BI 4/510 Ecological Field Methods

Summer 2019 Syllabus and Schedule, University of Oregon



"I come into the peace of wild things who do not tax their lives with forethought of grief... For a time I rest in the grace of the world, and am free."— Wendell Berry

Course Information

Instructor: Dr. Laurel Pfeifer-Meister lpfeife1@uoregon.edu Office Hour: Wednesday 10:00 — 11:00 am or by appointment, room 112 Huestis

Assistant: Noah Green

ngreen
7@uoregon.edu
 Office Hour: Monday 12:00 -1:00 pm, room 112 Huestis

- Lecture/Lab: Monday 1-3:50 and Wednesdays 1-4:50, 112 Huestis
- Field Trips: Tuesday 6/25 8am-6pm: Willow Creek Nature Preserve Tuesday 7/02 7:30am-6pm: McKenzie River Tuesday 7/09 6am-9pm: Oregon Institute of Marine Biology

Tuesday 7/16 8am-6pm: HJ Andrews Experimental Forest

Course Description

Exploration of the natural world has inspired endless scientific curiosity, questions, and research-my hope is that our exploration of Oregon will inspire the same curiosity in you. In this course, you will learn (1) how to formulate testable hypotheses in the field of ecology, (2) general methods of conducting ecological research in an outdoor setting, (3) how to design ecological experiments, (4) how to visualize and statistically analyze data you collect, and (5) how to present the results in both oral and written formats. Along the way, we will also learn some natural history of Oregon's coast, forest, river, and prairie ecosystems. These skills will be learned through a hands-on process in which you conduct a series of collaborative investigations in the natural environment. We will be asking: how do we identify the plants and animals that we see and what are the biotic, abiotic and historical factors affecting the composition and distributions of organisms in some of the major physiographic regions of Oregon? Not only will you learn to identify organisms and to see biological patterns, but you will also learn to test your hypotheses about what drives the patterns you see.

A large component of this class is the experiential learning that will take place during field study. After an introduction to the weeks activity on Monday, our Tuesday "lab" periods will be spent in the outdoors, followed by a 4 hour lab to analyze and interpret that week's data. These field-trips and labs are designed to gain hands-on experience with different organisms and habitats. Moreover, it is often easier and more meaningful to learn statistics when analyzing one's own data gathered in the field. Because this course satisfies both the MAPS and Major Lab/Field requirements in biology, your grade will be weighted approximately equally for these two components (i.e., field journal in which you will make observations and reflect on what you see and do in the field and weekly reports on the data you have collected with statistical analyses).

Prerequisites

Bi213, Bi283H or equivalent. Recommended: Bi370

Learning Outcomes

Upon successful completion of the lab portion of this course, you should be able to:

- Describe some of the most common ecosystem types in Oregon.
- Conduct several common ecological field techniques.
- Identify common plant and animal species found in our local ecosystems.
- Know how to keep a field notebook, and recognize the value of it.
- Design and carry out an experiment to test an ecological question.
- Apply quantitative reasoning and analysis to biological science problems, including statistical tests commonly used to analyze ecological data.
- Be able to research, read, and critically evaluate primary literature in the field of ecology.
- Communicate scientific results in written and oral formats.

How to succeed in this class

- Attend and participate actively in all lectures, labs, and field trips.
- Ask questions and seek help when you need it (that's what we are here for).

- Prior to coming to class, read the assigned reading in its entirety. To encourage this, there will be short canvas quizzes prior to lecture asking questions about the reading (see tentative schedule).
- In the field, take meticulous notes of the data you are collecting, the organisms you see, any patterns you notice, etc. At the end of each field trip, you should also take time to reflect on the activities of the day and record this in your notebooks. This will be an invaluable tool for writing your weekly reports.
- In the lab, record all results from pertinent analyses and INTERPRET these results prior to leaving.

Instructional Materials

I have worked hard to minimize the extra costs associated with this course (the field trip fees are unavoidable) by not requiring textbooks. Instead, I will be using a combination of free apps, software, journal articles, and books to supplement our time together. The one item you will be required to buy is a waterproof field notebook (Write in the Rain available at the bookstore or you may purchase one online). By 5:00 PM Thursday, I will have posted the next week's journal articles on the class Canvas site. In addition to these pdfs, we will be reading the freely available E-book from the UO Library: Writing Science: How to write papers that get cited and proposals that get funded by Joshua Schimel Link (http://ebookcentral.proquest.com/lib/uoregon/ detail.action?docID=845932). Software we will be using is listed below.

