

# BIOE126 | Biology of Large Marine Vertebrates

Summer 2024



Instructor: Florencia Vilches ([fvilches@ucsc.edu](mailto:fvilches@ucsc.edu))

Office Hours: Tuesdays 3–3 pm at [this](#) Zoom link

Faculty Advisor: Dr. Roxanne Beltran ([roxanne@ucsc.edu](mailto:roxanne@ucsc.edu))

Teaching Assistants: Milagros Rivera ([migriver@ucsc.edu](mailto:migriver@ucsc.edu))

Office Hours: Mondays 1–2 pm at [this](#) Zoom link

Meeting Schedule: Asynchronous pre-recorded lectures, synchronous discussion sections Tuesdays 1:00 pm–2:30 pm on Zoom.

Zoom Links: Provided on the Canvas website, Zoom tab.

Please refer to Canvas for all class lectures and assignments and check your UCSC email regularly to ensure that you are receiving important course announcements. There is no required text for this class. I strongly encourage you to come visit me during office hours, either with specific questions or to just talk about natural history! I would love to get to know you better.

## Enrollment Logistics

- Prerequisites are BIOE 20C.

## Learning Objectives

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Large marine vertebrates are incredible animals! In this course, we will cover a broad overview of the ecology, evolution, physiology, and behavior of marine mammals, birds, and turtles, with an emphasis on local Monterey Bay species. By the end of the course, you will be able to:

- Recognize local Monterey Bay species and describe basic aspects of their life histories
- Give examples of specialized adaptations that allow large marine vertebrates to survive and thrive in the marine environment
- Describe how ecology, evolution, physiology, and behavior interact to drive the patterns we see in nature
- Synthesize interdisciplinary knowledge to understand management strategies for marine mammal conservation
- Read primary literature and interpret data figures to summarize recent research findings on large marine vertebrates

- Know about potential career options in the field of large marine vertebrates

Like many topics, learning about large marine vertebrates works best when you engage and participate. I will do everything I can to create frequent opportunities for active learning. In return, I ask that you do your best to be a proactive participant in this course. Whether this means creating informal study/discussion groups, or developing personal learning goals, I will leave the choice to you. Let me know how I can support you. Here are some quotes from students who enjoyed previous offerings of the class:

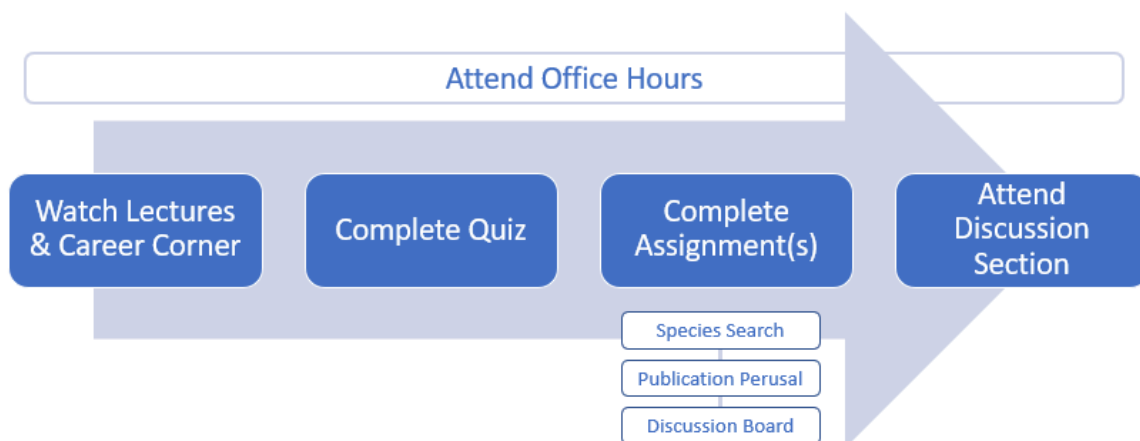
*“I’ve always been amazed by nature and wanted to surround myself with it, but this course really reassured me that the best way to appreciate nature is to study it. The dedication that the scientists featured in this course put into learning about marine ecosystems and species is so impressive and inspiring, I really want to join them. I’m excited to continue finding the bigger picture when it comes to marine ecology and investigating all the pieces of the puzzle, especially through the lens of climate change. Protecting the world’s oceans and coasts from the effects of climate change is my real driving passion, and this course gave me lots of angles to consider in pursuit of solutions to impacts on large marine vertebrates and their ecosystems.”*

