

SEMESTER AT SEA COURSE SYLLABUS

Discipline: Environmental Sciences

Fall 2008

SEMS 115-1/SEMS 115-2: Oceanography (2 sections)

Lower Division

Faculty Name: Ed Sobey

Suggested Pre-requisites: high school science

COURSE DESCRIPTION

The vast majority of students enrolled in introductory classes in oceanography spend more time buried in textbooks than observing and thinking about the ocean. Semester at Sea provides a unique opportunity for students to learn through first-hand experiences as well as the more traditional approaches. This class will take students through the physical and chemical environments of the ocean to its ecosystems and life processes. It will focus on what students can learn through the unique experience of being both at sea and in port on diverse near-shore environments. Topics included will be geography and geology of the oceans, physical processes (tides, waves, currents, ocean-atmospheric interaction, and world climate), chemical processes, and biological systems (shore environments, coral reefs, polar seas, pelagic, etc.). Environmental issues (oil spills, climate change, over-fishing) will be discussed. The goal will be to engage students in thinking about the processes and dynamics of the seas and to have them learn to satisfy their curiosity thus stimulated.

COURSE OBJECTIVES

To engage students in learning about the world's oceans through first-hand experiences during the Semester at Sea and for the duration of their lives. Students will hone their observation skills and deductive abilities to understand the oceans and will rely on readings and in-class discussion to refine their understanding.

Students will develop an appreciation for the complexities of ocean dynamics and the importance of oceans in current world issues.

TOPICAL OUTLINE OF COURSE

1. Assessment of interest, understanding, and evaluation of importance of the world's oceans. Discovery of observational opportunities aboard the ship. Chapter 1. Appendix III
2. Planet Ocean. Geography of the oceans. Nomenclature of the ocean basins. Chapter 4.
3. Are you seasick yet? Ocean waves. Chapter 9.
4. Observations from Field Experiences in Salvador.
5. What formed the oceans: tectonics, erosion, and more? Chapter 3 & 5.
6. Motion of the earth, maps/charts, tides. Chapter 10.
7. Where did the water come from and what is seawater. Properties of seawater. The hydrologic cycle Chapter 2.
8. Light and sound in the sea. Chapter 6.
9. Observations from Field Experiences: Marine mammals and other life at Walvis Bay and Cape Town
10. Climate, climate change, ocean-atmosphere interactions, the influence of the oceans on climate. Chapter 7.
11. Ocean currents and circulation. Chapter 8
12. Coastal processes, beaches, etc. Chapter 11.
13. Life in the sea. Chapter 12.
14. Observations from Field Experiences in Chennai
15. Marine ecosystem. Chapter 13-14.
16. Human's impact on the marine ecosystem. Chapter 15.
17. Polar worlds. Polar Seas – exhibit from American Museum of Natural History – listed in electronic articles.
18. Marginal seas. Appendix II
19. Observations from Field Experiences in Ocean World, Shanghai
20. Coral Reef communities. Appendix IV
21. Upwelling and coastal communities. View animation:
www.classzone.com/books/earth_science/terc/content/visualizations/es2405/es2405page01.cfm?chapter_no=visualization Read:
[//oceanexplorer.noaa.gov/explorations/02quest/background/upwelling/upwelling.html](http://oceanexplorer.noaa.gov/explorations/02quest/background/upwelling/upwelling.html)
22. Reflections on the dynamics of the oceans.
23. Final exam

Text content by chapters: *Essentials of Oceanography*.

1. History
 2. Origins
 3. Earth Structure and Plate Tectonics
 4. Ocean Basins.
 5. Sediments
 6. Water.
 7. Atmospheric Circulation
 8. Ocean Circulation
 9. Waves
 10. Tides
 11. Coasts
 12. Life in the Ocean
 13. Pelagic Communities
 14. Benthic Communities
 15. Uses and Abuses of the Ocean.
- Afterword
- Appendix I: Measurements and Conversions
- Appendix II: Geological Time
- Appendix III: Latitude and Longitude, Time, and Navigation. Appendix IV: Maps and Charts
- Appendix IV: Working in Marine Science
- Glossary
- Credits
- Index.

