

Marine Ecology
BIOL 529, 529L, 592I
Spring 2010

Lecture: Tuesday & Thursday 1:00-1:50 pm Magnolia Hall 4109
Lab/Field: Tuesday & Thursday 2:00-4:50 pm Magnolia Hall 4109 & Field Sites

Instructor: **Dr. Mark Steele** Office Hours: Tue & Thur 11:00-12:00
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Course website: www.csun.edu/~msteele/classes/marine_ecology/Marine_Ecology.htm

Required Books:

Seashore Life of Southern California. Sam Hinton 1988. University of California Press. ISBN 978-0-520-05924-5

A student handbook for writing in biology. K. Knisely 2005. Sinauer Associates. ISBN 0-7167-6709-0

The elements of style. W. Strunk and E.B. White. ISBN 0-205-30902-X

Other Required Reading: Electronic files (pdf) of *research papers* will be provided on the course website

Supplemental Texts (optional, but very helpful):

Marine Community Ecology, by M. Bertness, S. Gaines, & M. Hay 2001.

Ecology: the experimental analysis of distribution and abundance. C.J Krebs 2001.

Course Objectives: This course is intended to provide you with a general understanding of the ecological processes that determine the structure and dynamics of populations and communities in marine ecosystems; and to teach you how to conduct ecological research to reveal such processes. When you leave this course, you should (1) have a broad understanding of marine ecology; and you should know how to (2) look for, identify, and describe patterns in nature; (3) develop testable hypotheses of the causes of observed patterns; and (4) design and carry out empirical tests of the predictions of hypotheses to explain observed patterns.

Course Overview: This course will combine a series of lectures with extensive hands-on fieldwork to teach you about marine ecology. My intention is to involve you as an active participant – in lectures and field and lab studies – because doing something is the best way to learn it. The three portions of the course (lecture, lab, and field) are integrated and you must take them all this semester. You will receive the same grade

for all parts (BIOL 529, 529L, and 592I), except that 20% of your grade for 592I will be based solely on attendance and participation in field trips (see Grading Policy, below).

In lectures you will learn fundamental concepts in marine ecology. *You are encouraged and expected to ask questions during lecture.* There is no class textbook, but you are expected to read assigned papers from the scientific literature before lecture. You will learn how to do research on marine ecology with a series of field research projects. At the start of the semester, we will do these together as a class and in the second half of the course you will conduct an independent research project on a topic of your choosing. You will learn methods for studying marine ecology in the field; you will learn how to analyze and present the data you have collected; and you will learn how to write clear, effective, scientific research reports.

Grading:

Component	Percent of Grade
Midterm Exam 1	15
Midterm Exam 2	15
Final Exam	20
Lecture Quizzes	5
Research Paper 1	10
Research Paper 2 (Independent Research)	15
Independent Research Proposal	2
Independent Research Presentation	8
Field/Lab Study Question Sets	10
<i>Participation in Field Studies</i>	<i>(20% of grade for 592I)</i>
TOTAL	100

Your grade will be based on the components listed above. There will be 3 exams: 2 midterms and a final. The final will be cumulative. The **exams** will consist of short answer (one word to one short paragraph), true/false, and graphs or other figures. These exams will be designed to test your ability to synthesize information from lecture and think logically about the implications of this information. Answers will be graded on factual content, logic, and clarity. The exams will be based entirely on material covered during lecture. I expect you to read the assigned research papers to help you understand the material presented during lecture. **There are no make-up exams.** In exceptional cases, and if arrangements have been made in advance, exams (but not pop quizzes) may be taken at a mutually agreed upon time (usually before the rest of the class).

You will be required to write 2 **research reports** in the form of a published scientific paper (following the style of the journal *Ecology*). One of these papers will be based on a field study that we do together as a class, and the other will be based on the data that you gather for your independent research project. We will discuss the format and expectations for these papers in more detail later in the semester.

For your independent research project you will also be graded on a **research proposal** (given in both written and oral form to the class); and when you have

completed your research, you will give a 15-minute **oral presentation** of your findings (as one would at a scientific meeting).

In addition, there will be 5 **pop quizzes** at the end of certain lectures, on material presented in that lecture and the assigned readings. These will have a short-answer format and should take no more than 10 minutes. **No make-up quizzes will be offered.**

Also, for each field or lab study we conduct, there will be a **question set** to answer based on our findings. These are not meant to be difficult. They are designed to help you extract and remember the main findings of the activity.

Your grade in the field study portion of the course (592I) will be based 80% on the components just discussed and 20% on your participation in the field studies. If you attend every field trip and actively participate, you will get the full 20%.

Your grade will be based on your percentage of the total possible points. You can use the following cutoffs as a guideline. I reserve the right to lower the grade cutoffs.

