

**Instructors:**

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**Textbook:** Lecture: J. Levinton, 2022, Marine Biology Function, Biodiversity, Ecology (6<sup>th</sup> ed.)  
Syllabus reading assignments listed are specified for 6<sup>th</sup> edition, however, J. Levinton, 2017, Marine Biology Function, Biodiversity, Ecology (5<sup>th</sup> ed.) is acceptable, with students shifting to the corresponding chapters.  
Some lectures will have additional supplemental readings posted on BlackBoard.

Laboratory: Materials provided on Blackboard.

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

**Lecture times:** M/W 2:00 - 3:20pm, ZHS 252. Lectures are designed to be in person. Some attempt will be made to Zoom Record the lectures, but technical difficulties may prevent success in this for all classes.

**Laboratory times** W 11:00 - 1:50pm (13355R) ZHS 469 or  
W 3:30 - 6:20pm (13354R) ZHS 469

**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; physiological ecology and evolution of marine organisms; coastal ecosystems, including rocky intertidal biodiversity, estuaries, subtidal communities and coral reefs; pelagic and deep sea communities; and impacts of humans on the ocean and conservation. Some class aspects will 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 220; (students with BISC 103 can request an enrollment waiver). For students planning to take both BISC 473 and BISC 469, the recommended series is BISC 473 followed by BISC 469, but exceptions with permission.

**General objectives of the course**

The lectures, laboratories, and projects will give you experience toward some of the general curricular goals of the university as related to Marine Biology:

- 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 independently and as part of a group; and
- 4) The ability to explain in-depth information related to the specific sub-discipline of marine biology.

**Specific learning objectives related to Marine Biology. By the end of this course, students will be able to:**

- 1) Describe the variety of marine habitats in the world's oceans

- 2) Identify the major phyla that occur in particular marine habitats (e.g., plankton, nekton, intertidal and subtidal, deep ocean, etc.), and describe key aspects of their natural history, including their unique marine life adaptations.
- 3) Explain how abiotic factors (e.g., temperature, salinity, DO, nutrients, water flow) structure marine populations. Students will be able to describe how marine organisms adapt to physical conditions and explain how the distribution and abundance of marine organisms is influenced by changes in these physical parameters.
- 4) Explain how biotic factors (e.g., predator-prey, competition, symbiosis, genetic makeup, and differences in physiology) structure marine populations. Students will be able to describe how marine organisms adapt to biotic factors and ecological relationships, and explain their influence on distribution, abundance patterns and community structure.
- 5) Explain major life processes such as photosynthesis and cellular respiration and where they occur in the cells of marine organisms reflecting on the environmental limitations of the ocean.
- 6) Formulate hypotheses and conduct a research study to investigate particular problems in marine biology through laboratory exercises in marine ecology and physiology. Students will work both individually and as part of small groups to design the research projects, collect data and present the results in both oral and written formats.
- 7) Describe how humans impact marine ecosystems and organisms at multiple scales.

**Schedule of lecture and laboratory topics.** *Note that the schedule is subject change based on organism availability or other logistical factors. Any schedule changes will be discussed in class and posted on Blackboard.*

Day	Activity	Readings and Assignments
M Jan 9	Lec 1 Introduction and history of the study of the ocean	6 <sup>th</sup> edition Chapters 1 and 2 <b>HW#1:</b> Student questionnaire (due Wed Jan 14 via TurnItIn) <b>HW #2</b> Ocean Map and Marine Biomes Worksheet (due Wed Jan 19 <sup>th</sup> via TurnItIn)
W Jan 11	Lec 2 Ecological and evolutionary principles of marine biology. Overview for Catalina Island field trip	Chapters 4
M Jan 16	<b>Martin Luther King Holiday – NO CLASS</b>	
W Jan 18	Lec 3 Effects of physical/chemical properties of the marine environment on organisms and life in a fluid medium	Chapters 5 and 6
Jan 20-22	<b>Field trip to Catalina Island – FR-SUN</b> Shark Harbor mole crab lab; tide pool surveys; bioluminescence demo; kayak or snorkeling; collections for future lab work)	<b>Lab Activities: Intertidal zone and Mole Crab experiments and zooplankton sampling (for later UPC labs)</b>
M Jan 23	Lec 4 Reproduction, dispersal and migration	Chapter 7 <b>HW #3</b> Research Topic list provided and project rubric posted
W Jan 25	Lec 5 Plankton I (prokaryotes/microbial eukaryotes) Watch: <a href="http://nationalgeographic.org/media/plankton-revealed/">http://nationalgeographic.org/media/plankton-revealed/</a> (link on BB)	Chapter 8 (pages 155-159; 165-168)

