
MARINE ECOLOGY (BIOL 517) - SPRING 2009 - SYLLABUS

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Class schedule: *Lectures:* Monday and Wednesday, 1:00 – 2:00 PM (LS 343)
Lab: Monday and Wednesday 2:00 PM – 4:40 PM (LS 343 and other locations)

Required text: Marine Biology: Function, Biodiversity, Ecology, 3rd ed., by J.S. Levinton. Oxford University Press, New York

Course overview

Ecology can be defined as *the scientific study of the interactions that determine the distribution and abundance of organisms*. In marine ecology, we will learn about the interactions that occur among marine organisms and their surrounding biotic and abiotic features. The oceans contain an incredible diversity of life, but also a high diversity of habitats and ecosystems in which organisms interact. Therefore we will begin the course with an introduction to the oceans and the types of organisms that live there. We then will focus on the evolutionary characteristics that have developed among oceanic organisms – that is, their particular lifestyles – and we will take a close look at open populations, in which organisms have separate larval, juvenile and adult stages. The middle of the course focuses on the basic ecological processes, such as predation and competition, that structure communities within various habitats. Finally, we will learn about the special problems that confront marine organisms through the actions of people. Humans introduce alien species, destroy habitats, remove organisms from the water, and change the climate through their actions. We will discuss the impacts that people have on ecological processes in the sea, and what we can do to prevent marine extinctions.

Our survey of the oceans will take us from the intertidal zone to the deep sea, from coral reefs to seagrass beds, and to many other fascinating habitats. You will learn about adaptations of many kinds of organisms, from vertebrates to invertebrates to plants and algae. However, only half of the course involves learning about marine ecology in lecture; the other half involves learning how to *do* marine ecology. You will work in groups to complete a marine ecological study. This project will involve background research (reading), visits to the shore to conduct sampling and experiments, computer analysis of the results (statistics and graphing), and reporting your results and conclusions to the group. These are the basic steps in marine ecological research; thus, **the course focuses on learning about marine organisms and habitats as well as learning how to scientifically answer ecological questions about these organisms and habitats**

Learning objectives for Marine Ecology

After completing this course, you should be able to:

- list the major marine phyla and the major habitats present in the oceans;
- describe several major ecological processes that influence marine population dynamics and marine community structure;
- list several metrics that can be used to describe populations and communities in nature;
- describe laboratory techniques for quantifying characteristics of ocean water and sediments, and field sampling techniques for planktonic and benthic habitats;
- describe several threats to oceanic biodiversity, and what can be done to ameliorate these threats;
- organize, statistically analyze, and interpret field data and summarize your interpretations in written form.

What is expected of you

The primary rule of this class is to be on time and come prepared. This means reading the assigned readings *before* coming to class and being prepared to ask questions. Asking questions always makes a good impression – it shows that you are interested and paying attention. Being prepared also means being on time for field trips and being ready for all kinds of conditions when we are scheduled to go into the field. This course requires you to take personal responsibility for completing assignments outside of the classroom. There will be several occasions during the semester in which you won't be supervised, but you still will be expected to complete assigned tasks. Don't blow it off; you'll wind up in trouble, trust me!

Grading

Your grade will be based on the percentage of total points earned on the exams, quizzes, and other assignments as indicated below. GRADING IS NOT DONE ON A CURVE.

A = 90-100%	2 lecture exams, 100 pts each.....	200
B = 80-89%	3 quizzes, 25 pts each	75
C = 70-79%	5 lab homeworks, 25 pts each.....	125
D = 60-69%	5 labs, 10 pts each.....	50
F = < 60%	Seminar summary.....	15
	Final exam.....	150
	Manuscript.....	150
	TOTAL.....	765

Lecture exams will cover lecture material and readings from the textbook. The focus will be on short answer questions as well as a few essay questions.

Quizzes will be given at the beginning of class on 3 dates. They will cover recently covered lecture material.

Lab homeworks will require completing part of the assignment in the laboratory and summarizing your findings for the homework assignment. These usually will be due one week after the lab occurs (actual due date given during the lab).

Labs that do not involve homework are completed within the laboratory period. They are worth 10 points. They will consist of some short answer questions based on the assigned lab activity.

The seminar summary is a one-page summary of one of the semester's marine-oriented Ecology and Evolutionary Biology seminars. The seminars run from 4 to 5 PM on Mondays.

The final exam will primarily cover the lecture material covered after the second lecture exam, but will also include some of the important concepts covered throughout the semester, both in lecture and in lab.

The manuscript is a final report that describes the results of the group project. Even though the class project is performed as a group, every person in class is responsible for an original and unique manuscript. It should be written as if it is being submitted to a scientific journal. For more information, see the section of this manual entitled "writing a manuscript". Note that failing to submit a manuscript by the deadline will result in failure of the course.

Important notes about conduct in class

Exams: You are expected to take the exams during the regularly scheduled times. There is a no make-up policy for this class; no missed lecture exams or quizzes can be made up at a later time. If a lecture exam is missed, and the student has provided prior notification and a valid medical excuse, the score for the missing exam will be the average of the other lecture exam and the final. If you are absent during an exam period with no prior notification, I reserve the right to give you no credit for the exam. Finally, if you wish to dispute an exam grade, it must be done within one week after you receive your grade.