Percent	Letter Grade
93-100	A
90-92	A-
88-89	B+
83-87	B
80-82	B-
75-79	C+
70-74	C
65-69	C-
60-64	D+
55-59	D
<55	F

Exam Dates:	Midterm 1: February 23, 1:00 – 1:50 pm
	Midterm 2: April 1, 1:00 – 1:50 pm
	Final: May 11, 12:45 – 2:45 pm

Field Trips: There will be several field trips during the semester and they are all mandatory. At least one of these trips will fall on a weekend. Most of the weekday field trips will extend beyond normal class hours (i.e., often you will not be back at CSUN by 5 pm). You will not be able to make up missed field trips. If you have conflicts that will prevent you from participating in any of these field trips, please talk to me as soon as possible.

The field trips are designed to introduce you to marine organisms and ecosystems, reveal ecological patterns in nature, and teach you methods for identifying and quantifying such patterns. Attendance of the field trips is mandatory because classroom study is insufficient for learning and understanding these topics.

Come prepared for field trips. You are being trained as field ecologists and as such, you must be prepared to get cold, wet, or muddy, depending on what we will be doing. Bring suitable footwear (e.g., dive or surf booties, or old tennis shoes) and

clothing (e.g., wetsuits for some activities); and bring a pencil and notebook for data collection. If it rains you must still be able to collect data. If you are unsure what items you need before going out in the field, contact me or the GA. Field outings will normally be 3+ hours, so bring water, snacks, and sunscreen.

A note about field activities: The field activities that are part of this class can be physically taxing, and may place you some distance from help if you have a medical problem. If you have serious concerns about your ability to participate in the field activities, please talk to me as soon as possible.

Attendance: This is an intellectually challenging and time-demanding course. Students with other time-consuming responsibilities (heavy course loads, jobs > 20 hr/wk, athletics, music groups, etc.) should seriously consider their ability to meet these demands. You are expected to attend and actively participate in every lecture, lab, and field experience. You will not be able to make up missed lab or field activities.

Communication: Outside of class time, I will communicate with you via your CSUN email account. If you do not normally use this account, please configure your CSUN account to forward your messages to your preferred account. You can expect me to respond to your email within 24 hours (except on weekends).

Your best source of course information is the course website. Check the schedule on the website regularly because occasionally we may have to change the schedule due to bad weather or other unforeseen complications. Also, pdf files of required readings for lecture (scientific papers), pdf's of the PowerPoint lectures, class assignments, directions to field sites, and data from our field studies are downloadable from the website.

Expectations: You can expect me to be punctual, to treat you fairly, to return your graded assignments in a timely fashion, and most importantly, to treat you with respect. In return, I expect you to treat other students, the GA, and me with respect and do everything you can to ensure a comfortable learning environment. For example, jokes or comments made in poor taste that make any member of the class uncomfortable will not be tolerated. Use of cell phones or computers during class for any purpose other than those directly related to the class (e.g., note taking) is not allowed.

Policies:

- **Cheating** on an exam will result in failure of the course and may result in further University discipline. The CSU policy states: *“Cheating or plagiarism in connection with an academic program at a campus is listed as an offense for which a student may be expelled, suspended, or given a less severe disciplinary action.”*
- **Plagiarism** will result in you failing the assignment. Plagiarism is *“intentionally or knowingly representing the words, ideas, or works of another as one’s own in any academic exercise”*. Don’t do it. Remember to give full credit to authors that you cite in your research reports.

- **Late assignments lose 10% per day**, i.e., the most you can receive for an assignment that is one day late is 90% of its point value, 2 days late 80%, etc.
 - **Punctuality**: expect to start on time.
 - Students with **disabilities** must register with the Center on Disabilities and complete a service agreement each semester. Staff within the Center will verify the existence of a disability based on the documentation provided and approved accommodations. Students who are approved for test taking accommodations must provide an Alternative Testing Form to their faculty member signed by a counselor in the Center on Disabilities prior to making testing arrangements. The Center on Disabilities is located in Bayramian Hall, room 110. Staff can be reached at 818-677-2684.
 - The Biology Department **withdrawal policy** states: *"Unrestricted withdrawals are permitted only until the end of the third week. Thereafter, requests to drop a class will be honored only when a verifiable serious and compelling reason exists and when there is no viable alternative to withdrawal. Poor performance is NOT an acceptable reason for withdrawal. During the last three weeks of the semester withdrawals will not be approved except when a student is withdrawing from ALL classes for verifiable medical reasons."*
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Tentative Schedule (subject to change)

