

BIOE 158L: Field Methods in Marine Ecology **Syllabus*, Summer 2023**

Course Overview

The purpose of this course is to provide students with an **introduction to coastal marine ecosystems and the field methods used to study them**. Marine ecosystems are inherently complex, and exhibit variation across a wide range of spatial and temporal scales. As a result, accurately documenting patterns of abundance and distribution requires basic knowledge of the natural history of these systems and an understanding of how to design and conduct careful and rigorous studies. Because this topic is expansive, we will focus on observational studies (as opposed to ecological experiments), and we will use the rocky intertidal zone as a study system. Although these studies and this system have unique features and considerations, we will frame our discussion in a manner that communicates topics generally applicable to other ecological studies and ecosystems. Through this course we hope to **enhance students' 1) self-efficacy in understanding patterns and processes in coastal marine ecosystems and designing and conducting ecological field work, 2) sense of belonging in the science field, and 3) sense of stewardship and appreciation of coastal marine ecosystems**.

Course Learning Outcomes

Through taking this course, students will achieve learning goals based on six areas of significant learning (Fink 2003). 158L Students will:

Foundational Knowledge

- **Review fundamental tenets of ecological theory.**
- **Observe patterns** of distribution and abundance of organisms in coastal ecosystems and **build capacity to describe those patterns**.
- **Understand the diversity of ecosystems** on the California coast, the environmental drivers that influence them, their unique features, and why they are important.
- **Review the history** of observational field studies on the California coast.
- **Develop an understanding of fundamentals of experimental design.**
- **Understand scale** and its implications for scientific research.
- Learn to **access, comprehend, and synthesize** primary scientific literature.

Application

- **Learn to think like a scientist**, through all steps of the scientific method, including learning to: **Make observations, formulate hypotheses, design and implement observational surveys, collect data** in the field, **analyze** and **interpret** data, and **summarize** and **present** findings.
- **Demonstrate the ability to communicate original scientific work** in the form of a scientific paper.

Integration

- **Relate the study of the rocky intertidal zone** to other ecosystems.

- **Assess threats to coastal ecosystems and understand how they can contribute to coastal science and conservation.**
- **Appreciate** the long-term connections between humans and coastal ecosystems and **analyze and critique** our management and stewardship practices.

Human Dimension

- **Develop collaboration skills** through working with other students on team-based projects, both in the lab and in the field.
- **Demonstrate self-agency** in practicing the scientific method.
- **Develop a sense of self-efficacy** through self-directed work.
- **Develop a sense of belonging in science and view themselves and each other** as co-investigators and creators of knowledge.
- **Recognize that everyone has the potential to contribute to marine science and conservation.**

Caring

- **Appreciate ecological diversity.**
- **Appreciate the scientific method.**
- **Develop a sense of stewardship** for coastal ecosystems.

Learning how to Learn

- **Analyze their own learning**, and better understand what practices help them best access new information and knowledge.
- **Recognize that everyone has different prior knowledge and learns differently.**
- **Learn to ask questions and seek help from other students and the teaching team when it is needed.**

Learning Statement

Your success in this class is important to us, and we believe all students deserve the opportunity to succeed in this course. Our classroom will be a collaborative learning community, in which everyone's needs are prioritized to ensure equitable learning. We all learn differently, and each student has respective challenges and needs. **We will solicit student feedback throughout the quarter to better understand how the course material is being received and will adjust our teaching approach as necessary.** If there are aspects of this course that you feel are preventing you from learning or exclude you, please let us know as soon as possible. **Together we can develop strategies to meet both your needs and the requirements of the course.**

Meeting Dates and Location

2023/06/26 – 2023/08/18

Tuesday and Thursday 0900 – 1230, Coast Bio 115

Teaching Team and Communication

Instructor:

Niko Kaplanis

nkaplanis@ucsc.edu

Office Hours: Tuesday and Thursday 1300 – 1400, Coastal Biology Building

TA: TBD

Email

Office Hours:

Your teaching team values you and your learning needs! Please feel free to email us and / or talk to us in office hours and before, during, and after class. We will do our best to be available and listen!

