

Syllabus: SIO 181: Marine Biochemistry Spring 2024

INSTRUCTOR

E-mail

Prof. Martin Tresguerres (he/him)

mtresguerres@ucsd.edu

TAs

Angus Thies (he/him)

Qianqian Tao (she/her)

Brian Yun Lee (he/him)

LECTURE HOURS

Tuesday & Thursday 11.00 am- 12.20 pm

Mandeville B-202 - Podcast available



DISCUSSION SECTIONS (Start on Week 2)

A02 - Tuesday 1.00-1.50 pm

TA: Tao, Qianqian - **Room:** Center Hall (CENTR) 201 - (starts April 9)

A02 - Wednesday 9.00-9.50 am

TA: Lee, Brian Yun - **Room:** Humanities and Social Sciences (HSS) 1305 - (starts April 10)

A03 - Wednesday 12.00-12.50 pm

TA: Thies, Angus - **Room:** Humanities and Social Sciences (HSS) 1305 - (starts April 10)

A04 - Wednesday 3.00-3.50 pm

TA: Tao, Qianqian - **Room:** Center Hall (CENTR) 205 - (starts April 10)

A05 - Wednesday 1.00-1.50 pm

TA: Thies, Angus - **Room:** Humanities and Social Sciences (HSS) 1305 - (starts April 10)

A06 - Wednesday 8.00-8.50 am

TA: Lee, Brian Yun - **Room:** Humanities and Social Sciences (HSS) 1305 - (starts April 10)

REQUIRED TEXTBOOKS:

Instructors will upload reference material to Canvas.

COURSE GOALS

To provide an introduction 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.

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 including:

- Aerobic and Anaerobic Metabolism
- Adaptations to hypoxia
- Acid-Base regulation
- Osmoregulation
- Mechanisms to achieve and maintain buoyancy
- Biochemistry and physiology of *Osedax* worms, hagfish, and coral

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. Please check the course website frequently for announcements, updates and assignments.

GRADING:

Quizzes and Assignments	40 %
Midterm Exam (Week 6)	30% (Take home)
Final Exam (Week 11)	30 %
TOTAL	100 %

Pass/No Pass: $\geq 50\%$ (Must get $\geq 50\%$ in the quizzes and $\geq 50\%$ in the Exams)

Schedule

Week #	Date	Topic
1	Tue April 2	1. Introduction
	Thu April 4	2. Enzymes, RedOx reactions -General energy metabolism
2	Tue April 9	3. Oxygen Transport
	Thu April 11	4. Three key enzymes: Na ⁺ /K ⁺ -ATPase (NKA), Carbonic anhydrase (CA), V-type H ⁺ -ATPase (VHA)
3	Tue April 16	5. Hypoxia Adaptations (I)
	Thu April 18	6. Hypoxia Adaptations (II)
4	Tue April 23	7. Acid-Base Regulation (I)
	Thu April 25	8. Acid-Base Regulation (II)
5	Tue April 30	9. Buoyancy I
	Thu May 2	10. Buoyancy II
6	Tue May 7	11. Review session - MIDTERM
	Thu May 9	12. MIDTERM
7	Tue May 14	13. Thermoregulation
	Thu May 16	14. Diving physiology
8	Tue May 21	15. Osmoregulation (I)
	Thu May 23	16. Osmoregulation (II)
9	Tue May 28	17. Biochemistry and Physiology of HAGFISH

	Thu May 30	18. Biochemistry and Physiology of OSEDAX
10	Tue June 4	19. Coral (I)
	Thu June 6	20. Coral (II)
11	Tue June 11	Final exam - TBA - 11.30 am - 2.29 pm