M Jan 30	Lec 6 Molecular tools in marine ecology & evolution	Reading assignment on Blackboard HW#4 Who am I? (Due Feb 15 <sup>th</sup> to TurnItIn)
W Feb 1	Lec 7 Plankton II: Zooplankton	Chapter 8 Pages 159-162
M Feb 6	Lec 8 Plankton III: Gelatinous Zooplankton	Chapter 8 (pages 163-165)
W Feb 8	<b>MIDTERM 1 (Lectures 1-8)</b>	Research Topic Choice Due – topics are first come first served (instructions from HW#3)
M Feb 13	Lec 9 Marine Vertebrates and Other Nekton	CH 9
W Feb 15	Lec 10 Marine vertebrates II: Marine Mammals and birds	CH 9, esp. pages 181-189
M Feb 20	<b>Presidents Day – NO CLASS</b>	
W Feb 22	Lec 11 Food web patterns & processes Differential productivity in the world's oceans	Chapter 10
M Feb 27	Lec 12 Coastal Ecosystems II (Estuaries)	Chapters 13 and 17
W Mar 1	Lec 13 Coastal Ecosystems I (Intertidal soft and hard substrates)	Chapters 15 and 16
M Mar 6	Lec 14 Coastal Ecosystems III (Subtidal habitats – Kelp and seagrasses)	Chapters 16 and 17
W Mar 8	<b>NO CLASS</b> <b>NO LAB: Time off due to Catalina Island Field Trip</b>	Literature search and preliminary outline due to TurnItIn (instructions from HW#3)
Mar 12-19	<b>SPRING BREAK</b>	
M Mar 20	Lec 15 Coastal Ecosystems IV (subtidal habitats – Coral Reefs)	Chapter 17 Chapter 3 Knowlton and Jackson 2008 Normile 2016 (both on Blackboard)
W Mar 22	Lec 16 Deep Sea Biology	Chapter 18 Widder 2010 (on BB)
M Mar 27	<b>MIDTERM 2- Lectures 9-16</b>	
W Mar 29	Lec 17 Biology in Polar Environments Pre-class assignment – HW#5	Chapter 19 HW#5 Under the Antarctica Ice Movie Assignment
M Apr 3	Lec 18 Introduction to Fisheries Biology Human impacts: Fisheries and food from the sea Case study of Native Hawaiian lessons in fisheries management	Chapter 21 Reading: Pauly 1995 and Wilcox 2012 (on Blackboard)
W Apr 5	<b>Guest Lecture TBA</b>	
M Apr 10	Lec 19 Human impacts: Global Climate Change	Chapter 3
W Apr 12	Lec 20 Biodiversity, Conservation Overview	Chapter 20
M Apr 17	Lec 21 The role of MPAs	Chapter 20

W Apr 19	Lec 21 CA Science Center Tour and Independent work	Download workbook from BlackBoard
M Apr 24	Lec 22 Human impacts: Plastics <a href="http://discovermagazine.com/2008/jul/10-the-worlds-largest-dump/?searchterm=ocean%20plastic">http://discovermagazine.com/2008/jul/10-the-worlds-largest-dump/?searchterm=ocean%20plastic</a>	TBA
W Apr 26	Lec 23 Human impacts: Marine invasive species	Chapter 20 and BB reading HW#6 – End of Semester evaluations
M May 6	<b>FINAL EXAM 2:00-4:00 pm (Lectures 16-24)</b>	

