BI384 Biological Oceanography in a Changing Ocean

4 credit hours

Textbooks

Optional Text: *Biological Oceanography, n Introduction to the World's Oceans,* Wiley Blackwell, 2012, by Charles B. Miller and Patricia A. Wheeler ISBN-978-1-4443-3301-5 (cloth) or ISBN 978-1-4443-3302-2 (pbk)

Additional resources that you can use

Online Reference Texts:

Oceanography Special Volumes: *http://www.tos.org/oceanography/issues/archive.html*

Moodle Page: https://moodle.colby.edu/course/view.php?id=2988

Web sites of interest

American Geophysical Union	www.agu.org
Assoc. Sciences Limnology and Oceanogr	www.aslo.org
The Oceanography Society	www.tos.org
Coastal & Estuarine Research Federation	www.erf.org
Phycological Society of America	http://www.psaalgae.org/
Bigelow Laboratory and many others	www.bigelow.org
Scripps Institution of Oceanography	www.sio.ucsd.edu

Meeting times: Lectures: 9-11:30am, (with a 10 min break)
Labs: 9-12am
Location: Bigelow B102 lectures, all labs in Ocean Modular, some selected procedures in other Bigelow Labs (Emerson, Heil, Matrai)

Instructor: Dr. Cynthia Heil, Bigelow Laboratory for Ocean Sciences
e-mail: caheil@colby.edu, cheil@bigelow.org [both arrive at the same place]
phone: 207-315-2567 x304, (Cell phone: 727-385-4314)
office hours: Daily, 11:30am-12:30pm, C110
Lab Assistant: Dr. Jessica LaBonte, jlabonte@bigelow.org,

Course Description:

Course Overview and Description: The oceans are temporally and spatially heterogeneous. Global climate change is expected to increase the number and types of disturbances to marine systems, leading to less stable ecosystems. Marine organisms/populations must adapt/evolve on timescales of minutes to years to survive these constantly changing environmental conditions. This course will build on the previous course in the Bigelow Marine Semester and discuss the ecological constraints placed on biological processes in the oceans, and provide a survey of marine life with particular attention to its vast diversity, the distribution of organisms with respect to their physical and chemical environments, their interactions with each other to form stable communities, and the evolutionary solutions to the challenges of a dynamic ecosystem. The influence this information may have on the formulation of global policy will be a primary theme that will persist throughout the course.

Course Outline:

Lectures on each meeting day will generally break out into two one-hour lecture topics with a 10 minute break after the first hour. Part of the second hour of most sessions maybe used for discussions of readings. Labs will include a short tutorial, hands on activities, use of spreadsheets, resulting in lab reports that will usually include a problem set. See table below for lecture topics and assigned readings based on the specific lecture number. Schedule and topics are subject to change; however this will be announced in class prior to any revisions to the course calendar below.

Course Calendar:

Date	Lecture Topic
Thursday, October 3	Lecture #1: Class Logistics, Intro to Biological Oceanography in a Changing World
	Lecture #2: Marine Bacteria and Archaea
Friday, October 4	BOAT TRIP
Monday, October 7	Lecture #3: Marine Protists and Viruses
	Lecture #4: The physical and chemical Environment of Marine Organisms
	Lab #1: Isolation and Culturing of Marine Microorganisms
Tuesday, October 8	Lecture #5: Primary Production
	Lecture #6: Harmful Algal Blooms (HABs):' And the Sea Turned to Blood . . .'
Wednesday, October 9	Lab #2: Grazing Experiment to estimate Microbial Loss
Thursday, October 10	Lecture #7: Grazing and Viral Lysis
	Lecture #8: Oceanic Food Webs and the Microbial Loop
Friday, October 11	Lab#3: Limiting Nutrient Bioassays
Monday, October 14	Lecture #9: Fisheries Oceanography and Aquaculture
	Lecture #10: Climate Change and Biological Responses
Tuesday, October 15	BOAT TRIP
Thursday, October 17	Lecture #11: Deep Sea Biology and Polar Plankton, Life below Zero
	Lecture #12: Marine Genomics
Friday, October 18	Lab #4: Molecular Marine Biology
Monday, October 21	Lecture #13: Coral Reefs and Ocean Health
	Lecture #14: Local Biological Oceanography, a Changing Gulf of Maine
Wednesday, October 23	Lab #5: Primary Production by Dissolved Oxygen
Thursday, October 24	Lecture #15: Ocean Management & Ocean Issues: Jellies, Dead Zones & Eutrophication
	Lecture #16: Student Presentations
Friday, October 26	Lab #6: Molecular Computer Exercise

Academic Honesty:

Academic dishonesty will not be tolerated. This is particularly important as you will almost always be working in pairs or as a group, which is encouraged! Exams and lab reports must be your own work and thought, except when done jointly during the lab period. Use of other people's work without acknowledging their contribution is plagiarism and is a serious offense. Plagiarism includes verbatim copying, paraphrasing (changing a few words here and there), and structural plagiarism (borrowing the structure or outline of somebody else's work without acknowledgement). Students cheating on exams will receive an F in the assignment and may receive a failing grade for the course. Any case will be reported to Department Chair and the Dean of Students, possibly resulting in academic probation or suspension from the college, as noted in both the student handbook and college catalog. See specific statement from the online Colby College Catalogue here:
http://www.colby.edu/academics_cs/catalogue/2013_2014/about/aca_procedures.cfm

Attendance:

Attendance is required at all classes. Please contact me if you must miss a class. Unexcused absences will be reflected in the Class Participation portion of your grade.

Cell phone policy:

Use of cell phones or other personal electronic communication devices during class is strongly discouraged. Please silence your device before class. All such devices must be put away during exams.

Grading

Grading Policy:

Classroom participation	10%
Lab reports/problem sets (n=6)	30%
Project	20%
Final Exam	40%
Total	**100%**

Evaluations:

Participation will be evaluated through your contributions to class discussions and engagement with the course materials. There are no stupid questions! Ask!

Lab reports: Labs will involve observations, doing experiments, analyzing data and a written report of the results. Lab reports are due 2 days after you receive the last data for that lab. Late labs will NOT be accepted; you may e-mail them on the due date, if need be.

Project Oral Presentation: Short (10 min) exposé of the biological oceanography issue of your choice, selected with preapproval of the course instructor. Presentation should include 5 slides maximum describing the issue, its history, ecological and economic significance, stakeholders impacted, local and/or global significance, potential mitigation or management and your best guess as to the future of this issue. Specificity in topic selection is encouraged. Rather than 'declining fisheries' as a topic, select the management of a particular species (e.g Orange Roughy, or *Alexandrium* (Maine red tide)) or a particular area (e.g. rise & fall of the urchin industry in Maine) or a topic you have a particular interest in. You can access both popular and scientific literature, news stories as well as the web for information but make sure that you cite each source on slides (including photos).

Project Written summary: A 2-3 page summary of the topic selected for presentation, including an abstract (short summary of conclusion), discussion and references (at least 5 scientific papers citations, NOT websites).

Final Exam: This be a 'take home'' exam which may include information from oral presentations as well as several comprehensive questions derived from both lectures and labs throughout the term. It is due in 5 days after receiving it at the same time it was made available. Failure to make an exam or turn in assignments will result in a grade of zero (0).