

Instructional Team:

**Instructor:**

Dr. Karla Heidelberg  
Office Hours: by appointment  
Location: MSB 204B  
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**Teaching Assistant:**

Office Hours: TBD  
Location: MSB 209 (Library)  
Email:

Textbooks: Lecture: Jeffrey Levinton, 2013, Marine Biology Function, Biodiversity, Ecology  
Laboratory: Materials provided

Website: <https://blackboard.usc.edu>  
(site for course materials, lecture notes, quizzes, additional readings, grades etc.)

Notes: This class will have a heavy field-learning component. Times of lectures and labs may vary due to weather, tides or other logistics. There will be times when we switch labs to morning and have lectures in the afternoons or evenings. Updated schedules will be posted on the whiteboard in the library. Schedules will also be modified to accommodate boat arrivals on Mondays and departures on Friday.

**Course Overview**

The marine environment encompasses 98% of the Earth's biosphere and contains an incredible diversity of microbial, algal, and animal life forms. This course will examine these organisms in the context of the abiotic (e.g., salinity, nutrients, water currents and tides) and biotic factors (e.g., competition, predation, symbiosis) that influence their distribution and abundance. Specific topics will include primary and secondary production, rocky intertidal biodiversity, estuaries, subtidal communities, coral reefs, pelagic and deep sea communities, impacts of humans on the ocean, and conservation. Lecture periods may include discussions of primary literature as well as text chapters. Laboratory sessions will involve fieldwork, laboratory analyses, report writing, and special topics presentations.

Prerequisites: BISC 120 or 120; recommended BISC 315 (students with BISC 103 can request prerequisite waiver).

**General objectives of the course**

Through lectures, laboratories, and projects you will gain experience related to Marine Biology and Ecology. Through this topic, you will also enhance broader USC learning goals such as:

- (1) the ability to think logically, analytically, and independently;
- (2) the ability to communicate clearly and effectively, both orally and in writing;
- (3) the ability to learn on one's own and as part of a group; and
- (4) in-depth of knowledge in an specific sub-discipline of marine biology.

**Specific objectives of the course.** Students will

- 1) Develop an appreciation and understanding of different types of habitats in the marine environment, through readings, lectures, discussions, field studies, and laboratory analyses.
- 2) Learn how components of physical oceanography (temperature, salinity, DO, nutrients, water currents and tides) structure marine populations. Students will be able to describe how marine organisms adapt to physical conditions and also be able to explain how the distribution and abundance of marine organisms is influenced by changes in these physical parameters.

- 3) Be able to recognize many of the organisms that occur in particular marine habitats (e.g., plankton, nekton, intertidal and subtidal, deep ocean, etc.), and describe major aspects of their natural history and ecology.
- 4) Gain an understanding of the important ecological relationships among different marine organisms (e.g., predator-prey, competition, symbiosis, indirect effects), and their influence on distribution and abundance patterns and community structure.
- 5) Obtain practical experience in applying different sample and analysis methods for marine systems followed by practice in written research reports.
- 6) Formulate hypotheses and conduct experiments to investigate a particular problem in marine biology.
- 7) Work as teams or as individuals to present results in both oral and written formats.

Below is the proposed class and lab schedule. Most days will have a morning and an afternoon lecture and one field or lab activity. *Note that the schedule is subject to modification of specific topics and order based on weather or other logistics.* Any schedule changes will be discussed in class and posted on Blackboard. Students who miss classes are responsible for finding out about announcements.

Date	Morning	Afternoon or evening	Readings
<b>Week 1</b>	<b>MARINE SYSTEM OVERVIEWS AND CAST OF CHARACTERS</b>		
M Apr 11	Lec 1 Introduction to Marine Biology and the ocean environment	Lec 2 Physical/chemical properties of SW <i>Lab 1 Physical Properties of Seawater (Lab worksheet 10 pts)</i>	CH 1 & 2
Tu Apr 12	Lec 3 Marine Nutrient cycles <i>Lab 2 Physical properties of seawater (dock work)</i>	<i>Lab 2 Data workup and group results presentation and discussion (20 pts)</i>	CH 2
W Apr 13	Lec 4 Plankton – Bacteria and Phytoplankton <i>Lab 3 Marine organismal diversity (worksheet 10 pts) Reference CH 12</i>	Lec 5 Plankton – Zooplankton and Gelatinous Zooplankton	CH 7 Gelatinous zp plankton reading TBD
Th Apr 14	Lec 6 Diversity of benthic marine invertebrates	<i>Lab 3 Marine organismal diversity (open lab)</i>	CH 12
F Apr 15	<b>Lab Quiz 1 (50 pts)</b>	No class – boat departure at 12:30	
<b>Week 2</b>	<b>BENTHIC BIOLOGY/ECOLOGY</b>		
M Apr 18	Lec 7 Plankton Ecology; primary production/Top down vs. Bottom up controls; Food webs	Lec 8 Coastal Benthic Habitats	CH 9, 10  CH 14
T Apr 19	Intertidal Ecology <i>Lab 4: Mole crab Lab and intertidal diversity – Shark Harbor Field Trip</i>	<i>Lab 4 Data Workup</i>	CH 14
W Apr 20	Lec 11 Coral reef ecology	<i>Optional Big Fisherman Cove night snorkel</i>	CH 15
Th Apr 21	Lec 9 Subtidal ecology	Lec 10 The role of resources in species interactions (competition and predation)	CH 16
F Apr 22	<b>EXAM 1 (Lectures 1-9) (100 pts)</b> <b>Mole Crab Lab Write up Due (25 points)</b>	No Lecture – Boat departure 12:30	
<b>Week 3</b>	<b>PELAGIC ECOSYSTEMS (note Fisheries not covered to prevent duplication from DG)</b>		
M Apr 25	Lec 11 Climate change and ocean acidification	<i>Lab 5: Selective feeding by Aplysia</i>	CH 4.1 (hot topic section)
T Apr 26	Lec 12 Reproduction, dispersal and migration	Lec 13 Oceanic nekton and vertebrates	CH 8
W Apr 27	Lec 14 Polar environments CH 16	<i>Lab 6: Suspension feeding lab (temperature effects on feeding rates of the blue mussel)</i>	CH 16