#### Lab Schedule:

W Jan 11	No labs week 1	
W Jan 18	<b>Lab 1: Invertebrate Diversity Lab</b>	Pre and Post lab due in lab
F Jan 20- Sun 22	<b>Lab 2: Catalina Island Weekend Field Trip</b>	Separate agenda of activities
W Jan 25	<b>Lab 3 Day/Night Zooplankton Diversity Analysis</b>	No pre-lab; Must enter data into group spreadsheet <b>Zooplankton Lab Full Report Assigned</b> (due to TurnItIn February 22 <sup>nd</sup> )
W Feb 1	<b>Lab 4a: Snail feeding and morphology lab; Briefer on lab writeup assignment</b>	Pre lab and Post lab worksheet
W Feb 8	<b>Lab 4b: Snail feeding lab breakdown and data sharing and worksheet completion</b>	Post Lab Worksheet (due to TurnItIn February 22 <sup>nd</sup> )
W Feb 15	<b>Lab 5: LAB PRACTICAL I</b>	
W Feb 22	<b>Lab 6: Coral Lab Demo and Experimental design and group exercise</b>	Pre-lab watch Chasing Coral Movie Post-lab assignment
W Mar 1	<b>Lab 7: Bivalve Feeding and Dissection Lab</b>	Pre-lab and post-lab worksheet
W Mar 8	<b>Lab 8: SimBio Keystone Predator Lab</b>	<b>(online – no in-person lab)</b>
W Mar 15	SPRING BREAK	
W Mar 22	<b>Lab 9: Respirometry Lab - P to I curves</b>	Pre-lab and postlab worksheet
W Mar 29	Special Topic Research Presentations (up to 9 early birds)- PPTs submitted to Justin before labtime	Upload ppt presentation
W Apr 5	<b>No Lab to account for extra time at WMSC</b>	
W Apr 12	<b>LAB PRACTICAL II</b>	
W Apr 19	<b>Lab 10: California Science Center Lab</b>	<b>Workbook due April 21 via TurnItIn on April 21</b>
W Apr 26	Special Topics Research Presentations (end of semesters) PPTs submitted to Justin before labtime	Upload ppt presentation

**Blackboard Website:** Postings on Blackboard (<https://blackboard.usc.edu>) will be an official source for announcements, course/lab materials, lecture notes, grade postings and general discussions. Students are responsible for checking the course website on a regular basis. Please notify the TA or Instructor ASAP in the event of any mistakes.

#### LECTURE EXAMS:

There will be three lecture exams (150 pts each). Exam questions may include a combination of multiple choice, short answer, T/F, fill in the blank and essays. Material will be drawn from lectures, readings, and laboratory material. Additional readings for specific lectures or labs will be posted on Blackboard during the semester. Some lecture exam points may be allocated to information from these reading assignments

#### LABS:

Close-toed shoes and long pants are required for each lab. NO EATING OR DRINKING IS ALLOWED IN THE LABORATORY. Laboratory activities will include outdoor activities, bench side experiments and computer-based activities. These activities will emphasize how the ocean works and how marine biologist test their ideas, through quantitative observations, models, and manipulative, controlled, and replicated experiments.

Check with your instructor before leaving at the end of each lab. A laptop may be required for some lab activities.

Some labs will be in the field, and **there is one required field trip to Catalina Island (see schedule)**. Students are also expected to be on time and have active participation in all field trip activities. Completing labs will necessitate use of a laptop computer. The USC Computing Center Laptop Loaner Program - USC Information Technology Services provides loaner laptops at the general-use computing centers in King Hall, Ahmanson Information Commons at Leavey Library, and Waite Phillips Hall. To check out a laptop, go to the service desk at an USC computing center and log into the laptop checkout webpage. <https://itservices.usc.edu/spaces/computingcenters>.

More information: <https://itservices.usc.edu/spaces/laptoploaner>

Pre-Lab quizzes: There may be pre-lab quizzes during the first 10 minutes of each lab session. Students who come late to lab without a legitimate and verifiable excuse will not be allowed to make up the quiz. Questions will cover knowledge of the material you will be covering that day in lab, and/or the results from the previous lab. Prelab points for missed labs cannot be made up.