*“I know so much more about the animals surrounding me in the Monterey Bay and the oceans in general. I knew next to nothing about animal behavior and physiology coming into this class and I now feel very well informed on the topic. I feel like I can use a lot of that new knowledge not just for my future classes but to help me be a more informed and educated SCUBA diver and enjoyer of ocean sports. I feel much more connected to the ocean as a whole and those big blubbery things on the rocks of breakwater that bark at me (California sea lions) seem a lot less alien now. I am much more confident in my abilities as a researcher and ocean lover. Thank you for a lovely class.”*

## Remote Course Format

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*The general structure of each week will be:*



1. **Lectures and Career Corners:** To maximize the amount of interaction with classmates and faculty as well as active problem-solving, I have chosen to pre-record 3-5 mini lectures each week and upload them to Canvas. I hope this will help you engage with the course material and give you the option to revisit lectures when needed. To help you understand some possible career trajectories in the field of large marine vertebrates, one of the videos each week will feature one of my colleagues introducing themselves and their work. *You are responsible for watching these lectures and one Career Corner prior to the discussion section. This material will be included in the weekly quizzes.*
2. **Weekly Quizzes:** To help you synthesize and demonstrate your understanding, I have created weekly quizzes, each with 14 questions, on the lecture materials. These types of questions are similar to those on the final exam. *You are responsible for answering the Quiz Questions prior to the discussion section, and will get points for doing so.*
3. **Species Search:** To help you apply your knowledge to a new situation, you will complete take-home assignments to summarize the biology of a single study species, which will be assigned to you during the first week of class (in the Week 1 module - see Species Assignments page). You will search the primary literature for information about specific topics. *You are responsible for submitting the Species Search assignment prior to the discussion section (see assignment due date & time below), and will get points for doing so. There are a total of 5 Species Search assignments throughout the course that you need to complete. Check the syllabus for when each assignment is due.*
4. **Publication Perusal:** To introduce you to hot-off-the-press research, I have picked peer-reviewed publications for you to read and synthesize. You are welcome to work with your classmates on this assignment, but the submitted assignment should be in your own words. *You are responsible for submitting the Publication Perusal prior to the discussion section (see assignment due date & time below), and will get points for doing so. Check the syllabus for when each assignment is due. You will have the choice between two articles on the last Publication Perusal assignment.*
5. **Discussion Boards:** Each week, there will be a discussion board that you can contribute to by posting a response to the question prompt and/or responding to one of your classmates posts. *You are responsible for posting responses to 5 of the discussion board prompts (Week 1 is mandatory, plus 4 more of your choice) and responding to 5 of your classmates' posts throughout the course, and you will get points for doing so. No more than 1 post and 2 responses can be completed on the same discussion board. The new discussion board for the week will go up each week on the day after the discussion section and remain open until the end of the course.*
6. **Discussion Sections:** In section each week, we will review the Quiz Questions. If a Species Search assignment was completed that week, you will work with your peers to compare and contrast your species. If a Publication Perusal assignment was completed, we will review the publication and discuss the various components of a research article. *Discussion sections are mandatory, and you will get points for attendance and active participation.*

The weekly assignments will be due at 11:59 pm on the Monday before each discussion section. Because we discuss these assignments the following day in section and to ensure fairness across all students, **late work will not be accepted.** We understand that life can throw curveballs that may result in you missing an assignment, so we will give two "freebies" per person by dropping two grades: the lowest quiz grade and the lowest grade for a weekly assignment (either Species Search or Publication Perusal).

## Final Exam

The final exam will be a Canvas quiz that you will take during the designated exam period for the class (August 30, Time TBD). You may use your notes or other resources but please do not work with your classmates. You have a total of 180 minutes to complete the exam, although I expect it will only take you ~120 minutes. The exam structure is as follows (29 questions, 65 total points):

- 1 warm-up question (3 points)
- 6 multiple choice questions from your weekly quizzes (1 point each)
- 5 essay questions from your weekly quizzes (3 points each)
- 5 student-created multiple choice questions (1 point each)
- 5 student-created essay questions (3 points each)
- 2 species comparison questions (3 points each)
- 4 questions about your publication perusals (3 points each)
- 1 cool-down question (3 points)

