

Marine and Environmental Biotechnology

MEES 698/498(UMCP/UMCES) & MBIO 478 (UMBC)

(3 credits: Mondays and Wednesdays at 10-11:30 am) Spring 2022: offered via Zoom



Learn about exploring, exploiting, monitoring, preserving, protecting, restoring, and decontaminating our environment and ocean using biotechnology!



**Course title: MEES 698/498/ ENCE 489 Special Topics section 03
(UMBC) and MBio 478/678 (UMBC)
Marine and Environmental Biotechnology (3credits)
2022, Spring Semester**

Course organizer: J. Sook Chung: chung@umces.edu

Course taught through **Zoom/Webex** by Institute of Marine and Environmental Technology (IMET) faculty from IMET Partner Institutions (UMB, UMBC, & UMCES) and other research institutes (FDA, private companies, SC-DNR, MUSC, and TCNJ).

This course covers the utility of molecular techniques to address pressing issues and questions in marine and environmental sciences, toxicology, and sustainability, as well their use in discovering and developing useful products from marine systems. The following four main topics in marine science will be covered in the class: Biodiversity and Energy; Food (shortage); Disease and Diagnostics; Water (contamination) and natural product discovery.

Learning Outcomes: Students will learn the pressing concerns in marine environments; how to apply the current biotechnology to address these issues; how to translate the findings from scientific research into solving environmental issues.

Students will also have the opportunity of writing and reviewing a proposal.

Learning Assessment: Student learning will be examined by three exams on the subjects that they have learned in the class. The student learning and active participation will be assessed by **an NSF graduate student fellowship grant writing** on a student's choice, ad hoc proposal review (NSF format), a panel discussion, and presentation.

Spring Semester 2022

First Day of Classes	January 24 (Monday)
Spring Break	March 20-27 (Sunday-Sunday)
Last Day of Classes	May 10 (Tuesday)
Reading Day	May 11 (Wednesday)

- **Course Website:** <https://moodle.cbl.umces.edu/user/index.php?id=166>
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- **Mondays and Wednesdays at 10:00 am – 11.30 am**
- **Letter Grading**
 - ✓ Class participation: 15%
 - ✓ Exams: three exams: 65%
 - ✓ Proposal writing; review and presentation: 20%
- **No Prerequisites**

Senior undergraduate and graduate students who have some background in biology, chemistry or/ and biochemistry is eligible to take the course.

Zoom link for the class

Join Zoom Meeting

<https://zoom.us/j/97262497481?pwd=NC95THpTVldhaDV6b0V2VGlzWkxjZz09>

Meeting ID: 972 6249 7481

Passcode: 319929

One tap mobile

+13017158592,,97262497481#,,,,*319929# US (Washington D.C)

+19292056099,,97262497481#,,,,*319929# US (New York)

Dial by your location

+1 301 715 8592 US (Washington D.C)

+1 929 205 6099 US (New York)

All lectures will be recorded and the link will be sent to the students.

Date	Topics	Lecturer
	Energy and Biodiversity	
Jan. 24, M	Halophiles and Biotechnology	S. DasSarma
Jan. 26, W	Thermophiles and Biotechnology	F. Robb
Jan. 31, M	Microbial Diversity and Carbon Sequestration	F. Chen
Feb. 2, W	Aquatic Photosynthesis and Algal Bio-Refinery	H. Lin
Feb. 7, M	Algal Biology and Biotechnology	Y. Li
Feb. 9, W	Marine Biofoulings	G. Dickenson
Feb. 14, M	Biofilm	S. Chatterjee
Feb.16, W	Exam 1	
	Food	
Feb.21, M	Alternative Protein Production	J. Lamy
Feb.23, W	Seafood Authenticity and Biosecurity	J. Deeds
Feb. 28, M	Fish Molecular Reproductive Endocrinology: Spawning in Captivity	Y. Zohar
Mar. 2, W	Sterile Fish Technology	T.T. Wong
Mar. 7, M	Genetic Modification: GMOs	J. Du
Mar. 9, W	Current Status of Shellfish Aquaculture	J. S.Chung
Mar. 13, M	Environmentally Sustainable Aquaculture Technology	K. Saito
Mar.15, W	Developing Better Fish Diets	A. Watson
	Spring Break (March 20-27)	
Mar.28, M	Exam 2	
	Disease and Diagnostics	
Mar. 30, W	Parasitism in Marine Organisms	J. Antonio
Apr. 4, M	Disease and environment	C. Burge
Apr. 6, W	Disease and Detection	E. Schott
Apr. 11, W	Disease and Protection	H. Dooley
Apr.14, M	Disease and Prevention: Vaccine Development in Fish	V. Vakharia
	Water & Natural Products	
Apr. 18, M	Clean Water and Waste Water Treatment	K. He
Apr. 20, W	Ship Biofouling: Invasive Species and In-water Treatment	M. Tamburri
Apr. 25, M	Microplastics in the Ocean and Possible Solutions	M. Gonsier
Apr. 27 W	Bioremediation	K. Sowers
May 2, M	Symbiosis in Marine Organisms	R. Hill
May 4, W	Bioproducts from Marine Organisms/Marine Pharmaceuticals 1	H. Ahmed
May 9, M	Bioproducts from Marine Organisms/Marine Pharmaceuticals 2	M. Hamann
May 13, Th	Exam 3	

Recommended Textbook: Grand Challenges in Marine Biotechnology (2018)