

## BIOLOGY 354L

### EXPERIMENTAL ECOLOGY

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Meeting time: Wednesday 1:00-4:40pm  
Meeting place: LSN 235 or the specified field location  
Instructor: Bree Putman  
Office: PS 253  
Email: [putman.bree@gmail.com](mailto:putman.bree@gmail.com)  
Office Hours: by appointment only

**Course Description:** This course is meant as an introduction to research and analysis methodology in ecology. As such, it is intended that students become familiar with research design, implementation, and analysis as applied to field ecology.

**Course Objectives:** Students will:

- Gain exposure to several aspects of ecological research
- Learn to pose research questions
- Learn to design & implement studies to answer research questions
- Gain experience reading, analyzing and discussing primary scientific literature
- Practice analyzing and interpreting data
- Practice writing in the formal scientific format (intended for academics) and in an easy-to-understand format (intended for broad public audiences)

**Prerequisites:** Biology 354 or a similar course in ecological theory and principles **must** be taken prior or concurrently. Biology 215 or a similar course in statistical analytical techniques is **required**. Students who have not had these courses will find themselves at severe disadvantage.

**Readings:** Required readings from the primary literature will be posted on Blackboard or handed out in class. Articles should be read prior to the relevant class session.

**Recommended Book:** How to do Ecology: A Concise Handbook by Richard Karban and Mikaela Huntzinger, Princeton University Press, Princeton, NJ. 2006. A small but comprehensive primer on the fundamentals of ecological theory and practice, well written and largely free of jargon.

**Attendance:** Attendance is encouraged for all lectures and field trips, and is accounted for in the lab report grades and in-class assignments. Points will not be subtracted when absences occur under extreme or important circumstances. Should the instructor request it, appropriate documentation explaining an absence will need to be provided to the instructor in a timely fashion. Classes **will** run for the entire class period; students should not schedule appointments during this time. In the case of conflicts between the course and events such as official university events (e.g. university sports), professional travel, or religious observances, the student must notify the instructor at the beginning of the semester or no less than two weeks prior to the conflicting dates, and receive the instructor's approval to be excused. Students may be required to make up absences with alternative assignments. Unexcused absences, tardiness, and early departures from class will result in a reduction of points.

**Participation:** Students are expected to participate in both the field studies and classroom discussions. Field participation primarily includes active involvement in data collection activities. Classroom participation primarily includes involvement in discussions (e.g., offering opinions and asking questions), input into data analyses and interpretation.

**Field Trips:** We will spend a considerable amount of time outside at field sites. On these days, we typically meet at the locations specified on the course schedule (unless stated otherwise). Students are responsible for arranging their own transportation to and from the field sites. All students are also required to sign a waiver prior to going into the field. Should any injuries occur during a field trip, the student should immediately notify the instructor as soon as possible.

Students must dress appropriately for the field. Students should wear clothing they do not mind getting dirty. For field trips to the sea shore, students should be prepared to wade knee-deep in the water and walk on wet, potentially slippery terrain. Students should always dress appropriately for the weather on the day of field trips. Bad weather will NOT cancel field trips, only in extreme circumstances. **Students should wear sunscreen and bring water, writing materials, and the appropriate lab handout to the field site.**

**Lab Reports:** After each field study, students are expected to complete a written assignment reporting on the study and its findings – they will fill out the **Lab Report Outline** provided to them by the instructor. *The writing style in the outline should be modeled after the literature read in class (i.e., the formal scientific style).* Students are encouraged to work together on fieldwork, statistical analyses, and the interpretation of data, but lab reports must be written and submitted individually. It is strongly recommended that students read the **Manuscript Guidelines** and **Lab Report Rubric** as these describe the expectations upon which the reports are graded. All reports should be submitted to the instructor electronically, via TurnItIn on Blackboard, in an editable MS Word-compatible file type that retains formatting (e.g., .doc, .rtf).

**Independent Project:** Students will be responsible for designing, implementing, and analyzing their own ecological study. At the end of the semester, students will provide the instructor a research manuscript, and will present their research to the class. Students are expected to work either alone or in groups of 2-3 on the project. Each group will collaborate on a research proposal, a research manuscript, a public outreach project related to their study, and an academic-style presentation. Independent projects and outreach plans must be approved by the instructor prior to initiation.

**Quizzes:** Students will be given 3 quizzes over the course of the semester. These quizzes will occur after data collection and analyses of each study and will test the students' knowledge on the methods used in the study along with subject matter learned from in-class lectures.

**Make-up work and late assignments:** Make-up work will only be permitted in the case of an excused absence or extreme extenuating circumstances, subject to approval by the instructor. **Late work will lose 10% for each day it is past due, and will not be accepted more than three days past the date due.**

**Academic Integrity:** Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. Misconduct can result in debarment from performing research at any accredited institution, the denial from applying for federal research funding, and in extreme cases, imprisonment.

- **Fabrication** is making up data or results and recording or reporting them.
- **Falsification** is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented.
- **Plagiarism** is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.
- Research misconduct does **not** include honest error or differences of opinion.

