University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

Biological Oceanography

4 credits

MEES 621
Semester?

Course Objectives / Overview

MEES 621 is a 4-credit core course in the MEES program that provides an overview of Biological Oceanography for incoming graduate students. The course emphasizes fundamental concepts which include marine biogeochemistry and ecology and biological-physical interactions in both pelagic and benthic environments from the tropics to the polar seas and from the surface ocean to the deep sea, including estuaries. The course includes four hours of lecture per week augmented by one field trip to Poplar Island and two cruises on the Choptank River focusing on plankton/water column processes and fisheries oceanography/benthic ecology. MEES graduate students are encouraged to consider this course for the second semester of graduate school in the MEES program. MEES 621 is available system wide via IVN.

Expected Learning Outcomes

Students will obtain an understanding of fundamental concepts in Biological Oceanography. These include:

- Conceptual models related to marine biogeochemistry and ecology which include the ef-ratio, the Redfield ratio, the microbial loop and Margalef's mandala;
- Conceptual models related to biological-physical interactions like Critical Depth theory vs. the Dilution Recoupling Hypothesis;
- Descriptive understanding of nutrient biogeochemistry and cycling, and the role of nutrients and trace metals in limiting oceanic and estuarine primary production;
- Descriptive understand of the light response and limitation of oceanic and estuarine primary producers;
- Theory underlying marine optics, remote sensing of ocean color, primary production, sea surface temperature, sea surface height and sea surface salinity;
- Descriptive understanding of the taxonomy, physiology and ecology of macrophytes;
- Benthic ecological theory related to both rocky intertidal and soft sediment environments in coastal waters and the deep sea including hydrothermal vent ecosystems.

INSTRUCTOR DETAILS:

Faculty name 1
faculty email
faculty phone number

Faculty name 2
faculty email
faculty phone number

Faculty name 3
faculty email
faculty phone number

Faculty name 4
faculty email
faculty phone number

CLASS MEETING DETAILS:

Dates:
Times:
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

Course Assessment / Grading

There is one term paper, which counts as 30% of the final grade. The term paper is an essay based on a classic paper in biological oceanography. See the lecture schedule for the date the term paper is due.

There are two in-class, closed book exams: a mid-term and a final. Each exam consists of both short and essay-type questions and each constitutes 35% of the final grade. The mid-term covers material from the first half of the course and the final covers the 2nd half of the course. See the lecture schedule for examination dates, though the date of the final is determined to best accommodate all students.

Weekly Course Schedule

MEES 621 Spring Lecture Schedule, 2019:
(classes to be held Tues. and Thurs., 12:00 – 2:00 PM)

1/29 (Tuesday) **Introduction/Life in the pelagic** (Hood)

1/31 (Thursday) **Nutrients I** (Hood)

2/5 (Tuesday) **Nutrients II** (Hood)

2/7 (Thursday) **Nutrients III** (Hood)

2/12 (Tuesday) **Light, Pigments and Photosynthesis** (Hood)

2/14 (Thursday) **Marine Microbiology I** (guest lecture TBA)

2/19 (Tuesday) **Marine Microbiology II** (guest lecture TBA)

2/21 (Thursday) **P vs. I, critical depth and fluorescence** (Hood)

2/26 (Tuesday) **Primary production I** (Hood)

2/28 (Thursday) **Primary Production II** (Hood)

3/5 (Tuesday) **Primary production II continued** (Hood)

3/7 (Thursday) **Crustacean Zooplankton** (Hood)

3/12 (Tuesday) **Gelatinous Zooplankton** (Hood)

3/14 (Thursday) ****IN CLASS MIDTERM EXAMINATION****

3/17-24 **SPRING BREAK**

3/26 (Tuesday) **Estuarine Processes** (Hood)

3/28 (Thursday) **Macrophytes** (O'Neil**)**

3/29 (Friday)*** MEES 621 POPLAR ISLAND FIELD TRIP** (O'Neil, TA)

4/2 (Tuesday) **Microbial Food Webs I and II** (O'Neil)

4/4 (Thursday) **Microbial Food Webs III and IV** (O'Neil) ****TERM PAPERS DUE****

4/9 (Tuesday) **Optics and Remote sensing** (Hood)

4/11 (Thursday) **Growth and Grazing** (O'Neil)

4/16 (Tuesday) **Respiration, Growth Efficiency, Ecological Efficiency, and Regeneration** (O'Neil)

4/18 (Thursday) **Benthic Habitats I** (Plough)

4/23 (Tuesday) **Benthic Habitats II** (Plough)

4/25 (Thursday) **Benthic Larvae I** (Plough)

4/26 (Saturday)*** MEES 621 PLANKTON CRUISE** (Hood, O'Neil, TA)

4/30 (Tuesday) **Benthic Larvae II** (Plough)

5/2 (Thursday) **Fisheries Oceanography I** (Elizabeth North/Guest Lecture)

5/4 (Saturday)*** MEES 621 BENTHOS/FISHERIES CRUISE** (Plough, TA)

5/7 (Tuesday) **Fisheries Oceanography II** (Elizabeth North/Guest Lecture)

5/9 (Thursday) **Global Change** (Hood)

5/14 (Tuesday) **Polar Seas and Tropical Seas** (O'Neil), **Review for the Final Exam, Course Evaluations** (Hood, O'Neil, Plough, TA)

5/16-22 **Final Exams**

*MEES 621 cruise or field trip

Required textbooks, reading and/or software or computer needs

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.]

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.]