## Expectations and Grading

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This is a 5-unit course. Expectations for the course consist of the responsibilities detailed above, totaling 15 hours per week (e.g., 3 hours of lecture, 1 hour of discussion, 4 hours of reading, 7 hours of assignments and studying). Grades will be calculated as follows:

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|--|-------|
| ● Watching Lectures & Career Corners         | (10%) |
| ● Weekly Quizzes (8 total)                   | (20%) |
| ● Species Search (5 total)                   | (10%) |
| ● Publication Perusal (5 total)              | (10%) |
| ● Discussion Board Posts (5) & Responses (5) | (10%) |
| ● Participating in Discussion Sections       | (10%) |
| ● Final Project                              | (15%) |
| ● Final Exam                                 | (15%) |

The grading scheme will be as follows:

Name:	Range:	
A+	100 %	to 97.0%
A	< 97.0 %	to 92.0%
A-	< 92.0 %	to 90.0%
B+	< 90.0 %	to 87.0%
B	< 87.0 %	to 84.0%
B-	< 84.0 %	to 80.0%
C+	< 80.0 %	to 77.0%
C	< 77.0 %	to 74.0%
C-	< 74.0 %	to 70.0%
D+	< 70.0 %	to 67.0%
D	< 67.0 %	to 64.0%
D-	< 64.0 %	to 61.0%
F	< 61.0 %	to 0%

For students that take the class as Pass/NoPass (P/NP), a passing grade will be considered 70% or greater.

*In light of the ongoing Covid-19 pandemic, I understand that you may be dealing with urgent matters outside of school. Your health and well-being are important to me. Feel free to reach out if you need to discuss your participation in the course and I will accommodate you as best I can.*

#### Weekly Work

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Week	Lectures	Career Corner	Assignment
1	<ul style="list-style-type: none"> <li>● Course Overview</li> <li>● What is a LMV?</li> </ul>	Roxanne Beltran (Professor)	Syllabus Review
2	<ul style="list-style-type: none"> <li>● The Marine Environment</li> <li>● Taxonomy</li> <li>● Evolution</li> <li>● Anatomy</li> </ul>	Dan Costa (Professor)	Species Search #1 & Pub Perusal #1 (Block 2011 Nature)
3	<ul style="list-style-type: none"> <li>● Population dynamics</li> <li>● Life History</li> <li>● Technology/Methods</li> <li>● Field Trip to Año Nuevo</li> </ul>	Florencia Vilches (Researcher)	Pub Perusal #2 (Wood 2021 PLOS ONE)
4	<ul style="list-style-type: none"> <li>● Energetics</li> <li>● Locomotion</li> <li>● Diving Behavior/Physiology</li> </ul>	Greg Frankfurter (Veterinarian)	Species Search #2
5	<ul style="list-style-type: none"> <li>● Thermoregulation</li> <li>● Molt</li> <li>● Migration</li> </ul>	Diana Alvarado (Field Technician)	Pub Perusal #3 (Pagano 2018 Science)
6	<ul style="list-style-type: none"> <li>● Foraging</li> </ul>	Taiki Adachi	Species Search #3

	<ul style="list-style-type: none"> <li>● Feeding</li> <li>● Diet</li> <li>● Fasting</li> </ul>	(Instrument Developer)	
7	<ul style="list-style-type: none"> <li>● Social systems</li> <li>● Reproduction</li> <li>● Sensory Systems</li> <li>● Cognition</li> <li>● Captive Animals</li> </ul>	Shelby Burman (Animal Trainer)	Pub Perusal #4 (Strobel 2018 JEB)
8	<ul style="list-style-type: none"> <li>● Human Disturbance</li> <li>● Conservation</li> <li>● Management</li> </ul>	Autumn Lynn-Harrison (Research Ecologist)	Species Search #4 & Pub Perusal #5 ( <b>Pick one:</b> Sydeman 2015 Science OR Albouy 2020 Nature Scientific Reports)
9	<ul style="list-style-type: none"> <li>● Case study: Elephant Seal</li> <li>● Case study: Sea otter</li> <li>● Case study: Emperor Penguins</li> </ul>	Tony Orr (Fisheries Biologist)	Species Search #5
10			<b>Final Project &amp; Final Exam</b>

*My goal is to create an inclusive and supportive learning environment for all students that includes responsible, respectful interactions. Students are encouraged to bring any concerns regarding the class environment or content to me.*

#### Disability Resource Center (DRC)

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 submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to us privately during office hours or by appointment, as soon as possible in the academic quarter, preferably within 1 week. We also encourage you to discuss with us ways we can ensure your full participation in this course. We encourage all students who may benefit to learn about the DRC and the UCSC accommodation process. You can visit the DRC website at [drc.ucsc.edu](http://drc.ucsc.edu) to make an appointment with a DRC staff member. The phone number is 831-459-2089, or email [drc@ucsc.edu](mailto:drc@ucsc.edu).