Course Website and Other Important Websites:

<https://canvas.ucsc.edu/courses/63908>

NOAA Tide Predictions, Santa Cruz:

<https://tidesandcurrents.noaa.gov/noaatidepredictions.html?id=9413745>

National Weather Service Marine Forecast: Point Arena to Piedras Blancas:

<https://www.ndbc.noaa.gov/data/Forecasts/FZUS56.KMTR.html>

Course Operation

This course has **four major components**, each of which will require active student participation: 1) **Lectures**, 2) **Labs, Field Work and Field Notebooks**, 3) **Homework**, and 4) the **Final Project**. We believe that the more engaged students are, the more interesting the material will be, and that each student has valuable contributions, so please come prepared to participate.

Lectures will introduce students to course concepts and foundational knowledge. They will also incorporate interactive activities that will count toward the participation portion of the grade. These will include discussions of student survey results, course key terms and definitions, and questions related to course readings. We will also hold workshops to collectively work on improving our data analysis and interpretation skills and scientific writing while working on the final project.

Labs and Field Work are designed to expand upon topics covered during lectures, as well as to provide opportunity to practice skills relevant to the study of coastal marine ecosystems, such as making observations and describing field sites and natural patterns. Students will conduct **field work** at a few local rocky intertidal field sites. Students will oversee all steps, from assembling sampling gear and planning the field excursions, to collecting data using existing long-term

monitoring field methods and designs we they have devised as a class, to entering their data into shared databases. Finally, students will maintain a **field notebook** throughout the quarter in which they will document natural history observations, field conditions, and notes about the field work.

Homework will consist of short activities and readings paired with reading responses.

The **final project** will be a scientific paper developed as a class throughout the quarter. This will include all the elements of a scientific manuscript, including an introduction with citations of primary literature, methods, results synthesizing data collected during class field excursions, and a discussion. We will collectively work on questions of interest in groups, but students will be expected to produce their own paper. Instructors will provide guidance throughout the quarter on how to effectively write scientific content.

Lectures, labs, fieldwork and the field notebook will together require approximately 7.5 – 10 hours per week. Homework and the final project will together require approximately 7.5 – 10 hours per week. **In total, students can expect 150 hours of work for this 5-unit course over the quarter.**

Evaluation

Students will be evaluated by each of these major criteria:

- 1) Participation (25%)
- 2) Homework (25%)
- 3) Labs, Field Work, and Field Notebook (25%)
- 4) Final Project (25%)

Grading scale

98 - 100% -- A+
93 – 97% -- A
90 – 92% -- A-
87 - 89% -- B+
83 – 86% -- B
80 – 82% -- B-
77 – 79% -- C+
73 - 76% -- C
70 – 72% -- C-
50 - 69% -- D
<50% -- F

Late Assignment Policy

Assignments will generally not be accepted late. We build missing a couple assignments without penalty into the course grading. Due dates are listed on the course syllabus, modules for each week, and each assignment link. They are also announced in class, and we often send reminders. We will make accommodations if requests are **proactive** (made before the deadline is reached) and **reasonable** (context specific), so please come talk to your teaching team if you anticipate missing a deadline.

Academic Integrity

All members of the UCSC community benefit from an environment of trust, honesty, fairness, respect, and responsibility. You are expected to present your own work and acknowledge the work of others to preserve the integrity of scholarship.

Violations of the Academic Integrity policy can result in dismissal from the university and a permanent notation on a student's transcript. For the full policy and disciplinary procedures on academic dishonesty, students and instructors should refer to the Academic Misconduct page at the Division of Undergraduate Education.