- R AND R-studio (note that these are two different programs you need to download): here is a link on how to install both of these programs. Link https://courses.edx.org/courses/UTAustinX/UT.7.01x/3T2014/56c5437b88fa43cf828bff5371c6a924/If you'd like to use your own computer during labs, please have this downloaded prior to our first lab session.
- The free online book *R* for Data Science by Hadley Wickham & Garrett Grolemund is a good one to bookmark in your browser–when you get stuck you should refer to this book for help: Link https://r4ds.had.co.nz/
- The following apps will be used on our field trips (if you do not have a cell phone that is capable of installing these apps, please come talk with me

and we will create an alternative assignment when necessary). Please download these prior to our first field-trip.

- SoilWeb
- iNaturalist
- Seek by iNaturalist
- Oregon Wildflower search

Field Trips

Each Tuesday we will be going out in the field rain or shine, so come prepared! Each Monday I will give you more specifics on what we will be doing, but items that you should bring each week include:

- waterproof field notebook (your choice on size and whether its lined or not) and something to write with
- lots of water and any food you may want (these will be long days)
- rain jacket (if forecasted)
- closed toe shoes (we will be leaving the trail more often than not)
- sunscreen/hat
- camera and phone (with apps downloaded)
- Optional: binoculars (if we are lucky we will have some wildlife sightings); hand lens; ID books

Assignments, Grading Policy, and Academic Integrity

Readings— We will get to know the material by working with it, not by memorizing it. Thus, for a typical Monday lecture you will be given some background reading, one or two readings from the scientific literature, plus several chapters from Schimel's Writing Science book (in a four week course we must pack a lot in each week)¹. Prior to class their will be a Canvas 'quiz' to ensure you are prepared to discuss the material. These 'quizzes' will be a series of short answer, quantitative problems, and multiple choice. They are open note and not timed! During the class period we will work our way through the readings to better understand the context of the research, its major findings, its flaws and strengths. We may do in-class exercises that will help us explore the ideas in the readings.

Field notebooks—Briefly, you will keep notes and data from field trips and any additional fieldwork you do in your write-in-the rain field notebook. This should also include a short reflection at the end of each day. Additionally, you should upload 2 organisms each week (8 total) to the iNaturalist app and record these uploads in your field notebook (see instructions on Canvas for more detail). Your completed field notebook will be due during our last class period and may be picked up the next afternoon.

Field reports—each week you will get practice writing specific sections of papers found in the scientific literature. I will use a scaffolded approach beginning with a single section (results) week 1 and adding new sections each week (see tentative schedule). Thus, reports later in the term will be longer and take more time to complete. The assigned readings (in particular Schimel's book) will be invaluable for writing effective reports, but you will also need to search the primary literature to support your findings and conclusions. We will be analyzing your data during the lab period each Wednesday so it is a good idea to run your interpretation by Noah or me prior to leaving lab. Reports will be due the following Monday. During week 3, you will be designing and conducting your own study in groups of 3-4 at the coast. I encourage you to start thinking about ideas for a research question early in the term.

Group Presentation—During our last lab meeting (7/17), each group will present their independent research projects. Presentations will be 15 minutes with 5 minutes for questions. During our Monday meeting week 4, there will be time to work on planning your presentation, but this will not be adequate to complete the entire presentation. Thus, it is important that you manage your time well and set a schedule with your group for when you will meet to work on your presentation in weeks 3 & 4.

Concept Map/Art—At the end of the term, I want to encourage you to think creatively about how the concepts we have covered during our short time together are interrelated. The goal of this activity, is to help you to see the forest through the trees—the big picture! This map need not be restricted to only concepts we have covered in our class, but also to other ideas in biology (or related disciplines) you have learned previously. For those of you more artistically

 $^{^1}$ Because it would be cruel to have our first 'quiz' due prior to the first lecture, the week 1 quiz will be due Wednesday rather than Monday.

inclined, you could do paint/draw a picture instead. For more details on what a concept map is and why they are important for meaningful learning see: Link http://emp.byui.edu/FIRESTONEL/bio405/conmaps/ Concept%20mapping%20instructions.htm.

Participation—Your participation in class discussions, lab exercises and on field trips will contribute to 10% of your final grade. Participation will aid your success in the class, and will make it more enjoyable for all. You all have skills that you can share and there are many ways you can contribute (i.e., this doesn't mean you need to answer all the questions I ask).