Laboratory Practicals: The two lab practical exams will test your understanding of the topics and exercises covered in the laboratory sessions. Laboratory Practicals are Exams that require you to move from desk to desk to identify and answer questions about the displayed specimens or procedures. These exams are timed and regulated, therefore you must not be late. *Missed Laboratory Practicals cannot be made up.*

Your TA will provide details on lab requirements and expectations for each specific lab using BB or emails.

Lab Reports: Lab assignments will be submitted using a TurnItIn link on Blackboard and a hard copy (if requested by the TA) turned in at the beginning of the lab session that it is due.

Presentations: Detailed instructions and rubrics for preparing your presentation, including how points will be assigned, will be provided on Blackboard (<https://blackboard.usc.edu/>).

### **General Course Policies:**

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

Policy on Re-grades: All graded documents will be graded in the context of expectations set by an initial evaluation of all student responses. If you feel that an error was made in the grading of an examination or lab activity, you need to do the following: 1) Prepare a printed statement explaining why you feel your grade was incorrect, and 2) submit this and your original examination to your instructor within one week of the time the examination or assignment was returned to you. Your entire exam or assignment 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: All late assignments must be uploaded to TurnItIn or to your TA personally. All will be date stamped and penalized 5% of a grade for each day that the assignment is late.

Attendance and participation: Students are strongly encouraged to attend lectures and are required to attend labs. Students who miss classes are responsible for finding out about any class announcements using BB, the instructional

team or other class members. It is in your best interest to participate in class discussions and laboratory investigations, as well as interact positively with other members of the class. Points can be deducted from lab assignments if you are late to lab or do not effectively clean up your lab bench at the end of lab.

Policy on Missed Lecture Exams, Quizzes or Lab activities or Lab Exams:

**UNPLANNED ABSENCES:** You may be excused from an exam or labs only in the event of a documented illness or emergency as outlined by university policy, with notification to the TA or Instructor team within 48 hours. An invalid excuse, or the excuse turned in late, can result in a score of zero for the activity missed. You are required to attend all lab sessions. Any unexcused absences, late arrivals or early departures will seriously affect your evaluation. Complete all lab activities and clean and return all supplies to their proper place. Because most labs cannot easily be made up, a student may be able to receive a pro-rated grade for **one** missed lab if the justification for missing the lab is reasonable.

If you miss the final examination and have provided a valid USC-approved medical excuse within 56 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 will miss an examination or Lab Activity 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>. If the absence is listed by the USC Office of Religious Life, a reasonable accommodation will be provided. If you have any anticipated exam date conflicts due to athletic schedules or religious holidays see an instructor by WEEK 2 of the course.

**Grades:** The final letter grade will be assigned at the end of the semester based on the class distribution and determined by the total number of points described in the below table.

Letter Grade	%Grade	GPA (4.0 Scale)
A	94-100	4.0
A-	90-93	3.7
B+	87-89	3.3
B	83-86	3.0
B-	80-82	2.7
C+	77-79	2.3
C	73-76	2.0
C-	70-72	1.7
D+	67-69	1.3
D	65-66	1.0
F	<65	0

Activity	Points	Total Points
Exams 1, 2 and 3	150 each	450 (57%)
HW#1 Student questionnaire	5	
HW#2 Ocean map and marine biomes worksheet	10	
HW#3a Research topic choice -submitted on time	5	
HW#3b Research topic Lit Search and preliminary outline	10	
HW#4 Who am I? An introduction to BLAST	15	

