

## OCEANOGRAPHY

Biology/Geology 112

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Lecture: Carnegie 225  
Tues. & Thurs. 0930-1050

### Course Description

This course is designed to present an integrated overview of the principles and concepts of the geology, chemistry, physics, and biology of the world's oceans. The course begins with a description of the ocean basins and the mechanisms of their evolution. The physical and chemical properties of seawater are considered next and the role of the oceans in elemental cycles, particularly the carbon cycle, examined. The discussion of physical oceanography includes large-scale patterns, ocean circulation, as well as small-scale phenomena such as waves. The geology of the coastal ocean, beaches, and estuaries leads into a discussion of the ocean's major communities and the biotic and physical factors structuring them. Topics of current interest (global warming, coastal development, fisheries, and introduced species, resumption of whaling, coral bleaching and hydrothermal vents) are presented throughout the course. Films and in-class demonstrations and discussion emphasize reading and lecture material.

### Reading

You are expected to complete reading prior to class.

Text: Sverdrup, K.A., Duxbury, A.C., and Duxbury A.B. 2003. *An Introduction to the World's Oceans*. 8<sup>th</sup> Edition. McGraw Hill

Reserved: Assigned articles are listed under "Reading" in the syllabus and are on reserve in Ladd Library. Articles can be found under the course number or my name and are listed alphabetically by the title (making them a little hard to locate sometimes). You should copy these articles and study them as you do the text. More articles may be added during the semester.

### Papers

Two papers are required. The first can be no longer than 1 page and the second no longer than 2 pages, single sided, (maximum! not including references or figures). I will not read more than the maximum number of pages! For the first paper you must locate a current event story (print, TV, radio, web) that relates to one of the course topics (covered or to be covered), and relate the topic to the current event. For the second paper, you may pick your own topic, though I suggest you clear it with me, or select one from a list provided. Topics can be anything related to Oceanography. Written work must be done according to guidelines set forth in "Statement on Plagiarism and a Guide to Source Acknowledgment" (Bates College). Pay careful attention to the length restriction. Your papers are due in my mailbox by 1700 on 31 January and 14 March. Late papers will not be accepted.

### Seminars

Occasionally, there are seminars by outside professionals sponsored by the Biology, Geology and more rarely Chemistry Departments which pertain to Oceanography. They offer the opportunity to learn about topics not covered in class or to hear new perspectives on topics we do discuss. While you are not required to attend, I will offer extra credit questions on tests which can only be answered by attending the seminar. I will announce seminars well in advance in class and via e-mail.

## Grading

Test I	25 %
Test II	25
Papers	15 (5%, 10%)
Exam	35

Participation in class discussions and in class exercises will also be considered in grading. The final exam is comprehensive. Grading is on a 10-point scale.

## Office Hours

I maintain an “open door” policy and have no formal office hours. I am generally available any time I am on campus and you are welcome to drop by my office without an appointment. Make an appointment, however, if you want to be sure of seeing me. If my laboratory door or inner office door is shut, I am not available.

## Communication

The easiest way to reach me outside of class is by e-mail (wambrose). I will communicate with the class using the class e-mail lists (Wbio112a). If you have a question or concern that you think might benefit everyone, post it to the class list. I will use the list to communicate changes in the syllabus, clarification of reading or lecture material, etc. It is your responsibility to check your e-mail.

Date	Topic	Reading*
5 January	Introduction: What is Oceanography? Oceanography in the Press History of Oceanography	Ch. 1 (2-24) Ch. 2 (37-44) Carlton 1998
10 January	Structure of Earth and Ocean Basins	Ch. 2 (44-50) Ch. 3 (53-58)
12 January	Plate Tectonics I: Development of a Theory & Features	Ch. 3 (58-93)
17 January	Plate Tectonics II: Evidence & Mechanisms	
19 January	Marine Sediments	Ch. 4 (96-128)
24 January	Seawater: Physical and Chemical Properties	Ch. 5 (131-154) Ch. 6 (156-164)
26 January	Chemical Cycles	Ch. 6 (164-170) Falkowski <i>et al.</i> 2000
31 January	Global Warming <b>Paper # 1 Due</b>	Ch. 7 (175-186) Quadfasel 2005
02 February	Rapid Climate Change & Climate Oscillations	Ch. 9 (242-243) Taylor 1999

Date	Topic	Reading*
07 February	Water Column Structure & Thermohaline Circulation	Ch. 8 (208-225)
09 February	<b>TEST # 1</b>	
14 February	Atmospheric & Oceanic Circulation Surface Circulation I	Ch. 7 (186-198) Ch. 9 (228-241) Duplessy 1999
16 February	Surface Circulation II & El Niño	Ch. 7 (199-206)
18 February – 26 February	WINTER BREAK!	
28 February	Waves & Tides	Ch. 10 (248-272) Ch. 11 (278-297)
02 March	Coastal Ocean: Shores & Beaches	Ch. 12 (299-320) Riggs 1996
07 March	Introduction to Marine Communities (Slides)	Ch. 12 (320-331) Ch 18 (449-469) Peterson 1991 Bertness <i>et al.</i> 2004
09 March	<b>Film: <i>The Beaches are Moving</i></b>	Komar 2000
14 March	Open Ocean: Primary Production (Bottom-up organization) <b>Paper # 2 Due</b>	Ch. 15 (373-389) Ch. 16 (391-409)
16 March	<b>Film: <i>Dive to the Edge of Creation</i></b>	Ch. 18 (471-472) Lutz & Kennish 1993
21 March	<b>Film: <i>Deep Sea Invasions</i></b>	Ch. 13 (348-349) Carlton 1996 Ellis 2003
23 March	Open Ocean: Food webs (Top down-organization)	Ch. 15 (392-408)
28 March	<b>TEST # 2</b>	
30 March	Whaling	Ch. 17 (416-429) Holmes & Graham-Rowe 2005 Skåre 1994

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Date	Topic	Reading*
04 April	Fisheries	Ch. 17 (439-446) Safina 1995 Naylor <i>et al.</i> 2001

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\* Pages listed for chapters are inclusive up to a section heading. Articles are on reserve in Ladd Library.

**FINAL COMPREHENSIVE EXAM: TUESDAY, APRIL 06 AT 1030**