Field Method Lesson—For Biology 510 students only (see grade breakdown below). We will schedule a time to meet during week 1 so that I can learn more about your goals for the course and your research. Tentatively, you will pick a field method that is pertinent to your own research (or one you are deeply interested in) and after researching this method give a mini-lecture during the week it seems most appropriate (method dependent). In the field, you will demonstrate this method and design a short activity for the other students.

Component	Bi 410	Bi 510	
Reading Homework (online)	10 %	9 %	
Field Notebook & iNaturalist	$25 \ \%$	22.5%	
Field Reports	40 %	36%	
Group Presentation	10 %	9 %	
Concept Map/Art	5 %	4.5 %	
Participation	10 %	9 %	
Field Method Lesson		10 %	
Total	100%	100%	

Grade Breakdown:

Late Policy. Due to the fast pace nature of a 4 week course, no late work will be accepted except for genuine emergencies and crisis.

Class Courtesy. Please arrive to class and field trips on time. It is especially important that we depart on our field trips at the designated times as we will sometimes be meeting individuals that will help with our activities. Use your laptop only for class activities. Please ask questions if you did not hear or understand something.

Class rosters are provided to me with your legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the quarter (or before) so that we may address you properly.

Open inquiry, freedom of expression, and respect for differences are fundamental to a comprehensive and dynamic education. I am committed to upholding these ideals by encouraging the exploration, engagement, and expression of divergent perspectives and diverse identities. Classroom courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Our classroom is a learning environment, and as such should be a safe, inclusive and respectful place. Being respectful also includes using preferred pronouns for your classmates. Disrespecting fellow students as well as combative approaches, tones and/or actions are not acceptable. Please make me aware if there are classroom dynamics that impede your (or someone else's) full engagement.

Crises happen. If you are having problems that are interfering with your ability to do the work in this class, please let me know promptly. I am willing to make arrangements when the need is real and when you have done your best to deal with the situation in a timely manner. Clear communication is key.

Academic integrity. I expect students to complete assignments and exams in a manner consistent with academic integrity as outlined in the Student Conduct Code: https://policies.uoregon.edu/vol-3administration-student-affairs/ch-1-conduct/studentconduct-code. This includes cheating ("any act of deception by which a student misrepresents or misleadingly demonstrates that the student has mastered information on an academic exercise that the student has not mastered"), and plagiarism ("using the ideas or writings of another as one's own.") I have a zero tolerance policy for academic dishonesty. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures.

Discrimination and Harassment: Any student who has experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at safe.uoregon.edu. To get help by phone, a student can also call either the UO's 24-hour hotline at 541-346-7244 [SAFE], or the non-confidential Title IX Coordinator at 541-346-8136. From the SAFE website, students may also connect to Callisto, a confidential, third-party reporting site that is not a part of the university. Students experiencing any other form of prohibited discrimination or harassment can find information at respect.uoregon.edu or aaeo.uoregon.edu or contact the non-confidential AAEO office at 541-346-3123 or the Dean of Students Office at 541-346-3216 for help.

Reporting: I am a Student-Directed Employee. As such, if you disclose to me, I will respond to you with respect and kindness. I will listen to you, and will be sensitive to your needs and desires. I will not judge you. I will support you. As part of that support, I will direct students who disclose sexual harassment or sexual violence to resources that can help. I will only report the information shared to the university administration when you as the student requests that the information be reported (unless someone is in imminent risk of serious harm or is a minor). Please note the difference between 'privacy' and 'confidentiality.' As a Student-Directed Employee I can offer privacy because I am not required to report certain information to the university. However, I cannot be bound by confidentiality in the same way that a counselor or attorney is. Confidential resources such as these means that information shared is protected by federal and state laws. Any information that I as a student-directed employee receive may still be accessed by university or court proceedings. This means, for example, that I could still be called as a witness or required to turn over any related documents or notes that I keep.

Please note also that I am required to report all other forms of prohibited discrimination or harassment to the university administration. Specific details about confidentiality of information and reporting obligations of employees can be found at titleix.uoregon.edu. UO employees, including faculty, staff, and GEs, are mandatory reporters of child abuse. Child abuse pertains to individuals who are under the age of 18. This statement is to advise you that your disclosure of information about child abuse to the instructor may trigger my duty to report that information to the designated authorities.