HW#5 Under the Ice Assignment	10	
HW#6 End of Semester evaluations	3	
Research Presentation and ppt slides (see HW#3)	20	80 (10%)
<b>Labs</b>		
1a Marine organism diversity prelab	3	
1 Marine organisms diversity lab workbook	15	
2 Catalina Island Fieldtrip	30	
3a Zooplankton Lab (data analysis)	15	
3b Zooplankton Lab (full lab writeup)	30	
4a Snail feeding and morphology pre-lab	3	
4b Snail feeding lab and morphology worksheet	15	
<b>5 Lab Practical I</b>	25	
Lab 6: Coral Lab Demo and Experimental design and group exercise. Pre-lab assignment (will happen on Catalina Island)	3	
Lab 6: Coral Lab Demo and Experimental design and group exercise/in-class presentation	15	
Lab 7a: Bivalve Feeding and Dissection pre lab	3	
Lab 7b: Bivalve Feeding and Dissection worksheet	15	
Lab 8: SimBio Keystone Predator Lab	20	
Lab 9a: Respirometry Lab - P to I curves	3	
Lab 9b: Respirometry Lab - P to I curves	15	
<b>Lab Practical II</b>	25	
10_California Science Center Workbook	15	
Active engagement in other's talks via evals and questions	10	260 (33%)
<b>TOTAL</b>		<b>790 pts</b>

*\*Every effort will be made to follow this schedule. But several of the labs will be using invertebrate animals and/or specialized equipment that may dictate a change in the schedule. Total points may be changed if a lab must be cancelled. A revised course grading metric will be discussed and posted on BB.*

#### Policies:

1. Academic honesty and integrity are paramount characteristics! Dishonesty in any form is not tolerated. This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#).

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, "Behavior Violating University Standards" [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>. Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

2. Classroom norms: You will be expected to follow [USC Discussion Norms](#) during class and field activities.
3. Attendance and participation: Students are strongly encouraged to attend all lectures and are required to attend labs and field work activities. Students who miss classes are responsible for finding out about any class announcements from Blackboard, the instructional team or other class members. It is in your best interest to participate in class discussions and laboratory and field work, as well as interact positively with other members of the class.
4. PLANNED ABSENCES: Students who will miss a lecture or course activity for observance of a religious holy day or other reason should be aware of the University's policy on such absences, published at: <http://orl.usc.edu/religiouslife/holydays/absences.html>. If the absence is approved by the instructional team, a reasonable accommodation will be provided. If you have any anticipated course conflicts see an instructor by WEEK 2 of the course.
5. Exams: If a student misses an exam due to a true emergency (with an acceptable documentation), a make-up exam will be scheduled. The Final Exam date and time are set by the University and cannot be changed (<https://classes.usc.edu/term-20231/finals/>). A missed final will result in an Incomplete for the course, which the student can make up the following semester.
6. Re-grading of exams or assignments: Exams submitted for possible re-grading must be turned in to the instructor with a written concise explanation of the problem, and will be accepted only within one week of when the exam is returned to the student. Challenges to the final grade must be made within 6 weeks after final grades are assessed.
7. Other accommodations: Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP). A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to instructors as early in the semester as possible.

### **Support Systems:**

*Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call*

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. [engemannshc.usc.edu/counseling](http://engemannshc.usc.edu/counseling)

*National Suicide Prevention Lifeline – 1 (800) 273-8255*

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. [www.suicidepreventionlifeline.org](http://www.suicidepreventionlifeline.org)

*Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call*

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. [engemannshc.usc.edu/rsvp](http://engemannshc.usc.edu/rsvp)

*Sexual Assault Resource Center: For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: [sarc.usc.edu](http://sarc.usc.edu)*

*Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086: Works with faculty, staff, visitors, applicants, and students around issues of protected class. [equity.usc.edu](http://equity.usc.edu)*

*Bias Assessment Response and Support: Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. [studentaffairs.usc.edu/bias-assessment-response-support](http://studentaffairs.usc.edu/bias-assessment-response-support)*



*The Office of Disability Services and Programs:* Provides certification for students with disabilities and helps arrange relevant accommodations. [dsp.usc.edu](http://dsp.usc.edu)

*Student Support and Advocacy – (213) 821-4710:* Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. [studentaffairs.usc.edu/ssa](http://studentaffairs.usc.edu/ssa)

*Diversity at USC:* Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. [diversity.usc.edu](http://diversity.usc.edu)

*USC Emergency Information:* Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. [emergency.usc.edu](http://emergency.usc.edu)

*USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.*  
USC community safety: [dps.usc.edu](http://dps.usc.edu)