

Spring Maymester BISC 457L: Methods in Marine Biology and Biological Oceanography

Course Dates: Monday, May 19 – June 13, 2025 - CATALINA ISLAND

This class is considered part of the Spring Semester, for tuition and course load purposes.

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Course Brightspace LMS: Postings on Brightspace will be an official source for announcements, course/lab materials, lecture notes, grade postings and general discussions.

Overview: BISC 457L is designed to introduce students to methods used to study the physical features and biological communities of marine environments. This course emphasizes hands-on experiences in data collection, analysis, and interpretation and independent research in a way that fosters critical thinking and problem-solving. Course projects will incorporate state-of-the-art oceanographic equipment and authentic methods of scientific inquiry. Highlights of this class include the use of a research vessel (R/V *Yellowfin*) for a one-day sea-going expedition, exploration of factors controlling intertidal communities and opportunities to access special coastal environments by guided kayak and snorkeling. Students will capitalize on teamwork, data sharing and discussions. No prior exposure to oceanography or marine biology is required.

COURSE OBJECTIVES:

Introduction to the Marine Environment:

- Explore the principles of biological oceanography, focusing on the physical and chemical factors that influence marine life and ecosystems
- Provide students with an understanding of some of the various habitats, species, and their interactions adjacent to Catalina Island.
- Develop skills in the identification and classification of marine organisms, such as fish, invertebrates, and algae commonly found in the Catalina Island region.
- Explore the ecological dynamics of marine communities, including predator-prey relationships, competition, and symbiosis.
- Identify the ways that human activities impact marine ecosystems
- To develop a working knowledge of relevant literature to specific topics

Field Research Techniques:

- Teach students fundamental techniques of doing field work, including observational skills, sampling techniques, data collection, presentation and science communication skills.
- Provide students with hands-on experience working in different habitats including activities such as underwater surveys, research vessel use, specimen collection, and data recording.
- Provide students with opportunities to learn statistical methods and data interpretation.

- Enhance students' ability to communicate scientific findings through written reports and presentations, enabling them to effectively convey their research to a broader audience.
- Safety and Ethical Considerations: Emphasize safety protocols in marine research and instill ethical considerations for working with living organisms and sensitive ecosystems.

Collaborative Team Work :

- Encourage collaboration and teamwork among students including group data analyses and interpretation
- Use small teams to design and build gradual expertise in problem-solving
- Provide opportunities to learn and practice scientific writing and presentation skills to both scientific and broader audiences

Course Timing: This class fits into the USC Maymester time period. It is considered part of the spring Semester with respect to tuition and credit load. Weeks 1-3 are guided experiences using lectures, laboratory analysis and field work focused on specific theme, culminating in weekly research presentations and/or exams. In week 4, students will design, plan and carry out an independent project. The students will present results of their independent research project at a symposium at the end of the semester.

More information about the Catalina Maymester Program can be found here: <https://dornsife-wrigley.usc.edu/education/residential-college/maymester/>

Location: This class will be taught as part of the USC Catalina Residential College Maymester program at the Wrigley Marine Science Center, Santa Catalina Island – a program that simultaneously supports multiple classes on the island. USC will provide transportation to and from the island campus at no cost to the student. While students will be expected to stay on the island for the full class time period, and highly encouraged to stay over weekends for educational and extra-curricular content, USC boat trips to and from the mainland are available Mondays, Thursdays, and Fridays.

Pre-requisites and course credit: BISC 103 or one of BISC-120 or BISC-121, or by special permission. The class counts for the Marine Biology major focus area, the Marine Biology minor and an elective in either the general Biology degree or Environmental studies.

Office Hours: The all-day interactive nature of the class means that faculty and the TA will be easily approachable for assistance at any time. Students are welcome to schedule private office hours.

Required and Recommended Readings: Each student will receive a *Laboratory Manual* for the lab and field exercises. Additional readings will be provided in form of research papers (primary literature), review articles, online resources and textbooks held in reserve on the island. Reading assignments will be detailed on the final syllabus.

Below is a general schedule, with a detailed link of specific activities provided in an online schedule. The schedule during each week may vary slightly based on weather/ocean conditions.