Th Apr 28	Lec 15 Estuaries – Overview & physical properties CH 14	Lec 16 Estuaries – Chesapeake Bay case study CH 14	CH 14
F Apr 29	Lec 17 Human impacts: Pollution and Marine Debris CH 19	No class – boat departs at 12:30	CH 19
<b>Week 4</b>	<b>SPECIAL TOPICS</b>		
M May 2	Lec 18 Deep Sea Biology	Lec 19 Oil Spills Case studies Discussion/Student Presentations: Comparative Effects and differences between Exxon Valdez and Deepwater Horizon oil spills. READING Joye 2015. <i>Science</i> ; Atlas and Horizon 2011, <i>Env. Sci and Tech (25 points)</i>	CH 16; Articles listed under Lecture 19
T May 3	CH 20 Biodiversity, Conservation and MPAs	Lab 5 writeup due (50 pts)	CH 17
W May 4	<b>FINAL EXAM (150 pts)</b>	Lab cleanup	

**Grades:**

The final letter grade will be assigned on a curve, determined by the total number of points as follows:

Lectures and Quizzes:

Exam 1	100 pts
Exam 2	150 pts
Lab Quiz	<u>50 pts</u>
<b>SUBTOTAL</b>	<b>350 pts</b>

General rubric

90 - 100%	A
80 - 89%	B
65 - 79%	C
55 - 64%	D
0 - 54%	F

Laboratories, presentations and discussions:

Lab 1: Physical properties of sw (worksheet)	20 pts
Lab 2: Physical properties of sw dock (discussion and student presentation)	30 pts
Lab 3: Marine Organismal Diversity (worksheet)	20 pts
Lab 4: Mole Crab Lab and Intertidal diversity (Full)	50 pts
Lab 5: Selective Feeding by <i>Aplysia</i> (Full)	50 pts
Lab 6: Suspension feeding (worksheet)	20 pts
Oil Spills Discussion/Student presentations	30 pts
Lab notebook (detail and completeness)	30 pts
<b>SUBTOTAL</b>	<b>250 pts</b>
Class/field participation	30 pts
<b>CLASS TOTAL</b>	<b>580 pts</b>

**Additional information:**

**Quizzes and Exams**

Lectures: There will be two Exams (100 pts each), and 11 lecture quizzes given through Blackboard or by handout (6 pts each; only 10 counted in final grade). Questions on quizzes and exams will be a combination of multiple choice, short answer, problem sets, fill in the blank and essays.

Labs:

Laboratory activities will include outdoor activities and bench side experiments. These activities will emphasize how the ocean works and how marine biologists test their ideas, through quantitative observations, models, and manipulative, controlled, and replicated experiments.

Some labs will be in the field. Working outdoors is a great way to see organisms in their natural habitats. Plan to dress appropriately for each proposed activity and bring water.

### **Reviews of primary literature**

Additional readings for specific lectures or labs may be posted on Blackboard during the semester. Some lecture quiz points may be allocated to a paper review.

### **Course Policies**

Any document associated with grading may be photocopied by the instructional staff.

### **Exams and Quizzes**

Exams may include multiple choice questions, fill-in answers, definitions, T/F, short answers, and short or long essays. Material will be drawn from lectures, reading, and laboratory material. The final will focus heavily on the second half of the course, but may also have cumulative questions.

### **Policy on Re-grading Examinations**

If you feel that an error was made in the grading of an examination, you need to do the following: 1) Check the posted answer key, 2) Prepare a printed statement explaining why you feel your grade was incorrect, and 3) submit this and your original examination to your instructor within one week of the time the examination was returned to you. Your entire exam may be re-graded and, as a result, your grade may increase or decrease from a requested re-grade. No frivolous reasons will be accepted for requesting grade changes; stated reasons for a grade change must be legitimate (e.g., error in totaling the score).

