

ECOLOGY- BIOLOGY 370

FALL 2013

INSTRUCTOR

Dr. Laurel Pfeifer-Meister

Office: 394 Onyx Bridge

Office Hours: Wednesday 12- 2pm; or by appointment

Email: lpfeife1@uoregon.edu

Phone: 541-346-1549

Lecture: 9:00- 9:50am Monday/Wednesday/Friday, Room 221 McKenzie

Mandatory Field trips: **Willamette National Forest, Sat. Oct. 12**; Group A meet 7 am,

Group B meet 1 pm in Onyx Bridge Parking Lot

Oregon Coast, Sat. November 2; meet 7 am in Onyx Bridge Parking Lot

GRADUATE TEACHING FELLOWS

Tobias Policha

Email: tpolicha@uoregon.edu

Office Hour: Mon. 3-4 pm

Anya Hopple

Email: ahopple@uoregon.edu

Office Hour: Thurs. 1-2 pm

INSTRUCTIONAL MATERIALS

Smith and Smith. 2012 Elements of Ecology (including access code for ecologyplace.com) – required

iClickers – required

Primary literature, problem sets, and handouts will be posted on Blackboard as PDF files.

COURSE DESCRIPTION

This is an introductory course focusing on the scientific study of organisms' interactions with abiotic and biotic components of their environment. This course will include general principles of ecology and contemporary applications, as well as methods used in studying ecological interactions. A basic working knowledge of biology will be assumed. The prerequisite for this course is Biology 213/254 or equivalent.

LEARNING OUTCOMES:

Upon successful completion of Biology 370, a student will be able to:

1. Survey key principles of organisms' interactions with abiotic and biotic components of ecosystems.
2. Understand techniques used in studying plant and animal species, communities, and ecological interactions.
3. Apply quantitative reasoning and analysis to biological science problems.
4. Read and critically evaluate primary literature in the field of ecology.
5. Ask questions, test hypotheses, and write reports in the format of a scientific journal.

METHODS OF INSTRUCTION

This course will use lecture periods to (1) introduce students to topics via traditional classroom lectures and (2) discuss key principles of ecology via group activities and student-led discussions of primary scientific literature. All students will be expected to read the assigned material and to participate actively in these discussions. We will rely heavily on information in journal articles for class discussions, but knowledge of underlying principles will be required and evaluated.

EXAMS

Two exams will be given during the semester; one midterm exam and a final exam. The final exam is comprehensive but will emphasize materials since the midterm. Make-up exams will be given for extreme cases only, with written documentation of the reason the exam was missed.

GROUP-LED DISCUSSIONS

During group discussions of the primary literature, all students will be graded on their participation in the discussion of the paper.

PRIMARY LITERATURE ASSIGNMENTS

The student is to complete a written assignment for each paper we will read and discuss in class. See Page 6 (also posted on Blackboard) for the assignment. The assignments are not to be handwritten. This is to encourage students to read the papers and prepare for discussion before coming to class.

PROBLEM SETS

The student is to complete four problem sets assigned throughout the term. Assignments will be posted to Blackboard.

FIELD REPORTS

A major goal of this course is to give students valuable experience conducting scientific research, from collection of data to analysis to a final written report of findings. For this reason, field reports will contribute ~1/3 to your final grade. See page 7 for instructions on writing field reports (also posted on Blackboard).

ATTENDANCE

Attendance is mandatory. When conflicts or absences can be anticipated, such as University sponsored activities and religious observances, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency absences where advance notification to the instructor is not possible, the student should contact the instructor as soon as possible by e-mail or phone. Each student is responsible for class-related work missed as a result of an unavoidable absence; this work may be made up at the discretion of the instructor. Attendance during lecture will be

monitored periodically and will constitute 20 points towards the course grade. Attendance will be taken at the beginning of class using iClickers.

IClickERS

Similar to the Intro Bio series, iClickers will be used in almost every class. iClickers encourage participation and provide immediate feedback for everyone. Each student is expected to purchase an iClicker for use in this class. You will need to register your clicker on the course blackboard site. If you've already registered your clicker *this term*, for another class, then you don't need to register it again. Questions during lecture that require clickers will be multiple choice. iClickers contribute participation points to the final grade.

LATE ASSIGNMENTS

Late assignments will not be accepted, except under extreme circumstances.