#### Academic Integrity

For all assignments, answers should be in your own words (e.g., no plagiarism, including copy-pasting from a publication or website). You may paraphrase (put ideas and information in your own words, using a limited number of words from the original work. For example, if an article says “maximizing growth during the early years is thought to be a key factor in survival for juvenile cormorants”, you

might summarize the sentence as “for cormorants, one important way to prevent mortality is to build mass while you are young”.

By enrolling in the university, students are automatically agreeing to abide by policies, including those on academic misconduct. Academic integrity and scholarship are core values that should guide our conduct and decisions as members of the UCSC community. Plagiarism and cheating contradict these values and are very serious academic offenses. Penalties can include a failing grade on an assignment or in the course, or suspension or expulsion from the university. Students are expected to familiarize themselves with and follow citation practices (<http://netrail.ucsc.edu/ethics/index.html>) and the university's Rules of Conduct regarding student conduct and discipline:

<https://ue.ucsc.edu/academic-misconduct.html>

My lectures and course materials, including lecture recordings, assessments/exams, outlines, and similar materials, are protected by United States copyright law and by University policy. I am the exclusive owner of the copyright for materials I create. You may take notes and make copies of course materials for your own use. You may also share those materials with other students who are registered and enrolled in this course. However, you may not reproduce, distribute or display (post/upload) lecture notes or recordings or course materials in any other way — whether or not a fee is charged — without my express written consent. You also may not allow others to do so. If you do so, you may be subject to student conduct proceedings under the UC Santa Cruz Student Code of Conduct, Section 102.23. Similarly, you own the copyright in your original papers and assignments. Thank you for respecting this policy.

#### Diversity Statement

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As a community, we acknowledge the richness of commonalities and differences we share, the intrinsic worth of all who work and study here, and that science and learning are enhanced by investigation of and reflection upon multiple perspectives. We also aspire to create respect for and appreciation of all persons as a key characteristic of our campus community and to achieve an environment that welcomes and supports diversity as well as ensures full opportunities for all who teach, learn, work and do research here. The [EEB Department IDEA website](#) includes our full diversity, equity and inclusion statement, actions and links to give feedback or to report a problem.

#### Land Acknowledgement

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The land on which we gather is the unceded territory of the Awaswas-speaking Uypi Tribe. The Amah Mutsun Tribal Band, comprised of the descendants of indigenous people taken to missions Santa Cruz and San Juan Bautista during Spanish colonization of the Central Coast, is today working hard to restore traditional stewardship practices on these lands and heal from historical trauma.

#### TITLE IX

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Please be aware that under the UC Policy on Sexual Violence and Sexual Harassment, faculty and student employees (including Teaching Assistants, Readers, Tutors, etc.) are “responsible employees” and are required to notify the Title IX Officer of any reports of incidents of sexual harassment and sexual violence (sexual assault, domestic and dating violence, stalking, etc.) involving students. Academic freedom exceptions exist for disclosures made within a class discussion or assignment related to course content; under those conditions only, a report to the Title IX Officer is not required. The Campus Advocacy Resources and Education (CARE) Office (831) 502-2273, [care@ucsc.edu](mailto:care@ucsc.edu) can provide confidential support, resources, and assist with academic accommodations. To make a Title IX report, please contact the Title IX Office at (831) 459-2462, website: <https://titleix.ucsc.edu/>. The Title IX office can also assist with academic, housing, work, and transportation adjustments and implement interim and safety measures.

## CARE

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UCSC Campus Advocacy, Resources & Education (CARE) believes that all people deserve to live and engage in an environment free from violence. We believe in promoting an environment where people can learn and work while being safe and healthy. We celebrate the differences on this campus and believe in working collectively to create a community that is free from violence, exploitation, and harassment and instead promotes safety and equity. For an appointment, call 831-502-2273 or email [care@ucsc.edu](mailto:care@ucsc.edu).

BIOE 126

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*Logo by Katrin Pistor*

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