University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

MEES 698T/498T/ ENCE 489 Special Topics section 03 (UMBC) **Marine and Environmental Biotechnology (3 credits)**

MEES ***
Semester?

Course Objectives / Overview

Course organizer, J. Sook Chung: chung@umces.edu
Course taught through **IVN** by Institute of Marine and Environmental Technology (IMET) faculty from IMET Partner Institutions (UMB, UMBC, & UMCES) and other research institutes

 ➢ **No Prerequisites**
Senior undergraduate and graduate students who have some background in biology, chemistry or/ and biochemistry is eligible to take the course.

This course covers the utility of molecular techniques to address questions in marine and environmental sciences, toxicology and sustainability, as well their use in discovering and developing useful products from marine systems. Students will examine current molecular approaches to the study of the following topics: biodiversity, bioremediation, food chains, discovery of drugs and enzymes from marine microbes and macroorganisms, sustainable aquaculture (and use of genetically modified organisms, GMO), development of biofuels, the role of marine microbes in global carbon cycling, and genomics of marine organisms.

Expected 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 and start-up businesses or through development of business plans and formation of Maryland biotechnology start-up companies. Students will also have an opportunity of writing and reviewing a proposal.

[

INSTRUCTOR DETAILS:
Faculty name 1: J. Sook Chung
faculty email chung@umces.edu
faculty phone number:410-234-8841
and 20 some other lecturers

William Dennison <dennison@ca.umces.edu>, Colleen Burge <colleenb@umbc.edu>, JSOOK Chung <chung@umces.edu>, "Robb, Frank" <FRobb@som.umaryland.edu>, "sdassarma@som.umaryland.edu" <sdassarma@som.umaryland.edu>, Feng Chen <chenf@umces.edu>, "Lin, Hanzhi" <hlin@umces.edu>, Yantao Li <yantao@umces.edu>, "Chatterjee, Som" <Som.Chatterjee@ucsf.edu>, "Jonathan.Deeds@fda.hhs.gov" <Jonathan.Deeds@fda.hhs.gov>, Yoni <zohar@umbc.edu>, Ten-Tsao Wong <twong@umbc.edu>, Jim Du <SDu@som.umaryland.edu>, Aaron Watson <aaronwatson05@gmail.com>, Keiko Saito <saito@umbc.edu>, Eric Schott <schott@umces.edu>, "Dooley, Helen" <HDooley@som.umaryland.edu>, Vik <vakharia@umbc.edu>, Ke He <kehe1@umbc.edu>, Lee Blaney <blaney@umbc.edu>, "Goodwin, Peter" <pgoodwin@umces.edu>, Michael Gonsior <gonsior@umces.edu>, Trevor Needham

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

See attached learning outcomes evaluation

Course Assessment / Grading

- ✓ Class participation: 10%
- ✓ Exams: three midterms (45%)
- ✓ Proposal writing; review and presentation (45%)

<needham1@umbc.edu>, Kevin Sowers <sowers@umbc.edu>, Russell Hill <hill@umces.edu>, Frank <frank.mari@nist.gov>, Hafiz hahmed@glycomantra.com <tamburri@umces.edu>, Trevor Needham <needham1@umbc.edu>, Kevin Sowers <sowers@umbc.edu>, Russell Hill <hill@umces.edu>, "Hamann, Mark" <hamannm@musc.edu>, Hafiz <hahmed@glycomantra.com>,

CLASS MEETING DETAILS:
Dates: Mondays and Wednesdays
Times: 10-noon
Originating Site:
IVN bridge number:
(*******)
Phone call in number:
(***)
Room phone number:
(*****)

CURRICULUM FULLFILMENT:
MEES *** fulfills a *** (PD, ISG, etc) MEES requirement. OR elective etc

Prerequisites
Insert here or state N/A

Teaching Assistant
TBD or N/A

Tentative Weekly Course Schedule

lecture No.	Environmental Policy and Management

1 The major issues affecting Marine and Oceanic Ecosystems-Discussion group
2 & Project discussion
3

Energy and Biodiversity
Thermophiles and Biotechnology
4 Halophiles and Biotechnology
5 Microbial Diversity and Carbon Sequestration
6 Aquatic Photosynthesis and Algal Bio-Refinery
7 Algal Biology and Biotechnology
8 Biofilms/Marine biofoulings
9 Exam 1
10

Food
15 SeaFood Safety and Food Biosecurity
11 Fish Molecular Reproductive Endocrinology: Spawning in Captivity
12 Sterile Fish Technology
13 Genetic Modification: GMOs
15 Developing better fish Diets
16 Spring Break
17 Environmentally Sustainable Aquaculture Technology
Current Status of Shellfish Aquaculture
18 **Disease and Diagnostics**
19 Disease and Detection
20 Disease and Protection
21 Disease and Prevention: Vaccine Development in Fish
Exam 2
22 **Water**
23 Clean Water and Waste Water Treatment
24 Ecohydraulics and Water Management
25 Microplastics in the Ocean and possible solutions
26 Bioremediation 1
Bioremediation 2
27 **Natural Products**
28 Symbiosis in Marine Organisms
29 Bioproducts from Marine Organisms/Marine Pharmaceuticals 1
30 Bioproducts from Marine Organisms/Marine Pharmaceuticals 2
31 Exam 3
32 **Proposal- Pitch and discussion**

Required textbooks, reading and/or software or computer needs

Not required, but recommended: Grant Challenges in Marine Biotechnology
By P.H. Rampelotto and Antonio Trincone Editors

Course Communication
[You should specify how you will send information to students (e.g. MOODLE announcement) and how you want students to contact you (e.g. MOODLE, email, Google Drive) to discuss questions or other information.]

Moodle

Resources
[Course website: www.moodle.com/xxxxx]

Campus Policies

The University of Maryland Center for Environmental Science has drafted and approved of various academic and research-related policies by which all students and faculty must abide.

Please visit http://www.umces.edu/consolidated-usm-and-umces-policies-and-procedures for a full list of campus-wide academic policies.

Course-Specific Policies and Expectations
[Separate from the campus-wide policies linked earlier, you may want to outline any additional course policies of which students need to be aware. Also include late work policy, etc.]