Week			Topic	Reading	Work Due
1	19-Jan	Tuesday	Lecture: Introduction and Review of Ecology & Scientific Method Lab: Identification of Marine Organisms	Estes et al. 1998 How to read a scientific paper	
	21-Jan	Thursday	Lecture: General approaches to studying Marine Ecology Lab: Review of Statistics/Practice with Software Packages		
2	26-Jan	Tuesday	Fieldtrip: Rocky Intertidal (Leo Carrillo) - Introduction to Organisms		Question Set 1: Basic Statistics
	28-Jan	Thursday	Fieldtrip: Rocky Intertidal Zonation (Leo Carrillo State Beach)		Question Set 2: Identification of Marine Organisms
3	2-Feb	Tuesday	Lecture: Determinants of Distribution & Abundance Lab: Sampling Techniques	Gutierrez 1998	
	4-Feb	Thursday	Lecture: Population Ecology I Lab: Analysis of Rocky Intertidal data		
4	9-Feb	Tuesday	Lecture: Population Ecology II Lab: Population Dynamics Computer Exercise	Berkeley et al. 2004	Question Set 3: Rocky Intertidal Zonation Question Set 4: Sampling Techniques & Statistics
	11-Feb	Thursday	Fieldtrip: Hermit Crab Shell Use (Leo Carrillo State Beach)		
5	16-Feb	Tuesday	Lecture: Community Ecology Lab: Analysis of Hermit Crab Shell Use data		Question Set 5: Population Dynamics
	18-Feb	Thursday	Lecture: Rocky Intertidal Ecology I Lab: Initial Discussion of Independent Research Project Proposals	Connell 1961	Question Set 6: Hermit crab shell use
6	23-Feb	Tuesday	Midterm Exam 1		
	25-Feb	Thursday	Fieldtrip: Sandy Beach Ecology I		
7	2-Mar	Tuesday	Lecture: Rocky Intertidal Ecology II Lab:	Paine 1966	
	4-Mar	Thursday	Fieldtrip: Sandy Beach Ecology II		
8	9-Mar	Tuesday	Lecture: Maintenance of Diversity Lab: Discussion of Independent Research Project Ideas		
	11-Mar	Thursday	Lecture: Settlement and Pre-settlement Processes Lab: Analysis of Data from Sandy Beach fieldtrips	Steele 1997	
9	16-Mar	Tuesday	Lecture: Recruitment: Pre-Settlement Processes Lab: Presentation of Research Proposals		<i>Research Proposal</i>
	18-Mar	Thursday	Lecture: Recruitment: Settlement & Pre-settlement Processes Lab: Work on Independent Research Projects		

	19-Mar	Friday (eve)	Fieldtrip:	Catalina Island			
	20-Mar	Saturday	Fieldtrip:	Catalina Island			
	21-Mar	Sunday	Fieldtrip:	Catalina Island			
10	23-Mar	Tuesday	Lecture:	Recruitment: Early Post-Settlement Processes	Hixon & Carr 1997		
			Lab:	Analysis of Catalina Island Data			
	25-Mar	Thursday	Lecture:	Kelp Bed Ecology		<i>Research Report: Beach Grooming</i>	
			Lab:	Work on Independent Research Projects		Question Set 7: Catalina Island Studies	
11	30-Mar	Tuesday	Lecture:	Estuarine Ecology	Bertness 1984		
			Lab:	Work on Independent Research Projects			
	1-Apr	Thursday	Midterm Exam 2				
12	6-Apr	Tuesday	Spring Break				
	8-Apr	Thursday	Spring Break				
13	13-Apr	Tuesday	Lecture:	Soft-Sediment Communities			
			Lab:	Work on Independent Research Projects			
	15-Apr	Thursday	Fieldtrip:	Estuarine Fishes (Carpinteria Salt Marsh)			
14	20-Apr	Tuesday	Lecture:	Coral Reef Ecology	Edmunds & Carpenter 2001		
			Lab:	Work on Independent Research Projects			
	22-Apr	Thursday	Fieldtrip:	Distribution of Estuarine Bivalves (Carpinteria Salt Marsh)		Question Set 8: Estuarine Fishes	
15	27-Apr	Tuesday	Lecture:	Seagrass Ecology			
			Lecture:	Mangrove Ecology			
			Lab:	Work on Independent Research Projects			
	29-Apr	Thursday	Lecture:	Deep-Sea Ecology		Question Set 9: Estuarine Bivalves	
			Lab:	Work on Independent Research Projects			
16	4-May	Tuesday	Lecture:	Human Impacts on Marine Systems			
			Lab:	Independent Research Project Presentations			
	6-May	Thursday	Lecture:	Conservation & Management in the Sea			
			Lab:	Independent Research Project Presentations			
	7-May	Friday					<i>Research Report: Independent Project</i>
17	11-May	Tuesday	Final Exam				
			12:45 - 14:45				