### **Late work**

Late assignments will be penalized 10% of a grade per day.

### **Class participation**

Since this course will be interactive and will require you to work closely with others, part of your grade will be dependent on your ability and willingness to participate in class discussions and laboratory investigations, as well as interact positively with other members of the class. Students are also expected to be on time and have active participation in all field trip activities.

### **Policy on Missed Lecture Exams, Quizzes or Lab activities or Lab Exams**

**UNPLANNED ABSENCES:** You may be excused from an exams or labs only in the event of a documented illness or emergency as outlined by university policy. No other excuses for missing exams will be accepted. If you miss a class or lab exam, quiz or graded activity due to medical illness you must present a valid medical excuse to the TA or Instructor within 48h of the missed examination or quiz. The excuse cannot be to attend a dental appointment, a conference, or other similar reasons. The reason for missing an examination or quiz must be of a medical nature or totally unavoidable (e.g., a verified automobile collision on the day and time of the examination). Remember that the USC Student Health Center does not provide routine medical excuses. Notify the TA and Instructor in writing that you were seen by a physician, making sure that you include: 1) the physician's name and telephone number, and 2) a statement authorizing us to discuss with the doctor whether you were too ill to take the examination. Note that neither you nor the physician need tell us the nature of your illness. If the excuse is valid, we will accommodate needs. An invalid excuse, or the excuse turned in late, will result in a score of zero for the activity missed. If you miss the final examination and have provided a valid medical excuse within 72 hours of the examination time, a final course grade of incomplete (IN) will be recorded and you will be permitted to take a make-up final examination during the following semester.

**PLANNED ABSENCES:** Students who wish to miss an examination for observance of a religious holy day should be aware of the University's policy on such absences, published at: <http://orl.usc.edu/religiouslife/holydays/absences.html>. Requests for such absences should be made by email to the Instructor at least 2 weeks in advance of the absence. If the absence is approved, a reasonable accommodation will be provided.

### **Students with Disabilities**

Students requesting academic accommodations based on a disability are required to register with the Office of Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Be sure that the letter is delivered as early in the semester as possible. DSP is located in STU 301 and is open from 8:30 a.m. to 5:00 p.m., Monday through Friday. The telephone number of DSP is 213-740-0776. If a student's approved accommodation is limited to extra time on examinations, accommodation will be provided. For any other accommodation, such as a private room, translator, etc., students must make prior arrangements with the DSP office 2 weeks before the exam date. For more information please visit the following website: [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html).

### **Statement on Academic Integrity**

Ethics of academic integrity is a primary focus of the course. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00: <http://web-app.usc.edu/scampus/1100-behavior-violating-university-standards-and-appropriate-sanctions/>, while the recommended sanctions are located in Appendix A. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>. It is a violation of academic integrity to either use someone else's clicker in the classroom to assist that person in gaining points, or lend your assigned clicker to another student.

### **Website**

Postings on Blackboard (<https://blackboard.usc.edu>) will be an official source for announcements, course materials, lecture notes, grade postings and general discussions. We may also use Blackboard for lecture or laboratory quizzes. Students are responsible for checking the course website on a regular basis.

### **Laboratory Performance guidelines**

1. You are required to attend all lab sessions. Any unexcused absences or early departures will seriously affect your evaluation. Come to lab on time. You are also to remain for the entire lab session or until excused by your instructor. At the end of the lab session, clean and return all supplies to their proper place, and clean your work area. Check with your instructor before leaving. **NO EATING OR DRINKING IS ALLOWED IN THE LABORATORY AND SAFETY REQUIREMENTS COVERED IN TRAINING MUST BE ADHERED TO.**

3. **LAB WORK SUMMARIES OR WRITE-UPS:** During each lab students need to record their results (drawings, observations, calculations) in their lab notebook or provided worksheet. Tables need to be filled and all post-lab questions answered. Each student is required to show his/her TA the lab

workbooks before leaving the lab. Your TA will provide details on lab requirements and expectations for each specific lab.

4. **LAB REPORTS:** Lab reports will be submitted using turnitin link on Blackboard and a hard copy turned in at the beginning of the lab session that it is due. Lab report guidelines will be posted on Bb (<https://blackboard.usc.edu/>) in the beginning of the semester.
5. **LAB EXAMS:** Lab exams and worksheets will test your understanding of the topics and exercises covered in the laboratory sessions. Information may be tested using a written portion and/or a practical portion (being able to identify different organisms).
6. **PRESENTATIONS:** Students may work as teams, and detailed instructions (and expectations) for your presentation, including how points will be assigned, will be provided on Blackboard (<https://blackboard.usc.edu/>).
7. **BLACKBOARD:** Blackboard will be used to distribute course materials and announcements and grades. Lecture and lab grades will also be available on Blackboard: <https://blackboard.usc.edu>. It is the student's responsibility to notify his/her TA or Instructor ASAP in the event of any mistakes, so please check your scores on Blackboard weekly.