ACADEMIC INTEGRITY POLICY

"Learning is a process defined by the exchange of ideas and the advancement of knowledge. As such, learning entails a community of scholars united by their participation in, and commitment to, intellectual exchange. The University is, first and foremost such a community. Learning also involves reflecting on decisions and improving decision-making in the future. By establishing the standards of this community, the Student Conduct Code serves not just as a disciplinary system, but also as a part of the educational system. Hence, a corollary mission of the Student Conduct Code is to teach students to live and act responsibly in a community setting, with respect for the rights of other students and members of that community, and for the property, common resources, code of conduct, and laws associated with that community, and to encourage the development of good decision-making and personal integrity. Students are simultaneously members of the University community and the broader community (e.g. city, state, nation, and world). The Student Conduct Code, and the processes of its administration and enforcement, is directed specifically toward maintaining the standards of the University community. Within its jurisdiction the University may impose disciplinary sanctions against students or student organizations when their conduct materially interferes with the educational objectives of the University or university community member (University Student Conduct Code)".

Please refer to Student Conduct Code for more information: <http://uodos.uoregon.edu/>

UNIVERSITY OF OREGON'S ACCESSIBLE EDUCATION CENTER

At this University we do our best to facilitate and support accessible education. If you have special needs, such as test accommodations, note-taking, and sign language interpretation, please contact the Accessible Education Center (AEC) so that their personnel and I can work together to help you learn comfortably in this class. The AEC office is located in 164 Oregon Hall. Telephone 541 346-1155. On the web: <http://aec.uoregon.edu/index.html> E-mail: uoaec@uoregon.edu

FIELD TRIPS

Field trips will be a combination of natural history and data collection. Please dress appropriately for field trips as we might get muddy, encounter difficult terrain, or spiny plants. In the field, you will need:

- Closed-toed shoes (e.g., hiking boots, sneakers)
- Long pants and long sleeve shirt or jacket (we will be walking through brush that can scratch arms and legs). Layers are recommended.
- Drinking water and snacks
- A field notebook (Rite-in-Rain recommended)
- Sunscreen is recommended.
- Expect a variety of weather conditions.

GRADE COMPOSITION

FINAL GRADE DETERMINATION

Written paper summaries – 60 points (20 points each)

A = > 92.5%, A- = 89.5 – 92.5%

Participation in group-led discussion – 15 points (5 points each)

B+ = 87.0 – 89.5%

Field Trip Reports – 140 points (70 points each)

B = 83.0 – 87.0%

Problem sets – 60 points (15 points each)

B- = 79.5 – 83.0%

Attendance/ iClicker questions – 25 points

C+ = 77.0 – 79.5%

Midterm exam – 100 points

C = 73.0 – 77%

Final exam – 100 points

C- = 69.5 – 73.0%

Total – 500 points

D = 59.5 – 69.5%, F = < 59.5%

TENTATIVE SCHEDULE*

Date	Topic	Book Chapters	Assignments due
The Physiological Environment, Adaptation, and Physiological Ecology			
Sep 30	Introduction to ecology; Climate	1,2	
Oct 2	Climate; Aquatic environments	2,3	
Oct 4	Terrestrial environments	4	Problem Set 1
Oct 7	Natural Selection and Adaptation	5	
Oct 9	Plant and animal adaptation	6,7	
Oct 11	Adaption cont.; DISCUSSION-PAPER 1		Paper Summary 1
Oct 12	FIELD TRIP to Willamette National Forest		

Date	Topic	Book Chapters	Assignments due
Population Ecology/Interactions			
Oct 14	Field report guidelines; Life history	10	
Oct 16	Population growth	9,11	
Oct 18	In Class Activity: Lichen Demography meet at Pioneer Cemetery		
Oct 21	Species interactions, competition	13,14	Field Report 1
Oct 23	Invasive species		
Oct 25	Predation; DISCUSSION-PAPER 2	15	Paper Summary 2
Oct 28	Predation, mutualism	15,16	
Oct 30	MIDTERM EXAM	1-7,9-11,13-16	
Community/Ecosystem Ecology			
Nov 1	Community structure	17,18	Problem Set 2
Nov 2	FIELD TRIP to Oregon Coast		
Nov 4	Community struct.; Field report discussion		
Nov 6	Succession and disturbance	19	
Nov 8	Succession and disturbance		Problem Set 3
Nov 11	In class activity		
Nov 13	Production		Field Report 2
Nov 15	Decomposition	21,22	
Nov 18	Biogeochemistry	23	
Integrating Across Scales			
Nov 20	Biodiversity and conservation	27,29	
Nov 22	Biodiversity and conservation		Problem Set 4
Nov 25	Human ecology, Ecosystem services	28	
Nov 27	DISCUSSION-PAPER 3		Paper summary 3
Nov 29	THANKSGIVING VACATION-NO CLASS		
Dec 2	Global change	30	
Dec 4	Global change		
Dec 6	Final Review		
Wed., Dec 11	FINAL EXAM, 10:15 AM		Cumulative exam