FIELD COMPONENT

Each student is required to complete three practica (two of which are Faculty Directed and one is Independent). Students are required to maintain a log of their experiences and to write a comprehensive paper summarizing them.

An Independent Parcticum may be developed as part of a regularly-offered SAS trip, or it may stand alone. To organize an Independent Practicum, a student or small team of students must meet with the faculty member prior to undertaking the work. Suggested practica include:

- Mesasuring the angle of a beach face, beach grain size, and wave activity and comparing these measurements to two other beachers
- Measuring the density of human-made discarded materials along the tide lines of three beaches. Noting the types of materials most often encountered and suggesting where they might have come from.
- Measuring the density of animals along different areas of at least two beaches.

The paper should summarize what you did, describe the physical environment, list the identified marine animals, and note where they animals were located. Students should describe the activities of the most energetic/interesting animals. They should also report on indications of pollution, fishing, and other human impacts on the local environment. Where possible, they should include a few photographs. Comparisons between different marine environments should be made. The critical question is: What do you know now that you didn't know before?

NAMIBIA:	Sea kayaking tour of bay to see seals and dolphins (FDP); Beach walk or Fish market (IND)
SOUTH AFRICA:	SCUBA (certified divers only): Seal diving, kelp forest diving, wreck diving and reef diving; (FDP); Beach walk (IND); Harbor tour (IND)
MALAYSIA:	Pulau Payar Marine Park (FDP); Beach walk (IND) Fish market (IND)
VIET NAM:	Beach walk (IND); Fish market (IND)
CHINA:	Ocean World: Aquarium (IND).
HAWAII:	Hanauma Bay Nature Preserve: Snorkeling (IND); Beach walk (IND)
COSTA RICA:	Manuel Antonio National Park: Snorkeling (FDP); Whale Watching (IND) Beach walk (IND)

METHODS OF EVALUATION

After each field experience, students will make short presentations on what they saw and learned. Each class session, students will report observations, understandings they have made while at sea. Grades will be determined by:

Field component reporting	25%
Quizzes	25%
Reported observations	25% (self-initiated reports on what they see)
Final exam	25%

REQUIRED TEXTBOOK

Garrison, Tom S.
Essentials of Oceanography.
Wadsworth Publishing Company, Belmont, CA.
ISBN-13: 9780534249426.
2005.
\$10

RESERVE LIBRARY LIST

- Chart NO. 1
Nautical Chart Symbols
Abbreviations and Terms
Paradise Cay Publications
PO Box 29
Arcata, CA 95518-9063
www.paracay.com
- *A Diver's Guide to Reef Life*
by Andrea Ferrari, Antonella Ferrari
Publisher: Nautilus Publishing (June 1, 2006)
ISBN-10: 9832731011
ISBN-13: 978-9832731016
- *Marine Mammals of the North Atlantic* (Princeton Field Guides) (Paperback)
Carl Christian Kinze
Princeton University Press (February 1, 2003)
ISBN-10: 0691113084
ISBN-13: 978-0691113081
- *A Field Guide to North Atlantic Wildlife: Marine Mammals, Seabirds, Fish, and Other Sea Life* (Paperback)
by Noble S. Proctor, Patrick J. Lynch
Publisher: Yale University Press (June 11, 2005)
ISBN-10: 0300106580
ISBN-13: 978-0300106589
- *The Silent World* (Paperback)
by Jacques Yves Cousteau
New York Review of Books (October 2004)
ISBN-10: 1590171136
ISBN-13: 978-1590171134

ELECTRONIC COURSE MATERIALS

www.amnh.org/exhibitions/permanent/ocean/02_ecosystems/02e1_polarseas.php

ADDITIONAL RESOURCES

Do you anticipate that students will be expected to locate and employ resources beyond required texts, reserve library reading and intranet resources? If yes, please identify these resources.

- Nautical charts of ports
- National Geographic World Climate Map: www.mapsales.com/products/geonova/world-climate-wall-map.htm
- National Geographic Ocean Floor Map: www.mapsales.com/products/geonova/ocean-floor-wall-map.htm
- National Geographic World Physical Ocean Map: www.mapsales.com/products/ng/world-physical-std_t.htm
- *The Blue Planet* - Seas of Life Collector's Set (Parts 1-4) (2002) Director: Alastair Fothergill