

**Syllabus:**                    **SIO 281B: Marine Physiology**                    **Spring 2020**

**INSTRUCTOR**

**E-mail**

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**LECTURE HOURS**

Monday & Wednesday 3.30 pm- 4.50 pm

**ZOOM** Meeting ID 559-016-996

Join URL: <https://ucsd.zoom.us/j/559016996> (Links to an external site.)

**OFFICE HOURS:**

By appointment

**COURSE GOALS**

To provide an overview of biochemical and physiological adaptations in diverse marine organisms and how those adaptations are important in their natural environment and in relation to anthropogenic activities. To discuss classic and modern experimental techniques and research papers relevant for the students' own research. To promote critical thinking.

**Online Classroom Instruction Policies**

This course will be taught using live, online audio and visual instruction and will take place during the times indicated in the UCSD Schedule of Classes. Live lecture attendance is not required, but is highly encouraged so that questions can be asked and answered during the lecture and interactive discussions can be carried out.

This class will be recorded and made available to students asynchronously. All attempts possible will be made to record lectures and post them to Canvas in a timely manner. However, recorded lectures cannot be guaranteed. In the event that lecture recording fails, lecture notes will be posted. The lectures will also be available as Podcasts.

**Netiquette**

To minimize background noise and promote clear communications during live online lectures:

- Use headphones for audio.
- Keep your microphone on MUTE until you need to ask a question. Then return your microphone to MUTE.

**Communication**

In an online course, the majority of our communication takes place in forums that are visible and/or audible to all. However, when we have a need for communication that is private, whether personal, interpersonal, or professional, we will use individual email. For timely response to course questions, please contact TAs first. As needed, TAs will refer questions that they cannot answer to me. In an online classroom, another major method of communication is written. The

written language has many advantages: more opportunity for reasoned thought, more ability to go in-depth, and more time to think through an issue before posting a comment or sending an email. However, written communication also has certain disadvantages, such as lack of the face-to-face signaling that occurs through body language, intonation, pausing, facial expressions, and gestures. As a result, please be aware of the possibility of miscommunication and compose your comments/emails in a professional, respectful, and constructive manner.

### **Code of Conduct**

As we, as a campus community, transition to online instruction, please be aware that your Professors and Administrators are adapting at the same time that you are. Let us all pledge to remain respectful, supportive, and adaptable to ensure that educational goals are met. All participants in the course are bound by the UCSD Code of Conduct, found at: <https://students.ucsd.edu/sponsor/student-conduct/policiesandprocedures.html> Links to an external site.

Other FAQs

<https://academicintegrity.ucsd.edu/faq/index.html> Links to an external site.

### **LEARNING OBJECTIVES**

By the conclusion of the course, the students should be familiarized with biochemical and physiological adaptations used by marine organisms. In particular, they should have learned principles on essential physiological processes such as:

- Aerobic and Anaerobic Metabolism
- ATPases (sodium/potassium, proton, calcium)
- Carbonic anhydrases
- Acid-Base regulation
- Nitrogen metabolism
- Osmoregulation
- Physiological responses to Ocean Acidification in phytoplankton, corals, mollusks and fish.
- Carbon concentrating mechanisms
- Basic cellular biology
- Signal transduction
- Epithelial ion transport
- Oxygen transport by respiratory pigments (hemocyanin, hemoglobin)

The students should also become familiar with the most important biochemical and physiological adaptations that are characteristic of marine organisms, including general and species-specific mechanisms.

### **COURSE WEBSITE:**

Course materials will be available through Canvas. Be sure to check the course website frequently for announcements, updates and assignments.

**GRADING:**

**Weekly quizzes** ..... **50 points** (10 quizzes, 5 points each)

**Research Project** (*due June 3*)..... **50 points**

~2,500 words (+references and figures)

-Intro (Background, specific scientific question and why it is novel)

-Hypothesis (“prediction”)

-Methods (experimental design, reagents, statistical tests)

-Link it to your research project, if possible

<b>Week #</b>	<b>Date</b>	<b>Topic</b>
<b>1</b>	Mon March 30	Introduction
	Wed April 1	Enzymes, Energy Metabolism
<b>2</b>	Mon April 6	Energy Metabolism
	Wed April 8	General Principles of Oxygen Transport
<b>3</b>	Mon April 13	Carbonic Anhydrase and Na <sup>+</sup> /K <sup>+</sup> -ATPase
	Wed April 15	Oxygen Transport in Fish (Dr. Till Harter)
<b>4</b>	Mon April 20	Hypoxia Adaptations

	Wed April 22	Comparative Immunology (Dr. Lena Gerwick)
<b>5</b>	Mon April 27	Osmoregulation
	Wed April 29	Acid/base Regulation
<b>6</b>	Mon May 4	Effects of Ocean Acidification on Fish
	Wed May 6	Hagfish Physiology
<b>7</b>	Mon May 11	Osedax Physiology
	Wed May 13	Coral Physiology
<b>8</b>	Mon May 18	Coral Physiology
	Wed May 20	Photophysiology (Dr. Daniel Wangpraseurt)
<b>9</b>	Mon May 25	Memorial Day
	Wed May 27	Discussion of Project
<b>10</b>	Mon June 1	Discussion of Project
	Wed June 3	Research Project due
<b>11</b>		