Campus resources to support your learning

Tutoring and Academic Engagement Center: drop-in math and writing support in addition to tutoring, study skills support, and Class Encore. Located on the 4th Floor Knight Library (541) 346-3226, engage@uoregon.edu, https://engage.uoregon.edu/services/ **Counseling Center:** call anytime to speak with a therapist who can provide support and connect you with resources. Located on the 2nd Floor of the Health Center (541)346-3227

5

Accessible Education Center: UO is working to create inclusive learning environments. I believe strongly in creating inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your participation, please notify me as soon as possible. You are also encouraged to contact the Accessible Education Center. If you are not a student with a documented disability, but you would like for us to know about class issues that will impact your ability to learn, we encourage you to come visit during office hours so that we can strategize how you can get the most out of this course. Located on the 1st Floor of Oregon Hall (541) 346-1155, uoaec@uoregon.edu

Center for Multicultural Academic Excellence: CMAE's mission is to promote student retention and persistence for historically underrepresented and underserved populations. CMAE develops and implements programs and services that support retention, academic excellence, and success at the UO and beyond. Located on the 1st Floor of Oregon Hall (541) 346-3479, cmae@uoregon.edu

UO Access Shuttle is an on-campus ride service provided at no cost to students with conditions that limit mobility. More information and a sign-up form can be found on the parking & transportation department website: https://parking.uoregon.edu/content/access-shuttle.

Safe Ride is an assault prevention Safe Ride: shuttle that works to provide free, inclusive, and accessible alternatives to traveling alone at night for UO students, faculty, and staff. They are a schedule-ahead service and riders can (1) call once we open to schedule a ride with a dispatcher or (2) leave a voicemail on the day of their ride request. They do not call riders ahead of time to confirm due to capacity constraints, but riders are always welcome to call us to double-check that their ride was scheduled (541-346-7433 ext 2; pages.uoregon.edu/saferide) Operating hours: Summer term Sunday - Thursday | 9pm - midnight Friday + Saturday | 9pm - 2am

Tentative Schedule

"Of all fev	l the paths you take in life, make sure a v of them are dirt." — John Muir	
6/24	Lecture 1: Overview of course and P^{3} – Prairies, Plant diversity and Productivity	
6/25	Field trip to Willow Creek Nature Preserve (8 am - 6 pm)	7/9
6/26	Lab 1: Intro to R, Weigh and Analyze Productivity data (ANOVA)	7/10
	Due: Online reading quiz by 12:30 pm (25 pts) Schimel Chapters 2, 3 & 8; posted pdfs	7/15
7/1	Lecture 2: R^3 – Riparian, Riverine, and Reservoir ecosystems Form groups for independent projects	
	Due: Online reading quiz by 12:30 pm (25 pts) Schimel Chapters 4, 7 & 9; posted pdfs Field Report 1–Results only by 12:30 pm online (80 pts)	7/16 7/17
7/2	Field trip along the McKenzie River (7:30 am - 6 pm) We will be making several stops along the way and may have an opportunity to go out on the water (dress accordingly).	,
	Due : Data uploaded to shared google sheet by midnight.	7/18
7/3	Lab 2: Analyze stream and lake data (Regression)	
7/8	Lecture 3: C^{3-} Charleston Coastal Communities	
	Due : Each group should submit two potential	

research questions online for independent

project by 9 am (20 pts) Online reading quiz by 12:30 pm (25 pts) Schimel Chapters 5, 6, 10 & 11; posted pdfs

Field Report 2 – Question, hypothesis, results and discussion by 12:30 pm online (140 pts)

Field trip to Oregon Institute of Marine Biology, Charleston Oregon (6 am - 9 pm) Potential stop at Oregon Dunes Day Use Area depending on independent projects. Lunch provided at OIMB.

10 Lab 3: Analyze Independent Project Data; make plan for time to work on presentations and report

15 Lecture 4: F^{3-} Fir Forest Fundamentals and presentation planning

Due:

Online reading quiz by 12:30 pm (25 pts) Schimel Chapters 12, 14 & 16; posted pdfs Field Report 3 (one per group online) -Abstract through Discussion (160 pts)

- /16 Field trip to HJ Andrews Experimental Forest (8 am- 6 pm)
- 17 Lab 4: Group presentations on independent projects (100 pts)

Due:

Upload presentation slides by 12:30 pm Lab Notebooks in lab & iNaturalist observations (250 pts)

Due:

Concept Map online or hardcopy by 3 pm to the Biology office (50 pts). You may pickup your field journals at this time.