Course Schedule

Week 1:

- 06/27: Lecture: Course Introduction, Introduction to Coastal Ecosystems of the California Current
- 06/29: Lecture: Coastal Marine Ecosystems of California and Research Methods
- Lab: Terrace Point Site Description

Week 2:

- 07/04: University Holiday
- 07/06: Field work: Greyhound Rock Diversity and Abundance Surveys

Week 3:

- 07/11: Lecture: Sampling Design: Site Selection and Classification, Sampling units, Layout, and Replication
- 07/13: Class Project Sampling Design Workshop
- Lab: Sampling Gear Assembly

Week 4:

- 07/18: Field Survey: Long-Term Monitoring and Coastal Biodiversity Survey Plot Relocation

- 07/20: Field Survey: Long-Term Monitoring and Coastal Biodiversity Survey Sampling

Week 5:

- 07/25: Lecture: Long-Term Monitoring of the Northeastern Pacific Coast
- 07/27: Class Sampling Design Workshop
- Lab: Sampling Gear Assembly

Week 6:

- 08/01: Field Survey: Class Projects at Davenport Landing
- 08/03: Field Survey: Class Projects at Davenport Landing

Week 7:

- 08/08: Class Project Reflection, Final Project Data Analysis Workshop
- 08/10: Final Project Writing Workshop

Week 8:

- 08/15: Guest Lecture: Multi-Agency Rocky Intertidal Network (MARINe)
- 08/17: Final Project Presentations

Final Project Due Dates

- Literature Review – 07/11
- Introduction – 07/20
- Methods - 08/01
- Results – 08/09
- Discussion - 08/10
- Final Submission – 08/15

Course Materials

This course has no required texts, but we do recommend a few books. For excellent writing guidance, we highly recommend students obtain a copy of *The Elements of Style*, by William Strunk Jr. and E.B. White. Students may find it useful to reference *Monitoring Rocky Shores*, by Steve Murray, Richard Ambrose, and Megan Dethier. This is an excellent book on field survey design considerations for coastal marine ecosystems. We have a couple copies of this book that we can lend out during the quarter.

Collaborative Learning Community Agreement

Our course philosophy and operation will be guided by these principles, which aim to maximize inclusivity and accessibility to learning, and build a collaborative learning community.

Collaboration:

We're here to learn in a collective, interdisciplinary setting in which we help each other to develop self-efficacy and a sense of belonging in, and stewardship for, the field. We agree to participate in collaborative work, build a learning community, and incorporate the multiple perspectives of our peers.

Communication:

We aim to communicate with the instructing team if we are unable to attend / participate, and we invite our instructors to practice understanding and care.

We welcome sharing obstacles or problems when we encounter them to collectively find solutions to promote access and success in this course.

Perspective:

We aim to arrive at each class session prepared to the best of our ability, such as by doing the readings and being ready to engage actively.

We aim to identify where our own learning edges are and push them by adopting a growth mindset and being willing to ask questions.

We recognize the agency and power of each student to create meaningful knowledge. We agree to view each other as mutual inquirers and co-creators of our learning.

Recognition:

We aim to cite and uplift the ideas we learn from others, such as by directly naming the person(s) and explaining what we learned from their perspective, and inviting them to say more and speak for themselves.

Resources

Accessibility Accommodations: UC Santa Cruz is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability who requires accommodations to achieve equal access in this course, please affiliate with the DRC. We encourage all students to benefit from learning more about DRC services to contact DRC by phone at 831-459-2089 or by email at drc@ucsc.edu. For students already affiliated, make sure that you have requested Academic Access Letters, where you intend to use accommodations. You can also request to meet privately with us during office hours or by appointment, as soon as possible. We would like us to discuss how we can implement your accommodations in this course to ensure your access and full engagement in this course.

CARE and Title IX: The Title IX Office is committed to fostering a campus climate in which members of our community are protected from all forms of sex discrimination, including sexual harassment, sexual violence, and gender-based harassment and discrimination. Title IX is a neutral office committed to safety, fairness, trauma-informed practices, and due process. Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the Campus Advocacy Resources & Education (CARE) Office by calling 831-502-2273. In addition, Counseling & Psychological Services (CAPS) can provide confidential, counseling support, 831-459-2628. You can also report gender discrimination directly to the University's Title IX Office, 831-459-2462. Reports to law enforcement can be made to UCPD, 831-459-2231 ext. 1. For emergencies call 911.

Counseling and Psychological Services: Many students at UCSC face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation. If you could use assistance in any way, please talk to your teaching team, and visit <https://caps.ucsc.edu/>.

Thank you for participating in this course!

*Please note that syllabus content and dates are subject to change, especially because we remain at the whims of the tides!