***This is a tentative schedule and will be adapted as necessary; FIELD TRIPS, MIDTERM and FINAL dates will not change.**

PRIMARY LITERATURE ASSIGNMENT

Introduction	Points
1. What is the topic of the paper?	1
2. In light of previously published work, what knowledge gap does this current paper fill?	2
3. What are the objectives and/or hypotheses of the paper?	2
Methods	
4. What did the researchers measure? For example, what are the dependent and independent variables?	2
5. How were the data analyzed? For example, did the researchers use statistics or compare a treatment to a control?	2
Results	
6. Provide a clear and accurate summary of the major findings.	2
7. Did the findings support or refute the hypothesis? If the paper describes an observational study, did the study achieve the stated objective?	2
Discussion	
8. What was the study's impact? Discuss the overall significance of the research.	2
9. Identify the study's weaknesses or limitations.	2
10. If applicable, what future studies should be conducted based on the present findings?	2
11. Provide one question about the paper. This could be a question to help clarify a part of the paper you did not understand (e.g., terminology, methods), or a question about the context or implications of the study.	1
Total points	20

GUIDELINES FOR WRITING FIELD REPORTS

It is important that you write well, both as citizens and as scientists. For this reason field trip reports are a large part of your grade (28%). Please read this entire write-up before writing your first report, and refer to it for other reports.

The reports should be a maximum of five pages (four is better, if possible). Most of the length of your reports will be the results and discussion sections. The report should include a brief 1-2 paragraph introduction (the purpose of the study and hypotheses to be tested), a paragraph of methods, the results (details of expectations will be posted on Blackboard after each field trip), a discussion, and references. Most of the work in the reports will be yours, but if you draw upon the work of others, be sure to reference them with an in text citation (e.g., Parsons et al. 2012) and at the end of the paper use the format for the references from the journal *Ecology*:

Pearson, D. E., Y. K. Ortega, and S. J. Sears. 2012. Darwin's naturalization hypothesis up-close: Intermountain grassland invaders differ morphologically and phenologically from native community dominants. *Biological Invasions* 14:901-913.

Some time ago, when Bill Bradshaw taught Ecology 370, he asked his teaching assistants to come up with helpful comments for students based on their experience of grading reports. Bitty Roy and I have edited their anonymous comments and added to them. Please read through this each time you prepare a report. It will aid in organizing you thoughts and help your grade.

SOME GENERAL STYLE GUIDELINES

- All reports must be internally consistent: conclusions must come from the results that you state, the results must be the product of your stated materials and methods, and the introduction should present your hypothesis in a way that shows the relevance of your study to the field of ecology.
- Your report must be typed (figures should be in computer graphics; Excel graphics are fine).
- Spelling and grammar, in addition to format, count in your grade.
- When putting your paper together, watch for these common errors:
 1. The word "data" is plural (sing. datum). "This data is meaningless" is therefore incorrect. It should read, "These data are meaningless".
 2. Know when to use the word "less" and the word "fewer".
 3. Make sure your verbs and subjects agree in your sentences.
 4. The word "comparison" and "correlation" are often confused. Make sure that you are aware of the difference in meaning of these words.
 5. Places where we collect data are SITES, not SIGHTS, and a habitat that receives little rainfall is DRIER, not DRYER, than one that is very wet.
 6. Remember that when you type a scientific name for an organism, it should be in italics font, with the genus capitalized and the species in lower case (e.g., *Pinus contorta* for coast pine).

7. i.e. and e.g. are always followed by a comma when used in a sentence. To understand why, remember that "for example" is followed by a comma. "For example, there were fifteen trees per quadrat."

- The text of your paper, which describes what you did, should be in the past tense. It's not what you will do, but what you did.
- Avoid using passive voice by being direct in your writing. Use "we found" instead of "the research found". You did the work!
- If you use terms that may be unfamiliar to people outside our class (e.g., adiabatic cooling) include a brief, clear definition.

INTRODUCTION

- In your Introduction, make sure you answer such fundamental questions, such as: Why were you sampling lichens? Why is it reasonable to assume that size should be correlated with fitness? Your Introduction should answer these questions by presenting the purpose of your study in the context of the ecological background you introduce. You should explain WHY you did your study. In other words, introduce ecological theory relevant to your experiment, and then be sure to introduce YOUR experiment (including the hypotheses to be tested).
- The introduction to your paper must include background information that indicates why your study is relevant to the field of ecology. This part of the paper is the place to include an introduction to any theories that are germane to the questions being asked.
- The background information should enable the reader to understand why your question (that you were trying to answer by doing your experiment) is interesting and important, given the current state of knowledge in the relevant area (e.g., how successional theory applies to dune communities). It should also help the reader to understand the meaning of your results, and why you drew the conclusions you did, when you present these things later in your paper.
- The Introduction section can be distinguished from Discussion in that it is more general in terms of the biological information presented, and serves to set the overlying theme of your paper such that anyone reading it can understand the specifics that you emphasize in the Discussion in light of your Introduction.