Assignments: I reserve the right to give you no credit for an assignment if it is handed in late, depending on the circumstances. If I allow you to hand in a late assignment, no less than 5 points will be deducted per day (actual amount will depend on the assignment).

Lateness: Walking into class late is disruptive and disrespectful to me and to the class. I recognize that on rare occasions, circumstances beyond your control can make you late for class. However chronic lateness is inexcusable. After your second lateness I will begin deducting points from your grade.

Academic dishonesty: Cheating has rarely been a problem in Biol 517, and warning you about the consequences may seem unnecessary. Nevertheless, to avoid any possibility of you not recognizing what the consequences are, this is my policy: If you are caught cheating in an exam or on an assignment, you will receive a zero on the exam or assignment. In addition, the event will be reported to campus judicial authorities and may lead additional actions from the University. The consequences can include failing the class to being expelled from the university. *Plagiarism is a form of cheating:* for written assignments, your writing must be your own words. Information on how to avoid plagiarism is on page 11 of this manual and also is available at: <http://science.widener.edu/svb/essay/plagiar.html>. Note that faculty members are *required* to report suspected plagiarism to the SDSU administration.

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Lecture schedule

Week	Date	Topic	Reading
1	Jan 22	Classes begin	NA
2	Jan 26 Jan 28	Introduction; The oceanic environment I The oceanic environment II	13-15, 17-26 L 26-43
3	Feb 2 Feb 4	Plankton: taxa and their distribution <i>No lecture (field sampling)</i>	167-178
4	Feb 9 Feb 11	<i>No lecture (field sampling)</i> Plankton: productivity and grazing	225-243
5	Feb 16 Feb 18	Plankton: productivity and grazing II Life history strategies	243-253 123-141
6	Feb 23 Feb 25	<i>No lecture (field sampling)</i> <i>No lecture (field sampling)</i>	
7	Mar 2 Mar 4	Larval ecology Biogeography	141-160 67-68, 492-510
8	Mar 9 Mar 11	Physiological ecology EXAM I	85-103
9	Mar 16 Mar 18	Competition Predation	69-72, 363-369 48-53, 363-369
10	Mar 23 Mar 25	Population regulation Supply-side ecology	Paper 1
11	Mar 30 Apr 1	<i>Spring break – no class</i> <i>Spring break – no class</i>	
12	Apr 6 Apr 8	Disturbance Habitat structure	369-373 413-418, 422-432
13	Apr 13 Apr 15	Coral reefs Nekton	432-455 187-198, 201-204, 206-207

14	Apr 20 Apr 22	EXAM II <i>No lecture (field sampling)</i>	
15	Apr 27 Apr 29	The deep sea Large-scale ecology	463-477
16	May 4 May 6	Conservation: biodiversity & invasions Conservation: overexploitation I	510-522 537-543, 549-551
17	May 11 May 13	Conservation: overexploitation II Conservation: toxic substances	570-581

FINAL EXAM: Wednesday, May 20th, 1 – 3 PM in LS 343

All reading assignments from Levinton's Marine Biology, 3rd edition (our textbook for the course) unless otherwise noted.

Paper 1:

Anderson, T. 2001. Predator responses, prey refuges, and density-dependent mortality of a marine fish. *Ecology* 82:245-257.

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Lab schedule			
Week	Date	Topic	Assignment
1	Jan 22	Classes begin	NA
2	Jan 26 Jan 28	No lab; lecture 1 Introduction to experimental design (L)	NA Lab 1, text pgs 9-13,
3	Feb 2 Feb 4	Statistics I (L) Planktonic sampling methods (F)	Lab 2 Lab 4
4	Feb 9 Feb 11	Deploy recruitment & predation plots (F) Statistics II (LS 126)	Lab 13 Lab 3
5	Feb 16 Feb 18	Sample processing: nutrients (L) Sample processing: chlorophyll (L)	Lab 5 Lab 7
6	Feb 23 Feb 25	Rocky intertidal sampling methods (F) Mission Bay: recover predation plots (F)	Lab 6, part A Lab 13
7	Mar 2 Mar 4	Rocky intertidal data analysis (LS 126) Sample processing – zooplankton (L)	Lab 6, part B Lab 8
8	Mar 9 Mar 11	Mission Bay: recover recruitment plots (F) Process Mission Bay core samples (L)	Lab 13 Lab 9
9	Mar 16 Mar 18	Ecobeaker – predator avoidance (LS 126) Mussel data analysis: predation (LS 126)	Ecobeaker manual Lab 13
10	Mar 23 Mar 25	Mussel data analysis: recruitment (LS 126) Writing & oral skills lab (L)	Lab 13 Lab 11
11	Mar 30 Apr 1	<i>Spring break – no class</i> <i>Spring break – no class</i>	
12	Apr 6 Apr 8	Ecobeaker: go fish (LS 126) Functional response (L)	Ecobeaker manual Lab 12
13	Apr 13 Apr 15	Mussel data analysis (LS 126) Mussel data analysis (LS 126)	Lab 13 Lab 13
14	Apr 20	No lab (lecture exam)	

	Apr 22	Intermediate disturbance (F)	Lab 10, part A
15	Apr 27 Apr 29	Data analysis – Intermed. Dist. (LS 126) Manuscript write-up	Lab 10, part B
16	May 4 May 6	Class discussion: conservation (L) Manuscript write-up	
17	May 11 May 13	Class discussion: conservation (L) MANUSCRIPTS DUE	