Just as all scientists are subject to a law of research ethics, students in this class will not be permitted to perform research misconduct. In particular, **plagiarism is not acceptable**. Students caught performing misconduct will be reported to the Biology department and to the university Center for Student Rights and Responsibilities. Depending on the severity and at the discretion of the instructor, students may receive zero points for the assignment, a grade reduction, or receive a failing grade in the class.

For more information on academic integrity and plagiarism, see:

2013-2014 General Catalog: [http://arweb.sdsu.edu/es/catalog/2013-14/466-480 U Policies.pdf](http://arweb.sdsu.edu/es/catalog/2013-14/466-480%20Policies.pdf)

Center for Student Rights and Responsibilities: <http://csrr.sdsu.edu/conduct1.html>

SDSU Library Online Plagiarism tutorial: <http://infotutor.sdsu.edu/plagiarism/index.cfm>

Instructional Technology Services: <http://its.sdsu.edu/tech/plagiarism.html>

**Grading:** Grades will be based on the assignments detailed below. Students will be provided with guidelines for each assignment. Most assignments will be returned to the student after grading. Should the student request a reconsideration of a grade on any assignment, they will be responsible for returning the original assignment to the instructor.

ASSIGNMENT	Points	Percent
Lab reports (3, 55 points each)	165	37%
Quizzes (3, 15 points each)	45	10%
In-class exercises	20	4%
Independent project (220 pts)		
Project proposal	55	12%
• Class presentation (40)		
• Amendments to proposal (10)		
• Data collection spreadsheet (5)		
Research design & implementation	5	1%
Public outreach	40	9%
• Securing an outreach plan (5)		
• Rough draft (15)		
• Final draft (20)		
Presentation	20	4%
Manuscript	100	22%
<b>TOTAL:</b>	<b>450</b>	<b>100%</b>

**Grades will be assigned using the following scheme:**

93%	-	100%	A
90%	-	92.9%	A-
87%	-	89.9%	B+
83%	-	86.9%	B
80%	-	82.9%	B-
77%	-	79.9%	C+
73%	-	76.9%	C
70%	-	72.9%	C-
etc.			

The grade distribution may be curved and/or scaled at the discretion of the instructor. Grades are non-negotiable unless the student provides the instructor with evidence of mis-grading (mistakes made by the instructor).

**Help:** If you are having trouble in the course please see the instructor as soon as possible. Make an appointment or attend office hours! – these are provided for you to ask questions. The Biology Department Advising Office also offers help with improving academic skills.

**Disclaimers:** *The instructor reserves the right to make modifications to this syllabus and schedule during the course of the class should the need arise. Should this occur, the students will be responsible for the changes only after an announcement of the changes has been made. Neither the University nor its employees are responsible for any injuries that occur while participating in activities for this class.*

## CLASS SCHEDULE

Date	Class Agenda	Assignments
27-Aug	Introductions, Class Logistics <b>Lecture:</b> Picking and Posing Research Questions, Types of Hypotheses, Ways to Do Ecology	
3-Sep	<b>Lecture:</b> Communicating Research Prepare for next study	<b>Read:</b> How to Do Ecology pg. 88-104, Sousa 1979 abstract only
10-Sep	<b>No Class</b>	<b>FIELD: Cabrillo N. M. Tidepools is Sunday the 7<sup>th</sup></b>
17-Sep	Discussion and analysis of tidepool data, <b>Lecture:</b> Public Outreach and Science	<b>Read:</b> Wilkins 2008
24-Sep	<b>FIELD: Mark and Recapture I (SDSU)</b>	<b>Read:</b> Jamieson et al. 2000 <b>Quiz 1</b>
1-Oct	<b>Lecture:</b> Oral Presentations and Proposals <b>FIELD: Mark- Recapture II (SDSU)</b>	<b>Must Have Partner(s) for Group Project By This Date</b> <b>Tidepool Report Due</b>
8-Oct	Discussion and analysis of mark-recap data, work on research proposals in class	<b>Read:</b> How to Do Ecology pg. 120-129
15-Oct	<b>Student Research Proposals</b>	<b>Student Research Proposal Due</b>
22-Oct	Prepare for next study	<b>Read:</b> Stankowich and Blumstein 2005 <b>Amendments to Proposal Due</b> <b>Quiz 2</b>
29-Oct	<b>FIELD: Bird FID (Morley Field)</b>	<b>Mark-Recap Report Due</b>
5-Nov	Discussion and analysis of FID data	
12-Nov	Work on outreach project	<b>Outreach Project Rough Draft Due</b> <b>Quiz 3</b>
19-Nov	Independent Projects (in class analyses)	<b>FID Report Due</b>
26-Nov	<b>No Class – Thanksgiving (woo!)</b>	
3-Dec	Independent Projects (in class analyses)	
10-Dec	<b>Class Presentations</b>	<b>Final Presentation Due</b> <b>Outreach Project Final Draft Due</b>
17-Dec	<b>No Class – Finals Week</b>	<b>Research Manuscript Due</b>