MATERIALS AND METHODS

- The materials and methods section must include enough information so that another person could duplicate your field study and analysis. You must be specific about such details as site, sampling procedures, and criteria used to include specimens.
- Make sure that you make some initial statement about what you were trying to sample, e.g., "We sampled tree density and diversity at seven sites." Do not jump right into a discussion of how

randomization was achieved. Simply state that x was randomized. Also don't include irrelevant details, such as how you copied over your data sheet. You must also include a description of the methods you used to analyze your data (including statistics). Explain the approaches used in the data and statistical analyses. Also tell me how the measurements you took in the field corresponded to estimates of density, diversity, equitability, etc. A sure sign of a complete Materials and Methods is that anyone could repeat your study just by reading this section.

RESULTS

- The results section must include the results of statistical analyses that are relevant to your conclusion and must not include irrelevant data and analyses. State your probability levels and the results of statistical tests. This section is the place to be specific about your hypotheses.
- If you choose to examine less than the entire database, establish your reasons for your choice ahead of time. Don't examine the data for statistical significance and delete the non-significant data.
- Minimize redundancy.
- Do not simply refer to a figure or a table (e.g. "Table 1 shows the elevation and tree species for all 7 sites". Highlight those aspects of the figure or table that you will discuss in the aptly named Discussion (e.g., "*Juniperus occidentalis* is only found at sites 1, 2, and 3 (Table 1)".).
- Do not interpret your results here-- state them (**in words**). If you did a regression analysis, report the outcome--positive correlation? Negative correlation? Significance? Use a combination of words and numbers (e.g., $t = 4.38$, $df = 5$, $P < 0.05$). Refer to the appropriate figure. Do not include pages of calculations either.
- You shouldn't *discuss* any non-significant patterns, but you should mention non-significant results. For example, "We found no significant correlation between density and rainfall ($t = 1.23$, $df = 5$, $P > 0.05$)."
And don't put in irrelevant figures, no matter how fascinating they may be.

• Tables and Figures

Tables have titles that go at the top and figures have legends that go at the bottom. Like your Results, your figures and tables should be understandable in isolation through their associated legend.

DISCUSSION

- The main purpose of the Discussion is to interpret the results and explain how they relate to the background provided in your Introduction and to the purpose of the study. The Discussion should briefly summarize results (and state whether or not your data supported or refuted the null hypotheses) and then put them in the context of ecological theory. This is where you answer the questions posed in the Introduction, and give the answer some meaning.

Some small amount of redundancy with Results is not a big problem, and can serve to stress key points. The bulk of this section, however, should be interpretation of these points. You must discuss the ecological implications of your statistical results. This is not easy, but it is necessary for a good paper. You should try and suggest plausible ecological reasons for the observed patterns and cite literature to support your reasoning. We went into the woods hoping to detect some ecological patterns, not significant statistics. The statistics are merely a tool with which we can get an idea of the “strength” of the patterns in question.

- The discussion section is a discussion of the results you provided in the results section. This is not the place for introductory theory; however, it is the proper place for your conclusions.
- DON'T fall back on “insufficient” information as a means of rationalizing your lack of Discussion. If you weren't going to even speculate on the meaning of your Results (which is fine to do as long as you state that this is actually what you're doing), you wouldn't be writing the paper to begin with. I understand the frustration involved in feeling like you're making generalizations or uninformed conclusions, but remember that all Ecological studies start with ignorance, questions and pilot experiments, and build from there.

REFERENCES

- It is considered plagiarism if you do not give a citation every time you present factual information that is not derived from your data or personal observations. We take this very seriously at the UO. Also, it's rarely desirable to include long quotations from a source in your paper. Usually, stating the ideas in your own words and then citing the source is better. Use quotations only when the exact wording in the reference is critical to the point you are trying to make.
- You are expected to fully adhere to paper format in the journal, *Ecology* <http://esapubs.org/esapubs/preparation.htm#Lit> There is other good advice in their style manual, for example, the information under "Statistical analysis and data presentation".
- Do not cite any source in the body of your paper that is not listed in the references.