
Mon	22-Oct	Species Interactions IV: Competition cont'd and Mutualism	Ch 16, 17	Stream Inverts - More Data Collection	
Wed	24-Oct	Community Ecology I: Community Structure	Ch 18		
Thu	25-Oct	X-hour: Hannah ter Hofstede			
Fri	26-Oct	Community Ecology II: Disturbance and Succession	Ch 18-19		
Mon	29-Oct	<b>Exam 2 (covers material through Oct 26)</b>		Stream Inverts - Analyses and Reporting	Data Visualizations and Interpretations, Full Report
Wed	31-Oct	Ecosystems I: Energy=Food	Ch. 20		
Thu	1-Nov	X-hour: Mark Laidre, <b>Blog DUE</b>			
Fri	2-Nov	Ecosystems II: The carbon cycle I	Ch. 21		
Mon	5-Nov	Ecosystems III: The carbon cycle II	Ch. 21	Vernal Pool Leaf Decomposition Study	
Wed	7-Nov	Ecosystems IV: The nitrogen cycle--oh no chemistry!	Ch. 21		
Thu	8-Nov	X-hour: Jennifer Brentrup			
Fri	9-Nov	Ecosystems V: The phosphorus cycle--get ready to rock!	Ch. 21		
Mon	12-Nov	Biodiversity and ecosystem function, <b>Blog DUE</b>	Ch. 23	None	
Fri	16-Nov	<b>FINAL EXAM: comprehensive (08:00 - 10:00)</b>			

<sup>a</sup> From textbook. Other readings as assigned.

<sup>b</sup> See Canvas for due dates