Schedule ([Link to detailed daily schedule here](#))

LECTURES, LABORATORY EXERCISES, AND FIELD TRIPS:

Week 1 INTRODUCTION TO OCEANOGRAPHY AND OCEAN DYNAMICS

General topics and Readings: 'How the ocean works' M. Denny (editor) Chapters 1,3

- Introduction to the marine environment and biological oceanography
- The scientific method
- Introduction to the plankton
- Introduction to benthic intertidal habitats (mudflats)
- Photosynthesis to Irradiance (P to I) curves working with microbial mats

Week 2 THE STRUCTURE OF OCEAN ECOSYSTEMS

Reading: 'How the Ocean Works' M. Denny (editor) Chapter 2, 6, 7, 8

- Introduction to physical oceanography; Water column structure and function
 - Working with global ocean ecosystem data
- Primary and secondary production & the role of nutrients
- vertical differences in primary production
- Introduction to biogeochemistry
- Introduction to oceanographic instrumentation
 - R/V *Yellowfin* research cruise

Week 3 BENTHIC PELAGIC COUPLING AND METHODS IN MARINE ECOLOGY

Reading: 'How the Ocean Works' M. Denny (editor) Chapters 9

- Mussel feeding lab
- Intertidal community structure and biodiversity (physical and biological factors structuring environments) – Field trip to Shark Harbor (Mole crab lab and intertidal zonation labs)
- Anemone zooxanthellae symbiosis lab
- Fish form and function lab

Week 3-4 APPLIED FIELD RESEARCH

- Mentored independent research projects in small groups
- Additional sampling, analyses and data processing
- Laboratory wrap ups
- The students prepare a final report and presentation, long form video, series of short videos, or podcast for the public science symposium at the conclusion of the Maymester.
- Temperature effects on benthic pelagic coupling: Mussel feeding experiments
- Class synthesis discussions:
 - Big questions in marine biology & biological oceanography

- Humans and the ocean

Grading: 1000 pts total: The course is structured in a way that each week will be like a short research project. Students will learn and apply different methods and collect data. On Friday of each week students will present a short presentation and a written report for feedback. During the 4th week, the students will plan, prepare and carry out directed research and will present their findings in a public symposium. The results from the earlier work during the first 3 week will be included and expanded upon for final projects.

The final course grade will be based on the following criteria:

Grade	Criteria
20%	Weekly Laboratory Reports/ data workups (100 pts each, weeks 1 through 3)
25%	Contributions to class discussions and lectures
20%	Four exams (50 pts each, distributed through weeks 1 through 3)
10%	Lab notebooks and datasheet recording (100 pts)
5%	Effort, attitude, and time invested (including lab safety/organization, attention to detail, participation in lab meetings, troubleshooting, working with lab managers, etc.) (50 pts)
15%	Symposium Presentation (150 pts)

Requirements for final symposium presentation:

Students will prepare a contribution to the Wrigley Institute Maymester symposium, which will be held on the final Thursday of the course. Friends and family are welcome to attend this event. The total duration of each presentation should be 15 minutes. Other formats may also be considered, but must be approved.

The presentation will detail an independent research project which will be conducted by the student in the final week of the course, utilizing research methods and concepts developed in weeks 1-3. Regardless of format, students must communicate an introduction, statement of research question, information on methods, data visualization (or description in the case of a podcast episode), summary of results, conclusion, and discussion of the wider implications of the finding.

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

General Course Policies:

Class norms: In this class, we prioritize fostering a supportive and inclusive environment where all individuals are encouraged to share diverse perspectives, and act mutually respectful to others' contributions.

Accommodations: USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process a Letter of Accommodation (LOA) will be provided. The LOA must be given to each course instructor by the student and followed up with a discussion. More information can be found at osas.usc.edu.

Policy on Re-grades: All graded documents will be graded in the context of expectations set by an initial evaluation of all student responses. Any document associated with grading may be photocopied by the instructional staff. If you feel that an error was made in the grading, submit your request for a regrade in writing explaining why you feel the grade was incorrect.

Late work: All late assignments must be provided to your TA personally. All will be date stamped and penalized 5% of a grade for each day that the assignment is late.

UNPLANNED ABSENCES: Students are expected to attend all lab sessions. You may be excused from an exam or labs in the event of a documented illness or emergency as outlined by university policy, with notification to the TA or Instructor team. 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. Participation in laboratory and classroom activities is especially important for this field-based class. 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. Exams cannot be made up without a documented medical illness or emergency. If you miss the final examination (symposium presentation) 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 other reason see an instructor by WEEK 1 of the course.

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](#). For more information about academic integrity the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#). Plagiarism as defined by presenting someone else's ideas or AI generation of text as your own, is a serious academic offense with serious consequences.

Support Systems:

[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking)

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, and visitors.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and responses.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students

[USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.